

Community-led Total Sanitation in Manufahi, Timor-Leste

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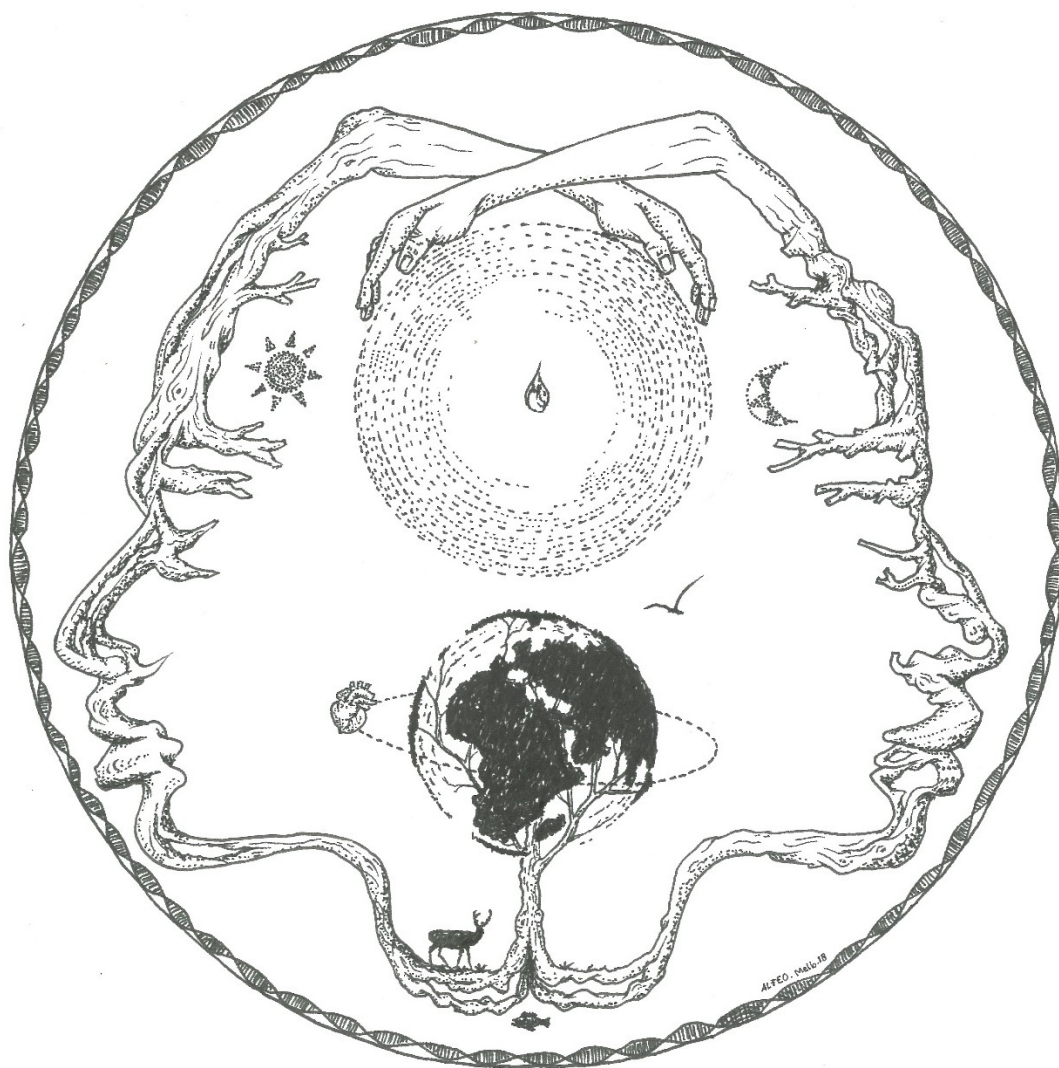


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‘One Family’

By alfe RM

Abstract

Water, sanitation and hygiene (WASH) are important for health and wellbeing. In Timor-Leste, the rates of access to WASH are some of the lowest in the world, particularly in remote areas. The national government's response to improving sanitation in remote areas is a community-based approach called 'PAKSI' (*Planu Aksaun Komunitade, Saneamentu no Ijiene*) which is also implemented by non-governmental organisations. The research documented in this thesis sought to understand the implementation and outcomes of the PAKSI component of the WaterAid program in Manufahi Municipality, Timor-Leste from 2013 to 2014 as part of the 'WASH for Worms' cluster-randomised control trial.

PAKSI is based on Community-Led Total Sanitation (CLTS): an approach which aims to inspire rural communities to lead themselves to become open defecation free (ODF) through triggering collective feelings of disgust and shame about open defecation. CLTS is popular; however, there are few rigorous studies about the approach, especially in the context of Timor-Leste. Three studies were conducted as part of this research to better understand PAKSI: the Timor-Leste adaptation of CLTS.

The first study compared the official descriptions of PAKSI (and CLTS) to the way it was implemented and described by 19 representatives of the government, WaterAid and intervention communities as well as Dr Kamal Kar and Dr Robert Chambers. The findings suggested that, officially, PAKSI and CLTS are quite similar; however, the implementation of PAKSI in the research sites diverged from these official descriptions in that the approach was more facilitator-led than community-led.

The second study used quantitative methods with 65 households to measure the changes in sanitation-related knowledge, attitudes and practices after the WaterAid program. Whilst toilet coverage increased over the course of the study, and open defecation decreased, the proportion of participants who reported feeling disgusted at the sight of faeces in the open did not change. This suggests that a) the WaterAid PAKSI intervention did not trigger feelings of disgust (which is what PAKSI and CLTS are officially purported to do) and b) whilst disgust might be a necessary motivator for becoming ODF, on its own it is insufficient.

The third study explored the possible factors influencing whether households become or continue to be ODF, through interviews with 21 participants including community leaders, household representatives and implementing staff. The experiences of participants who had a disability, an age-related impairment or were from female-headed households were sought to be included. Several factors were identified, including competing priorities for finances and other resources, and participants feeling like they were doing what they had been 'told to do'.

The 17 behavioural factors in the RANAS model of behaviour change provided a framework for analysing what motivates people in remote parts of Timor-Leste to change their sanitation behaviour. The findings suggest that motivators other than disgust and embarrassment, such as affordability of toilets and 'being told what to do', are relevant. Further research should investigate whether other approaches such as government regulation and strengthened sanitation markets are effective for bringing about ODF communities in Manufahi Municipality, Timor-Leste.

Declaration

Community-led Total Sanitation in Manufahi, Timor-Leste

This is to certify that:

- i. the thesis comprises only my original work towards the PhD except where indicated in the Preface,
- ii. due acknowledgement has been made in the text of all other material used,
- iii. the thesis is fewer than 100,000 words in length, exclusive of tables, maps, bibliographies and appendices.

Naomi Francis

20th August 2019

Preface

This research is a component of the ‘WASH for Worms trial’ which was funded by a Partnership for Better Health—Project grant from the Australian National Health and Research Council (NHMRC) (APP1013713).

I received an Australian Postgraduate Award to conduct this research.

Publications

Nery, S.V., et al. (2015). "A cluster-randomised controlled trial integrating a community-based water, sanitation and hygiene programme, with mass distribution of albendazole to reduce intestinal parasites in Timor-Leste: The WASH for WORMS research protocol." BMJ Open 5(12). [N. Francis is 10th of 13 authors of this journal publication.]

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Francis, N., et al. (2014). Stakeholders' interpretations of a WASH program in East Timor (poster). WASH for everyone everywhere Conference. Brisbane, Australia. [N. Francis is the sole author of this poster.]

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When I first met my supervisor, Jim Black, in his office in the Alan Gilbert building which the Nossal Institute for Global Health called home in 2012 he explained, in typical Jim-fashion, that really I was there to interview him: not the other way around. I chose well. Jim is a brilliant supervisor and mentor – he gave me room to think for myself and learn through practice. He introduced me to writers such as Freire and Newell, whose work has helped me to articulate my values and the part I would like to play in community development. Jim also provided invaluable guidance for, and support of, my exploration of pathways beyond academia into the world of water, sanitation, and hygiene (WASH). I am extremely grateful for our regular catchups about research, community development, equity, fencing and sometimes even this PhD – especially during the last couple of years.

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grateful for his guidance and encouragement to make my findings relevant in the ‘real’ world. Matt is also a fantastic mentor in the WASH world beyond academia and has given me the space and trust to learn there too.

The Nossal Institute for Global Health is a unique place. Not all research units are open to throwing medical professionals, accountants, economists, administrators, sociologists, philosophers, inventors, and psychologists together in the same office to work toward a common goal of global equity, health, and wellbeing. I’m grateful that you invited an engineer into your midst! There are many wonderful personalities at the Nossal. I am particularly grateful to Michelle Kermode, Graham Brown, Graham Moore (from Engineering) and Barbara McPake who, as my Advisory Committee, sat through more progress reviews than any of us has envisaged! Linda Bennett gave me the best advice for working overseas, the best hugs when I needed them, and has been a linchpin of the Nossal community during my time here. Brigitte Tenni, Jim Black, Grant Blashki, and Debbi Long all took me on as a tutor or lecturer at various times and have taught me everything I know about teaching (and also made sure I could pay the bills!) Thank you to Brooke, Melissa, Bronwyn, Becky, Myra and Arden who made everything happen at the Nossal during my time there.

A PhD can be a lonely slog at times, and I am happy I was never alone among the Nossal PhD student cohort. Thank you for your company, late night snacks, advice, support, laughs and inspiration to hurry up and finish!

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I am really lucky to call many places home – and this thesis was written in lots of them. That wouldn’t be possible without an incredible network of friends and family in Melbourne, greater Victoria, Adelaide, Alice Springs, Darwin, Timor-Leste, France, the Netherlands and the USA – you know who you are. Thank you for providing many rooms of my own, food, conversation, Friday night vomits (of the verbal kind) dancefloors, starry nights, bike rides, advice, and love.

This thesis is dedicated to those who do not yet have safe water, sanitation and hygiene – may you have mastery over your own fate.

Abbreviations

APODETI	<i>Associação Popular Democrática Timorense</i>
ASDT	<i>Associação Social Democrática Timorense</i>
BCD	Behaviour Centred Design
BESIK	<i>Bee, Saneamentu no Ijiene ba Kommunidadade</i> (Rural Water Supply and Sanitation Program (RWSSP))
CAP	Community Action Planning (<i>Planu Aksaun Komunitidade</i>)
CATS	Community Approaches to Total Sanitation
CEPAD	Centre of Studies for Peace and Development
CLTS	Community-Led Total Sanitation
CVTL	<i>Cruz Vermelha de Timor-Leste</i> (Timor-Leste branch of the Red Cross)
CWSSP	Community Water Supply and Sanitation Program
DNAS	<i>Direcção Nacional de Água e Saneamento</i> (National Directorate for Water and Sanitation)
DNCQA	<i>Direcção Nacional de Controlo e Qualidade da Água</i> (National Directorate for Control and Quality of Water)
DNSA	<i>Direcção Nacional dos Serviços de Água</i> (National Directorate for Water Services)
DNSB	<i>Direcção Nacional de Saneamento Básico</i> (National Directorate for Basic Sanitation)
DPES	<i>Departamento Promosaun no Edukasaun Saude</i> (Department of Health Promotion and Education)
DSA	<i>Departamento de Saude Ambiental</i> (Department of Environmental Health)
FRETILIN	<i>Frente Revolucionária de Timor-Leste Independente</i>
GDP	Gross Domestic Product
GLAAS	Global Analysis and Assessment of Sanitation and Drinking-Water
GMF	<i>Grupo Maneija Facilidade</i> (Water Management Group)
HCES	Household-Centred Environmental Sanitation
IBM-WASH	Integrated Behavioural Model for Water, Sanitation, and Hygiene
IDS	Institute of Development Studies
JMP	Joint Monitoring Programme
KAP	Knowledge, Attitudes and Practices
KOTA	<i>Klibur Oan Timor Asuwain</i>
MCK	<i>Mandi, Cuci, Kakus</i>

MDGs	Millennium Development Goals
MEP	Minimum Evaluation Procedure
MHM	Menstrual Hygiene Management
MoH	Ministry of Health
MOU	Memorandum of Understanding
NDVI	Normalised Difference Vegetation Index
NGO	Non-Governmental Organisation
NGP	<i>Nirmal Gram Puruskar</i>
ODF	Open Defecation Free
PAKSI	<i>Planu Aksaun Komunitade, Saneamentu no Ijiene</i> (Community Action Plan for Sanitation and Hygiene)
PCR	Polymerase Chain Reaction
PHAST	Participatory Hygiene and Sanitation Transformation
PLS	Plain Language Statement
PNDS	<i>Programa Nasional Dezenvolvimentu Suku</i> (National Program for Village Development)
PRA	Participatory Rural Appraisal
PWD	People with a Disability(ies)
RANAS	RANAS (risk, attitudes, norms, abilities, and self-regulation) Model of Behaviour Change
RCT	Randomised Control Trial
RWSSP	Rural Water Supply and Sanitation Program (referred to in this thesis as BESIK (<i>Bee, Saneamentu no Ijiene ba Kommunitade</i>))
SACOSAN	South Asian Conference on Sanitation
SaniFOAM	Sani(tation) Focus-Opportunity-Ability-Motivation
SAS	<i>Serviço de Água e Saneamento</i> (Water and Sanitation Service)
SDGs	Sustainable Development Goals
SIBS	<i>Sistema Informasaun Bee no Saneamentu</i> (Rural Water and Sanitation Information System)
SISCa	<i>Servisu Intergradu Saude Comunidade</i> (National Integrated Community Health Services)
SPRT	Sector Planning and Reporting Tool
SSA/SSP	Strategic Sanitation Approach/Strategic Sanitation Planning
STH	Soil-Transmitted-Helminth
TSC	Total Sanitation Campaign
UDT	<i>União Democrática Timorense</i>

UN	United Nations
UNICEF	United Nations Children's Fund
UNMIT	United Nations Integrated Mission in East Timor
UNTAET	United Nations Transition Administration in East Timor
USAID	United States Agency for International Development
USD	United States Dollars
VERC	Village Education Resource Centre
VIP	Ventilated Improved Pit
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WSP	(World Bank's) Water and Sanitation Program
WWDR	World Water Development Report

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1 Introduction

This thesis describes the research I undertook for my PhD between 2012 and 2019 at the University of Melbourne's Nossal Institute for Global Health. This research is about the efforts being made to improve access to safe water, sanitation and hygiene (WASH) in remote communities in Timor-Leste. This chapter includes a summary of the context and motivations for this PhD; the aim, scope and significance of the research; my position; and an overview of this thesis.

1.1 The problem of water, sanitation and hygiene

Along with enough food, clean air and shelter, the supply of clean water, safely managed sanitation and good hygiene are necessary for good health and wellbeing. Put another way, when access to water, sanitation and hygiene is compromised there are both negative biomedical consequences and negative impacts on wellbeing. The main biomedical consequences of poor access to water, sanitation and hygiene are diarrhoea, stunting and infections; all due to the transmission of bacteria, viruses, protozoa and helminths (Prüss-Üstün et al. 2008, Prüss-Ustün et al. 2019). The social impacts of poor WASH include reduced income, educational and recreational opportunities, reduced comfort and dignity, and violence against women. These impacts are borne disproportionately by women, people with disabilities and those living in poverty (Cairncross and Valdmanis 2006).

Whilst poor WASH conditions can be found in almost any country, it is mostly an issue of high importance in low-income countries. In 2010, of Timor-Leste's rural population, 40-percent did not have access to safe water and 47-percent were defecating in the open (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2012). Timor-Leste's health indices in 2012 were also of concern. A national soil-transmitted-helminth (STH) survey showed that 29 percent of children between 7 and 16 years old were infected (Martins et al. 2012). The rate of pneumonia, diarrhoea, malaria, dengue and tuberculosis in children was high (World Health Organization (WHO) 2016).

Pneumonia and diarrhoea together are responsible for 29-percent of deaths among children under five worldwide and WASH is known to be one of the key interventions to prevent these deaths (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2013). Improving WASH is a component of primary health care outlined in the Alma-Ata Declaration of 1978 (World Health Organization (WHO) United Nations Children's Fund (UNICEF) and Government of Kazakhstan 1978); hence it is vital that in the pursuit of health equity, more focus is placed on improving water, sanitation and hygiene globally.

1.2 The 'WASH for Worms' trial

This research was part of a larger project called the 'WASH for Worms' trial for which the field work took place between 2012 and 2016 in Manufahi Municipality (previously called 'Manufahi District'), Timor-Leste (Vaz Nery et al. 2015). The 2002 World Health Organization (WHO) guidelines on STH control recommended improvements to WASH at a community level as well as anthelmintic treatment (such as albendazole) because such treatment does not prevent reinfection (World Health Organization (WHO) 2012). Despite this recommendation, Campbell et al. (2016) found little evidence to show the association between improved WASH and STH infection.

The WASH for Worms trial was a cluster-randomised control trial (RCT) which sought to understand the effectiveness of combining mass albendazole administration with a community-based WASH program to control STHs. The hypothesis of the trial was that a combined approach would be more effective in reducing infections with STHs than albendazole treatment alone (Vaz Nery et al. 2015).

The RCT took place in remote villages of Manufahi Municipality in Timor-Leste where an international non-governmental organisation (NGO) called WaterAid was implementing a community-based WASH program. The WaterAid WASH program included new water infrastructure; a Timor-Leste adaptation of Community-Led Total Sanitation (CLTS) called *Planu Aksaun Komunitade, Saneamentu no Ijiene* (PAKSI) (Community Action Plan for Sanitation and Hygiene); and hygiene promotion activities.

The WASH for Worms trial collected baseline data from 24 communities; 18 of which were part of the RCT (Campbell et al. 2016, Vaz Nery et al. 2019). Half the communities in the RCT received the albendazole treatment as well as the WASH program (interventions) and half received the albendazole treatment only (controls). The trial measured the infection with STHs among participants using polymerase chain reaction (PCR); socioeconomic indicators; and health indicators such as mean haemoglobin concentration, weight-for-age, weight-for-height and height-for-age (Vaz Nery et al. 2019).

1.3 Research aim

The aim of this research was to better understand the planning, implementation and outcomes of the WaterAid community-based WASH program which took place in the project sites of the WASH for Worms trial. This was to serve two purposes. Firstly, this research intended to complement the epidemiological findings of the WASH for Worms trial. Secondly, this research intended to explore the desired, as well as the unexpected, outcomes of the WASH program and how these came about. In turn, these findings would suggest areas of strengths as well as areas for improvement in the WaterAid WASH program as well as for the broader WASH sector.¹

1.4 Research scope

Whilst this research captured information about most aspects of the WaterAid WASH program, there was a general focus on PAKSI, the sanitation component of the WaterAid program. This was mostly due to the time constraints of a PhD which only allowed for a longitudinal study of interventions with rapid changes. Within the WaterAid WASH program, the results of the water component rarely show up in less than a year (because of the time needed for community engagement and construction); and the results of hygiene promotion generally take longer as these are somewhat dependent on the improved water supply. However, CLTS, on which PAKSI is based, is thought to result in rapid change (within one week to three months according to the WaterAid staff). Hence, this research focused on the sanitation component of the intervention; water and hygiene were included, albeit to a lesser extent.

This research is not a study of the sustainability of the results of water, sanitation and hygiene interventions. The sustainability of a WASH intervention implemented by an

¹ By WASH sector I mean those involved in the planning and implementation of WASH programs, including government, local administrators, NGOs, community organisations and practitioners.

agency such as WaterAid would normally only be measured after the implementing agency had officially handed the project over to the community. WaterAid was still actively present in all the communities during this research; hence none of the findings should be interpreted to be about sustainability.

Whilst it may have been relevant and interesting to explore the research questions across several districts, countries and implementing agencies, this research was closely linked to the WASH for Worms trial which only took place in remote villages of Manufahi Municipality, Timor-Leste where WaterAid were working. It is anticipated that many of the findings will still be relevant for other parts of Timor-Leste and other countries.

1.5 Significance of this research

The findings of this research are significant both for the WASH for Worms trial as well as for their contribution to the body of knowledge which informs best practice for improving access to WASH in low-income settings. Three gaps in knowledge were identified in the literature review which inspired three objectives for my research. The significance of these objectives is described in the sub-sections below.

1.5.1 Interpretations of Community-Led Total Sanitation in Timor-Leste

At the time of data collection (2013-2014), CLTS was very popular and had spread to more than 60 countries around the world (da Silva Wells and Sijbesma 2012). Since its introduction to Bangladesh in 1999, there has been much discussion amongst practitioners and academics about whether the key elements of CLTS should be defined and then applied consistently to all contexts, or whether it is acceptable to adapt CLTS to different contexts. Regardless, several national governments and non-governmental organisations have produced their own manuals and guidelines for various CLTS-inspired approaches. (See Section 3.1.5 of the literature review for more detail about these.)

Concurrently, several authors found that many implementers were not documenting descriptions of their CLTS (or CLTS-inspired) interventions. (See Section 3.1.6 of the literature review.) Consequently, these authors called for more detailed descriptions of interventions which claimed to be CLTS (or based on CLTS). As described in Section 1.2, part of the WaterAid program in Manufahi is the Timor-Leste adaptation of CLTS called *Planu Aksaun Komunitade, Saneamentu no Ijiene* (PAKSI) (Community Action Plan for Sanitation and Hygiene). Hence, the first objective of my research was:

To compare how CLTS and PAKSI are described and understood by the pioneer and early supporters of CLTS, as well as by those involved in planning and implementing PAKSI in Timor-Leste (pre-2014).

This objective is significant because it contributes to the body of knowledge which documents interventions which claim to be CLTS (or based on CLTS). It is also significant because the comparison of CLTS as it is prescribed by its founder, Kamal Kar, to the interpretations of PAKSI by planners and implementers in Timor-Leste responds to the debate about whether CLTS is, or should be, adapted to different contexts. Finally, this objective is significant for the WASH for Worms trial: PAKSI was one of the key differences between the intervention and control arms of the study and it is therefore important that PAKSI, as it was delivered in the project sites, was described clearly.

1.5.2 Outcomes of the WaterAid water, sanitation and hygiene program in Timor-Leste

The second objective of my research sought to document some of the results of PAKSI, the sanitation component of the WaterAid program, in Manufahi. The results of an intervention such as PAKSI can be categorised in different ways. As described in Section 3.2.1 Poulos, Pattanyak and Jones (2006) identify three categories: **outputs**, **outcomes** and **impacts**. In the context of a sanitation program, **outputs** include such things as toilet coverage. **Outcomes** are changes in knowledge, attitudes and practices in the short or medium term of an intervention: for example, changes in where people defecate. **Impacts** include health impacts such as changes in the rates of stunting or worm infestation which is what the WASH for Worms trial measured.

At the time that data was collected for this research, there was some literature which described what Poulos, Pattanyak and Jones (2006) categorised as **outputs** of water, sanitation and hygiene programs in Timor-Leste but there was little to no documentation of the **outcomes** of such programs there. Consequently, some authors called for research about the changes in knowledge, attitudes and practices following sanitation interventions in Timor-Leste (see Section 3.4). It is this gap in knowledge which the second objective of my research sought to address:

In communities where the WaterAid PAKSI triggering activities² had taken place, to identify the changes in household members' knowledge, attitudes and practices regarding water, sanitation and hygiene.

As described in Section 3.5, some authors have lamented the lack of baseline and incremental data collected in CLTS studies. The method used to achieve the second objective of this research responds to the methodological gap identified by these authors. That is, household members' knowledge, attitudes and practices regarding water, sanitation and hygiene were measured within the week prior to; within the week after; and 9 to 11 months after the WaterAid PAKSI activities took place.

Not only does this second objective address some of the knowledge gaps identified by other authors, but it is also an important supplement to the WASH for Worms trial. The trial sought to document the health **impacts** arising from the WaterAid WASH program. The challenges with measuring the health impacts of WASH programs has been widely documented (see Section 2.1.2.3 of the background chapter). At the time that this research was designed, it was possible that the WASH for Worms trial would measure few to no health impacts; that is, no differences would be detected in the health indicators measured in the control and intervention arms of the trial). If that was the case, then the outcomes measured by my second research objective might provide insight into why such health impacts were not detected. For example, if households did not start using toilets (which is one of the desired outcomes of the PAKSI process), this would help to explain a lack of change in worm reinfestation rates. Furthermore, in the absence of detectable health improvements, this objective could identify alternative positive results of the WaterAid WASH program.

² See Section 3.1.2.2 in the literature review for a description of triggering activities.

1.5.3 Factors that influence whether households become and continue to be open defecation free in Timor-Leste

The literature describes several factors which influence whether households and individuals become open defecation free as well as whether they stay open defecation free sustainably after sanitation interventions such as CLTS take place (see Section 3.3.3). Understanding these factors is useful for implementers because it means they can tailor their interventions to better meet the needs of their intended beneficiaries.

These factors, which are sometimes also described as barriers and enablers, can include **factors in the enabling environment** such as the presence of institutional support or a functional sanitation market. **Factors relating to the implementation of the sanitation intervention** might include the quality or the timing of the facilitation. There are many **factors at the household or individual level** which influence whether people become and continue to be open defecation free. These could include whether there is access to a toilet or latrine, the durability of the toilet, and the value placed on ceasing open defecation (for example, for health benefits, dignity or comfort).

Globally, there are several studies which document the factors that influence whether households and individuals initially become and stay open defecation free after sanitation interventions. However, at the time that data was collected for this research, there were no published studies which documented such factors in the context of Timor-Leste. Hence, the third objective of my research was:

To identify factors that influence whether households become and continue to be open defecation free after participating in the WaterAid WASH program.

Note that this objective did not necessarily identify factors which influence whether households *sustain* their open defecation free status in the long-term. As described in Section 1.4 above, the scope of this research does not include findings about sustainability because the time-frame for data collection was not long enough. Hence, this objective was to measure factors which influenced households' initial transition to becoming open defecation free as well as the factors which influenced whether they continued to be open defecation free in the medium-term; that is, in the time between their initial decision and when data collection finished (9-11 months later).

The data collected in this objective was significant firstly because it supplemented the WASH for Worms trial findings. Participation in a community-based WASH program (in this case, the WaterAid program) was the distinguishing characteristic between the control and intervention arms of the WASH for Worms trial. The trial hypothesised that the communities in the intervention arm would have lower reinfection rates of soil-transmitted helminths because of improved access to water, sanitation and hygiene. However, it was predicted that some households in the intervention arm would not gain improved access to WASH, despite participating in the WaterAid program, and it was important to understand why this might be. The third objective in my research sought to address this gap in understanding: specifically with regard to households' sanitation behaviour. This objective is also significant because it begins to address the lack of documentation of factors that influence whether households become and stay open defecation free in Timor-Leste.

1.6 Author's position

My mixed-methods approach to research is informed by a recognition of the value of positivism, constructivism and critical theory. However, in my view, research which is

fundamentally about people, specifically peoples' culture, behaviour and social interactions as opposed to the makeup of their blood or stool, cannot be purely positivist. That is, when conducting research about and with people:

truth and knowledge are subjective, as well as culturally and historically situated, based on people's experiences and their understanding of them. Researchers can never be completely separate from their own values and beliefs, so these will inevitably inform the way in which they collect, interpret and analyse data (Ryan 2018 p17).

Hence, I will introduce some of the aspects of myself that I believe to have possibly influenced this research, as well as how these characteristics might have been influential. Of course, this too is subjective.

I am a cis-female-identifying Australian with English (Anglo-Saxon) and Dutch heritage. I have spent most of my life in Australia; and lived and studied for extended periods in the Netherlands and China. My preferred languages are English and Dutch (and Mandarin to a lesser degree). My interest in water, sanitation and hygiene in low-income settings has been informed by my work as a flood-modelling engineer in Australia; volunteer English language tutoring in Cambodia; as well as travels throughout China and several south-east Asian countries. Prior to starting this research, I had never been to Timor-Leste and did not speak Tetun: the official language (alongside Bahasa Indonesia and Portuguese) of Timor-Leste.

My experience in cultural settings outside of those I am familiar with prepared me somewhat for communicating with, and trying to understand the experience of, the Timorese participants in this research. However, not speaking Tetun or other local Timorese languages and being new to Timor-Leste was a communication barrier that might have meant my interpretations of what participants said or what they meant were not always accurate. I was fortunate to spend long periods of time in Timor-Leste and cross-check my interpretations of the data both with the participants themselves and colleagues who are far more familiar with Timor-Leste than me.

My position as an Australian researcher in Timor-Leste was not straight-forward. I come from a country that turned a blind eye to Timor-Leste when it most needed help but has also provided the same country with substantial aid. Most Timorese people are aware of this paradox. Regardless of this history, as an outsider I am certain to have been treated with caution by many participants which might have meant that they did not share their experiences as openly as they would have with a Timorese researcher. This was especially the case for people who thought I was a missionary.

My position as a person from a high-income country meant that I was usually treated like an important visitor, and often mistaken for someone who would be able to provide money or other resources. Whilst I did my best to explain my true purpose, it is likely that this encouraged some participants to talk to me who might have otherwise held back.

The daily lives of Timorese men and women in rural areas are partially segregated: for example, cooking is mostly done by women and meetings are mostly led and attended by men. As is often the case for female researchers and practitioners from high-income settings who work in lower-income settings, I was encouraged to occupy the spaces that were normally reserved for Timorese men rather than Timorese women. It is unclear how this might have influenced my findings, but it might have meant that participants were more reserved in sharing their experiences with me due to my foreignness in terms

of both race and gender role in that context. Conversely, my foreignness possibly meant that participants were likely to share more openly with me: partly because of being somewhat anonymous and partly because of my obvious lack of understanding of most things about the Timorese context.

I tried to ameliorate some of the effects of my positionality as a non-Timorese, non-Tetun-speaking researcher by working together with a female interpreter from Manufahi Municipality, Timor-Leste. Furthermore, I often travelled to the project sites with a team of local, male staff who were from different parts of Timor-Leste. The senior research team staff with whom I had the most contact were a mixture of women and men from Portugal and Australia.

I have, to the best of my understanding, articulated how aspects of my colleagues' and my identities might have specifically influenced this research in the 'Limitations' sections of this thesis.

1.7 Thesis overview

This thesis is organised into nine chapters. After this introduction, **Chapter 2** describes the background and context of this research. Firstly, the importance of WASH and key approaches to improving WASH are introduced. Then, the demographics and history of Timor-Leste as well as its international relations are summarised. Finally, the nexus of these two themes are presented in a section about WASH in rural Timor-Leste.

Chapter 3 is a review of the literature about four broad themes in this thesis. Firstly, the key elements and debates about Community-Led-Total-Sanitation are presented. The second and third themes are about the ways in which WASH interventions and CLTS interventions, respectively, are measured. The final theme summarises the existing evidence about sanitation in Timor-Leste.

Chapter 4 describes the objectives and research questions which arose from the research gaps identified in the preceding chapter. The objectives and research questions are arranged into three groups which gave rise to three separate, but related, studies.

Whilst the method for each of the three studies is discussed separately in later chapters, the overall method for this research is presented in **Chapter 5**. This includes the conceptual frameworks and study designs; the limitations and the ethical considerations pertaining to the research in general.

Chapters 6, 7 and 8 describe the method, results and discussion for Studies 1, 2 and 3 respectively. Study 1, described in **Chapter 6**, is about the way the key elements of CLTS, the key elements of PAKSI and the implementation of PAKSI by WaterAid are described by those involved with planning and implementing PAKSI in Timor-Leste.

Chapter 7 presents Study 2 which is a quantitative study about the changes in WASH-related knowledge, attitudes and practices in remote communities in Manufahi Municipality, Timor-Leste since participating in the WaterAid program.

Study 3, which is about the factors influencing whether households become and continue to be open defecation free, is described in **Chapter 8**.

Finally, **Chapter 9** is a discussion of the overall themes and findings arising from the three studies. I offer recommendations for practitioners as well as suggestions for further research which arise from the gaps in knowledge identified by this research.

2 Background

This chapter describes some of the context of this research. Firstly, some of the key aspects of the water, sanitation and hygiene (WASH) sector are introduced. Secondly, the demographics, history, governance of Timor-Leste are described briefly. Finally, the WASH sector in Timor-Leste is described, including the role of the international non-government organisation: WaterAid.

2.1 Water, sanitation and hygiene

This section describes the definitions and global guidelines for water, sanitation and hygiene. The consequences of poor access to WASH are explained in the context of public health and the strategies and approaches for improving WASH in low-income settings are introduced.

2.1.1 What is ‘WASH’?

The scope of the WASH sector has evolved since the 1970s when it was called the ‘water sector’. In the 1980s, the sector was called ‘WATSAN’ and focused on water and sanitation. From the 1990s, the term ‘WASH’³ became popular to reflect the new focus on hygiene as well as water and sanitation (de Jong 2003, Garandeau 2009). The term ‘WASH’ refers both to the mediums through which pathogens⁴ can be transmitted as well as the services and behaviours that can inhibit that transmission (Prüss-Üstün et al. 2008).

Water refers to the quality as well as the availability (time needed to collect water factoring the volume of supply, waiting times, and distance from the household).

Sanitation refers to the safe containment of human faeces (World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) 2019). The scope of **hygiene** has increased substantially in recent years: handwashing is still the main focus but bathing, clothes-washing, storage of food and dishes, menstrual hygiene management and household rubbish disposal are also considered important elements of hygiene (Baquero et al. 2015, World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) 2019). Child and animal faeces have not received much research attention but are increasingly being recognised as important WASH issues (Gil et al. 2004, Penakalapati et al. 2017, Lamichhane et al. 2018).

2.1.2 Why is ‘WASH’ important?

Water is essential for survival, as is avoiding getting infected by the pathogens transported through faeces; hence, WASH has always been important to humans. Indigenous Australians, the oldest continuing culture in the world (at least 60 000 years), used coolamons to store water (National Museum of Australia year unknown) and dug tunnels to access groundwater to survive on the driest continent in the world (Skatssoon Wednesday 15 March 2006). The remains of what seem like basic lavatories were found

³ The acronym ‘WASH’ was used as early as 1989 by the United States Agency for International Development and stood for ‘Water, Sanitation and Health’ but this usage did not become popular globally (Cullivan et al. 1988)

⁴ Pathogens are disease-causing agents that can be classified as viruses, bacteria, fungi, protozoa, and helminths (worms) (Janeway et al. 2001)

in the remains of dwellings in the Scottish town of Skara Brae which is thought to have been occupied as early as 3000 BC (Wickham-Jones 2006).

The importance of WASH has been formally recognised in the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDGs). In the MDGs, water and sanitation were included under Goal 7: Ensure Environmental Sustainability (United Nations date unknown). In the SDGs Goal 6: Clean Water and Sanitation is wholly dedicated to WASH (including hygiene) (United Nations date unknown).

Whilst WASH is rarely a problem in high-income countries⁵, WASH is a challenge for most low and lower middle-income countries.

2.1.2.1 *Faecal-transmitted disease*

Diarrhoea, which is caused by faecal-transmitted pathogens, accounts for about 10-percent of deaths among children under age five (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2013, Hug et al. 2018). Interrupting the pathways of faecal-transmitted pathogens to human hosts is central to WASH. These pathways are conceptualised in a diagram commonly referred to by practitioners as the 'F-diagram' (see Figure 2-1 below) which has been adapted from the original diagram by Wagner and Lanoix (1958).

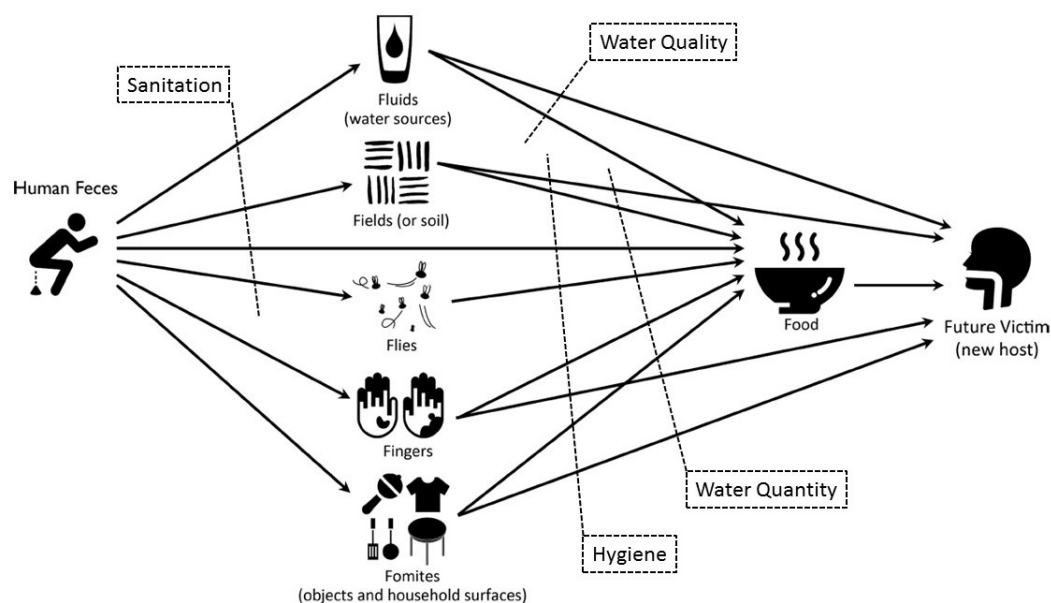


Figure 2-1 Traditional F-Diagram showing potential faecal-oral transmission pathways (Penakalapati et al. 2017 p11538) (I have added broken lines to show the ways in which water, sanitation and hygiene interrupt these pathways.)

⁵ Rather than use the terms 'developed' or 'developing' to indicate a country's progress against economic, social or other indicators, this thesis will use the terms 'low-income', 'lower middle-income', 'upper middle-income' and 'high-income' countries. From July 2018, the World Bank defined low-income economies (which is used interchangeably with 'countries') as having USD1025 or less Gross National Income (GNI) per capita and high-income countries as having USD12 376 or more GNI per capita. (World Bank date unknown)

A common misconception is that faecal-transmitted diseases are always passed on through the faecal-oral route (Chambers and von Medeazza 2014). There are also faecal-transmitted diseases which are due to pathogens transported through the skin, such as hookworm, and through the eyes, such as *Chlamydia trachomatis* (Chambers and von Medeazza 2014). Another common misconception in public health, is that improving water quality is the most important method for preventing faecal-transmitted diseases (Cairncross and Feachem 1993, Cairncross 2003). Sanitation, hygiene and water quantity are also important interventions. For example, the World Health Organization (WHO) promotes sanitation and face-washing (as well as surgery and antibiotics) as strategies for preventing trachoma (World Health Organization (WHO) 2019). Whilst schistosomiasis can be partially prevented through improving drinking water quality, other measures such as bathing and improving sanitation are also important (Prüss-Ustün et al. 2019). To better illustrate the transmission of excreta-related pathogens and to clarify some of these misconceptions, the World Health Organization published a more comprehensive version of the F-Diagram in their 2018 report entitled: ‘Guidelines on sanitation and health’ (see Figure 2-2 below).

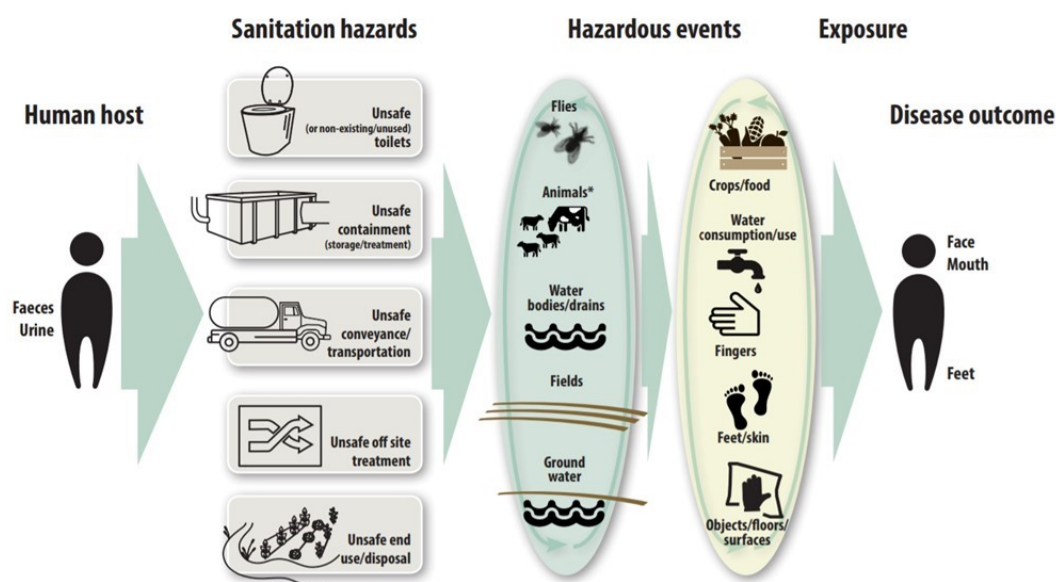


Figure 2-2 Transmission of excreta-related pathogens

(World Health Organization (WHO) 2018 p4)

2.1.2.2 Other biomedical issues related to ‘WASH’

Other than faecal-transmitted diseases such as diarrhoea, there are other biomedical issues that are preventable with adequate access to safe WASH. Some of these include water-related diseases (which are not faecal-transmitted), infections, issues related to environmental enteropathy and respiratory illnesses.

There are several biomedical health issues that are **water-related** but not faecal-transmitted. Some of these are caused by water that has high levels of poisons such as arsenic, lead or fluoride. Other issues include malaria, dengue or other diseases caused by vectors which live on or near water (World Health Organization (WHO) 2020).

The spread of **infection** in various settings is also associated with poor access to WASH. In 2016, 12-percent of health care facilities globally had no water service, 21-percent had

no sanitation service and 16-percent had no hygiene service (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2019). These figures are concerning because a lack of access to WASH in a health care facility increases the transmissions of infections. A systematic review by Benova et al. (2014) found a high association between maternal mortality (either during pregnancy, labour or post-partum but prior to leaving a health care facility) and poor access to water and sanitation. These deaths could have been due to sepsis from poor hand hygiene or unclean surfaces in the delivery room or from infections contracted during pregnancy from poor access to water and sanitation such as hookworm or Hepatitis E (Benova et al. 2014).

Some studies in the last few years have found an association between poor menstrual hygiene and higher prevalence of lower reproductive tract infections (Das et al. 2015, Torondel et al. 2018). Indicators for poor menstrual hygiene management were using reusable absorbent pads rather than disposable pads and not having a private place for changing and cleaning.

Poor access to WASH is associated with a process called **environmental enteropathy** (Bartram and Cairncross 2010, Chambers and von Medeazza 2014, Schmidt 2014). Environmental enteropathy is a condition whereby chronic infection causes inflammation of and structural damage to the intestinal walls (Gilmartin and Petri 2015). In turn, this can lead to compromised immune function, lower absorption of nutrients and oral vaccine failure (Gilmartin and Petri 2015). Chronic malnutrition from environmental enteropathy can result in stunting which leads to reduced cognitive ability, and therefore decreased educational and income-generating opportunities later in life (Spears 2012, Spears et al. 2013).

The transmission of **respiratory illnesses** such as influenza and acute respiratory illnesses is potentially reduced by hand washing, although a systematic review by Warren-Gash, Fragaszy and Hayward (2013) found that the effectiveness of this depended on setting, context and compliance.

2.1.2.3 Evidence of the association between WASH and health

There is a lot of focus on the association between poor WASH and poor health outcomes such as faecal-transmitted disease, infections and stunting (see Sections 2.1.2.1 and 2.1.2.2 above). Prüss-Üstün et al. (2008) estimated that the global burden of disease due to poor WASH was 9.1-percent. In 2019, the same authors found that the global burden of disease due to WASH was still an 'important fraction' of the total burden (Prüss-Üstün et al. 2019, p11). However, creating evidence to show the association between good or improved access to WASH and positive health outcomes is difficult (Cairncross 1990, Mehta 2011, Penakalapati et al. 2017).

There are several reasons why it is difficult to create evidence showing a causative link between improved WASH and health outcomes. One reason is when **intervention fidelity is suboptimal** in a randomised control trial: something Garn et al. (2017) found to be common in their review of sanitation interventions. Blum and Feachem (1983) identified several methodological problems with WASH and health studies; in particular, when there are **inconsistencies in the definition of health-indicators**. As early as 1975, an Expert Panel to the International Bank for Reconstruction and Development identified **confounding variables** such as governmental, physical, environmental, economic, cultural and educational factors as making it difficult to reliably quantify the health impact of WASH interventions (World Bank 1976). Animal faeces is another confounding variable that is often unaccounted for in sanitation interventions even

though animal faeces are a substantial source of pathogens which affect human health (Penakalapati et al. 2017). A study of faecal exposure pathways in urban areas in Ghana found that eating uncooked produce was the dominant exposure pathway for children suggesting that this is yet another confounding variable that should be controlled for when measuring the impact of WASH on health (Robb et al. 2017). Finally, it is challenging to measure hygiene behaviour because such studies involve **regular observation, which is likely to influence the behaviour of those observed**. That is, participants will tend to perform better hygiene behaviour when they are aware they are being observed (Manun'Ebo et al. 1997, Strina et al. 2003).

Despite the known difficulties of creating evidence to show the link between improved WASH and better health outcomes, there are many studies that have set out to do this. Some studies and reviews suggest, using mostly observational data, that better access to WASH is associated with improved children's health indicators. (See Clasen et al. (2010); Freeman et al. (2014); Dangour et al. (2013); Njuguna (2016); and Strina et al. (2003).) However, several studies are inconclusive. (See Patil et al. (2014); Clasen et al. (2014); Fewtrell et al. (2005); Freeman et al. (2013); and Pickering et al. (2015).)

Most recently, a set of randomised efficacy trials which measured the effect of household-level WASH and improved infant and young child feeding on stunting and diarrhoea led to a debate among WASH experts about the benefits of WASH for health (Pickering et al. 2019). The WASH Benefits trial took place in Bangladesh and Kenya and the Shine trial took place in Zimbabwe. Stunting was not reduced by improved WASH in any of the project sites and WASH interventions were only associated with a decrease in diarrhea in Bangladesh (Luby et al. 2018, Null et al. 2018, Humphrey et al. 2019, Pickering et al. 2019). This led the authors to suggest that WASH should not be prioritised as an intervention to improve children's nutrition. The Lancet published some of the rebuttal from other WASH experts in its correspondence section. Kearns (2019) argued that one reason the trials failed to measure an impact, on diarrhoea and stunting by the WASH interventions, was that synthetic chemicals present in the environment which lead to immunotoxicity were not controlled for. Cumming and Curtis (2018) questioned the external validity of the trials and pointed out that the baseline WASH access in the intervention arms was already moderate (rather than low) and that the WASH interventions chosen for the trials were not appropriate for the health outcomes they sought to improve. Whilst they commended the work of the WASH Benefits and Shine trials, Kearns, Cumming and Curtis did not accept the conclusion that WASH was not important for improving health. They did concede, however, that 'business as usual in the WASH sector will not be enough to significantly improve child growth' (Cumming and Curtis 2018 e613).

Whilst the debate about demonstrating the health benefits of access to WASH continues, there are several non-health related issues associated with WASH and these will be discussed in the following section.

2.1.2.4 Environmental, social and economic issues related to 'WASH'

Aside from the health issues related to WASH, there are also environmental, social and economic concerns. The environmental issues fall into two categories: the over-extraction of water resources for human consumption and the contamination of the environment by poorly managed human effluent (Hutton and Chase 2017). For example, Schlosser et al. (2014 p341) estimated that by 2050, 'socioeconomic growth and uncertain climate change' will mean that surface water supply will consistently not meet people's water needs. Poorly managed human sewage pollutes groundwater, surface water and the

ocean which in turn compromises water and food sources for both humans and animals, biodiversity and the value of land used for tourism, recreation, primary industries and habitation (Hutton and Chase 2017).

There are also myriad socio-economic consequences of poor access to WASH (Cairncross and Valdmanis 2006). Being unwell, or caring for someone who is unwell, due to a WASH-related illness costs households in medical expenses as well as time away from income generating activities (Patel et al. 2013). Similarly, WASH-related illness caused by infection, inflammation and environmental enteropathy in children could compromise their growth and neurodevelopment and ultimately their learning outcomes (Hutton and Haller 2004, Piper et al. 2017). More recently there have been studies about whether improving WASH in schools leads to decreased rates of absenteeism among students; however, the results of these studies are mixed (Chard et al. 2019, McMichael 2019).

The gendered nature of WASH is something the sector has focused on for at least a decade already. This began with acknowledging that poor access to WASH affects women and girls in different ways than it does men and boys. Women and girls disproportionately face the risk of:

- **Infection** due to a lack of safe WASH facilities during childbirth and menstruation; as well as urinary tract infections if they need to wait long periods to urinate in private.
- **Violence** while collecting water away from home or whilst toileting in secluded places or after dark.
- **Missing out on school or income** because they spend more time collecting water and caring for unwell family members. They might also miss out because there are no facilities to manage menstruation at their place of education or work.

(Cairncross and Valdmanis 2006, Fisher 2006, Prüss-Üstün et al. 2008, Das et al. 2015, Grant et al. 2016, WaterAid Canada 2019)

For these reasons, improving access to WASH is inherently a project of gender empowerment (Fisher 2006). In recent years, various gender empowerment frameworks for WASH have been developed and these go beyond merely considering the impacts of poor access to WASH on women and girls. See, for example, WaterAid's (2018) Gender Equality and WASH Programming Framework in Figure 2-3 below.

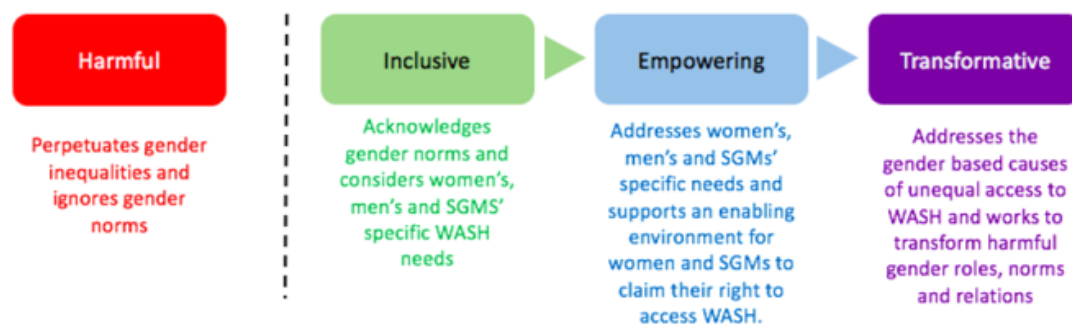


Figure 2-3 Gender equality and WASH programming framework

(WaterAid 2018 p5)

Frameworks such as that presented by WaterAid above recognise that WASH interventions are potentially a platform for broader gender transformation which seeks to change gender norms as well as avenues to cater for the needs of people of different genders. Some implementing agencies have devised toolkits for gender empowerment in their WASH programs: for example, WaterAid Timor-Leste's (2016) manual: 'Exploring Gender Aspects of Community WASH: Manual for Facilitating Dialogue in Communities' and UNICEF's (2017) toolkit: 'Gender-Responsive Water, Sanitation and Hygiene: Key elements for effective WASH programming'.

Most recently, the WASH sector has broadened its focus on women and girls to also include the specific experience of men and boys (see Cavill et al. (2018)); transgender and gender-non-binary people (see Boyce et al. (2018)); and people of sexual minority groups. Some of the specific WASH-related experiences of gender-non-binary identifying people and people of sexual minority groups are:

- difficulty urinating and defecating in public places that only have male or female toilets;
- migrating to urban areas (due to stigma in rural areas) and having to live in overcrowded conditions; and
- having limited access to WASH-related emergency aid if they do not present the same way as their identity cards indicate.

(House et al. 2017)

The WASH sector is increasingly paying attention to the specific needs and experience of potentially disadvantaged groups such as people with a disability, elderly people, or people with chronic illnesses such as AIDS (Jones et al. 2012, Myers et al. 2017, Pryor et al. 2018). The sector acknowledges that WASH infrastructure needs to be designed differently for people with different abilities (for example, ramps and pathways to public tap stands). However, what is also being recognised is that potentially disadvantaged people often have less decision-making power in community settings and WASH interventions are a platform for challenging this norm (Jones and Reed 2005, Myers et al. 2017).

This section has only briefly described some of the non-biomedical effects of poor WASH. However, these are important to consider when studying WASH interventions such as the WaterAid project in the project sites of this research because these issues highlight the value of such interventions even when the biomedical health impacts are not detected.

2.1.3 Global 'WASH' standards

The World Health Organization (WHO) (and its predecessor the League of Nations Health Organization) has collected data and published recommended standards about WASH since at least 1930 (Bartram et al. 2014). Currently, WASH standards are documented in a few different reports. For example, the World Water Development Report (WWDR) is focused on freshwater resources and the Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) report is focused on the policies, institutions and finance mechanisms for managing WASH globally (World Health Organization (WHO) 2017).

The Joint Monitoring Programme (JMP) is a collaboration between the United Nations Children's Fund (UNICEF) and WHO. Since the 1960s, the JMP have reported on national-level WASH standards and now serve as the main record of countries' progress

against the WASH-related Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) (World Health Organization (WHO) 2017, World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) date unknown).

The JMP collates data from household surveys, and analyses these with linear regression modelling to provide national-level data for global comparison (Bartram et al. 2014). Previously, the JMP reports were critiqued for not showing inequities within countries nor providing sufficiently robust data on drinking water quality (Bartram et al. 2014) and for not including standards about menstrual hygiene management (Baquero et al. 2015). Most recently, Chatterly et al. (2018) noted that WASH standards in non-household settings such as health care facilities is absent from JMP reporting. However, the latest report includes information about sub-national inequities, drinking water quality and handwashing (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2017) and the first report about WASH in health care facilities was published in 2019 (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2019).

Furthermore, in the transition from the MDG period to the SDG period, the indicators and standards for drinking water and sanitation were expanded to measure *service levels* as well as *infrastructure* (that is, the water source or sanitation facility which were the indicators during the MDG period). This was in recognition that safe access to water and sanitation is achieved through a service chain as well as infrastructure (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2017).

For drinking water, what was previously categorised as an 'improved' water source, is now categorised as one of three service levels: 'safely managed', 'basic' or 'limited'. 'Safely managed' means that three conditions are met: 1) the water is accessible on premises, 2) the water is available when needed, and 3) the water is free from contamination. 'Basic' means that the water source is improved, and a round trip to collect the water is 30 minutes or less; but that it does not meet all three conditions required for a safely managed service. 'Limited' is the same as a 'basic' service; but collection takes longer than 30 minutes (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2017).

For sanitation, what was previously categorised as 'improved' is also now categorised in one of three service levels: 'safely managed', 'basic' or 'limited'. 'Safely managed' means that the sanitation facilities are improved, not shared with other households and are either treated and disposed *in situ*, stored temporarily and then emptied and transported to treatment off-site, or transported through a sewer with wastewater and then treated off-site. 'Basic' means that the sanitation facility is not safely managed, but it is improved and not shared with other households. A 'limited' facility is improved but shared with other households (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2017).

The latest indicators and standards for drinking water quality, sanitation and hand-washing articulated by the JMP are set out in Figure 2-4, Figure 2-5 and Figure 2-6 respectively (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2017).

SERVICE LEVEL	DEFINITION
SAFELY MANAGED	Drinking water from an improved water source that is located on premises, available when needed and free from faecal and priority chemical contamination
BASIC	Drinking water from an improved source, provided collection time is not more than 30 minutes for a round trip, including queuing
LIMITED	Drinking water from an improved source for which collection time exceeds 30 minutes for a round trip, including queuing
UNIMPROVED	Drinking water from an unprotected dug well or unprotected spring
SURFACE WATER	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal
<i>Note: Improved sources include: piped water, boreholes or tubewells, protected dug wells, protected springs, and packaged or delivered water.</i>	

Figure 2-4 Joint Monitoring Programme standards for drinking water quality

SERVICE LEVEL	DEFINITION
SAFELY MANAGED	Use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite
BASIC	Use of improved facilities that are not shared with other households
LIMITED	Use of improved facilities shared between two or more households
UNIMPROVED	Use of pit latrines without a slab or platform, hanging latrines or bucket latrines
OPEN DEFECATION	Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches or other open spaces, or with solid waste
<i>Note: improved facilities include flush/pour flush to piped sewer systems, septic tanks or pit latrines; ventilated improved pit latrines, composting toilets or pit latrines with slabs.</i>	

Figure 2-5 Joint Monitoring Programme standards for sanitation

SERVICE LEVEL	DEFINITION
BASIC	Availability of a handwashing facility on premises with soap and water
LIMITED	Availability of a handwashing facility on premises without soap and water
NO FACILITY	No handwashing facility on premises
<i>Note: Handwashing facilities may be fixed or mobile and include a sink with tap water, buckets with taps, tippy-taps, and jugs or basins designated for handwashing. Soap includes bar soap, liquid soap, powder detergent, and soapy water but does not include ash, soil, sand or other handwashing agents.</i>	

Figure 2-6 Joint Monitoring Programme standards for handwashing

The latest data about global access to WASH reported by the JMP is from 2017:

- 71-percent of the global population used a **safely managed drinking water service**. 11-percent of the global population did not have access to a basic drinking water service.
- 45-percent of the global population used a **safely managed sanitation service** and just over one-quarter of the global population did not have access to basic sanitation.
- The data about **handwashing with soap** and water was only available for 52-percent of the global population. In the least-developed countries, just under 75-percent of the population did not have handwashing facilities with soap and water. There was insufficient data from many high-income countries.

(World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) 2019)

The specific data about access to WASH in Timor-Leste is described in Section 2.3.

2.1.4 How is poor access to ‘WASH’ addressed?

Improving access to WASH requires quite different approaches in rural and urban areas (Prüss-Üstün et al. 2008). This section will focus on approaches to improving access to WASH in remote or rural areas where generally transport and communications technology are challenges (Strasser 2003). More detail is provided here about sanitation interventions (than water and hygiene interventions) because this is the focus of this research.

The approaches for improving access to water and sanitation and hygiene are presented separately here. However, usually WASH interventions will include components of all three because there is growing evidence to suggest that comprehensive WASH interventions have better outcomes on health indicators such as reducing the prevalence of diarrhoea (Fuller et al. 2015).

As described in Section 2.1.2.4 WASH practitioners have acknowledged the importance of gender issues and social inclusion in their work. Increasingly, WASH programs have dedicated resources and staff whose role it is to ensure that the specific WASH needs of women and potentially disadvantaged people are being addressed. For example, gender and social inclusion were cross-cutting themes in the last two rounds of Australian Government funding dedicated to Civil Society WASH programs (Government of Australia Department of Foreign Affairs and Trade (DFAT) and GHD 2018,

Government of Australia Department of Foreign Affairs and Trade (DFAT) and Palladium date unknown).

2.1.4.1 Water

Interventions that aim to give people access to safe drinking water are concerned with minimising or removing contamination at the source, during transportation or during the storage of water (Pedley et al. 2011). The WHO recommends that a basic water supply for health is 20 litres per person per day and collection time should not exceed 30 minutes (Howard and Bartram 2003).

Natural sources of water fall into three categories: rainwater, groundwater and surface water (Pedley et al. 2011). Rain water can be harvested from roof catchments, rock catchments, ground catchments and sand dams (Gould and Nissen-Petersen 1999). Groundwater collects in permeable material underground. It either flows naturally to the surface through a spring (and can then be gravity-fed to a water collection point) or it needs to be accessed through a hand-dug well, tube well or borehole (WaterAid UK date unknown). Water from wells and boreholes requires an extraction system such as a pump or a bucket on a rope (Pedley et al. 2011). Surface water includes fresh-water lakes, streams, and rivers (Pedley et al. 2011). Each of these options poses different challenges for minimising contamination in the water source itself, during extraction, transportation and storage. See Pedley et al. (2011) and WaterAid UK (date unknown) for technical notes about how to minimise contamination.

Achieving the goal of access to safely managed water is about much more than identifying an appropriate source of the water: it is also about the way water extraction, delivery and storage are managed, maintained and paid for. In the 1990s, the Demand-Responsive Approach (DRA) was applied to rural water supply in low-income countries. That is, the costs of operating and maintaining rural water supplies were expected to be paid for directly by residents rather than through taxes paid to the central government (because it was assumed that rural populations paid insignificant amounts of tax) (World Bank 2012). This posed challenges for sustainability and since then, the importance of the professionalisation of rural water service providers, maintenance of water systems, diversification of management, engaging the private sector and the strengthening of governance systems and local institutions has been recognised as critical to the sustainability of rural water systems (Lockwood and Smits 2011, Whaley and Cleaver 2017, World Bank 2017).

Community-based models are one approach to the management of rural water supply systems and are particularly important when private and public services and utilities are not operating properly (Machado et al. 2019). Such models for water management became popular during the 1980s because of their participatory nature (Whaley and Cleaver 2017). However, the water point committees (or *Grupo Maneija Facilidade (GMF)* (Water Management Group) in Timor-Leste) formed in community-based models do not necessarily deliver sustainable water supply either: they are generally not legal entities, they often lack external support, they operate in complex financial and institutional environments where power is not shared equally, and are usually under-financed (Whaley and Cleaver 2017, World Bank 2017). Nevertheless, community-based models continue to be adopted for rural water supply systems globally, including in the project sites of this research.

2.1.4.2 Sanitation and hygiene

The approach to delivering safe sanitation and hygiene has evolved from being predominantly a top-down model of hardware provision to more participatory interventions which focus on behaviour change. This section briefly describes the main aspects of this evolution.

Several authors (including Kar (2003), Sah and Negussie (2009), Bongartz et al. (2010), Jenkins and Sugden (2006) and Mehta (2011)) explain that the conventional response by practitioners to the lack of adequate sanitation in low-income settings has typically included toilet construction or subsidies for sanitation hardware. Underpinning this response is the assumption that people are too poor to construct their own WASH facilities but will use them if facilities are provided (Bongartz 2010). However, the limitations of merely providing toilets or subsidies for sanitation hardware have been noted repeatedly by WASH practitioners and academics alike. For example, Cairncross (1992, 2003, 2003) argues that infrastructure which has been installed without the participation of the community which will use it is unlikely to fulfil its intended function nor meet the communities' needs. Peal et al. (2010) explained that although hardware focused sanitation programs increased the coverage of toilets and washing facilities worldwide, little benefit was derived because these facilities were generally not used correctly, if at all. Similarly, Bongartz et al. (2010) noted that subsidised toilets were often used as shelters, prayer rooms and storage spaces.

By the 1990s, many WASH programs included an educational component to ensure that the toilets and washing facilities they provided were used correctly (Peal et al. 2010). However, this approach was also critiqued by researchers (Prüss-Üstün et al. 2008). For example, Simpson-Hebert et al. (1997) argue that it is necessary for a person to understand the health benefits of changing their sanitation and hygiene behaviour, but this knowledge is insufficient for them to overcome the barriers to such change. Curtis (2001, 2002) and Cairncross (2003) who consider the issue of behaviour change from multiple perspectives including history, anthropology, marketing and consumer science, psychology and biology make a slightly different argument than Simpson-Hebert et al. and suggest that the motivations for hygiene practices are much more complex than merely health-seeking. This was evident in the study by Welle et al. (2007) about the barriers to improving sanitation in Burkina Faso, which found that the participants' sanitation behaviour change was motivated by a mixture of factors, including privacy, safety and convenience, as well as or instead of better health. Curtis (2001) encouraged the WASH community to move away from an *etic* (that is, outsider and in this case, the typically scientific) view of behaviour change. Instead Curtis (2001) argued for a move toward an *emic* (insider) view which focused more on what motivated people's hygiene practices: for example, by adopting a marketing science approach and starting with asking consumers what they wanted out of a hygiene product.

As well as having limited success in improving sanitation and hygiene practices, programs which centred on the provision of toilets, handwashing facilities and other hardware subsidies (with or without an educational component) were critiqued for their 'top-down' nature. Sah & Negussie (2009) explained that the construction of toilets was generally managed and funded by agencies external to communities, rather than through participatory processes which included the community in discussions, decision-making and action.

Since the 1990s several approaches to improving sanitation and hygiene have emerged which aim to be both more participatory as well as more focused on creating demand

among community members for improved services rather than assuming what they want (Peal et al. 2010). Peal et al. (2010) summarised some of these in their publication: 'Hygiene and Sanitation Software: An Overview of Approaches'. An example of the hygiene promotion interventions described is 'Participatory Hygiene and Sanitation Transformation (PHAST)'. The objective of the PHAST approach is to prevent diarrhoeal disease through community management of WASH facilities (Sawyer et al. 1998). This is achieved with the community 'in a participatory process involving: assessing their own knowledge base; investigating their own environmental situation; visualizing a future scenario; analysing constraints to change; planning for change; and finally implementing change' (Simpson-Hebert et al. 1997 p2). Many of these approaches also diverge from conventional approaches to improving sanitation because they focus on the outcome of becoming open defecation free rather than providing toilets (the focus on open defecation free status as an indicator of access to sanitation is discussed in more detail in Section 3.3.1) This is quite a contrast to the conventional approach to improving WASH services described above because there is no mention of providing infrastructure or subsidies, nor is there an explicit educational component.

The sanitation promotion approaches which emerged around the same time were similar in their focus on community participation and demand-creation (Peal et al. 2010). Peal et al. (2010) categorise sanitation promotion approaches into those focused on the marketing of sanitation goods and services and those focused on demand creation at a community-level. Community-led Total Sanitation (CLTS) is categorised as part of this second group of approaches and is described in Section 3.1.

2.2 Timor-Leste

Many years ago a small crocodile lived in a swamp in a far away place. He dreamed of becoming a big crocodile but as food was scarce, he became weak and grew sadder and sadder.

He left for the open sea, to find food and realise his dream, but the day became increasingly hot and he was still far from the seashore. The little crocodile—rapidly drying out and now in desperation—lay down to die.

A small boy took pity on the stranded crocodile and carried him to the sea. The crocodile, instantly revived, was grateful. “Little boy”, he said, “you have saved my life. If I can ever help you in any way, please call me. I will be at your command...”

A few years later, the boy called the crocodile, who was now big and strong. “Brother Crocodile”, he said, “I too have a dream. I want to see the world”.

“Climb on my back,” said the crocodile, “and tell me, which way do you want to go?”

“Follow the sun”, said the boy.

The crocodile set off for the east, and they travelled the oceans for years, until one day the crocodile said to the boy, “Brother, we have been travelling for a long time. But now the time has come for me to die. In memory of your kindness, I will turn myself into a beautiful island, where you and your children can live until the sun sinks in the sea.”

As the crocodile died, he grew and grew, and his ridged back became the mountains and his scales the hills of Timor.

Now when the people of East Timor swim in the ocean, they enter the water saying “Don’t eat me crocodile, I am your relative”.

Timorese folk story published by Timor Leste’s Independence Day Committee (2002)

Today, the Democratic Republic of Timor-Leste covers the eastern half of the island of Timor as well as several smaller islands and an enclave (Oecusse) on the western half of the island surrounded by Indonesian territory (see Figure 2-7).



Figure 2-7 Map of Timor-Leste

(Smets 2015 p3)

Covering just over 15 000 square kilometres, Timor-Leste is mostly mountainous; rising steeply from the coastal regions to the long ridge of the crocodile's back which peaks at 2963 metres (Mt Tatamailau). The climate is mostly tropical, characterised by hot and humid weather, and punctuated by wet and dry seasons (Government of Timor-Leste 2012).

The country is divided into 13 administrative areas called 'municipalities' (prior to 2015 these were called 'districts'). Dili municipality, located on the northern coast, is the country's capital. Manufahi municipality, where this research took place, is on the southern coast: approximately 100 kilometres from Dili. The municipalities are divided into administrative posts (previously 'sub-districts') which are further divided into *sucos* (villages). Villages are made up of several small hamlets or communities called *aldeias*. The smallest clusters of family groups are called *knuas* or *bairos* (Leach 2017).

2.2.1 Demographics

In 2015, the total population was 1.184 million people of which about 70-percent lived in rural areas (Director General for Statistics (Government of Timor-Leste) 2016). Timor-Leste is ranked 132 out of 189 countries on the Human Development Index (United Nations Development Programme (UNDP) 2011).

2.2.1.1 Ethnicity, language and literacy

Excavations in a cave near Tutuala on the eastern tip of Timor-Leste indicate that humans have been present on the island of Timor for at least 35 000 years (O'Connor 2007). Migrants of Melanesian and proto-Malay-Polynesian descent came to Timor-Leste around 2000 BCE (Before Common Era) resulting in a mix of Austronesian and Trans-Papuan languages spoken across the island (Leach 2017).

Language has been a site of political struggle in Timor-Leste at least since the Portuguese occupation (Taylor-Leech 2005). Currently, Tetun and Portuguese are the official

languages and English and Malay (Indonesian language) are working languages. (Centre of Studies for Peace and Development (CEPAD) 2009) National languages and vernaculars (such as Mumbai) are spoken at home and in rural areas (Taylor-Leech 2005).

In 2015, the National Census found that 84.3-percent of the population aged 15-24 were literate in at least one of Tetun, Portuguese, Malay and English, with literacy being highest in Tetun (Director General for Statistics (Government of Timor-Leste) 2016). Schools are mostly taught in Portuguese even though this language is not widely spoken among the high youth population (McGrath 2017).

2.2.1.2 Religion

Prior to the Portuguese occupation, spirituality in Timor-Leste was centred around animist beliefs where the spirits of the living and ancestors co-existed (Niner 2005). When the Portuguese colonised Timor-Leste, their missionaries had already begun converting people to Catholicism (Leach 2017). In 2015, around 97-percent of the population identified themselves as Catholic. The remainder identify as Protestant, Evangelical, Islamic, Buddhist, Hindu or 'traditional' (Director General for Statistics (Government of Timor-Leste) 2015). The Catholic Church not only plays a spiritual role in the lives of the Timorese, but during the Indonesian occupation it served as a rampart of Timorese culture (Ingram et al. 2015).

2.2.1.3 Economy

Neves (2011) describes Timor-Leste's economy as heading toward a 'rentier economy': one where the country derives its revenue primarily from oil and gas products rather than taxing its citizens. Timor-Leste's reserves of oil and gas are substantial (despite Australia owing billions of dollars to the Timorese for oil already extracted from contested fields). (McGrath 2017) Nevertheless, the reserves are diminishing rapidly (Commonwealth of Australia 2014, McGrath 2017) and the industry creates very few employment opportunities for the Timorese (Akmeemana and Porter 2015).

About 55.5-percent of people aged 15-64 were economically active in 2015, most of whom were engaged in primary industries such as agriculture, forestry, fishing, mining and quarrying (Director General for Statistics (Government of Timor-Leste) 2016). In 2015, the number of youth entering the job market each year was around 27 000 but the number of new jobs created was far less than this (Magalhães 2015).

The Gross Domestic Product (GDP) per capita was US\$2270 in 2017 (World Bank 2019). Although poverty levels are declining in Timor-Leste, 41.8-percent of the population were still living in poverty in 2014 (World Bank 2019). Aid funding is still an important element of Timor-Leste's economy (Commonwealth of Australia 2014).

2.2.1.4 Health

Despite the uptake of pre- and post-natal care, family planning and other health interventions, many health indicators are still poor in Timor-Leste (World Health Organization (WHO) 2019). In 2016, life expectancy at birth was 67 and 70 for men and women respectively (World Health Organization (WHO) 2019).

When the first demographic health survey was conducted (across four regions of Timor-Leste) in 2003 the fertility rate was the highest in the world (7.8 children born per woman) (Utomo 2005). In 2017 the fertility rate had declined to 5.4 births per woman (World Bank 2019).

The maternal mortality ratio in 2015 was 215 per 100 000 live births (World Health Organization (WHO) 2016). At the time this was the second-highest maternal mortality ratio in Asia (Commonwealth of Australia 2014). The mortality rate of children under five was also high: 49.7 per 1000 live births in 2016, which the government attributed mostly to lower respiratory infections and diarrhoeal disease (Government of Timor-Leste 2011, World Health Organization (WHO) 2019).

Malnutrition is a major health concern in Timor-Leste, with some of the highest rates of stunting and wasting among children in the region (World Health Organization (WHO) 2016). In 2009-10, more than 57.7-percent of children were stunted and 18.9-percent were wasted (World Health Organization (WHO) 2019). The WASH for Worms trial found similar rates in their project sites: 60-percent of children were very highly stunted; 60-percent were underweight; and 20-percent were wasted (Campbell et al. 2017).

Campbell et al. (Campbell et al. 2017) found that there had been no published analyses indicating a correlation (let alone causation) between soil-transmitted helminth (STH) infections and stunting or wasting. However, STH prevalence in Timor-Leste was high: school-based prevalence was 29-percent (Martins et al. 2012) and community-based prevalence was 69-percent (Campbell et al. 2016).

Aside from STH infections, tuberculosis, malaria, dengue, leprosy (in some areas), lymphatic filariasis, yaws, cardiovascular and chronic obstructive pulmonary diseases are the main health concerns in Timor-Leste (World Health Organization (WHO) 2016).

Whilst only 1.5-percent of GDP was spent on health in 2014, health systems are improving in Timor-Leste (World Health Organization (WHO) 2016). The National Government's capacity to plan, deliver and monitor health systems is increasing. This has been further strengthened by the development of national health plans and policies and the establishment of a department to manage partnerships with donors to Timor-Leste's health system (World Health Organization (WHO) 2016).

2.2.2 History and international relations

By the 14th century, Timor-Leste was trading with China and India and by the 16th century, Timor-Leste's sandalwood drew the attention of Europe. Portugal were the first Europeans to arrive in Timor and declared the eastern part of the island 'Portuguese Timor' in 1515. Once sandalwood supplies dwindled in the early 19th century, the Portuguese introduced sugar cane and coffee to Timor-Leste as cash crops for export (Peake 2013, Magalhães 2015). The 460 years of Portuguese colonisation was characterised by alliances with, as well as resistance by, local leaders. One of the most famous stories of resistance during this time is the Manufahi War of 1908-12 led by *liu rai* Dom Boaventura (Peake 2013, Leach 2017, James and Grenfell 2018). During World War Two Timor-Leste was a battleground for Australian and Dutch Allied forces against Japanese soldiers. Most of the Portuguese colonisers left Timor during this time; however, around 60 000 local people's lives were lost through supporting the Allied forces (Leach 2017).

The Portuguese resumed control over Timor-Leste after World War Two but in 1974 the Carnation Revolution (where Portugal's authoritarian leader was overthrown in a military coup) took place and a rapid decolonisation agenda was announced (Leach 2017). Several political parties emerged (and were in conflict) around this time. *União Democrática Timorense* (UDT) generally supported maintaining strong links with Portugal. The *Associação Social Democrática Timorense* (ASDT), whose founders included Jose Ramos-Horta, Nicolau Lobato and Mari Alkitiri, initially described themselves as a nationalist

movement rather than a party and favoured rapid independence. The ASDT later changed their name to *Frente Revolucionária de Timor-Leste Independente* (FRETILIN). *Associação Popular Democrática Timorense* (APODETI) supported integration with Indonesia and *Klibur Oan Timor Asunain* (KOTA) advocated for the restoration of the power of the Timorese ruling class: *liu rais* (described below in Section 2.2.3) (Leach 2017).

On November 28 1975, FRETILIN declared Timor-Leste independent; however, nine days later Indonesia invaded (Ishizuka 2004, Leach 2017). Australia's policy towards Timor-Leste around this time was characterised by contradictions: there was some support for an independent Timor-Leste but also an imperative to maintain a positive relationship with Indonesia (not least of which was gaining access to natural resources in the Timor Gap) (Ishizuka 2004). Ultimately, Australia knew in advance of the Indonesian invasion but did nothing to stop it (Hopkins Wednesday 13th September 2000).

The Indonesian occupation was brutal with violent attacks by the Indonesian military toward Timorese resistance fighters as well as civilians (Vinck and Pham 2016). This was largely unknown by the outside world until a 1991 peaceful pro-independence demonstration which turned into the Santa Cruz massacre in Dili was filmed and broadcasted to the world by Western journalists (Rothschild 2017). This international awareness as well as the 1997 Asian Economic Crisis which led to the decline of the Indonesian Suharto regime are thought to be some of the precursors to Timor-Leste's eventual independence (Ishizuka 2004).

In 1999, the United Nations (UN) supervised a referendum of self-determination which showed that independence was popular (Vinck and Pham 2016). The administration of Timor-Leste was taken over by the United Nations Transition Administration in East Timor (UNTAET) until the Democratic Republic of Timor-Leste was declared on May 20 in 2002 and Xanana Gusmão was elected to be the first president (Smets 2015, Leach 2017).

The first few years of the newly declared nation were unsteady (Vinck and Pham 2016). This culminated in the 2006 'crisis' when tensions between easterners and westerners from Timor became violent in Dili and around 150 000 people were displaced (Grenfell 2015, Vinck and Pham 2016, Leach 2017). The United Nations Integrated Mission in East Timor (UNMIT) was set up as a result and only officially withdrew, including Australian soldiers, in 2012 (Vinck and Pham 2016). Although Australia continued its aid program to Timor-Leste, relations became strained when in 2014 Australia was accused of bugging the 2004 negotiations over oil and gas reserves in the Timor Gap (Vinck and Pham 2016).

2.2.3 Power, leadership and governance

Since independence, Timor-Leste has established itself as a democracy with a freely elected government (Cummins 2010). However, the political and governance landscape of Timor-Leste is shaped by many other systems of power which come together in what Grenfell (2015) calls a 'hybrid political order'. The oldest of these is a system of hereditary governance that was present throughout both Portuguese and Indonesian times (Cummins 2010). In this hereditary governance system, leaders called *liu rai* (kings), *datu* (aristocracy), *lia na'in* (traditional dispute mediators and interpreters of regulation) and more recently *chefes* (chiefs) are responsible for overseeing *lisan* (customary law) (Cummins 2010, Grenfell 2015, Leach 2017).

A 2016 study about understanding resilience for peace in Timor-Leste found that in addition to legitimacy for leadership being derived from heredity, the heroes of the

resistance movement also have considerable leadership status (Centre of Studies for Peace and Development (CEPAD) and the National Working Group on Resilience 2016). Furthermore, Freitas (2005 p20) argues that the political landscape is still shaped by the legacy of the Portuguese and Indonesian occupations:

Most Third World countries, on attaining independence from colonial rule, choose to retain, with little change, the inherited centralised colonial institution. This is generally a rule-driven, hierarchical administration with overbearing bureaucracy, often concerned more with compliance with rules and procedures than with results. Timor-Leste is no exception.

It seems that whilst Timor-Leste is an emerging democratic state, citizens' agency is deeply intertwined with long-standing hierarchical notions of power. Cummins (2010) found in her study of governance in several sub-districts that whilst democratic structures aim to ensure that everyone 'speaks', the 'notions of class and hierarchical leadership are deeply embedded within *lisan*, where only those of the higher classes hold the "ritual words" that are essential to maintaining traditional leadership'. Similarly, in the CEPAD (2016) study, most of the respondents felt that they could not freely protest or disagree with decisions made by leaders, even if they felt that these were wrong or unjust.

Timor-Leste is establishing itself as an independent sovereign state after 500 years of colonialism and occupation and the tendency to look to leaders as guides means these figures have a clear responsibility to lead by example [and] have power to inspire citizens and public servants to act for the greater good.

(Centre of Studies for Peace and Development (CEPAD) and the National Working Group on Resilience 2016)

Hence, it seems that leaders in Timor-Leste are perceived to have great responsibility as well as great potential for doing good in the interests of the community. At the same time, the government's decentralisation plan which was announced in 2013, aims to distribute this responsibility and strengthen the voices of local people (Pereira 2015).

2.2.4 Foreign aid and community development

Even though Timor-Leste voted for self-determination in the 1999 referendum, it was not until two years later that independence was declared and the first government of Timor-Leste established. In the interim, the country was administered by UNTAET and heavily dependent on foreign aid (Akmeemana and Porter 2015). Pereira (2015) describes this as a time when the Timorese political leadership was involved in consultations, but 'not in charge—the UN was.'

In the same period, the number of non-governmental organisations (NGOs) in Timor-Leste expanded from 34 to 231 which covered sectors including human rights as well and the delivery of services such as health and education (Hunt 2005). This number began to decline after independence was declared in 2002, as the focus of donors shifted from emergency response to supporting capacity development (Hunt 2005). Given that Timor-Leste had recently emerged from a top-down centralised model of governance under Indonesia, Hunt (2005) argued that one of the roles of NGOs in Timor-Leste was to support communities 'determine their own needs and priorities and shape the kind of development they want'.

The participation of Timor-Leste communities in managing their development needs has been discussed by several parties (see The Rolling Think Tank Initiative (2004); Pereira

(2015); and Moxham (2005).) In a study conducted by the Rolling Think Tank Initiative in 2004 about a World Bank-funded local governance project in Timor-Leste, participants suggested that lack of community ownership and participation was due to the “‘Indonesian mentality’”—a passive dependency on the state to provide services for the community’. However, the authors thought this was too simplistic an explanation in light of the active resistance of the Timorese community against the Indonesian and Portuguese occupations (Rolling Think Tank Initiative 2004). The authors suggested alternative explanations. For example, there was an expectation among the participants of the study that organisations external to their communities were a source of foreign funds and thus, participation was merely a means to access this. Furthermore, the participants reported ‘a lack of knowledge about the purpose and rules’ of the development projects taking place in their communities which demotivated community members to continue their participation (Rolling Think Tank Initiative 2004).

The tension between top-down and participatory approaches to development described here is not unique to Timor-Leste. Top-down models of development have long been critiqued, particularly by post-development scholars (see Escobar (1995, 1999), Ferguson (1994), Makuwira (2006) and Rahnema and Bawtree (1997)). This has given rise to alternative models including grassroots, community-led and participatory approaches to development which take indigenous and local forms of knowledge into account (see Chambers (1983), Sahle (2012), Helling et al. (2005) and Mohan (1997)). A detailed description of the various theories of development is beyond the scope of this thesis. However, it is important to note that endeavours to improve water, sanitation and hygiene in Timor-Leste, at the time of data collection, took place in a context where the tension between top-down and grassroots approaches to development were very much a reality.

2.3 Water, sanitation and hygiene in rural Timor-Leste

The status of water, sanitation and hygiene in Timor-Leste has evolved since the Portuguese occupation when the population’s needs for WASH and other services were largely neglected (Peake 2013, Magalhães 2015, Smets 2015). Whilst the Indonesian occupying forces built some WASH infrastructures such as ‘*Mandi, Cuci, Kakus (MCK)*’⁶ in Timor-Leste, it is difficult to know what proportion of the population had access to safe WASH at the time (Smets 2015). After the referendum in 1999, most of Timor-Leste’s infrastructure, including WASH infrastructure such as irrigation systems and water supplies, was destroyed in retaliation by the Indonesian army and anti-independence militia (International Committee of the Red Cross (ICRC) 1999, Commonwealth of Australia 2014, World Bank 2019).

The proportion of people in Timor-Leste with access to an **improved water supply** has gradually increased since independence. In 2000, 52-percent of the total population had access and by 2017, this had increased to 78-percent. Coverage in rural areas has consistently been lower than the national average over the last two decades, although this too has improved from 47-percent in 2000 to 70-percent in 2017 (World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) 2010, World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) 2019). Most rural water systems in Timor-Leste rely on ground water sources which are

⁶ This is an Indonesian public facility for bathing, washing and toileting. (Smets 2015)

accessed either from springs (gravity-fed systems), protected wells or boreholes. Water is usually accessed from taps or standpipes in household yards or public areas (Smets 2015).

In 2000, the proportion of the total population with access to **improved sanitation** was 32-percent and this increased to 54-percent by 2017. Again, the access to improved sanitation was lower in rural areas than the national average: 25-percent in 2000 and 44-percent in 2017 (World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2010, World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) 2019). The rates of open defecation in rural areas decreased from 44-percent in 2000 to 28-percent in 2017 which suggests that there is a proportion of the population who are moving from open defecation to unimproved sanitation or shared latrines but not gaining access to improved sanitation.

The two broad categories of latrines found in rural areas of Timor-Leste are:

1. **Simple pit latrine (also known as 'rai kuak' and 'sentina basic')** – as the name suggests, this is a pit dug into the ground with a structure or slab over the top. This structure might be as simple as a single plank of wood to squat on top of or a fully covered pit using planks of wood and packed dirt (with a hole for squatting over). These latrines work best as dry systems, but most Timorese prefer to wash themselves after defecating so the latrines often end up being wet systems.

Pour-flush latrine (also known as 'sentina paralon', 'sentina closet', 'sentina modern' and 'sentina permanent') – in these latrines, the pit is offset from the squat plate or toilet and the waste is flushed to the pit with water via a pipe. There are many variations of this latrine which use different materials and designs. For example, the pipe might be made of plastic or bamboo. The squat plate could be cement, shaped with a home-made mould or a standard mould (such as that provided by WaterAid) or a porcelain plate bought from the market. The pit is usually covered with wooden planks and packed with dirt.

Super-structures for either of these latrines to create privacy and shelter from the rain range in quality and materials or might not exist at all. For either latrine to be classified as a Ventilated Improved Pit (VIP) latrine, there should be: a) a pipe inserted into the pit, extending above the super-structure with fly screen on the top, to carry foul odours away, b) a fully sealed pit and c) a superstructure which creates semi-darkness over the squat plate so that any flies in the pit are drawn toward the pipe instead of the squatting hole (Bester and Austin 2000). Pit latrines with slabs or VIP latrines are the most common types of sanitation facilities found in rural parts of Timor-Leste (National Statistics Directorate (NSD) and United Nations Population Fund (UNFPA) 2011).

A 2011 study of **handwashing** amongst mothers of children-under-five in rural Timor-Leste found that both self-reported and observed rates of handwashing were low. Only 28.9-percent of the participants reported ever handwashing with soap and only 4.6-percent of these participants said they washed their hands with soap after using the toilet (Scott et al. 2011). In 2015, a study of menstrual hygiene management (MHM) sought to understand practices, attitudes, beliefs and decision-making processes about MHM in Timor-Leste. Some of the initial findings of this exploratory study were that there was a dearth of understanding of the biological processes of menstruation in Timor-Leste which influenced beliefs and attitudes, and the demand for disposable MHM products such as pads were increasing (Nguyen 2015).

The management of WASH in Timor-Leste has gone through several iterations since independence was declared in 2002, with responsibilities for WASH divided between different government ministries and directorates. Decrees and policies for WASH have been drafted and some of these have been endorsed (Buhl-Nielson et al. 2009, Smets 2015, World Bank 2018). The remainder of this section briefly describes the way WASH in rural Timor-Leste was managed in 2015, which is when data collection for this research was complete.

2.3.1 Institutional framework

In 2015, there were several government ministries and directorates responsible for the different elements of WASH management in Timor-Leste (Renneberg et al. 2015, Smets 2015). These are set out in Figure 2-8 below.

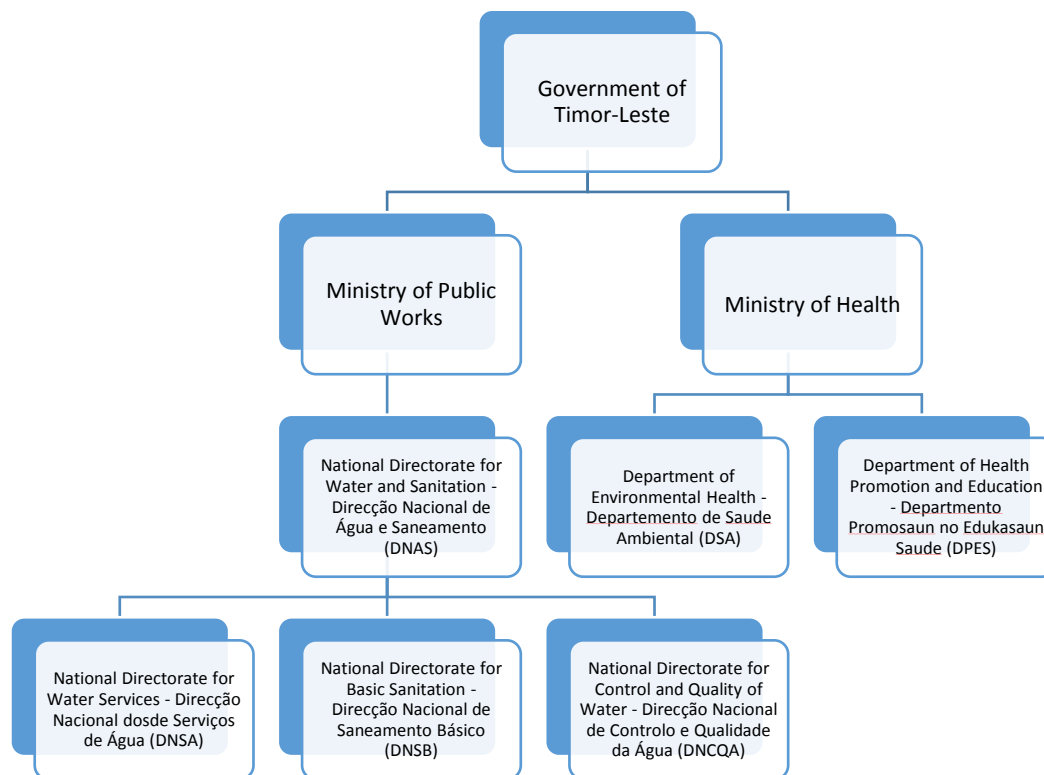


Figure 2-8 Ministries, directorates and departments responsible for water, sanitation and hygiene in Timor-Leste, 2015

In 2015, rural **water** was managed by the National Directorate for Water Services⁷ which had departments in each district (Renneberg et al. 2015, Smets 2015). **Rural sanitation and hygiene** were the responsibilities of the Ministry of Health, through the Department of Environmental Health (the Directorate of Basic Sanitation had no budget for rural sanitation) (Smets 2015). Until 2013, the rural districts had very few staff to

⁷ Previously, water and sanitation were managed jointly under *Direcção Nacional dos Serviços de Água e Saneamento* (DNSAS) (National Directorate for Water Services and Sanitation). (Willetts 2012)

support household-level sanitation (Smets 2015). Hence from 2013-15, the Ministry of Health trialled a program where ‘sanitarians’ were employed at the district level to directly deliver the government’s rural sanitation program (described in Section 2.3.3 below) (Clark and Willetts 2016). Since 2008, hygiene and sanitation promotion has also been conducted by Family Health Promoters through the Ministry of Health-run National Integrated Community Health Services (*Servisu Intergradu Saude Comunidade* (SISCa)) (Smets 2015). Other resources for rural WASH projects are available through the government’s decentralisation plan. For example, in 2014, the *Programa Nasional Dezenvolvimentu Suku* (PNDS) (National Program for Village Development) provided funding for village-level projects which included options for WASH (Smets 2015).

The national government has worked in partnership with other governments and organisations to deliver rural WASH services. For example, the Australian Government supported the development of rural WASH in Timor-Leste between 2002 and 2016 in three phases. The first phase (2002-2006) was called the Community Water Supply and Sanitation Program (CWSSP). The second phase (2007-2012) and third phase (2012-2016) were called BESIK 1 and BESIK 2 respectively (Aurecon Group date unknown).⁸ Other support for rural WASH has come from Japan, the United States, Ireland, Portugal, the European Commission and the Asian Development Bank as well as others (Buhl-Nielson et al. 2009).

Both local and international NGOs and UNICEF were supporting the national government to deliver rural sanitation and hygiene services in Timor-Leste in 2015 (United Nations Children's Fund (UNICEF) 2016). (See Figure 2-9 in Section 2.3.3). Many of these organisations are also involved in rural water supply.

Representatives from the government departments and non-government partners working on WASH in Timor-Leste meet regularly at the national WASH forum and Sanitation Working Group (World Health Organization (WHO) 2015).

2.3.2 Policies

The Timor-Leste Strategic Development Plan 2011-2030 set the ambitious target that all Timorese people would have access to clean water and improved sanitation by 2030 (Government of Timor-Leste 2011). In 2013, the National Directorates for Basic Sanitation (DNSB) and Water Services (DNSA) prepared Five-Year Action Plans which focused on sanitation and water respectively (Smets 2015).

In 2010, the **National Water Supply Policy** was drafted but this is yet to be formally approved (Institute for Sustainable Futures - University of Technology Sydney (ISF-UTS) 2011, Smets 2015, World Bank 2018). In 2012, the **National Basic Sanitation Policy** was approved (Government of Australia 2016). This included four main objectives:

1. An open defecation free environment, including water bodies and institutional buildings
2. All people practice improved hygiene behaviour all of the time, particularly use of a hygienic toilet, handwashing with soap, and ensure the safe disposal of child and infant excreta

⁸ BESIK is the acronym for *Bee, Saneamentu no Ijiene ba Komunitade* (Rural Water Supply and Sanitation Program (RWSSP)).

3. All people and institutions always practice safe management and disposal of solid wastes
4. All people and institutions always practice safe management and disposal of wastewater (and other liquids)

(Government of Timor-Leste 2012 p5)

This policy stipulates that households are responsible for constructing and maintaining their own toilets and handwashing facilities (Government of Timor-Leste 2012).

2.3.3 Approaches

In rural areas, **water supply systems** are constructed and managed by communities at the village level through a process called *Planu Aksaun Komunitade* (Community Action Planning (CAP)) (Government of Australia 2016). Financing for water systems is largely provided by development partners and NGOs (World Bank 2018). Local communities are expected to volunteer their labour and to form a *Grupo Maneija Facilidade (GMF)* (Water Management Group) (Buhl-Nielson et al. 2009, Murta and Willetts 2014). In 2005 the GMF was institutionalised in a decree law which set out the responsibilities of the eight GMF members; namely, collecting funds, facilitating repairs and conducting hygiene promotion activities (Neely 2015, Smets 2015).

Since 2012, the Ministry of Health has endorsed *Planu Aksaun Komunitade Saneamentu no Ijiene* (PAKSI) (Community Action Plan for Sanitation and Hygiene) as the key approach for **ending open defecation and encouraging good hygiene** in rural areas (United Nations Children's Fund (UNICEF) 2016). PAKSI is based on Community-Led Total Sanitation (CLTS) which was introduced to Timor-Leste by WaterAid and other NGOs in 2007 (Murta and Willetts 2014, Grumbley and Moran 2017, Moran 2017). (PAKSI is described in more detail in Section 6.2.3.) Through the PAKSI program, households are expected to finance their own sanitation and hygiene infrastructure unless they are eligible for a 'vulnerable household subsidy' through the Ministry of Social Solidarity (Smets 2015).

As described in Section 2.3.1, the Ministry of Health trialled the implementation of PAKSI by government-employed 'sanitarians'. Furthermore, almost all partners of the Government of Timor-Leste with a rural WASH program have adopted the PAKSI approach (see Figure 2-9) (United Nations Children's Fund (UNICEF) 2016).

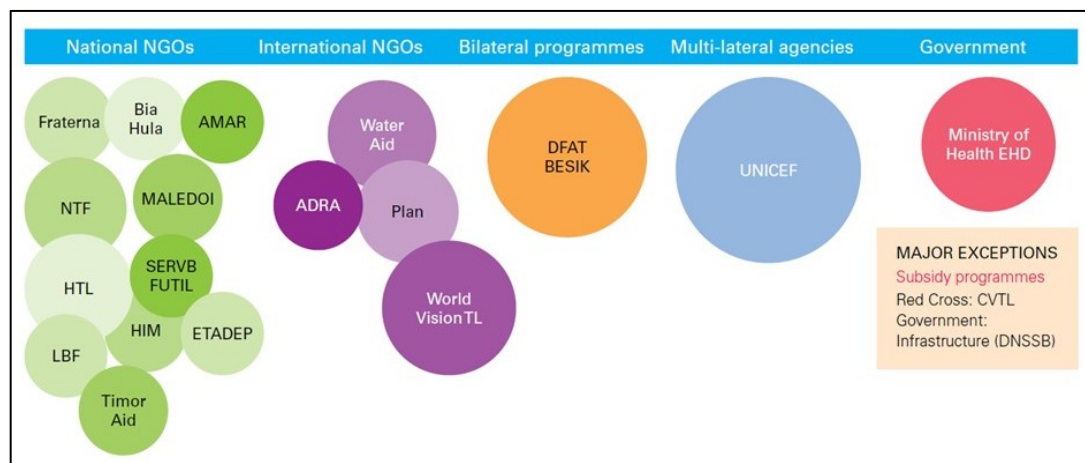


Figure 2-9 Institutions and organisations involved in the delivery of CLTS in Timor-Leste (as at 2015)

(United Nations Children's Fund (UNICEF) 2016 p120)

Not all international NGOs which have a sanitation focus in Timor-Leste implement PAKSI. Some, such as the Timor-Leste branch of the Red Cross, *Cruz Vermelha de Timor-Leste* (CVTL), still implement subsidy- or infrastructure-based approaches to sanitation as part of their broader programs (United Nations Children's Fund (UNICEF) 2016). The Government of Timor-Leste and its WASH partners are concerned because slippage rates for CVTL's subsidised sanitation programs are quite high (86-percent) and are thought to raise expectations of subsidies in neighbouring communities (United Nations Children's Fund (UNICEF) 2016).

Much effort has been made towards monitoring WASH in Timor-Leste. In 2010, the *Sistema Informasaun Bee no Saneamentu* (SIBS) (rural water and sanitation information system) was established (Smets 2015). Data for SIBS is collected via mobile phones in rural areas and sent to a central database via SMS (United Nations Children's Fund (UNICEF) et al. 2013). (However, the mobile data collection system was found to be unsuccessful by UNICEF's review of CLTS in 2016.) There is also a Sector Planning and Reporting Tool (SPRT) for partners such as WaterAid to share their data at a national level (United Nations Children's Fund (UNICEF) 2016).

2.3.4 The WaterAid Timor-Leste program

WaterAid is an international NGO which was formed in the United Kingdom in 1981, dedicated to delivering universal access to sustainable WASH services (WaterAid 2010). The WaterAid Australia office was established in 2003 and began working in Timor-Leste in 2005. By 2007, WaterAid had made a formal agreement with the Government of Timor-Leste to undertake WASH programs in Aileu and Liquiçá municipalities (WaterAid 2010). The program expanded to Manufahi Municipality around 2012.

The approach of WaterAid includes improving access to WASH with a focus on equity and inclusion as well as climate change resilience (WaterAid 2016). The **water supply** component of the Timor-Leste program involves constructing (and occasionally repairing) a water supply system. The two main types of systems WaterAid install are gravity-fed water systems supplied by a spring and pumped ground water. WaterAid

usually aim to install one tap-stand per three to five households. The **sanitation** and **hygiene** component is PAKSI, in accordance with the government sanitation policy.

WaterAid collaborates closely with the government, BESIK and local NGOs. This is to ensure local ownership of WASH development as well as sustainability after WaterAid leave project sites. In 2015 WaterAid worked with two local NGOs in Manufahi Municipality. Both local NGOs worked with multiple organisations apart from WaterAid and WASH was only part of the work that they did.

In choosing which communities to invite for participation in their WASH program, WaterAid coordinates with the government: for example, the district SAS office, to ensure there is no duplication with other WASH programs. Smaller communities (approximately 100-200 households) where there is the least WASH coverage and where access is most difficult are prioritised. Communities where the water supply system is non-existent or more than ten years old are usually eligible. The final selection of communities takes place after feasibility studies for a reliable water source are conducted as well as consultation with community leaders and household representatives.

2.4 Conclusion

This background chapter described some of the information that is needed for the reader to understand the context within which this research took place. The water, sanitation and hygiene sector has evolved over time and this history is important for understanding WASH interventions in the present day. Similarly, understanding some of Timor-Leste's history and culture is critical for understanding any research which takes place there.

Whilst this background chapter has been mostly descriptive, the literature review which follows is a more critical synopsis of the theory and research pertaining to the key themes in my research: Community-Led Total Sanitation (CLTS) and the measurement of CLTS and other WASH interventions, particularly in the context of Timor-Leste.

3 Literature Review

This chapter is a review of the literature relevant to this research. The first section is discusses the origins, activities, key elements, key debates and adaptations of the Community-led Total Sanitation (CLTS) approach. The second section is about how the results of water, sanitation and hygiene (WASH) interventions are measured. The third section describes how CLTS interventions, specifically, are measured and the fourth section summarises the literature about CLTS in Timor-Leste. The final section identifies some of the gaps in this literature which give rise to the objectives and research questions described in the following chapter.

3.1 Community-Led Total Sanitation

Community-Led Total Sanitation is an approach to improve sanitation used by WASH practitioners with the goal being that the communities they work with become open defecation free (ODF). As described in the background chapter, the Government of Timor-Leste adapted CLTS in their national approach to improving sanitation in rural areas, which is called *Planu Aksaun Komunitade, Saneamentu no Ijiene* (PAKSI) (Community Action Plan for Sanitation and Hygiene). WaterAid incorporated PAKSI into its WASH program in Manufahi Municipality, including the communities which were part of the ‘WASH for Worms’ project.

This section of the literature review will describe CLTS and place it within the broader WASH context summarised in Section 2.1 of the background chapter. This background information about CLTS is necessary for understanding some of the major debates about CLTS which will also be presented.

3.1.1 Origins

The origins of CLTS are described by its pioneer Kamal Kar in the first publication about CLTS: ‘Subsidy or Self Respect? Participatory total community sanitation in Bangladesh’ (Kar 2003). In late 1999, Kar undertook a series of participatory impact assessments of a WASH program that a local non-governmental organisation (NGO), the Village Education Resource Centre (VERC), was implementing with WaterAid (an international NGO) in Bangladesh (Kar 2003). Some of the key findings were that: 1) subsidies for toilets were the same in all villages studied, regardless of poverty levels, which meant that the poorest families were still unable to construct toilets; and 2) although toilets were constructed, open defecation was still commonplace. Kar and the team recommended a radical new approach which did not include subsidies and encouraged community members to analyse their own sanitation situations to ‘catalyse community self-help’ (Kar 2003 p4). This approach was piloted in some of VERC’s project sites and eventually scaled up and adopted by other agencies such as Plan International and CARE Australia (Kar 2008). The activities and key elements of this approach are described in the following sections.

3.1.2 Activities

Community-led total sanitation (CLTS) involves facilitating a process to inspire and empower rural communities to stop open defecation and to build and use latrines, without offering external subsidies to purchase hardware (Kar 2005 p2).

Rather than relying on external motivations or incentives, the basic premise of CLTS is that communities are motivated to become ODF through their own means. The source of this motivation is a collective feeling of shame and disgust that is ignited when CLTS facilitators conduct a series of activities designed to make the community realise they are ingesting their own and each other's faeces (Kar 2005).

Kar explained that CLTS was partly inspired by Participatory Rural Appraisal (PRA) (Kar 2003). Chambers, a key proponent of PRA (and an early supporter of CLTS) summarises PRA as a:

family of approaches and methods to enable local people to share, enhance and analyze their knowledge of life and conditions, to plan and to act. PRA flows from and owes much to the traditions and methods of participatory research (e.g. Freire, 1968), applied anthropology, and field research on farming systems (Chambers 1994 p1437).

Chambers acknowledges that whilst PRA is facilitated by outsiders of a community, it is 'owned and shared by local people' (Chambers 1994 p1437). Examples of some of the activities used in PRA are participatory mapping, transect walks, matrix scoring and seasonal calendars (Chambers 1994). Similar activities are undertaken by trained facilitators in the various stages of CLTS.

In 2005, Kar set out the instructions for 'triggering'—the fundamental stage of the CLTS process—in his 'Practical Guide to Triggering Community-Led Total Sanitation' (Kar 2005). This was superseded by the 'Handbook on Community-Led Total Sanitation' in 2008 by Kar with input from Chambers (Kar 2008). Whilst the first guide described the 'triggering' stage, the follow-up handbook consolidated instructions and advice for all four stages of CLTS; namely 'pre-triggering', 'triggering', 'post-triggering' and 'scaling up'. The stages of CLTS according to the 2005 guide and the 2008 handbook are summarised in the following sections.

Note that CLTS activities are undertaken by facilitators. Facilitators should be trained in CLTS and can be employed by either national governments, international or local NGOs. Sometimes 'natural leaders' emerge from communities where CLTS has been successful and these people go on to become CLTS facilitators in other communities. In 2010, Kar published a 'Trainers' Training Guide' to use during CLTS facilitator training workshops (Kar 2010).

3.1.2.1 'Pre-triggering' stage

In the pre-triggering stage, CLTS facilitators meet with community representatives to introduce themselves, build rapport and evaluate the community's suitability for CLTS. There are several factors that contribute to the effectiveness of CLTS, including geographical, physical and cultural conditions, and according to the handbook these should be assessed during the pre-triggering phase (Kar 2008). In particular, the timing of the intervention needs to be planned appropriately to not coincide with busy periods for the community, such as market days or celebrations. This part of the process can take anywhere from half a day to a week (Kar 2008).

3.1.2.2 'Triggering' stage

The purpose of the triggering stage is to bring about the community's collective realisation that they are ingesting their own and each other's faeces. There are several activities which facilitators can conduct during 'triggering' which are outlined in the 2005 guide and 2008 handbook. These activities are summarised below.

Transect walk— ‘A transect walk involves walking with community members through the village from one side to the other, observing, asking questions, and listening’ (Kar 2008 p27). After arriving in the village, the facilitators ask some of the community members who met them to join them on a transect walk through the community. During the walk, the facilitators identify areas where open defecation has occurred, as well as the existence of latrines. Usually this draws interest from other community members who also join in the walk. The facilitators linger at open defecation sites and ask who from the community has defecated there. The handbook states that this an important part of the process because, whilst the local people might be accustomed to the smell and sight of open defecation, having outsiders draw attention to this is a key motivator (Kar 2008).

Community mapping—After the walk, the community are invited to gather together. The handbook does not specify exactly how many people should attend but suggests that ‘a good part of the community’ is ideal and that women, men, and other groups are all represented (Kar 2008 p25). Attendees are then asked by the facilitators to mark out the following: where they live; public buildings; existing latrines; water resources; and where they defecate. This is usually done on the ground with coloured chalk. The facilitators then ‘interview the map’ by asking attendees questions such as how far they have to walk to defecate and whether this location is comfortable or safe (Kar 2008 p32).

Identifying the dirtiest neighbourhoods—In communities where there are clearly defined neighbourhoods or geographical sections, facilitators might encourage the attendees who are gathered to decide in which of these neighbourhoods open defecation occurs the most. According to the handbook, this can be an effective exercise to draw attention to situations where a whole community is defecating in one neighbourhood (usually the poorest).(Kar 2008)

Calculation of faeces production and medical expenses—In this activity, the facilitator will ask the attendees to calculate how much faeces they collectively produce each year. This exercise can also include the calculation of the community’s yearly medical expenses for diarrhoea (Kar 2008).

The Glass of Water! —To bring about the attendees’ realisation that they are ingesting faeces, the facilitator will conduct an activity to demonstrate the faecal-oral pathway. An example of such an activity is the ‘Glass of Water!’ activity where the facilitator brushes a pile of faeces (usually gathered during the transect walk) with a piece of hair, then places the hair in a glass of water and offers the water to an attendee to drink. When he or she refuses, the facilitator explains that flies have legs just like the piece of hair they brushed on the faeces and are able to transfer invisible faecal matter to food and water (Kar 2008).

It is anticipated that around this point the attendees will realise that they are eating their own and each other’s faeces. This moment of realisation is referred to by Kar as ‘ignition’ and ideally results in the attendees deciding to take action to become ODF (Kar 2008). In the handbook Kar stresses that this decision should be made completely independently by the attendees and he encourages the facilitators to thank the community for their time and stop the meeting here (Kar 2008).

The handbook describes a range of responses from the attendees. They may express doubt, hesitation or disagreement about how to move forward or make no indication of changing their current sanitation behaviour (what Kar refers to as a ‘damp matchbox’) (Kar 2008 p38). However, if the triggering has worked properly, the response from the

attendees should be an enthusiastic declaration to change their practices and become ODF ('matchbox in a gas station') (Kar 2008 p38). In the case of a 'matchbox in a gas station', the facilitators are encouraged to assist the community to form a sanitation action committee to oversee the process of becoming ODF (Kar 2008).

In many CLTS programs, it is assumed that households will progress along what is called the 'sanitation ladder' to become ODF. The 'sanitation ladder' usually refers to a progression of technical options for places to defecate; ranging from least desirable (open defecation) to most desirable. Given that sanitation infrastructure varies according to context, WASH programs often have their own version of the sanitation ladder which is applicable to their project sites. An example from Zimbabwe is shown below in Figure 3-1.

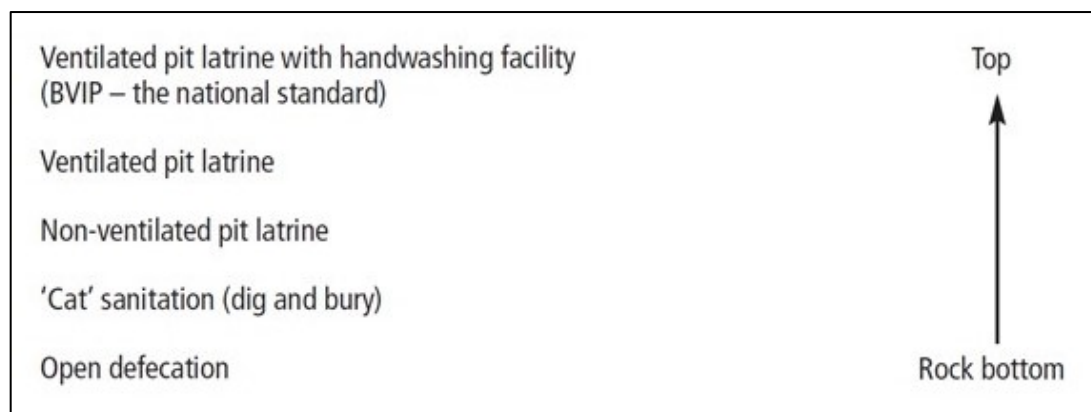


Figure 3-1 The sanitation ladder model for rural communities in Zimbabwe
(Rukuni 2010 p145)

The 'steps' in sanitation ladders are sometimes likened to the 'service levels' of the Joint Monitoring Programme (JMP) standards for sanitation (see Section 2.1.3 in the background chapter). However, they differ in that sanitation ladders depict infrastructure options (that is, types of toilets) whereas the JMP standards describe service levels (that is, the level of access to safe sanitation).

3.1.2.3 'Post-triggering' stage

The post-triggering stage consists of several activities to assist communities in the process of becoming ODF. In the handbook, Kar explains that facilitators should be ready to start these activities immediately after triggering because '100 per cent ODF status may be achieved within a few days, weeks or months depending on conditions and the size of the community' (Kar 2008 p45).

Follow-up visits by CLTS facilitators include assisting individual households with their plans to construct latrines, encouraging households who are better-off to help others and encouraging the involvement of children through schools or youth groups (Kar 2008).

Monitoring – The facilitators should check with community members about whether they would like to conduct monitoring of latrine construction or other indicators. If a hard copy of the community map was created during the triggering stage, this can be used to keep track of latrine construction progress as well as to create a sense of competition between households (Kar 2008).

Natural leaders – Community members who take responsibility or show extra enthusiasm during the triggering activities are referred to by Kar as ‘natural leaders’ (Kar 2008 p47). The handbook encourages facilitators to identify, acknowledge and encourage these people during the follow-up visits. Natural leaders often go on to become facilitators themselves and to inspire other communities to become ODF (Kar 2008).

Sanitation markets—Facilitators should connect communities dedicated to becoming ODF with local sanitation markets if there are any, to enable them to upgrade their toilets as soon as possible (Kar 2008).

Verification is an inspection which takes place when a community believes it has reached ODF status. Kar makes several suggestions about how this could be done effectively and to avoid false declarations of ODF status. For example, including a variety of representatives in the inspection team such as natural leaders, government representatives and people from neighbouring committees can be effective for avoiding false self-declaration of ODF status. Surprise visits, or repeated inspections can ensure that ODF status is maintained (Kar 2008).

Certification is a celebration that takes place once a community has been verified to be ODF. Celebrating the achievement of ODF status is considered important both for the community to take pride in their work and to demonstrate to other communities and local authorities the importance of becoming ODF (Kar 2008).

3.1.2.4 Scaling-up and sustaining ODF status

Hancock defines scaling-up as ‘to efficiently increase the socioeconomic impact from a small to a large scale of coverage’ (Hancock 2003 p5). In his 2008 working paper about the scaling-up of CLTS, Deak describes the spread of CLTS as being both horizontal and vertical (Deak 2008). Horizontal scaling-up involves the spread of CLTS from one community to other communities, usually through word-of-mouth and when natural leaders from ODF communities become facilitators in neighbouring communities (Deak 2008). Vertical scaling-up describes the incremental institutionalisation of CLTS, such as when CLTS is adopted into national government sanitation programs (Deak 2008).

In the 2008 handbook, Kar includes a short section about scaling-up and going beyond CLTS. He warns of the danger of compromising the quality of CLTS when scaling up too quickly (Kar 2008). The motivation for Kar’s 2010 ‘Trainers’ Training Guide’ was partly to ensure that the quality of CLTS facilitation was maintained as CLTS went to scale (Kar 2010).

At the time of finishing this thesis, Kar was about to release a new book entitled ‘From Village to Nation—The Complete Guide to Community Led Total Sanitation’. The book will be based on the 2008 handbook but will include more detailed sections about scaling-up, in what Deak described as the vertical trajectory (that is, towards institutionalisation), and strategies for ensuring that the ODF status of certified communities is sustained (CLTS Foundation 2018).

The main stages of a CLTS intervention and their corresponding activities have been presented here. As well as these activities, there are several key elements which underpin the CLTS approach and these are described in the following section.

3.1.3 Key elements

The key elements underpinning CLTS are described in the papers Kar, often together with other early supporters, wrote about CLTS during the decade following its inception. These key elements (in bold) are described below.

The **lack of hardware subsidies or materials for toilets** is a key element of CLTS (Kar 2003, Kar and Pasteur 2005, Kar and Bongartz 2006, Bongartz et al. 2009). Kar observed, in several settings, that approaches which included hardware subsidies often did not lead to communities becoming 100-percent ODF (Kar 2003). Instead, he argues that communities should address the problem of ODF using their own means (Kar 2003).

In several early publications (Kar 2003, Kar and Pasteur 2005) about the progress of CLTS, Kar and other supporters described the challenge of getting institutional support for a non-hardware subsidy approach to sanitation. They pointed out that, in contexts where there was a mixture of hardware subsidised approaches and non-hardware subsidised approaches, communities might prefer to wait for hardware subsidies before taking their own action to become ODF (Kar 2003, Kar and Bongartz 2006, Bongartz et al. 2009).

Kar argues that, when done properly, **CLTS facilitation is not educative or advisory** because such a style would also serve as a form of external motivation (Kar 2005). Kar and Pasteur encourage facilitators not to come across as educative, authoritative or critical (Kar and Pasteur 2005). Instead, the facilitators should be ‘hands-off’ and take the role of convening, appraising and analysing the community’s sanitation practices in conjunction with community members (Kar and Pasteur 2005 p1).

The ‘**self-mobilisation**’ by communities to take their own action to become ODF is also a key element of CLTS (Kar 2003 p4). The strength of CLTS according to Kar is that, rather than being externally motivated by subsidies; incentives; or advice from outsiders, communities are self-motivated which means that more effective, rapid and efficient change is possible (Kar 2003, Kar and Pasteur 2005, Kar and Bongartz 2006).

Within CLTS, the key motivators for this self-mobilisation are feelings of **disgust, shame and self-respect** (Kar 2003, Kar and Pasteur 2005, Bongartz et al. 2009). In the 2005 guidebook, Kar explains that when community members confront the fact that they are ingesting each other’s faeces, their feelings of disgust are triggered (Kar 2005). When this realisation occurs in the presence of a visitor to the community, feelings of shame arise (Kar 2005). Kar assumes that ‘no human being can stay unmoved once they have learned that they are ingesting other people’s faeces’ (Kar 2005 p3). Therefore, he explains that the need to reduce feelings of disgust and shame and regain self-respect are critical motivators in CLTS (Kar 2005).

Given that CLTS does not use hardware subsidies, Kar describes it as a **low-cost approach** (Kar and Pasteur 2005). In his 2003 paper, Kar compares the construction costs of community-innovated latrine models in Bangladesh with other low-cost models designed by ‘external experts’ (Kar 2003 p12). He found that the community-innovated latrines ranged from USD1.9-5.96 and those designed by ‘external experts’ ranged from USD3.43-15.15 (Kar 2003).

Although there are no material or construction expenses, CLTS interventions still require budgets to cover facilitators’ wages, transport, facilitation materials, training and organisation overheads. Estimates of the cost of CLTS approaches in different parts of the world range from USD2.30-10 per beneficiary (Bevan 2011, Harvey 2011, 2011).

The key elements of CLTS summarised here are what set the approach apart from other sanitation interventions. However, as CLTS was scaled up to more countries and contexts, debates emerged amongst practitioners and researchers about various aspects of the approach. From these debates emerged a greater question about whether CLTS should be implemented in the same way everywhere, or whether it should be adapted to different contexts. The following two sections will present these debates.

3.1.4 Key debates

Community-Led Total Sanitation has many passionate supporters and has spread to more than 60 countries since it was first trialled in the Rajshahi District of Bangladesh (da Silva Wells and Sijbesma 2012). Despite its popularity, there are debates about some aspects of CLTS which are discussed below.

3.1.4.1 Incentives: subsidies and rewards

Incentives are defined as public subsidies given in various forms to the private sector to encourage socially desirable actions by private entities (Gregerson 1984 p302).

Although Gregerson was referring to subsidies as a public policy instrument to manage deforestation, subsidies have been used in similar ways to improve household access to sanitation (Jenkins and Sugden 2006). Gregerson (1984) went on to argue that subsidies for private actions are justified if the public get more benefit than the private entity which performed that action. Jenkins and Sugden argue that this applies to sanitation also. That is, 'that the public health and development benefits of good sanitation go beyond the private benefits which the individual gains by choosing latrine use over open defecation' (Jenkins and Sugden 2006 pp5-6).

Whilst CLTS requires funding (for example, to cover the costs of facilitation and project management) resources in CLTS projects are not spent on incentives or subsidies for toilet hardware (Sijbesma 2008, Harvey 2011, Harvey 2011). Kar decided to try this approach after observing several projects which used hardware subsidies but did not lead to 100-percent ODF communities (Kar 2003). In the years since the inception of CLTS, practitioners and scholars have debated whether a completely non hardware subsidy approach is most effective for bringing about sustainable ODF communities. This section will present some of the different perspectives in this debate.

Evans et al. (2009) divide the arguments supporting the use of hardware subsidies in sanitation interventions into two groups: moral and economic. The moral arguments for providing hardware subsidies are that citizens have a right to sanitation, and it is the governments' duty to uphold this basic right (Evans et al. 2009). Economic arguments assume that individuals value sanitation less than society does, and subsidies can be used to compensate for this (Evans et al. 2009). Some of the case studies shared during the CLTS workshop of the 2009 African conference included examples of interventions where subsidies were necessary to gain the interest of community members who had competing demands (such as food security) for their attention which is an example of the economic justification for the use of subsidies (Bongartz 2009). Similarly, Guiteras et al. (2015) found, in a cluster randomised control trial (RCT) of sanitation interventions in Bangladesh which included options such as community motivation and strengthening the sanitation market, that subsidies were most effective for reducing open defecation.

Conversely, there has been considerable opposition to the use of hardware subsidies in sanitation programs. This perspective was summed up by public health scholars

Cairncross, Bartram, Cumming and Brocklehurst (Cairncross et al. 2010 p5) in their call for:

an end to donors and NGOs pressuring governments to apply or increase hardware subsidies in sanitation programmes in the belief that they will increase uptake rates despite the well documented corrosive effects of this approach.

Several scholars have identified various negative effects of sanitation hardware subsidies. Firstly, hardware subsidies can **create dependency** which means that households might not be willing or able to maintain or replace their toilets unless further subsidies are provided, especially if the infrastructure is very expensive (Jenkins and Sugden 2006, Evans et al. 2009). Approaches which include hardware subsidies are **supply-driven rather than demand-driven** and those offered the subsidy might take it simply because it is free and not end up using the toilet (Jenkins and Sugden 2006, Evans et al. 2009).

Households might **delay constructing** their own toilets if they expect to get sanitation subsidies in the future (Jenkins and Sugden 2006, Kar and Bongartz 2006, Sah and Negussie 2009). This is particularly the case in communities which are neighbours to other communities which have received hardware subsidies as part of a sanitation program. This has been described in case studies in Senegal (Trémolet et al. 2010) and Nigeria (Robinson 2012, Bawa and Ziyok 2013). An expectation for a subsidy might not just arise due to sanitation projects in neighbouring communities but from other projects (for example, agriculture development) happening in the same village (Kar and Bongartz 2006).

Furthermore, hardware subsidies are **expensive** and therefore difficult to apply at scale (Jenkins and Sugden 2006, Evans et al. 2009). For example, Trémolet et al. (2010) describe a program in Senegal which was initially very effective but had to stop scaling up because it ran out of funding. This is especially the case when there is an expectation or requirement that the toilets being provided are of a high standard: for example, when the government is the donor (Evans et al. 2009).

Hardware subsidies might **discourage innovation** and necessary adaptations to local conditions if a standard model of toilet is supplied everywhere (Evans et al. 2009). In turn, these could **distort local markets** when the subsidy is given to suppliers (Jenkins and Sugden 2006, Evans et al. 2009).

Finally, hardware **subsidies often do not reach the poorest households**. This can be because such households cannot afford the gap in cost if the hardware subsidy is only partial (Kar 2003, Sijbesma 2008) or because households need to meet conditions such as owning the title to their land to be eligible for the subsidy (Jenkins and Sugden 2006, Evans et al. 2009, Trémolet et al. 2010).

Furthermore, the 2008 CLTS handbook suggests that subsidies for the poor are unnecessary because:

‘when it occurs well, CLTS revives traditional social practices of self-help and community cooperation and creates new examples of social solidarity and cooperation between rich and the poor in achieving ODF status.’
(Kar 2008 p9)

Sometimes incentives for improved sanitation come in the form of rewards for communities which have become ODF rather than up-front hardware subsidies. An example of this is the financial reward scheme called the *Nirmal Gram Puruskar* (NGP)

which is granted by the President of India to village councils which have achieved ODF status (Dyalchand et al. 2011). This kind of incentive is also critiqued. Robinson (2012) found that the NGP scheme was effective in initially motivating communities to construct latrines. However several studies (Kar 2008, TARU Leading Edge 2008, Khale and Dyalchand 2011, Sanan 2011) suggest that many communities which receive the NGP award are not sustainably ODF and may never have been ODF. Kar (2008 p55) argues that this is because when rewards like the NGP are promised ‘the scope for abuse is obvious’.

In between those who support and those who are against hardware subsidies and rewards in sanitation programs, there are those who argue that *in certain circumstances* subsidies are appropriate or necessary; although they should be used cautiously. ‘Smart subsidies’⁹ for helping the poor is one such circumstance. The ‘idealized notion of “community”’ helping the poorest of the poor outlined in the 2008 CLTS handbook was challenged by Mehta (2011 p9) who argued that ‘flexible arrangements are necessary to ensure that the poorest of the poor are not excluded.’ Trémolet et. al (2010) found in their six-country review of sanitation financing that pro-poor subsidies helped communities in Bangladesh achieve 100-percent ODF status. Perez et al. (2012) drew a similar conclusion in their three-country study of India, Indonesia, and Tanzania. More recently, the World Bank’s 2017 report about reducing inequities in WASH also acknowledged that ‘it may be prudent to employ subsidies [for certain households] due to low income levels’ to improve access to sanitation (World Bank 2017 pxix). In 2017, a randomised control trial conducted by iDE and Casual Design found that offering partial subsidies to poor households lead to an increase in toilet uptake by 14 to 16 percentage points, thus supporting the notion of smart subsidies (Lestikow and Nicoletti 2017).

As part of the series published by the CLTS Knowledge Hub, Meyers et al. (2017) discuss the need to assist the ‘least able’ to become open defecation free as part of CLTS interventions. They distinguish between ‘facilitating and strengthening intra-community support’ and ‘providing support from outside’ which includes cash transfers and other subsidies (Myers et al. 2017 p2). Whilst this indicates some concession on the stipulation that no subsidies be used in CLTS interventions, the authors still warn that:

Careful consideration of the trade-off between ensuring the human right to sanitation for the least able and perversely incentivising those that do not act for themselves is needed (Myers et al. 2017 p3).

Similarly, the World Bank cautions that subsidies are often ‘expensive, poorly targeted, non-transparent, and distortionary’ but in their 2019 report ‘Doing More with Less: Smarter Subsidies for Water Supply and Sanitation’, they offer guidance on how policy makers can still use subsidies to support the poor without these negative effects (Andres et al. 2019 pxi).

Historically, using subsidies was the standard approach in sanitation interventions (see Section 2.1.4.2) even though, as discussed in the literature presented in this section, there are numerous arguments for not doing so. Perhaps when Kar first pioneered CLTS it was necessary to completely oppose the use of subsidies to convince the sector to change its approach. However, Kar’s absolute resolution might no longer be necessary: the detailed critique of subsidies in the sanitation literature here suggests that the sector now

⁹ Smart subsidies are ‘well targeted, outcome-based, cost-efficient, and designed to promote competition for customers and avoid disruption to local markets’. (United Nations Children's Fund (UNICEF) 2013 p13)

understands the risks associated with subsidies far better than it did previously. Furthermore, it seems that there are contexts or situations where a subsidy or partial subsidy is beneficial, or even essential, for improving access to sanitation; and therefore, completely banning subsidies would mean that some people miss out. Fortunately, it appears that the sector is becoming somewhat flexible about subsidies, with positive results.

3.1.4.2 Punishments

There is also a debate about whether punishments for open defecation should be meted out as part of CLTS interventions. In some contexts, national CLTS guidelines include instructions for punishment of those who open-defecate. For example, the Tanzanian national guidelines for rural CLTS state that teachers and pupils are responsible for punishing ‘pupils who are found practising OD’ (Government of Tanzania 2016 p38). Similarly, the 2007 Handbook for Facilitators (of CLTS) in Nepal suggests that community-based CLTS committees should ‘develop rules and regulations regarding [open defecation] and make people follow [these]’ (Resource Centre Network Nepal (RCNN) 2007 p17). These ‘rules’ included ‘[publishing] the names of people who do not stop defecating openly’; driving away those who are ‘spotted in the act’ by ‘blowing whistles’; posting flags with people’s names on them near faeces that are in the open and making those people pay fines (Resource Centre Network Nepal (RCNN) 2007 p17). In their field note about CLTS in Madagascar, Gaya et al. (2015 p4) described ‘enforcement mechanisms or punishments’ (such as fines for open defecation) as being a part of ‘normalization, or making the new practice common’. Similarly, in their study of CLTS in Bangladesh, (Choudhury and Hossain 2006) found that the threats of fines or litigation were necessary to get some households to construct proper latrines.

The critique of the use of punishments in CLTS fall into two broad categories: those who argue that punishments do not result in sustainable ODF communities and those who argue that punishments are a violation of human rights. Kar and Bongartz (2006 p5) were critical of the use of fines in Bangladesh because households would ‘construct toilets out of fear of being fined’ without properly understanding why they should build toilets. (Instead, the authors found that chickens were being allowed into the toilets and eating human faeces.)

The use of punishments and threats as a means to end open defecation has also been critiqued as a violation of human rights (Bartram et al. 2012, Galvin 2015). In an extreme example of the use of threats to coerce people into constructing latrines, in one CLTS program in Bangladesh it was declared by the Village Development Committee that no penalty would be meted out to those who raped women or girls who defecated in the open (Mahbub 2011) (Whether this was actually carried out was not mentioned.) Bartram et al. (2012) described this as a violation of human rights because it restricted access to justice for those who experienced such violence. Similarly, Bartram et al. (2012) argue that punishments such as social sanctions through mockery or throwing stones (as described by Devine (2009)) and locking people out of their houses (described by Chatterjee (2011)) are also violations of human rights.

Presumably, the use of punishments arose out of a need to motivate those who continued to practise open defecation whilst their peers changed their behaviour by constructing and using toilets. An unpleasant consequence for non-compliance to a publicly agreed norm is a motivator used in all parts of the world. For example, in

Australia, if you leave your garbage on the footpath you are likely to get fined by the council.

However, the use of the punishments in CLTS interventions described above is different from a regulatory framework such as that in the example of garbage disposal in Australia. There are two main issues with the use of punishments described in this section. Firstly, these kinds of punishments seem to disproportionately disadvantage those who are least able to comply to the new norm (in this case, ceasing open defecation): for example, people from low-socio-economic households. (This is discussed by Morales and Harris (2014).) The second issue is about the tension between people's right to health (in this case through not being exposed to faecal-transmitted pathogens) and their right to dignity, safety and shelter (in this case, access to justice and housing and freedom from violence and humiliation). This tension is the subject of much literature and discussion beyond the scope of this thesis; however, it is difficult to justify the breach of one set of human rights (dignity, safety and shelter) to address pre-existing violations of human rights (health). Furthermore, this type of justification is too narrow because it ignores the broader structural issues that contribute to the absence of the right to health and instead, punishes individuals who have varying means and power to change their behaviour.

Finally, this brief discussion relates to the question of whether 'negative emotions' such as humiliation brought about through punishments are effective in bringing about lasting behaviour change. Morales and Harris (2014) suggest that 'positive emotions' such as pride and self-respect are possibly more effective. This leads into another key CLTS debate: whether disgust and shame are appropriate motivators for behaviour change, and this will be discussed in the following section.

3.1.4.3 'Disgust' and 'shame' as motivators for behaviour change

In his 2005 practical guide to CLTS Kar explained that a key principle of CLTS triggering is that participants are inspired to change their behaviour because of feelings of shame and disgust, rather than because of a health message (Kar 2005). The questions of whether shame is *effective* for motivating participants to cease open defecation and whether, regardless of effectiveness, using such an approach is *ethical* are debated by WASH implementers and researchers alike.

Disgust is defined by the Merriam-Webster dictionary as: 'marked aversion aroused by something highly distasteful'. Disgust is manifested as 1) a characteristic facial expression (detectable across cultures), 2) withdrawal, stopping the activity or dropping the object that caused disgust, 3) physiological changes such as lowered blood pressure and galvanic skin response, and 4) reports of negative effect such as nausea (Curtis et al. 2011 p390).

Charles Darwin was likely the first person to document the idea that disgust is a universal human emotion in his (1872) book: 'The Expression of the Emotions in Man and Animals'. The role of disgust in motivating people to behave in certain ways, has been discussed by anthropologists and psychologists alike (see, for example, Douglas (1966) and Rozin et al. (1999)) More recently, scholars such as Curtis and her colleagues at the London School of Hygiene and Tropical Medicine have focused on the role of disgust in sanitation and hygiene behaviour change. (See Curtis, Barra and Aunger (2011); Curtis, Aunger and Rabie (2004); and Curtis and Biran (2001).) They explain that humans and animals have evolved to protect themselves from parasites through both physiological immune systems and 'behavioural immune systems.'. Part of the behavioural immune

system is disgust: ‘a psychological mechanism for producing pathogen avoidant behaviour’ (Curtis et al. 2011 p389).

Again, Darwin (1872) was likely one of the first people to document the notion of ‘shame’. Like disgust, shame is an emotion which manifests across all cultures albeit in varied ways (Wong and Tsai 2007). Shame is categorised as a ‘self-conscious emotion’ together with pride, guilt and embarrassment (Lewis 2000 p623).

‘Pride occurs when one makes a comparison or evaluates one’s behaviour vis-à-vis some stand, rule or goal (SRG) and finds that one has succeeded. Shame or guilt, on the other hand, occurs when such an evaluation leads to the conclusion that one has failed’ (Lewis 2000 p623).

Dąbrowski explained, in his 1967 book ‘Personality-shaping Through Positive Disintegration’, that shame is an indicator that a person is ready to reconcile the difference between who they are and who they would like to be through behaviour change.

There appears to be very little critique of the use of disgust in CLTS. However, the use of tactics which incite shame in CLTS participants, to motivate them to change their sanitation behaviour, has been criticised by many in the WASH sector; including those who support CLTS. In Greaves’ compilation of recommendations for the use of CLTS in emergency contexts, he explained that:

The debate has been between those who believe that the element of shame as applied during a CLTS trigger is unethical as it amounts to degrading and embarrassing the community, and those who believe that the element of shame is actually positive, and that it indeed awakens the community to the realities of open defecation (Greaves 2012 p26).

In separate publications about CLTS, Devine (2009) and Sah and Negussie (2009) are critical of the use of shame in CLTS. Lomas and Hammersley-Mather (2016) present a case study of CLTS in Madagascar where a staff member from the implementing NGO felt that the use of offensive sign boards (to discourage open defecation) ‘had the potential to put the livelihoods of the NGO’s 65 Malagasy staff and their families at risk’”. In their article which questions whether CLTS programs in Indonesia are a ‘return to colonial public health practices’ Engel and Susilo (2014 p157) argue that the use of shaming techniques is ineffective for bringing about sustained behaviour change and possibly immoral. Furthermore, Bartram and his colleagues (2012 p500) question whether it is a breach of human rights to condone ‘systemic humiliation of community members who will often represent the least educated and those with the least means to act in the manner demanded’.

There have been several different responses to the criticism of the use of shame in CLTS. Some proponents, such as Chimhowa (2010 p71) argue that the use of shame and other ‘culturally insensitive’ tactics are necessary for motivating people to become ODF.

Other proponents say there are different types of shame and only some types of shame should be used. Otieno argues that shame which instigates insight and inspiration to improve is acceptable whereas shame that attacks self-esteem and leaves participants feeling helpless and angry is not productive. He writes that CLTS facilitators are responsible for the type of shame used. For example, if the facilitator does not conduct a truly participatory session then there is a risk that the process will be derogatory toward the community (Otieno 2011). Musyoki and Winartasaputra (2012) and House and Cavill (2015) explain that CLTS participants’ feeling of shame is evoked by the process of

realising they are ingesting their own faeces, rather than from the facilitators shaming them directly. It is implied that this first type of shaming is justified whereas the second type is not. Similarly, Harvey (2011 p1038) describes the CLTS triggering process as one of 'guided discovery' which is designed to provoke feelings of shame and disgust rather than being a shaming technique itself.

Finally, there are a group of CLTS proponents who argue that it is disgust, or other emotions such as dignity and pride which motivate people to change their sanitation behaviour and therefore the use of shame is unnecessary. For example, Peter Hawkins, senior WASH specialist with the World Bank, proposed that people's 'natural' disgust for faeces is what motivates their behaviour change, rather than shame; at least in the early stages of the CLTS process (Bolton and Kanguru 2013). Bongartz (2011) explains that in CLTS it is positive emotions such as self-respect, dignity and pride which inspire action and change.

There seem to be parallel debates taking place with respect to the use of shame and disgust as motivators for behaviour change in CLTS. Firstly, there is a lack of consensus about whether it is shame or disgust (or neither) which is effective for motivating participants to stop defecating in the open. At the time that data collection for this research took place, to my knowledge there was very little documentation of studies which measured this (see Hullah et al. (2015)). Since data collection took place, two studies found that disgust and shame are effective motivators for sanitation behaviour change (see Lawrence et al. (2016) and McMichael and Robinson (2016)). More recent research suggests that other factors are important. For example, in the first study of the psychosocial mechanisms of CLTS, Harter, Mosch and Mosler (2018 p1) found that the factors which influenced whether participants built a latrine included 'the behavior of others in the community, the (dis)approval of others of latrine ownership, personal self-confidence in latrine building, and a precise communication of the benefits of latrine ownership during a CLTS triggering event'. In the same project sites, the researchers found that factors associated with whether participants rebuilt latrines after they were damaged or collapsed included: education, soil conditions, social cohesion, feeling safe from diarrhoea, the perception that others owned latrines and self-efficacy (Mosler et al. 2018). That is, there was no mention of disgust or shame in these studies. In another study, which focused on CLTS in rural Ghana, Harter, Lilje and Mosler (2019 p5467) found that 'whether such feelings as shame and disgust are necessary to driving latrine construction is not yet understood'.

Secondly, there is a debate about whether the use of shame is ethically justified (regardless of whether it is effective). At the time that this research took place, this debate remained unresolved and opinions varied across contexts. In Timor-Leste, at least, CLTS was only accepted as a national strategy by the government on the proviso that its focus would be more on disgust than shame (Kidd et al. 2011).

The fact that there are such detailed discussions about the distinction between 'good' and 'bad' shame suggests that the sector is at least aware that relying on 'negative' emotions to achieve the goal of ODF communities is problematic. If CLTS continues to be promoted as a sanitation intervention, it is critical that both the question of whether shame and disgust are *effective* motivators for behaviour change and whether this is an *ethical* approach, need to be resolved.

As explained in the previous section, in deciding whether the use of shame and disgust as motivators for behaviour change is ethical, consideration needs to be made about whether these means justify the end goal (open defecation free communities).

Experiencing shame implies a loss of dignity and potential for self-judgement, hence it being termed a self-conscious emotion. This kind of approach should be avoided if other, effective, approaches exist; particularly if the use of shame disproportionately disadvantages people who are least able to change their behaviour. Disgust, on the other hand, is not a self-conscious emotion in the way that shame or pride are. Hence, approaches which rely on disgust for motivating behaviour change are likely to be less problematic.

3.1.4.4 Providing technical assistance for building toilets

The question of whether CLTS facilitators should provide participants with technical assistance for building toilets: for example, instructions for building specific models or types of latrines, is debated amongst CLTS proponents. Both the 2005 CLTS Guide and 2008 CLTS Handbook instruct facilitators:

DO NOT prescribe models of latrines. Remember that the central idea of CLTS is not to prescribe the best and most durable model of toilet to the community at first, but to initiate local action for communities to look for their own alternatives to open defecation (Kar 2008 p37).

According to Kar (2003) the conventional or ‘formal engineering’ approach to improving sanitation starts with an expensive latrine model and tries to design it more cost effectively. Instead, Kar (Kar 2003 p14) advocates ‘barefoot engineering’ where toilets are designed by CLTS participants using local materials. Kar and Bongartz (2006) explain that the intended benefit of the latter approach is two-fold. Firstly, it reduces the dependency of communities on external assistance or knowledge. Secondly, households will likely feel a greater sense of ownership over a toilet which they have designed themselves which, in turn, likely leads to sustained use of the toilet.

However, not all CLTS proponents agree with Kar’s insistence on adhering to ‘barefoot engineering’. Papafilippou et al. (2011) summarise this debate in their paper entitled ‘Is there a role for external technical support in the Community Led Total Sanitation (CLTS) approach?’. The authors asked 48 engineers and social scientists involved with CLTS to what extent technical support for toilet construction was necessary for bringing about sustained ODF communities through CLTS. Overall, those interviewed thought that technical support was necessary; however, the amount and timing thereof varied. There was concern that ‘barefoot engineered’ latrines were likely to pose environmental and public health hazards such as exposed pits or from construction on high water tables. (See Kalimuthu and Hossain (2008) for more discussion about this.)

In contrast to Kar’s argument that ‘barefoot engineered’ toilets bring about sustained use, the participants in the study by Papafilippou et al. (2011) were concerned that the opposite was true because these designs would be uncomfortable or dissatisfying for the users. For example, a latrine without a ventilation pipe will eventually smell quite badly and unsupported pits will eventually collapse. Ogunjobi et al. (2013) presented a case study from Nigeria where communities that had participated in a CLTS program had become ODF but reverted to open defecation once latrine pits, which were dug out of sandy soil, started to collapse. In response, a local artisan centre was established which has successfully designed models of toilets which do not collapse in the sandy soil and can be demonstrated to communities wishing to construct toilets (Ogunjobi et al. 2013).

The example of the local artisan centre in Nigeria contradicts Kar’s instruction not to prescribe certain models of latrines to CLTS participants. However, the local nature of

the centre, and others like it, perhaps partly address Kar's concerns about the need for participants' sense of ownership over their toilets and the need for independence from external engineers. These case studies are likely to be what Papafilippou et al. (2011 p92) intended when they encouraged practitioners to 'not just follow the CLTS methodology dogmatically where technical support is clearly beneficial'. The adaptations of CLTS, from the original guidebook and handbook, to different contexts is widely discussed among its proponents: this is what the following section will address.

3.1.5 Adaptations of the approach

After CLTS was pioneered in 2000, it rapidly became a popular approach and Deak explained that 'similar to the first few years of PRA [...] it was fashionable to claim that CLTS was being used' (Deak 2008 p32). Since 2000, practitioners and academics alike have discussed whether the key elements of CLTS should be clearly defined and adhered to or variations and adaptations of CLTS are acceptable and even necessary.

CLTS practitioners at the South Asian Conference on Sanitation (SACOSAN) II in Pakistan, 2006, argued that the definition of CLTS should be context-dependent; thereby allowing for some adaptation of the CLTS approach (Deak 2008). They raised concerns about the prospect of identifying a 'purist', or fixed definition of CLTS (Deak 2008 p32).

However, the rapid emergence of CLTS variants in the early 2000s meant that there was a risk of CLTS becoming 'conflated with other discourses' in what Deak has termed the 'bandwagon effect' (Deak 2008 p32). For example, the Total Sanitation Campaign in India is sometimes called CLTS although it lacks the key CLTS element of community self-mobilisation described in Section 3.1.3 above (Deak 2008). Deak identifies two issues with the bandwagon effect. Firstly, CLTS might appear to be more widespread than it is when it is conflated with other approaches. Secondly, Deak argued that it is important to define CLTS clearly to be able to provide CLTS facilitators a standard from which to work (Deak 2008). Thus, Deak asks 'what exactly is CLTS [and] at what point does it become something altogether different?' (Deak 2008 p32).

Similarly, Kar and Chambers felt that it was important to implement CLTS in a consistent manner. In 2007 Kar and Chambers wrote an open letter to the CLTS community expressing their appreciation for the rapid spread of CLTS (Kar and Chambers 2007). However, they urged that CLTS should only go to scale if the quality of implementation could be assured. Kar and Chambers called for consistency, in particular with regard to ensuring that 1) funding for CLTS projects was steady but not excessive so as not to tempt project managers to provide subsidies, 2) there were staff who were dedicated to CLTS full-time and that they received hands-on training, and 3) there was follow-up after triggering (Kar and Chambers 2007).

It seems that whilst Kar and Chambers called for consistency in the implementation of CLTS they also allowed for *some* adaptations. They published the CLTS handbook a year after the open letter was written, with the hope that it would help maintain and improve the quality of CLTS as it went to scale (Kar 2008). As in their open letter, they outlined some key elements of CLTS that should be adhered to such as encouraging people to design their own latrines and to not offer subsidies (Kar 2008). However, they also stressed that the guidelines set out in the handbook should be adapted to local contexts, and facilitators should feel free to be innovative in their approach (Kar 2008).

Later that year, in a second open letter, Kar and Chambers again urgently insisted that CLTS be done with quality and consistency (Kar and Chambers 2008). They felt that CLTS was being 'increasingly abused' and saw that moment as a juncture in CLTS

history where CLTS could spread effectively, or rapidly degenerate (Kar and Chambers 2008). In the letter, Kar and Chambers again reiterated the key elements of CLTS and reminded readers of the ultimate aims of CLTS (Kar and Chambers 2008). Finally, they appealed to the CLTS community to only use the term 'CLTS' in reference to practices which adhered to the key elements outlined in the letter (Kar and Chambers 2008).

In a 2009 workshop for practitioners, government and United Nations representatives involved with CLTS, the participants reflected on what 'the underpinning beliefs and principles' of CLTS should be. They agreed that:

it is good to be rooted in a philosophy and be reflective as otherwise CLTS could just become a mechanical practice: In order to move people, we need something to believe in (Bongartz 2009 p21).

In the years since its inception, CLTS has spread to many countries and has been adopted by governments and NGOs alike. In their overview of approaches to hygiene and sanitation software Peal et al. listed several approaches which are based on CLTS (Peal et al. 2010). Some of these include:

- Community-Led Basic Sanitation – Nepal Water for Health in Nepal
- Sustainable Community-Owned Total Sanitation (SCOTS) – Plan in India
- Total Sanitation Campaign (TSC) – Government of India
- Southern Nations Nationalities and People's Region project (SNNPR) – Ethiopia
- Learning by Doing: At Scale Hygiene and Sanitation Improvement, Amhara – Ethiopia
- The Decentralised Integrated Sanitation, Hygiene and Reform Initiative (DISHARI) – Bangladesh
- Community Approaches to Total Sanitation (CATS) – UNICEF

(Peal et al. 2010)

For all these approaches, CLTS has been adapted to suit different organisations' values. For example, UNICEF's Community Approaches to Total Sanitation (CATS) includes CLTS as well as other approaches which adhere to the nine 'CATS Essential Elements' (which are very similar to the CLTS key elements described in Section 3.1.3 above (United Nations Children's Fund (UNICEF) 2009). Like UNICEF, the international group of organisations which form the Red Cross and Red Crescent movement have also adopted CLTS. However, for them, a 'purist CLTS approach does not seem an appropriate approach' (Gonzalez et al. 2010 p5). In their 2010 discussion paper about CLTS in the Red Cross and Red Crescent movement, Gonzalez et al. described a hybrid approach adopted by the movement which drew upon elements of both PHAST (described in Section 3.1.1 above) and CLTS. They recognised that CLTS triggering was effective for creating demand but felt that a completely non subsidy approach was inappropriate for extremely poor households. The use of shame in CLTS was also problematic for the Red Cross movement, which preferred to focus more on the participants' sense of self-respect which could emerge from 'natural disgust' (Gonzalez et al. 2010 p13).

In addition to CLTS variations by organisations, examples of adaptations to different geographic contexts emerged in many parts of the world. Many of these were described in two collections of CLTS case studies from different countries that were published in 2010. 'Shit Matters: The potential of community-led total sanitation' included examples

of CLTS in Bangladesh, India, Indonesia and some African countries (Mehta and Movik 2011). ‘Tales of Shit’ was published after a ‘writeshop’ held in Kenya with CLTS practitioners from around the world and described many of the geographical adaptations of CLTS (Ashley et al. 2010). For example, in their study of CLTS programs in Zambia, Zulu, Harvey and Mukosha (2010) found that whilst CLTS was an appropriate approach for Zambian rural communities, it needed to be adapted for urban and peri-urban situations. This was because in urban areas they found there was less community cohesion, denser populations and higher rates of tenancy rather than home-ownership (Zulu et al. 2010). In their chapter about the implementation of CLTS in Zimbabwe, Chimhowa (2010) also advocated for a higher degree of flexibility in the implementation of CLTS because of the variability of social and cultural contexts, even within Zimbabwe.

The rapid spread of CLTS and its adaptations in the decade since its establishment inspired practitioners and scholars to meet and discuss the progress and potential of CLTS. In 2010, two ‘Regional Sharing and Learning Workshops’ were attended by ‘CLTS decision-makers, practitioners and networkers’ (Lusaka Declaration 2010). One workshop took place in Lusaka, Zambia, which produced a document called the ‘Lusaka Declaration’ (2010). The ‘Bamako CLTS Consensus’ emerged from the other workshop which was held in Bamako, Mali (Bamako CLTS Consensus 2010). Both documents summarised the key lessons learned from CLTS implementation globally as well as recommendations for future CLTS programs. The lessons and recommendations included topics like those raised by Kar and Chambers in their open letters in 2007 and 2008, such as the importance of training facilitators well, following-up properly and ensuring that funds were not used as incentives for becoming ODF.

In the following year, the ‘Lukenya Notes on Going to Scale with Quality’ (2011) emerged out of a meeting of CLTS practitioners convened by the Institute of Development Studies (IDS) after the AfricaSan3 meeting in Lukenya, Kenya. Like the Lusaka Declaration and the Bamako Consensus, this document summarised key lessons and recommendations for CLTS practitioners and decision-makers. Unlike calls from Kar and Chambers in their open letters from 2007 and 2008 for CLTS to be scaled up slowly and with caution, the Lukenya Notes (2011 p4) stated that:

‘CLTS is now irreversibly being taken to scale with unstoppable momentum. Going slow is not an option. As a matter of urgency, therefore, we came together to brainstorm ideas, and compile and collate evidence and experience, and present these without delay.’

It seems that with the scaling up of CLTS and its adaptations to various organisations and geographical contexts there is a persistent tension between defining the key elements of CLTS and allowing for variations on these key elements. Some of this confusion is alleviated by the CLTS Knowledge Hub website which documents both the original guide and handbook by Kar as well as several country specific CLTS guides. Hosted by the Institute of Development Studies, the CLTS knowledge Hub was established by Kamal Kar and Lyla Mehta in 2009 to share findings, document variations and host some of the debates about CLTS (which are discussed in Section 3.1.4). In addition to the country-specific CLTS guides, the website also describes the adaptations of CLTS for urban, emergency, school and other settings (Institute of Development Studies 2019).

It should be assumed that everyone involved in the debate about whether CLTS should be adapted to different contexts is striving to achieve a common goal of ending open defecation; albeit through slightly different means. Regardless, to understand whether it is ‘pure’ CLTS or adaptations of CLTS that lead to open defecation free communities, it is

paramount that implementers at least define clearly what they are doing. A year after Harvey, together with his colleagues, had argued that CLTS should be adapted for urban contexts in Zambia, he cautioned that:

‘hybrid approaches threaten to create confusion as to what the “pure” CLTS approach entails and it is important that evaluations determine whether programmes meet existing CLTS guidelines or are in fact variations on the approach’ (Harvey 2011 p104).

The following section discusses this very issue; that is, the importance of documenting what takes place in an intervention regardless of whether it adheres to a theoretical definition or an adaptation of an approach.

3.1.6 Intervention fidelity

Horner et al. (2006 p80) explain that ‘intervention fidelity means that the intervention was conducted as planned.’ Even if CLTS guidelines are adapted to local contexts, this does not mean that implementation at the project level will adhere to these guidelines or to what implementers report they are doing. Hence, despite the documentation of CLTS variations for different countries and contexts, the separate issue of intervention fidelity at the project or community-level remains.

Carroll et al. (2007) conducted a review of the literature published between 2002 and 2007 pertaining to conceptual frameworks for measuring intervention fidelity. Their findings were incorporated into the development of a new framework depicted in Figure 3-2 below.

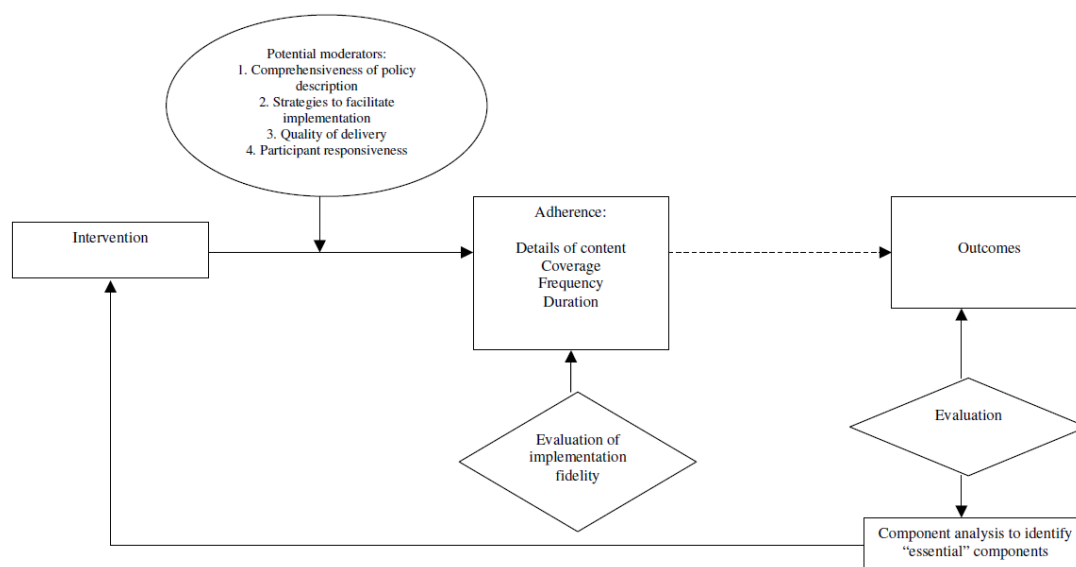


Figure 3-2 Conceptual framework for implementation fidelity

(Carroll et al. 2007 p4)

This framework clearly identifies the elements that need to be measured to assess intervention fidelity. However, a potential limitation of the framework is that the context within which the intervention is implemented is not included as a potential moderator. Interventions do not exist outside of a context which is something that health systems theory acknowledges.

Health systems research frameworks can help us to understand the way in which an approach such as CLTS is translated from manuals and guidebooks to project sites which exist in different contexts. One such framework is the ‘Dynamic Responses Model’ which was originally developed by McPake, Blaauw and Sheaff (2006) during a Health Systems Development Programme funded by the United Kingdom Department of International Development. This is illustrated in Figure 3-3 below.

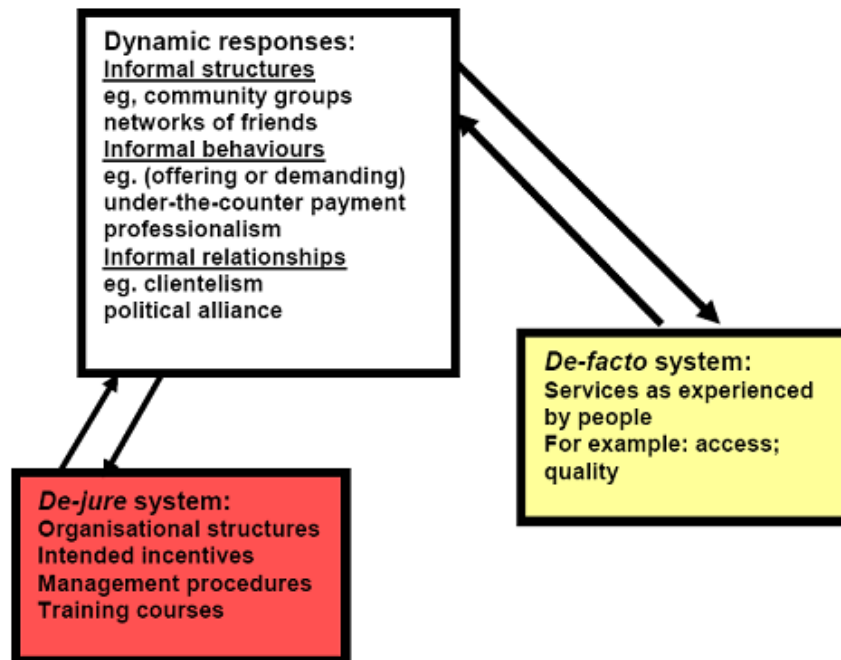


Figure 3-3 A conceptual model for health systems research

(McPake et al. 2006 p16)

The premise of the Dynamic Responses Model is that within health systems there is a ‘*de-jure* system’ (that is, the formal organisational structure of the system and its intended outcomes) and a set of ‘dynamic responses’ to that system (which include informal structures, behaviours and relationships: that is, the context). Emerging from the ‘dynamic responses’ to the ‘*de-jure*’ system is the ‘*de-facto* system’ (that is, health services as experienced by the people who use it). The directional arrows between these three elements represent the dynamic interactions between them. The lack of arrows directly linking the ‘*de-jure*’ and ‘*de-facto*’ systems emphasises the main premise of the model: that nothing occurs in a health system without human interaction or independently of context (McPake et al. 2006, Ssengooba et al. 2007).

The Dynamic Responses Model is intended to draw attention to the differences between the way health systems are formally described (for example, in policies and manuals) and the way health systems are experienced. A similar disjuncture might be found between the theoretical basis of an intervention such as CLTS and the way implementers and the intended beneficiaries of CLTS interpret and experience it. Bartram and his colleagues lamented that ‘there is precious little evidence of exactly what is happening on the ground at all’ in regard to CLTS (Bartram et al. 2012 p501). Ficek and Novotny (2018 p2) also noted that very little ‘analytical literature has been published about how the implementation of CLTS is evaluated.’ In their study of CLTS programs across 13 countries, Sigler et al. (2014 p16) found that ‘a wide range of activities are conducted

across the different programs and often go beyond standard CLTS activities.’ These authors all called for more empirical studies to understand what activities were taking place in CLTS programs and which of these were most effective for ending and sustaining open defecation.

3.2 How water, sanitation and hygiene interventions are measured

‘A program theory is an explicit theory or model of how an intervention, such as a project, a program, a strategy, an initiative, or a policy, contributes to a chain of intermediate results and finally to the intended or observed outcomes’ (Funnell and Rogers 2011 pxix).

A program theory is beneficial for several reasons including that it facilitates agreement amongst various stakeholders about the purpose and operations of their intervention as well as enables those stakeholders to identify any unintended outcomes of the program: whether these are positive or negative. The measurement—or monitoring and evaluation—of an intervention is also made easier when a program theory is clearly defined (Funnell and Rogers 2011).

Funnell and Rogers (2011) explain that a program theory should have two parts: a theory of change and a theory of action. The theory of change describes the processes of change: for example, in sanitation programs the important processes of change might be a mixture of psychological and economic processes. The theory of action refers to how interventions are constructed to bring about the desired change. That is, the series of steps in an intervention which start with what Poulos, Pattanayak and Jones (2006) call the ‘planned work’ and ends in the ‘results’ of an intervention (this is described in Section 3.2.1).

This section will describe some of the ways of measuring what Funnell and Rogers (2011) have termed the theory of action. In his paper entitled ‘Evaluating and Improving the WASH sector’, Garandeau (2009) presents an overview of the ways in which WASH interventions are evaluated. He identifies three types of evaluations which focus on the theory of action: evidence-based evaluations; realistic evaluations; and complexity evaluations.

3.2.1 Evidence-based evaluations

Evidence-based evaluations assume that interventions are a series of steps which link the intervention inputs to the results via a ‘causal chain’ (Garandeau 2009 p10). This is represented by the ‘Generic Model of a Program’ described by Poulos, Pattanayak and Jones (2006 p4) in Figure 3-4 below.

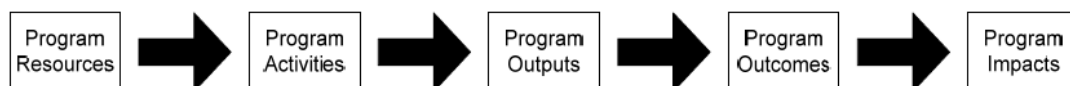


Figure 3-4 Generic Model of a Program

(Poulos et al. 2006 p4)

Poulos, Pattanayak and Jones (2006) divide the causal chain into ‘planned work’ and ‘results’. The ‘planned work’ consists of **resources** (financial, material, social and institutional) and **activities** (actions and processes such as construction or training). The ‘results’ of the intervention are divided into **outputs**, **outcomes** and **impacts**. **Outputs** are the products, capital, goods and services arising directly from the intervention inputs such as toilets built in a WASH intervention. **Outcomes** are the changes in knowledge and behaviour in the short or medium term of an intervention. **Impacts** are the long-term effects of an intervention: direct or indirect; positive or negative; intended or unintended (Poulos et al. 2006).

More complex versions of the causal chain depicted in Figure 3-4 are called ‘logical frameworks’ (Garandeau 2009 p11). The WASH sector measures indicators defined in logical frameworks using methods adopted from medical research such as longitudinal studies; case-control studies; randomised controlled trials; quasi-experimental evaluations; and non-experimental evaluations (Cairncross 1999, Garandeau 2009).

3.2.2 Realistic evaluations

Usually, the main aim of WASH interventions is to bring about positive health impacts; however, the assumption of linear, unidirectional causation in evidence-based evaluations is often an oversimplification (Garandeau 2009). Hence, ‘realistic evaluations’ seek to open the ‘black box’ of causality and examine *why* interventions bring about certain impacts. A sub-set of ‘realistic evaluations’ is ‘theory-based evaluations.’ These evaluations describe a theory of change; identify assumptions about causality; and describe unexpected as well as anticipated or positive results (Weiss 2000).

As part of the shift toward realistic evaluations, the World Health Organization developed the Minimum Evaluation Procedure (MEP) (World Health Organization (WHO) 1985). The MEP focuses on the context, processes, **outputs** and **outcomes** of WASH interventions (for example, toilets and their use); rather than just on the **impacts** on health (which evidence-based evaluations tended to do). Furthermore, the MEP considered socio-economic impacts and used both qualitative and quantitative methods (Garandeau 2009). Another evaluation tool developed around this time which used qualitative, participatory methods was the ‘Hygiene Evaluation Procedures’ created by Almedom et al. (1997).

3.2.3 Complexity evaluations

Garandeau (2009 p26) concluded that ‘there is no real consensus on what should be evaluated in WASH interventions, and how.’ Evidence-based evaluations have the advantage of producing numerical outputs which are easily stored and analysed (Sijbesma and Postma 2008); however, such evaluations risk oversimplifying complex phenomena. Realistic evaluations offer a more comprehensive description of WASH interventions and use qualitative methods which consider the perspective of participants; however, these approaches are sometimes criticised for seeming less rigorous or objective. Garandeau (2009) explained that both types of evaluations have been criticised for being too focused on a simple causal chain between interventions and impacts. Similarly, Guijt and Roche (2014) also critique the assumption that change in development work is linear and can therefore be measured by the steps described in the ‘Generic Model of a Program’ alone (introduced in Section 3.2.1 above). Instead, they call on those evaluating development programs to embrace ‘a complexity perspective’ which acknowledges uncertainty (Guijt and Roche 2014 p53).

This critique, together with a general shift in focus within the WASH sector in the late 1990s, gave rise to ‘complexity evaluations’ (Garandeau 2009). The WASH sector evolved from merely installing hardware such as wells and toilets to acknowledging that social and management processes such as water governance, hygiene promotion, institutional development and gender equity are important aspects of their work. This shift required evaluation methods that could engage with high levels of complexity. Furthermore, there was demand for evaluations which described not only whether interventions worked but also where, when, why and how they worked; as well as how to scale up interventions and sustain their impacts (Garandeau 2009, Sparkman 2012).

Garandeau (2009) presented ‘complexity evaluations’ (which are based on complex adaptive systems theory) to address this need because they enable evaluators to describe the ways in which the resources, activities and outputs of WASH interventions are adaptive and responsive in non-linear and unpredictable ways. Neely (2013) too argued that complex adaptive systems theory should be used to better understand WASH interventions in the context of Timor-Leste. (She went on to do this as part of her PhD research about water systems in the Timor-Leste WaterAid program. See Neely (2015) and Neely and Walters (2016).)

3.2.4 Behaviour change frameworks

Much of the work of WASH practitioners seeks to bring about behaviour change in target communities (Stanton et al. 1992, Carter 2015). However, it was not until the 1970s that WASH practitioners (predominantly engineers) began to conduct behavioural studies of their work (Sijbesma and Postma 2008). Behaviour change theory helps to explain the variables which determine behaviour at individual, interpersonal, organisational and community levels in different contexts (Painter et al. 2008).

Professionals from many sectors, including psychology, health promotion, economics, marketing and design, have proposed myriad behaviour change frameworks (Aunger and Curtis 2016). These frameworks inform both the design and the evaluation of behaviour change interventions (Rimer and Glanz 2005, Sigler et al. 2014). A full discussion of behaviour change theory is beyond the scope of this thesis; hence, this section will introduce some behaviour change frameworks and models which focus on WASH specifically.

Several scholars have created taxonomies of behaviour change techniques to aid the design and evaluation of interventions which seek to change health behaviours. (See, for example, Abraham and Michie (2008); Prochaska, DiClemente and Norcross (1992); Hausmann-Muela, Ribera and Nyamongo (2003) and, Hardeman et al. (2000)) In their review of behaviour change techniques used in CLTS programs, Sigler et al. (2014) found that most activities corresponded to three behaviour change models: the Health Belief Model (HBM), the Social Cognitive Theory (SCT) and the Transtheoretical Model (TTM).

The **Health Belief Model (HBM)** is the result of the work undertaken by several researchers (in particular G. M. Hochbaum, S. S. Kegeles, H. Leventhal and I. M. Rosenstock) at the United States’ Public Health Service in the 1950s (Rosenstock 1974). The theory underlying the model was that the main factors influencing a person’s behaviour were:

- Perceived Susceptibility – the extent to which a person feels they are at risk of a particular outcome of their behaviour (for example the risk of contracting a disease if they wash their hands)

- Perceived Seriousness – a person’s belief about the seriousness of the outcome of their behaviour (for example whether not washing one’s hands will lead to death or just temporarily feeling unwell)
- Perceived Benefits of Taking Action and Barriers to Taking Action – perceived benefits are a person’s assessment of whether performing a behaviour will benefit them. Perceived barriers are a person’s assessment of what will prevent them performing a behaviour
- Cues to Action – these include internal cues (for example, pain or symptoms) and external cues (for example information in the media) to perform a behaviour
- Self-efficacy – a person’s belief about their ability or competency to perform a behaviour.

Self-efficacy was included in the model in 1988 when Rosenstock, Strecher and Becker (1988) realised they needed an extra indicator to explain the differences they were observing in people’s behaviours. However, at the time, these researchers advocated incorporating self-efficacy into the other factors described in the HBM. It was not until later that self-efficacy was listed as a separate factor (Abraham and Sheeran 2007).

Social Cognitive Theory (SCT) was developed by Bandura in the 1960s when it was still referred to as Social Learning Theory. (LaMorte 2019) Bandura (1986) described SCT in his book ‘Social foundations of thought and action: a social cognitive theory’. His theory was that human motivation and action are influenced by reciprocal interactions between cognitive, behavioural, and environmental factors. There are six central concepts in SCT:

- Reciprocal Determinism – that there is a dynamic and reciprocal relationship between a person, their environment, and their behaviour
- Behaviour Capability – that for a person to successfully perform a behaviour, they must know how to do it
- Observational Learning – that people witness behaviours performed by others and are able to reproduce those behaviours
- Reinforcements – that there are internal and external responses to a person’s behaviour, and these influence whether they continue that behaviour
- Expectations – that a person anticipates the outcomes of their behaviour, and this influences whether they perform that behaviour
- Self-efficacy – that a person believes in their ability to perform a behaviour

(LaMorte 2019)

Whilst other behaviour change theories at the time focused on the initiation of new behaviours, Bandura also placed great emphasis on the maintenance of these new behaviours.

The **Transtheoretical Model (TTM)**, sometimes referred to as the ‘Stages of Change’ was developed by Prochaska and DiClemente (1992) in the late 1970s. The Model sets out five stages of behaviour change:

- Precontemplation – a person is usually unaware of the negative consequences of their behaviour and do not plan to change

- Contemplation - a person is usually aware of a problem with their behaviour and are thinking about changing it but have not yet committed to act
- Preparation - a person has committed to act but has not yet done so
- Action - a person modifies their behaviour
- Maintenance – a person consolidates their new behaviour and prevents relapses

The model is presented here linearly and, in the early days of developing the model, Prochaska and DiClemente assumed that people moved this way through the stages. They later found that relapse was more common than linear progression, especially for people trying to change addictive behaviours. Consequently, they adjusted the model to be a spiral instead, as shown in Figure 3-5 below.

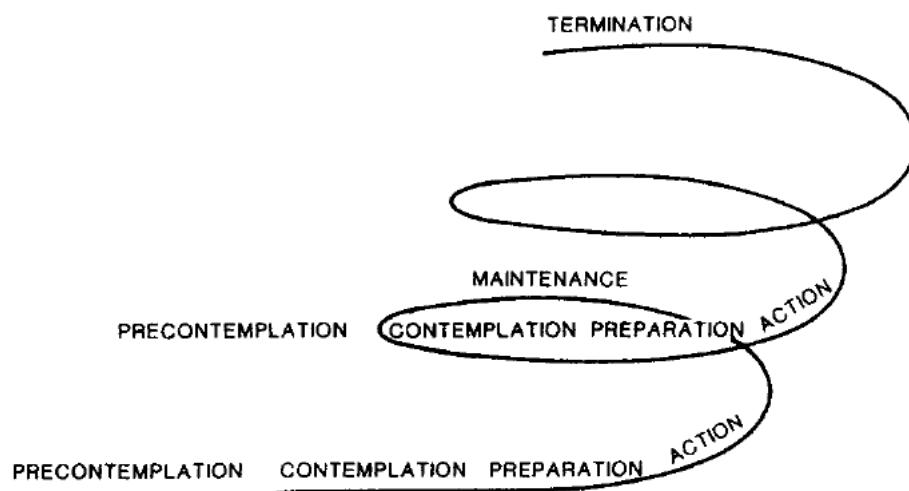


Figure 3-5 A Spiral Model of the Stages of Change

(Prochaska et al. 1992 p1104)

All three of these models are adequate for describing the CLTS programs; however, they were not designed for analysing WASH interventions specifically (Sigler et al. 2014).

Several behaviour change frameworks and strategic planning processes have been developed specifically for WASH interventions (Dreibelbis et al. 2013). Some of these are introduced in Table 3-1 on the following pages. They are not all strictly theoretical frameworks for behaviour change; some are practical frameworks or strategies for planning and implementing WASH interventions. Nevertheless, they all offer frameworks for the analysis of behaviour change in WASH interventions.

Table 3-1 A selection of WASH-focused behaviour change frameworks, models and strategic planning processes

Name	Description
Behaviour Centred Design	This framework, developed by the London School of Hygiene and Tropical Medicine, draws on the behaviour change theories from many disciplines. This framework includes a five-step theory of change: an intervention will change the environment which in turn triggers changes in the brains of participants and therefore they will behave differently. This brings about changes in the world : for example, improved health, profits or social benefits (Aunger and Curtis 2016). The efficacy of the BCD framework has been demonstrated in several settings (see Judah et al. (2009); Greenland et al. (2016); and Biran et al. (2014)).
Framework to Assess and Monitor the enabling environment	This framework was developed by the World Bank's Water and Sanitation Program (WSP) and comprises eight dimensions. For example, institutional arrangements, availability of products and services as well as aspects of the intervention implementation (Perez 2012).
Household-Centred Environmental Sanitation (HCES)	The HCES was developed by the Swiss Federal Institute of Aquatic Science and Technology (eawag) and is based on the 2000 Bellagio Principles for Sustainable Sanitation which argue for human dignity and environmental security; the participation of all stakeholders; integrated waste management processes; and resolution of sanitation problems at the household or community level (eawag 2005).
Integrated Behavioural Model for Water, Sanitation, and Hygiene (IBM-WASH)	IBM-WASH is a synthesis of the existing models and frameworks for designing and evaluating WASH-interventions that academic Dreibelbis and his colleagues identified during their 2013 systematic review of WASH studies. IBM-WASH considers three sets of factors (Contextual; Psychosocial; and Technology) at five levels (Societal/Structural; Community; Interpersonal/Household; Individual; and Habitual) (Dreibelbis et al. 2013).
Nudging	Nudging is a theory that was originally described in the field of behavioural economics but has also become popular in public health (Vlaev et al. 2016). Nudges 'alter the environmental context in which a decision or behaviour is completed' to stimulate the unconscious decision-making processes that impact behaviour (Dreibelbis et al. 2016 p2). Dreibelbis et al. have used 'Nudging' in hand-washing interventions in schools in Bangladesh.

Name	Description
RANAS	The RANAS model was developed by Mosler at the Swiss Federal Institute of Aquatic Science and Technology (eawag). The model consists of five groups of factor blocks: Risk; Attitudinal; Normative; Ability; and Self-regulation factors. The model proposes a toolkit of behaviour change interventions that correspond to each factor block (Mosler 2012).
SaniFOAM	SaniFOAM (Focus-Opportunity-Ability-Motivation) was also developed by the WSP. 'Focus' is for defining the desired behaviour as well as the target population of the behaviour change intervention. The determinants of sanitation behaviour are categorised under three headings: Opportunity; Ability and Motivation. SaniFOAM is useful in the context of sanitation interventions because it considers both internal determinants of behaviour (for example, a person's belief about the risk of open defecation) and external determinants of behaviour (for example, government subsidies for latrines) (Devine 2009, O'Connell and Devine 2015).
Sanitation 21	Sanitation 21 is an approach designed by the International Water Association. It considers all levels of urban environments (households as well as neighbourhoods); external determinants of behaviour; technical options; and the management requirements of a sanitation program (International Water Association (IWA) date unknown).
Strategic Sanitation Approach/Strategic Sanitation Planning (SSA/SSP)	This framework, developed by the WSP, is focused on long-term, city-wide, integrated approaches rather than short-term projects (Tayler et al. 2000).

The WASH-focused behaviour change frameworks and models presented here are by no means an exhaustive list: there are many for practitioners and researchers to choose from. However, several scholars argue that many health behaviour change programs, including those that are WASH-focused, still lack a clearly defined theoretical basis which compromises the quality of these interventions. (See Aboud and Singla (2012); Stanton et al. (1992); Sigler et al. (2014); Briscoe and Aboud (2012) and, Dreibelbis et al. (2013).) In particular, Briscoe and Aboud (2012) found that many programs use trial and error to select the behaviour change activities they conduct with communities instead of identifying the underlying behaviour change mechanisms that are relevant to that community. The RANAS model, which is described in the following section, offers a method for identifying appropriate behaviour change activities for target communities.

3.2.4.1 The RANAS (risk, attitudes, norms, abilities, and self-regulation) Model of Behaviour Change

The RANAS (risk, attitudes, norms, abilities, and self-regulation) Model of Behaviour Change was developed by Mosler and Contzen at the Swiss Federal Institute of Aquatic

Science and Technology (eawag) to better understand health behaviour change, particularly within the WASH sector. It brings together several existing theories of behaviour change and offers a process for designing and evaluating targeted behaviour change interventions. Mosler (2012 p432) explains that the outcomes of behaviour change processes include behaviour, intentions and habit and that these are:

‘the result of psychological processing of factors within the individual’.

Contzen and Mosler (2015) argue that to effectively change behaviour, intentions and habits, the ‘behavioural factors’ which are important to a particular group of people must be identified and strategically targeted with interventions that correspond to those behavioural factors. In the RANAS model, these behavioural factors are categorised into 17 types (Mosler 2012).¹⁰ These are arranged in five ‘factor blocks’ which are shown in Figure 3-6 below. As a result of the interventions (shown on the left in Figure 3-6) the participants will either practise new behaviour (Behaviour A) or continue their existing behaviour (Behaviour B).

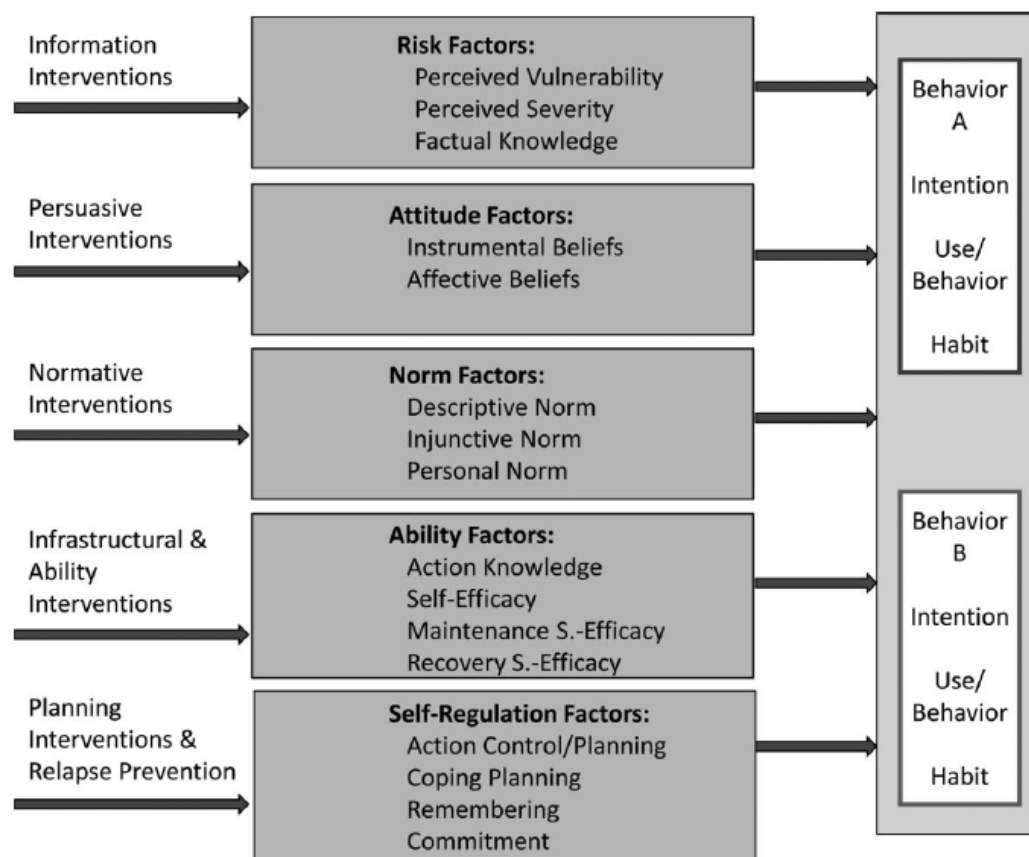


Figure 3-6 The RANAS Model of behaviour change

(Mosler 2012 p433)

¹⁰ Sometimes, ‘Action Control’ and ‘Action Planning’ are merged as a single factor, and then there is only a total of 16 factors.

Risk Factors includes factors about a person's perception of their vulnerability to, as well as the consequences of, a negative health outcome such as contracting a disease. These factors are about knowledge and understanding (Mosler 2012).

The **Attitude Factors** block includes a person's beliefs about the costs and benefits of a new behaviour as well as how performing or thinking about the new behaviour will make a person feel (Mosler 2012).

The **Norm Factors** block includes factors that relate to which behaviours a person thinks most other people are performing; which behaviours are approved of or disapproved of by others (especially authority figures); and which behaviours they think they, personally, should or should not do (Mosler 2012).

The **Ability Factors** block refers to whether a person believes that they can perform a new behaviour through knowing how to do it; trusting they are able to organise for the new behaviour to happen; trusting that they can manage barriers to performing the new behaviour; and trusting they can recover when they fail to perform the new behaviour (Mosler 2012).

The **Self-Regulation Factor** block is about sustaining the new behaviour. It includes factors relating to monitoring, planning, remembering and committing to the new behaviour (Mosler 2012).

In 2012, Mosler had already identified a limitation in the RANAS Model that he had helped to create: that is, that it is focused on the psychology of individuals. He pointed out that the model:

‘makes no statements about changes on the meso- and macro-level, such as institutions, the economic or political system, or even changes in the environment (Mosler 2012 p445).’

He moderated this limitation by explaining that the RANAS model would indirectly detect the influence of meso- and macro-level systems though because these systems influence behavioural factors in individuals (Mosler 2012).

Nevertheless, in 2015, a new part of the RANAS model appeared which was designed to capture factors influencing behaviour that were additional to the psychosocial factors described in the original model. These were named ‘Contextual Factors’ and are depicted in the diagram of the RANAS model as influencing each of the behaviour change techniques, the factor blocks and the resulting behaviours (Contzen and Mosler 2015). (See Figure 3-7 below for the updated version of the RANAS model.)

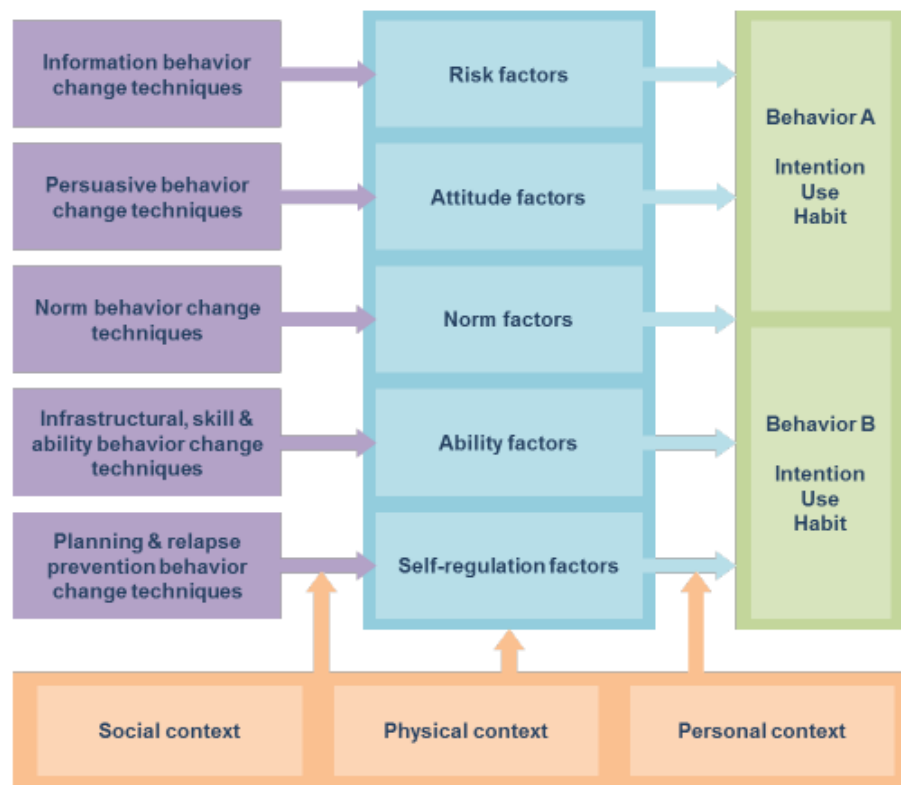


Figure 3-7 The RANAS Model of behaviour change – updated version

(Contzen and Mosler 2015 p1)

The contextual factors were organised in three groups: social, physical and personal. The **social** contextual factors included culture and social relations; policy; law; economic conditions; and the information environment. **Physical** contextual factors included aspects of the natural and built environment such as soil type; topography and climate. The **personal** contextual factors included socio-demographic characteristics such as age; sex; educational achievement; religious beliefs; and the health of the person (Mosler and Contzen 2016, Nunbogu et al. 2019).

There appears to be very little discussion of the interrelation between the psychosocial factors described in the RANAS model. However, Mosler and Contzen (2016) describe the influence of the contextual factors on the rest of the model. The contextual factors might **mediate the impact of the chosen behaviour change technique on its associated psychosocial factor**. For example, an information behaviour change technique which uses complicated written material will have a different effect on someone who is highly educated than on someone who is illiterate. The contextual factors might **change the psychosocial factor**. For example, someone who has a high income will perceive the costs of WASH infrastructure as less expensive than someone with a low income. Finally, the contextual factors might **change the psychosocial factors' influence on behaviour**. For example, even if someone desires safe water, they will not access safe water if contextual factors such as the built environment or government policy deny such access.

It appears from recent studies that these contextual factors are not always included in research which uses the RANAS model. For example, Friedrich et al. (2020) trialled the use of RANAS to increase latrine use in Karnataka, India. A limitation of their study was

that **social** contextual factors such as a concurrent sanitation intervention called Swachh Bharat Mission (SBM) were not accounted for in their findings. However, another study which focused on the connection between mental health and access to safe drinking water in Malawi did include the measurement of mental health which is a personal contextual factor (Slekiene and Mosler 2019). Given that the addition of these contextual factors to the RANAS model is relatively recent, it is likely that the inclusion of these factors in WASH studies which use the RANAS model will increase.

Contzen and Mosler (2012, 2015) set out an eight-step protocol for behaviour change interventions which refers to the RANAS Model. This protocol firstly includes a ‘doer/non-doer analysis’¹¹ to **identify** which behaviour factors are relevant to the desired behaviour in the group of intended beneficiaries. This analysis would identify, for example, whether a person’s decision to stop open defecation is more influenced by their ‘factual knowledge’ about the risks of open defecation or an ‘affective belief’ that it is disgusting to come into contact with other people’s faeces. The next set of steps in the process include **selecting, implementing** and **evaluating** interventions which are known to affect the behavioural factors identified in the first steps. For example, if it is found that ‘factual knowledge’ is a highly relevant behavioural factor in a person’s decision to stop open defecation then an appropriate intervention might be an education campaign about faecal-transmitted diseases (Mosler 2012, Contzen and Mosler 2015). The rationale for this approach was that instead of deciding on which behaviour change intervention to implement via trial and error, this protocol offered a mechanism for tailoring interventions to the needs and characteristics of the target population.

There are two main limitations of the RANAS model and the associated protocol for WASH program design and evaluation. These limitations are identified by the authors of the model, Mosler and Contzen, as well as others in the WASH sector. Firstly, the reliance on self-reported data relating to behavioural outcomes and their associated psychosocial factors is cited as a limitation in the RANAS model by several authors. (See Dreibelbis et al. (2013); Seimetz et al. (2017); Harter et al. (2020); and Nunbogu et al. (2019)) Dreibelbis et al. (2013) explain that self-reported behavioural outcomes have dubious reliability and validity. They concede that there have been attempts to ameliorate this limitation in the RANAS model by operationalising ‘many of its determinants through single questions in a survey [but] more information is required on the reliability and validity’ of this method (Dreibelbis et al. 2013 p10).

Secondly, the model and protocol are quite complex, and they do not necessarily lead to better outcomes than simpler behaviour change models. For example, Andrade et al. (2019) compared the RANAS Model and Health Belief Model to predict health behaviours in response to flooding in Ireland. Their findings suggested that the RANAS model was more robust in certain contexts within the study. However overall, the Health Belief Model was far simpler to use and almost as robust as the RANAS model.

Whether a tailored approach leads to better access to WASH than a single approach implemented at scale is yet to be understood. Dockx et al. (2019) are currently conducting a study which will compare the effect of a tailored, or contextualised,

¹¹ In a doer/non-doer analysis, ‘the responses of people who do the behavior (doers) is are compared to the responses of those who do not (non-doers); a large difference in the responses between doers and non-doers shows that the behavioral factor in question critically steers the behavior and thus can be addressed through behavior change techniques (BCTs) to change the behavior’ (Contzen and Mosler 2015 p2)

intervention to a non-contextualised intervention on improving handwashing, sanitation and health in rural Tanzania.

3.3 How Community-Led Total Sanitation interventions are measured

The methods used to evaluate WASH interventions (discussed in the previous section) have informed the way CLTS interventions are measured and evaluated. Many evaluations of CLTS interventions measure the **resources, activities, outputs, outcomes** and **impacts** of the program, in accordance with the ‘evidence-based evaluation’ approach described in Section 3.2.1 above.

According to the authors, the first systematic review of CLTS evidence was conducted by Venkataramanan et al. in 2018. The authors found that **activities** such as the number of CLTS training events or number of triggered communities were reported on in just under one-third of CLTS studies (Venkataramanan et al. 2018).

Venkataramanan et al. (2018) as well as several other authors have noted the tendency for toilet coverage (an **output**) to be the main indicator measured in CLTS interventions. (See Sah and Negussie (2009); Sparkman (2012); and Kumar et al. (2012).) The **impact** upon health status in communities triggered by CLTS was reported on by about one-quarter of the studies in the review by Venkataramanan et al. (2018); however, these reports were often based on anecdotes. (The challenges of measuring the health impacts of WASH interventions apply to CLTS interventions. This has been discussed in Section 2.1.2.3 of the background chapter.)

Aside from measuring the activities and outputs of CLTS, Kar (2003) and Mehta (2011) explain that the real benchmark of success in CLTS is whether a community has become ODF (an **outcome**). Kar (2008 p4) defines open defecation and ODF in the CLTS handbook:

OD means open defecation—defecating in the open and leaving the stuff exposed. ODF means open defecation free, that is, when no faeces are openly exposed to the air.

Harvey (2011) explains that measuring an outcome such as ODF status is valuable because it describes a change in behaviour. Measuring toilet coverage alone does not reveal whether people are sharing toilets (and therefore might be ODF despite not owning a toilet) or whether people defecate in the open despite having a toilet.

3.3.1 The challenges of measuring open defecation free status

In their review of CLTS studies Venkataramanan et al. (2018) found that, after toilet coverage, ODF was the most measured indicator. However, many authors have reported that the definition of ODF and how it is measured varies considerably between countries and programs. (See Thomas and Bevan (2013); Evans et al. (2009); UNICEF (2016); and Venkataramanan et al. (2018).) For example, in their review of CLTS in 20 countries within sub-Saharan Africa, Thomas and Bevan (2013 p3) found that the indicator for ODF in some countries was that a household had a latrine whereas in other countries the indicator was ‘evidence of no open defecation’. As recently as 2016, UNICEF found in their review of CLTS in East Asia and Pacific that:

‘Timor-Leste’s guidelines are not detailed and the review found that the criteria for ODF was open to interpretation and not applied consistently

between implementing partners (United Nations Children's Fund (UNICEF) 2016 p29).⁷

Consequently, there has been a call amongst CLTS scholars for a clear definition and indicators of ODF. (See Thomas and Bevan (2013); Evans et al. (2009); UNICEF (2016); and Venkataramanan et al. (2018).)

Cavill, Chambers and Vernon (2015 p1) summarised the criteria which are typically used to indicate ODF in CLTS programs:

- Eradication of open defecation in the community.
- Household toilets which are hygienic, provide the safe containment of faeces, offer privacy, with a lid on the defecation hole and a roof.
- Use of sanitation by all household members and all in the community.
- A handwashing facility nearby with water, soap or ash, and evidence of regular use.

Prior to the commencement of data collection for this study, there was a lack of consensus about what percentage of a community needed to be ODF for there to be a positive health impact. Several authors argued that 100-percent ODF was necessary because even if only a small number of people practise open defecation, all members of their community are in danger of contracting a faecal-transmitted disease. (See for example, Mehta (2011); Bongartz et al. (2010) and Chambers (2009).) Mukherjee et al. (2012) and UNICEF (2013) argued instead that the relationship between the proportion of a community that is ODF and health indicators such as diarrhoea were not yet properly understood at that time.

In 2017, Andres et al. estimated the health benefit (reduction in diarrhoea prevalence) a child experienced due either to having access to sanitation infrastructure themselves (direct benefit), or to living in a neighbourhood where people had good access to sanitation infrastructure (external benefit). Andres et al. (2017) found that there was a 47-percent reduction in diarrhoea prevalence among children who had both personal access to improved sanitation and lived in neighbourhoods where people had good access to sanitation. Three-quarters of this reduction was attributed to the neighbourhood having high access to sanitation. It was estimated that improvements in diarrhoea prevalence only began once 30-percent of households had access to sanitation infrastructure (Andrés et al. 2017). A systematic review by Jung et al. (2017) (of similar studies to that of Andres et al. (2017)) found that the proportion of reduction in diarrhoeal morbidity was approximately equally due to direct and external sanitation improvements.

Beyond measuring whether communities *become* ODF, several CLTS practitioners and researchers have noted the importance of measuring whether communities' ODF status is *sustained*. Vernon and Bongartz (2016 p1) explain that the:

Achievement of ODF status is now recognized as only the first stage in a long process of change and sanitation improvement, with new challenges emerging every step of the way, such as how to stimulate progress up the sanitation ladder, how to ensure the poorest and marginalized are reached, or how to maintain and embed behaviour change.

'Sustainability for a sanitation program' is defined by Evans et al. (2009 p25) as 'the use of latrines beyond their immediate short-term (one pit-full) life and by community members who were not present at the first stage of "ignition".'

3.3.2 Sanitation studies

In their meta-analysis of WASH-related impact evaluations Andres et al. (2018) found that only 7-percent of evidence-based studies were about sanitation interventions. This is consistent with the observation among many CLTS proponents that globally there has been insufficient monitoring and evaluation of CLTS interventions at both the community- and national-level. (See for example, Zulu, Harvey and Mukosha (2010); Lukenya Notes (2011); Kumar et al. (2012), Sijbesma (2008); Crocker, Saywell and Bartram (2017) and, UNICEF (2013).)

In 2018, two reviews of CLTS studies were conducted: one by the United States aid program (2018) and a far more rigorous systematic review by Venkataramanan et al. (2018). The two reviews came to similar conclusions about the quality of the CLTS evidence base which were summed up by Venkataramanan et al. (2018 p14):

CLTS has been rolled out with minimal rigorous evidence on its effectiveness and impact on sanitation and health outcomes. While quantitative evaluations show reductions in open defecation and increases in latrine coverage, they do not mirror practitioner accounts of widespread elimination of open defecation. There is little evidence for sustained sanitation behaviour change as a result of CLTS, and there has been minimal systematic research of the CLTS implementation process and its adaptations.

UNICEF's (2013) review of CLTS in East Asia and the Pacific found that baseline, or incremental data about the results of CLTS interventions, are rarely collected.

Venkataramanan et al. (2018) had similar findings: only 17-percent of studies in their review included baseline data. Another aspect of CLTS studies that is noticeably lacking is sustainability; even though the sustainability of ODF status in CLTS triggered communities has been identified as a key area of research. (See Sparkman (2012); Crocker, Saywell and Bartram (2017); and Garn et al. (2017).)

According to Venkataramanan et al. (2018 p12) the 'widespread claims of ODF villages found in case studies' were not supported by the findings in the independent quantitative evaluations in their review. However, these quantitative evaluations did report decreases in open defecation in CLTS-triggered communities. The meta-analysis by Garn et al. (2017) found that, on average, sanitation coverage increased by 14-percent in CLTS-triggered communities.

In 2015, Pickering et al. (2015) conducted the first known RCT of CLTS which assessed the effect of CLTS on child health in Mali. They found that in villages where CLTS (without subsidies) had been implemented, access to toilets increased and child growth improved; however, diarrhoeal prevalence was similar to control villages. This suggests that CLTS might impact child growth in ways other than decreasing the prevalence of diarrhoea (Pickering et al. 2015).

At the time that data was collected for this research, there were a few published studies about ODF sustainability. (See UNICEF (2014); Tyndale-Biscoe, Bond and Kidd (2013); Mukherjee et al. (2012); The World Bank (2011); Hulland et al. (2015) and Hanchett et al. (2011).) Vernon and Bongartz (2016 p3) summarised the findings of these studies: 'progression up the sanitation ladder has been slow or non-existent, [and] slippage from ODF status was common'.

Venkataramanan et al. (2018), USAID (2018) and Crocker, Saywell and Bartram (2017) argued that whilst implementing governments and organisations should continue their

internal monitoring there was a need for more independent studies of CLTS. In their study of CLTS practitioners' perspectives about CLTS, Ficek and Novotny (2018 p4) also called for more rigorous evidence; noting that the main justification for using CLTS in sanitation interventions was 'positive experiences and results from previous projects.'

3.3.3 Summary of known factors influencing the attainment and sustainability of open defecation free status

Much attention is paid by the CLTS community to the factors that influence the attainment and sustainability of ODF status (Kumar et al. 2012). This section summarises some of the factors discussed in the CLTS literature.

3.3.3.1 Factors in the enabling environment

Many CLTS proponents argue that implementing CLTS at scale can only be successful with political and **institutional support** at all levels of government. (See Bevan (2011); Sah and Negussie (2009); Kar and Chambers (2008); Robinson (2012); Mukherjee et al. (2009); Welle et al. (2007); Kelkar and Ram (2019); and (Venkataramanan et al. 2018)) It is thought that institutional support for CLTS will mean that governments feel ownership over and responsibility for sanitation improvements. Furthermore, institutional support is needed to create a **subsidy-free environment**. (See Section 3.1.4.1 for a discussion about sanitation subsidies.)

A strong **sanitation market**, which supplies products to serve the demands of both low- and high-income households, is thought to complement CLTS interventions (Evans et al. 2009, United States Agency for International Development (USAID) 2010). Bevan (2011) argues that households which construct a temporary latrine (for example, after CLTS triggering) are at risk of reverting to open defecation if there is no sanitation market to provide a more durable option to upgrade to.

The **location of a community** is also thought to influence the success of CLTS interventions. Urban environments are considered challenging locations for CLTS; partly due to insecure land tenure (O'Connell and Devine 2015). There are also fewer natural materials available for construction in urban areas and higher numbers of transient people meaning one-off CLTS triggering is less effective (Lukenya Notes 2011). In areas where the soil is sandy (collapses easily) or very rocky (hard to dig) it can be difficult to construct pits (Tyndale-Biscoe et al. 2013, Mosler et al. 2018). Finally, it can be difficult to convince communities to use latrines if they live near rivers or oceans (because water bodies are usually less smelly or fly-ridden and the sewage is carried away) (Kar and Bongartz 2006, Mukherjee et al. 2012, O'Connell and Devine 2015).

Finally, the **social capital** of a community: that is, 'the norms and networks that enable collective action', is thought to influence the success of CLTS interventions (Cameron et al. 2019 p2, Harter et al. 2019). Cameron, Olivia and Shah (2019) found in their study of CLTS in Indonesia that in villages where there was high social capital (community participation), CLTS triggering resulted in higher sanitation coverage. They attributed this to 'high social capital communities being better able to use social pressure to get community members to conform with program objectives' (Cameron et al. 2019 p11). Similarly, **power relations** and **community cohesion** are also considered important factors (Jamasy and Shatifan 2011, Kar 2011, Mukherjee et al. 2012, Crocker et al. 2016).

3.3.3.2 Factors related to the implementation of CLTS

As discussed in Section 3.1.3 above, CLTS interventions require a certain style of **facilitation** (Kar 2010, Kar 2010). Kar argues that facilitation should be ‘hands-off’, relaxed, honest, humorous and not instructive (Kar 2003, Kar 2008). Moreover, if staff do not receive practical training or sufficient time and resources to dedicate to CLTS, this could undermine the effectiveness of the CLTS process (Kar 2010, Haq and Bode 2011, Crocker et al. 2017).

Following up (see Section 3.1.2.3) with communities after the CLTS triggering is considered by CLTS proponents to be an important factor for reaching ODF status. (See Mukherjee et al. (2012); Bamako CLTS Consensus (2010); Lusaka Declaration (2010) and Bevan (2011)).

The **timing** of CLTS implementation is also thought to influence whether interventions are successful. For example, CLTS programs should not take place during rainy or intensive farming periods because people are unlikely to construct toilets then (Bevan 2011, O’Connell and Devine 2015). Greaves (2012) has considered the effectiveness of CLTS in emergency situations. For communities which are in the early stages of a rapid-onset emergency (for example, just after an earthquake), fully subsidised sanitation infrastructure provision is more appropriate than CLTS.

3.3.3.3 Factors at the household or individual level

Several studies have identified household-level factors that potentially influence the attainment and sustainability of ODF status. See Tyndale-Biscoe, Bond and Kidd (2013); Bongartz, Fox and Vernon (2016); Hanchett et al. (2011); Hulland et al. (2015); O’Connell and Devine (2015); Sara and Graham (2014); Odagiri et al. (2017); Welle et al. (2007); Mukherjee et al. (2012); Crocker, Saywell and Bartram (2017); Mosler, Mosch and Harter (2018); UNICEF (2014); Gerwel-Jensen, Rautanen and White (2015); and The World Bank (2011); and Vernon and Bongartz (2016). Tyndale-Biscoe, Bond and Kidd (2013) pointed out that factors influencing ODF status are often two-sided: that is, having a durable toilet could be a *motivator* for being ODF and not having a durable toilet could be *barrier* to being ODF.

Some of the factors mentioned in the studies mentioned above are:

- **Owning** a latrine
- **Durability** of latrines
- **Functionality** of latrines
- **Cleanliness** of latrine
- **Quality** and **type** of latrines (for example, Bajracharya (2008) and Carrard et al. (2009) found that in Timor-Leste, households tended to prefer pour-flush latrines (despite not having water for flushing) because this is what well-off people had during the Indonesian occupation.)
- **Self-efficacy** – the belief that one can do something
- **Perceived costs** of building a latrine
- **Perceived availability of materials and masons** to help
- **Actual costs** of building a latrine
- **Competing priorities** for time and resources
- **Availability of land, materials and labour**

- Availability of a **constant water supply**
- **Availability of services for maintenance** (for example, pit emptying in urban areas)
- **Technical advice or knowledge**
- **Support from other family or community members**
- **Emotional drivers** (some of which are linked to **social norms**) such as comfort, convenience, privacy, security, satisfaction with current place of defecation, embarrassment, shame, humiliation, social status, prestige, honour and pride.
- **Sharing latrines**
- **Health** reasons (for example, to prevent diarrhoea)
- **Environmental hygiene**
- **Demographic factors** such as age and gender
- **Household socioeconomic status**
- **Education** level of household members
- **Religion** of household members
- **Ethnicity** of household members

There is a growing body of literature which discusses the experience of people from **‘potentially disadvantaged’** households in the context of sanitation interventions. Potentially disadvantaged people are defined by House, Ferron and Cavill (2017 p11) as:

individuals and groups who may be vulnerable, marginalized, excluded or actively discriminated against, or experiencing inequities, inequalities or stigma.

Several groups have been identified, in the WASH literature (see Robinson (2009) and House, Ferron and Cavill (2017)), as being potentially disadvantaged including:

- Extremely poor people
- People with a disability (physical, intellectual or psycho-social)
- Female-headed households
- Older people
- Young adults living alone
- People with chronic conditions such as HIV or AIDS
- People with insecure land tenure
- Minority ethnic or religious groups
- Sexual and gender minorities

There is some evidence to suggest that coming from a potentially disadvantaged household might (but does not necessarily) influence the ability to become and continue to be ODF. In their study of the sustainability and equity aspects of WaterAid supported sanitation programs in Nigeria, Bangladesh and Nepal, Evans et al. (2009) found that ultra-poor; landless; female-headed, and older households as well as household with people with a disability were least able to access latrines. Plan Uganda (2012) found that whilst people living with HIV expressed enthusiasm about becoming ODF, they often did not have the capacity to build latrines. In her study of CLTS interventions with

adivasis (aboriginal peoples of South Asia), who are a marginalised group in Bangladesh, Mahbub (2011) found that they were often excluded from CLTS activities.

In the CLTS guide and handbook, Kar (2003, 2008) argues that the better-off members of triggered communities understand that the entire community needs to become ODF and therefore, will help potentially disadvantaged households to become ODF if they are struggling. Conversely, Mehta (2011), da Silva Wells and Sijbesma (2012), and Gonzalez, Güllemann and Thyberghien (2010) question whether Kar's assumption of such social solidarity might be somewhat naïve and idealised. House, Ferron and Cavill (2017), da Silva Wells and Sijbesma (2012) and Wilbur and Danqah (2011) called for explicit steps to include potentially disadvantaged people in the CLTS triggering process and follow-up to ensure that such groups were not more marginalised. In recognition that community activities, such as the CLTS triggering, do not generally allow for individual voices and needs to be heard, the Water Supply & Sanitation Collaborative Council (WSSCC) and WaterAid India explored possibilities for the needs of potentially marginalised people to be more included in CLTS (Prakash 2016). Nevertheless, the USAID review (2018) of CLTS studies found that more evidence was needed about the experiences of potentially disadvantaged people in the context of CLTS interventions.

3.4 Studies about sanitation in Timor-Leste

At the time of data collection for this research, there were very few documented studies about sanitation in Timor-Leste. The evaluation and review reports of the Australian Government program to support rural WASH in Timor-Leste document some of the activities and outcomes relating to sanitation; however, these are not focused specifically on CLTS or PAKSI (the Timor-Leste adaptation of CLTS). (See Buhl-Nielson et al. (2009); Government of Australia (2011); and Renneberg, Bond and Patrocinio (2015).)

In 2008 the WaterAid country manager, Bajracharya, conducted a case study which compared a WaterAid project in seven villages in Aileu Municipality (which provided subsidised pour-flush latrines) with another WaterAid project in five villages in Liquiçá Municipality (which implemented CLTS). Toilet coverage was achieved in both municipalities. Although it was not tested, Bajracharya (2008) argued that there were some disadvantages to the subsidy approach: namely, that it would be difficult to scale-up due to high costs and that it would make people dependent on external technologies.

In the only peer-reviewed study of CLTS in Timor-Leste at the time of data collection for this research, Noy and Kelly (2009) also conducted a case study of the WaterAid project in Liquiçá. They found that the sanitation aspect of the program was very similar to CLTS as described in the original guides by Kar. However, the authors noted that the promise of a new water supply (which was also part of the WaterAid program) at the same time as conducting CLTS triggering potentially served as an incentive for building latrines. (As explained in Section 3.1.3 above, incentives and subsidies are discouraged by Kar.) Although the five villages in the study were declared ODF in less than two months, the evidence collected by Noy and Kelly (2009) suggested that latrine usage was actually quite low (in some villages it was lower than 50-percent). The authors called for more field trials, critical analysis and rigorous data collection methods (for example, a knowledge, attitudes, beliefs and practices survey) to better understand the outcomes of CLTS in Timor-Leste.

In 2009 Carrard et al. (2009) researched the roles and approaches of NGOs working in the sanitation sectors in Vietnam and Timor-Leste. They noted that, in Timor-Leste, NGOs played a significant role in the sanitation sector both in the delivery of services

and advocacy. They referred to a study entitled ‘Rural Sanitation in Timor-Leste: Current Practices and Policy Options’¹² which had found that despite the financing of 17 000 latrines in Timor-Leste since 2001, many of these were not in use. Carrard et al. (2009) acknowledged the important role that NGOs played in introducing alternatives (such as CLTS) to subsidised sanitation. Carrard et al. (2009 p3116) called for ‘the collection of baseline data on knowledge, attitudes and practices (KAP) around sanitation and hygiene.’

Between 2010 and 2012, several studies which related to but did not focus on sanitation were documented. For example, Smith (2010) conducted research about the issues that people with disabilities in rural parts of Timor-Leste faced when accessing WASH services. A study about handwashing with soap by Scott et al. (2011) suggested that the increased use of CLTS in Timor-Leste could provide a ‘single platform’ from which to promote becoming ODF and handwashing with soap. Baker, Chapin and Pedi’s (2012) report of a pilot project about sanitation marketing in Timor-Leste recommended that this strategy be aligned with existing PAKSI interventions.

In 2013, UNICEF led a review of CLTS in East Asia and the Pacific. The ODF success rate (that is, the percentage of triggered communities which achieve ODF status) for Timor-Leste was 34-percent, which was relatively high for the region (United Nations Children's Fund (UNICEF) 2013). The reviewers attributed this success to the high level of support from the Australian Government BESIK program¹³ as well as several international NGOs working together with the Government of Timor-Leste. However, they found that sustainability was a challenge due to the lack of resources for follow-up, the low durability of latrines and mixed messages around subsidies (United Nations Children's Fund (UNICEF) 2013).

Several studies about CLTS in Timor-Leste were published after data collection for this research was completed. For example, in 2015 BESIK did an exploratory study about menstrual hygiene practices, attitudes and beliefs among rural Timorese women (Nguyen 2015). SaniFOAM (described in Section 3.2.4 above) was the conceptual framework for the study. Among other findings, the study suggested that greater access to toilets meant that women were better able to manage their menses hygienically (Nguyen 2015).

UNICEF’s second review of CLTS in South Asia and the Pacific (2016) reported that, in Timor-Leste, CLTS implementers estimated that 602 communities were ODF and that it usually took communities two to twelve months to become ODF. (UNICEF estimated that it took four to nine months to become ODF in Timor-Leste.) In general, the review found that in Timor-Leste ‘the sector lacks a common strategic approach’ to the evaluation of CLTS (United Nations Children's Fund (UNICEF) 2016 p124).

In 2015, a new municipal-level approach to achieving ODF was piloted in Bobonaro Municipality (Clark and Willetts 2016). This involved four main strategies: institutional triggering (at the municipality, *suco* and *aldeia* levels); PAKSI at the community level; a behaviour change campaign called “*Uma Kompletu ho Sentina*’ (A Complete Home is with a Toilet); and strengthening the local sanitation market. Clark and Willetts’ (2016) evaluation of this pilot found that within nine months, sanitation coverage had increased

¹² Robinson, A. 2007 Rural Sanitation in Timor-Leste Current Practices and Policy Options, IDSS. (I was unable to access the original document.)

¹³ BESIK (*Bee, Saneamentu no Ijiene ba Komunitade*) is an Australian Government funded Rural Water Supply and Sanitation Program (RWSSP) in Timor-Leste.

from 47-percent to 87-percent; with 70-percent of latrines classified as good quality. The authors concluded that the pilot had significant potential to be scaled-up to other parts of Timor-Leste.

In a partnership between the Government of Timor-Leste, BESIK, and several international NGOs involved in WASH programs in Timor-Leste, a study of ODF sustainability was conducted in three municipalities (Aileu, Ermera and Liquiça) in 2017. (Moran 2017) The study found that 68-percent of households from villages which had been declared ODF two years earlier were still maintaining their toilets. A further 13-percent shared toilets and 20-percent of households had reverted to open defecation (half of whom reported this was because their toilet had broken) (Moran 2017). (A study which focused on Liquiça alone, found that ODF sustainability was slightly higher there: 84-percent of households had remained ODF (Abdi 2016). The top five reasons for building and maintaining toilets were: health; shame (due to being seen whilst open-defecating or not being able to offer guests or family a toilet), disgust, pride or fear; privacy and security; availability of water; and accessibility (Moran 2017).

3.5 Gaps in the literature which this research seeks to address

This review has presented the literature which describes and discusses the CLTS approach; the ways in which WASH (including CLTS) interventions are measured; the quality of evidence about sanitation interventions; and finally, studies about sanitation in Timor-Leste. The literature reviewed here includes works that were published after the design and data collection for this research. However, it was the gaps in the literature in 2012-2013 that informed the design of this research: these are discussed briefly here.

As described above, several authors noted the lack of research about the implementation process of CLTS interventions, and the adaptations of CLTS. (See Venkataramanan et al. (2018); Briscoe and Aboud (2012); and Sparkman (2012).) At the time of data collection for this research, there were no studies which thoroughly described the implementation of CLTS or PAKSI in Timor-Leste. There were manuals which WaterAid used to guide the implementation of PAKSI in their project sites. However, there was an absence of studies which focused on intervention fidelity within sanitation programs in Timor-Leste at the time. To understand the outputs, outcomes and impacts of an intervention, it is important to firstly understand what that intervention was. This research sought to address this gap in knowledge in the context of the WaterAid program in Manufahi Municipality.

Venkataramanan et al. (2018) found that ‘CLTS has been rolled out with minimal rigorous evidence on its effectiveness and impact on sanitation and health outcomes.’ Furthermore, several authors noted that baseline and incremental data is rarely collected in CLTS studies (United Nations Children's Fund (UNICEF) 2013, Venkataramanan et al. 2018). At the time of data collection for this research, there was grey literature published by sanitation program implementers in Timor-Leste which focused on documenting what Poulos, Pattanayak and Jones (2006) describe as **activities** and **outputs** such as toilet coverage. However, there were few independent studies about the **outcomes** and **impacts** of sanitation programs in Timor-Leste; in particular the WaterAid program in Manufahi Municipality which had only recently been introduced. The WASH for Worms trial sought to measure some of the health **impacts** (for example, worm infection rates, anaemia and stunting) of this program. Hence, this research sought to address the gap in knowledge about the **outcomes** of the program.

Poulos, Pattanayak and Jones (2006 p6) describe **outcomes** as the changes in 'behaviours, knowledge and actions' in the short or medium term of an intervention. Carrard et al. (2009) and Noy and Kelly (2009) who had conducted studies about CLTS in Timor-Leste called for the collection of data about changes in knowledge, attitudes and practices (KAPs) regarding sanitation in Timor-Leste. This research sought to address this gap by measuring the outcomes of the WaterAid program in Manufahi Municipality with a KAP survey that included the collection of baseline data prior to the intervention commencing.

The literature review revealed that, globally, there were several studies which focused on the factors that influence whether households become and continue to be ODF. However, at the time of data collection for this research, there were no published studies which focused on such factors in the context of Timor-Leste. Hence, this research sought to address the gap in knowledge about the factors that influenced whether households in the WaterAid program in Manufahi Municipality became and continued to be ODF.

The CLTS manuals and guidebooks claim that, when successful, *all* people in a community become open defecation free after participating in CLTS, including those who are marginalised and disadvantaged. However, the literature revealed that this is not always the case. Overall, this review identified a gap in understanding of the experience of potentially disadvantaged people in the context of CLTS interventions, particularly in Timor-Leste. Hence, as part of addressing the gap in knowledge about the factors which influenced whether households became and continued to be ODF, this research sought to understand whether being marginalised or disadvantaged was one such factor in the WaterAid program in Manufahi Municipality.

There are many more gaps, not described here, in the literature about CLTS in the context of Timor-Leste: for example, understanding the long-term sustainability of CLTS interventions as well as the outcomes and impacts of sanitation markets in combination with CLTS interventions. These will need to be addressed by other studies. The gaps identified above, however, inform the objectives of this research which will be described in the following chapter.

4 Objectives and Research Questions

The background described in chapter two and the review of the literature in chapter three introduced the context of this research. The gaps in knowledge identified in the literature review informed three sets of research objectives and questions which were tailored to the context of the WASH for Worms trial. Each set of objectives and questions was arranged into separate studies which are described below.

4.1 Study 1 – Interpretations of Community-Led Total Sanitation in Timor-Leste

The first study aimed to describe the way in which Community-Led Total Sanitation (CLTS) was implemented in Timor-Leste and whether the CLTS approach was interpreted by key stakeholders in the same, or different, ways. The Dynamic Responses Model by McPake, Blaauw and Sheaff (2006) suggests that in all health systems there is a difference between the ‘*de-jure*’ system (that is, how it is described officially) and the ‘*de-facto*’ system (that is, as it is experienced by intended beneficiaries). To understand the outputs, outcomes and impacts of sanitation interventions such as CLTS, it is important to understand the different interpretations of that intervention as well as how it was implemented in practice.

The Timor-Leste adaptation of CLTS, *Planu Aksaun Komunitade Saneamentu no Ijiene* (PAKSI) (Community Action Plan for Sanitation and Hygiene), was a substantial part of the WaterAid water, sanitation and hygiene (WASH) program in Manufahi Municipality. The contested nature of the definition of CLTS-based interventions is well documented (see Section 3.1.5 in the literature review). Therefore, it was important to understand the degree of consistency of interpretations of the PAKSI component of the WaterAid WASH program in Manufahi by key implementers and planners. These interpretations were also compared to the CLTS approach as described by the pioneer of CLTS, Kamal Kar, and other early supporters. Hence, this study had the following objectives and research questions:

Objective

- 1) To compare how CLTS and PAKSI are described and understood by the pioneer and early supporters of CLTS, as well as by those involved in planning and implementing PAKSI in Timor-Leste (pre-2014).

Research Questions

- 1) How are the ‘**essential elements**’ of CLTS described by the pioneer and early supporters of CLTS, as well those involved in planning and implementing PAKSI in Timor-Leste?
- 2) How is **PAKSI—the adaptation of CLTS in Timor-Leste**—officially described in manuals and guidelines?
- 3) How is the **implementation of PAKSI in Timor-Leste** described by those involved in its planning and implementation?
- 4) How do the descriptions of the ‘**essential elements**’ of CLTS, PAKSI, and the **implementation of PAKSI in Timor-Leste** differ from each other?
- 5) How do the research participants’ descriptions of each of:
 - a. the ‘**essential elements**’ of CLTS,

- b. **PAKSI**, and
- c. the **implementation of PAKSI in Timor-Leste**

differ from each other?

Those involved in planning and implementing CLTS in Timor-Leste include:

- Representatives of the government and, BESIK¹⁴, the Australian bilateral aid program for WASH in Timor-Leste at the time.
- Representatives of local and international non-governmental organisations (NGOs) which were involved in planning and implementing PAKSI in Timor-Leste.
- Intended beneficiaries of the WaterAid WASH program in Timor-Leste.

4.2 Study 2 – Outcomes of the WaterAid water, sanitation and hygiene program in Timor-Leste

The second study aimed to measure the sanitation outcomes of the WaterAid WASH program in Manufahi Municipality. A significant gap identified in the literature review was the lack of research about the outcomes of CLTS interventions in general, but particularly in Manufahi Municipality where the WaterAid WASH program had only just started at the time of this research. This study sought to complement the research conducted by the WASH for Worms trial which focused on the health impacts of the WaterAid program in Manufahi.

Given the timeline of this research, it was not possible to identify all the outcomes of the WaterAid WASH program in Manufahi. Whilst some outcomes relating to water access and hygiene were included, this study focused mainly on the sanitation outcomes of the program.

The objectives and research questions for this study were:

Objective

- 1) In communities where the WaterAid PAKSI triggering activities¹⁵ had taken place, to identify the changes in household members' knowledge, attitudes and practices regarding water, sanitation and hygiene.

Research Question

- 1) In communities where the WaterAid PAKSI triggering activities had taken place, what were the changes, if any, in household representatives' knowledge, attitudes and practices regarding water, sanitation and hygiene between the time points listed below?
 - Up to a fortnight prior to the WaterAid PAKSI triggering activities
 - Up to a week after the WaterAid PAKSI triggering activities
 - 9-11 months after the WaterAid PAKSI triggering activities

¹⁴ BESIK (*Bee, Saneamentu no Ijene ba Komunitade*) is an Australian Government funded Rural Water Supply and Sanitation Program (RWSSP) in Timor-Leste.

¹⁵ See Section 3.1.2.2 in the literature review for a description of triggering activities.

Note that the gender of the household representatives is not specified in this research question; however, the gender of the main respondent to the questionnaire used in Study 2 was documented.

4.3 Study 3 – Factors that influence whether households become and continue to be open defecation free in Timor-Leste

The literature review showed that globally there is much research about the factors that influence whether households and communities that participate in sanitation interventions become or continue to be open defecation free (ODF). In WASH programs with a CLTS component it is common for some members of the target community to cease open defecation in the early stages of the program but to later revert to their original behaviour. Others may never change their behaviour at all (Tyndale-Biscoe et al. 2013).

It is important to understand the factors that influence people's sanitation behaviour to improve the efficacy of sanitation interventions such as that implemented by WaterAid in Timor-Leste. However, at the time of data collection for this research, there were no published studies which focused on the factors influencing people's sanitation behaviour in the context of Timor-Leste and this is the knowledge gap which Study 3 aimed to address.

The literature described in Section 3.3.3.3 of the literature review suggests that an important factor which inhibits households and people to become or continue to be ODF is if they are already 'potentially disadvantaged'¹⁶: for example, because they are extremely poor compared to their neighbours. Conversely, the CLTS handbook (Kar 2008) claims that the approach is inclusive of potentially disadvantaged people because communities motivated to become 100-percent ODF will assist households that are unable to do so independently. (See Section 3.3.3.3 of the literature review for a more detailed discussion about this.) This third study did not seek to resolve the debate about whether potentially disadvantaged households are assisted by others as part of CLTS interventions; however, this study aimed to document, where possible, the experiences of potentially disadvantaged households in the context of the WaterAid WASH program in Manufahi.

Objective

- 1) To identify factors that influence whether households become and continue to be open defecation free after participating in the WaterAid WASH program.

Research Questions

- 1) What are the factors that influence whether households become and continue to be open defecation free according to the stakeholders involved with the WaterAid WASH program in Manufahi Municipality? In particular:

¹⁶ 'Potentially disadvantaged' households includes extremely poor households; households with people with a disability or people who are chronically unwell; female-only households, female-headed households, households with only elderly or only young people; households with insecure land tenure; racially or culturally marginalised households; and households with people of sexual and gender minorities.

- Why do some households become and continue to be open defecation free?
 - Why do some households not become open defecation free?
 - Why do some households initially become open defecation free but later revert to open defecation?
- 2) How did households that might have faced additional barriers to becoming and continuing to be open defecation free because of being female-headed or having members who had a disability; chronic illness or age-related impairments experience and respond to the WaterAid program?

4.4 Conclusion

As described in Section 3.5 of the literature review, this research could not possibly address all the gaps identified in the literature pertaining to CLTS in Timor-Leste. However, the research questions defined here intend to address some of these gaps within the scope of a PhD research project and in accordance with the preferences of some of the key stakeholders in this research: the WASH for Worms trial team and WaterAid Timor-Leste. The methods used to respond to these questions are introduced in the following chapter and are described in more detail in the chapters pertaining to each of Studies 1, 2 and 3.

5 Methods

This chapter describes the conceptual frameworks underpinning this research, the study design, limitations and ethical considerations. More detailed aspects of the method for each of the three studies are described in the chapters pertaining to each study.

5.1 Conceptual frameworks and study designs

The three sets of research questions described in the previous chapter required distinct conceptual frameworks and study designs. Hence, this research was conducted as three separate, but related, studies which involved a mixture of qualitative and quantitative research methods.

Several conceptual frameworks for measuring water, sanitation and hygiene (WASH) interventions and understanding health behaviour change are described in the literature review. This research is broadly guided by three frameworks: the 'Dynamic Responses Model' (McPake et al. 2006); the 'Generic Model of a Program' (Poulos et al. 2006); and the 'Risks, Attitudes, Norms, Abilities, and Self-regulation (RANAS) Model of Behaviour Change' (Mosler 2012).

Whilst Beresford (2010 p723) warns that 'it would be naïve to ignore the strengths of a reductionist approach', which these models offer, he also argues that such approaches must be considered with caution. Models are limited in their description and interpretation of reality. Thus, in keeping with the broadly constructivist stance that I adopted for this research (described in Section 1.6 of the introductory chapter), the models underpinning this research are used only as frameworks for analysis; they are not assumed to be complete representations of Community-Led Total Sanitation (CLTS) in Timor-Leste.

The specific data collection methods for each study are described in Chapters 6, 7 and 8 respectively; however, the conceptual framework and the broad design of each study is summarised here.

5.1.1 Study 1 – Interpretations of Community-Led Total Sanitation in Timor-Leste

As described in the literature review, at the time of data collection for this research, there were no known studies which thoroughly described the implementation of CLTS or PAKSI *Planu Aksaun Komunitade, Saneamentu no Ijiene* (Community Action Plan for Sanitation and Hygiene) in Timor-Leste. This was a common issue with CLTS interventions globally, and there was concern among some CLTS proponents that the critical elements of CLTS were not being followed closely enough by planners and implementers.

The conceptual framework for measuring intervention fidelity proposed by Carroll et al. (2007) incorporates the strengths of other conceptual frameworks which preceded it. Some of the elements identified in this framework are useful as a basis for the thematic analysis of the data collected in Study 1. That is, quality of the facilitation; the participation of community members; and details of the content of the intervention are themes that inspired the question guide and analysis of the data. However, as explained in Section 3.1.6 of the literature review, this framework was not sufficient on its own because it did not include the context of the intervention as a potential moderator.

I argue that the interpretation, by planners and implementers, of an intervention such as CLTS is a contextual factor which would fall under the 'dynamic responses' box in the

Dynamic Responses Model (described in Section 3.1.6 of the literature review and shown in Figure 5-1 below).

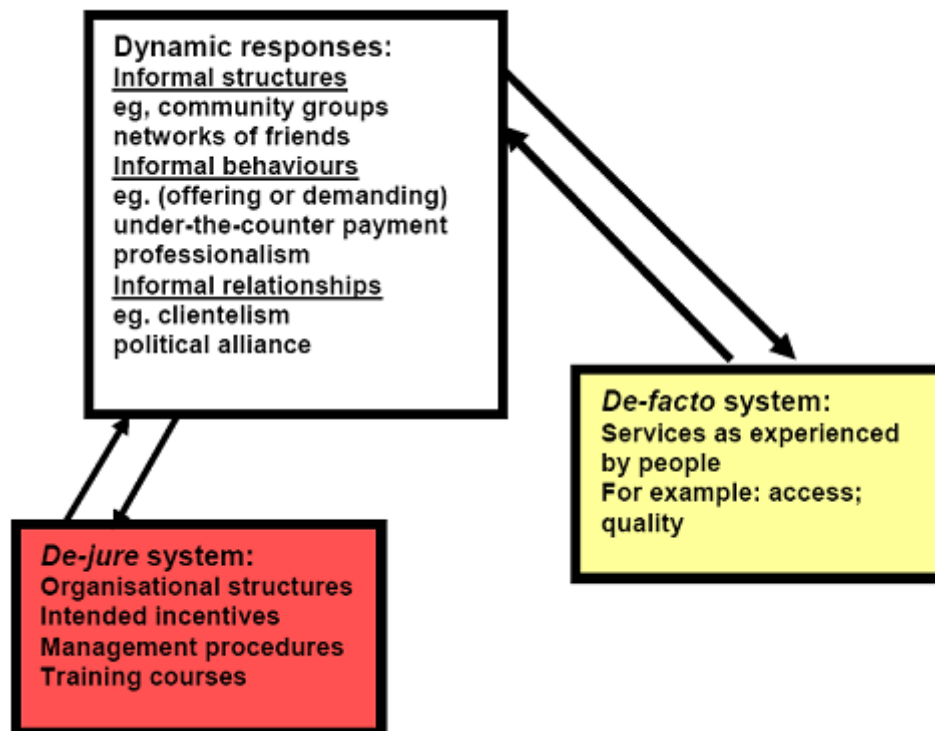


Figure 5-1 A conceptual model for health systems research

(McPake et al. 2006 p16)

Before the ways CLTS is interpreted, by planners and implementers in a given context, are properly understood the results attributed to interventions such as CLTS remain uncertain. The purpose of Study 1 in this research was to understand and compare the ways in which PAKSI was interpreted and described by the stakeholders involved in the WaterAid program to contextualise the results of the program. Study 1 is a descriptive, observational, cross-sectional study which used qualitative methods to collect rich and nuanced data.

5.1.2 Study 2 – Outcomes of the WaterAid water, sanitation and hygiene program in Timor-Leste

The results of a WASH intervention can be measured in many different ways, as described in Section 3.2 of the literature review. Although the Generic Model of a Program is critiqued in the literature because of its linearity (which does not reflect the complexity of interventions), it was chosen as the conceptual framework for this Study. This is because it clearly identified the group of results that were not already being measured by the WASH for Worms trial team and the WaterAid team: that is, the intervention **outcomes**.

Poulos, Pattanayak and Jones (2006) argue that WASH interventions have three intended groups of results: ‘outputs’, ‘outcomes’ and ‘impacts’ in their ‘Generic Model of a Program’. (See Section 3.2.1 of the literature review and Figure 5-2 below.)

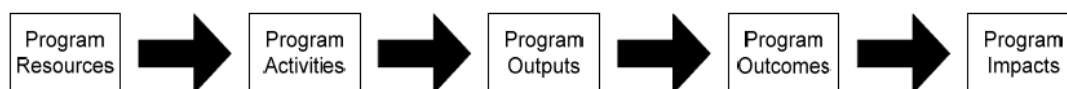


Figure 5-2 Generic Model of a Program

(Poulos et al. 2006 p4)

Implementers need to measure ‘outputs’ (such as new water supply systems) for their own planning but also to meet the requirements of donors and governments (Poulos et al. 2006). For example, WaterAid measured the ‘outputs’ of their program in the project sites for this research. The health ‘impacts’ of the WaterAid and WASH for Worms programs, such as changes in the rate of re-infection with soil-transmitted-helminths (STHs), were measured by the epidemiological team for the WASH for Worms trial. Hence, Study 2 of this research measured the ‘outcomes’ (that is, the changes in knowledge, attitudes and practices) resulting from the WaterAid WASH program.

Hausmann-Muela, Ribera and Nyamongo (2003) discuss the benefits and limitations of using knowledge, attitudes and practices (KAP) questionnaires in their review of health-seeking behavioural studies. They explain that KAP questionnaires are often used in studies about health behaviour change because compared to other data collection methods, they are cheap and quick to design, administer and analyse. However, they warn that KAP questionnaires reveal little information about why people behave the way they do (which is something that models of behaviour change are better designed to do).

Study 2 was designed in two parts. First, there was a qualitative formative research phase to identify the range of community members’ WASH-related knowledge, attitudes and practices in the context of Manufahi Municipality. Secondly, the main part of Study 2 was quantitative to measure changes over time in the knowledge, attitudes and practices (identified during the formative phase) of representatives of households which had participated in the WaterAid program.

5.1.3 Study 3 – Factors that influence whether households become and continue to be open defecation free in Timor-Leste

As described in Section 3.2.4 of the literature review, there are several behaviour change models that could be used as the basis for an analysis of the factors that influence whether households become and continue to be open defecation free in Timor-Leste. Of these models, the RANAS Model of Behaviour Change was selected to be an appropriate framework for analysing the factors identified in this research: particularly in Study 3. The RANAS (risk, attitudes, norms, abilities, and self-regulation) Model of Behaviour Change is described in Section 3.2.4.1 of the literature review and is depicted again in Figure 5-3 below.

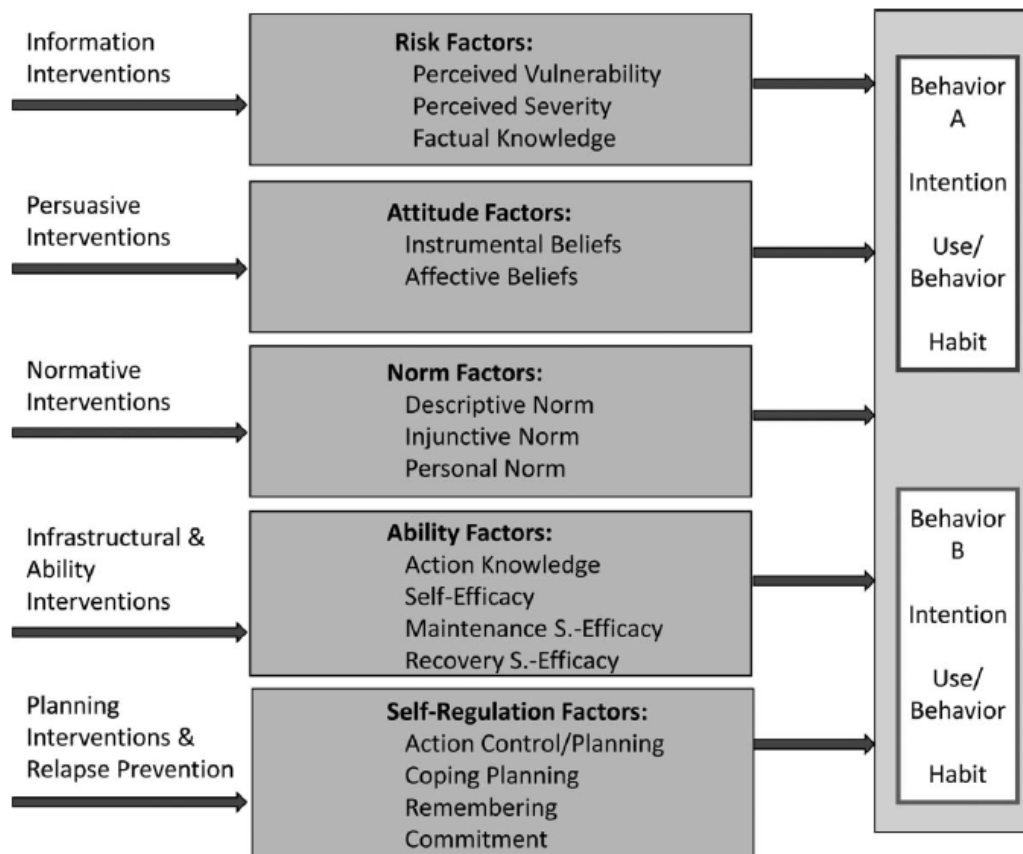


Figure 5-3 The RANAS Model of behaviour change

(Mosler 2012 p433)

The RANAS model is normally used as part of a protocol for designing (and later measuring) WASH interventions which are tailored to the specific characteristics of a target population. Whilst my research did not include the design of the WaterAid WASH program; the RANAS model offered a framework for analysing the program. There are several reasons why the RANAS model was deemed appropriate for this research. Firstly, the focus of the model on individuals' self-reported psychosocial factors for behaviour change suited the type of data collection that was possible within the scope of my research. The factors influencing whether households become and continue to be open defecation free include contextual factors such as topography, remoteness, income, education, national policy and much more; however, it was beyond the scope of my research to measure the impact of all these factors. (As described in Section 3.2.4.1 of the literature review, an updated version of the RANAS Model in 2015 included three groups of contextual factors: social, physical and personal; however these were not included in the 2012 version of the model which informed the design of my research.)

Furthermore, the RANAS model is built upon existing models for behaviour change, such as the Health Belief Model, and has been identified as 'one of the few [models] that is intended to be applicable across multiple WASH practices and interventions' (Dreibelbis et al. 2013 p5). This was appropriate for this study given that the WaterAid WASH program included water, sanitation and hygiene interventions.

The purpose of Study 3 was to identify the factors that influenced whether participants in the WaterAid program achieved and continued to have open defecation free (ODF)

status. Given that such a study had not yet been conducted in Manufahi Municipality, Study 3 used qualitative methods to gain a deeper and more nuanced understanding of the relevant factors. The RANAS model provided a framework for identifying and categorising these factors as well as for analysing some of the results regarding sanitation behaviour change which emerged from Studies 1 and 2.

5.2 Limitations

In this section, the limitations which potentially affect all three studies, as well as strategies to mitigate these limitations, are discussed. Limitations which pertain only to individual studies are discussed in their respective chapters.

5.2.1 Influence of the ‘WASH for Worms’ trial

This research sought to document the planning, implementation and outcomes of the WaterAid WASH program that took place in the study sites for the WASH for Worms trial. By this very definition, any findings from this research are about *both* the WaterAid WASH program and the WASH for Worms trial. The two programs were initiated at the same time in each village; had common desired outcomes such as becoming ODF; and both involved regular follow-up visits and activities.

It is unclear how this might have affected the findings as compared with research that took place in villages where only the WaterAid WASH program took place. Having two programs meant there was more staff and more frequent visits (because they did not always visit at the same time) which in turn meant there were more reminders about building toilets, washing hands and other desired WASH behaviours. This might have meant that these outcomes were achieved at greater proportions or faster pace. Alternatively, the extra reminders and extra time required from participants might have meant they were less enthusiastic about changing their WASH behaviours.

Regardless, although this research is focused on the WaterAid WASH program, I do not claim that the findings presented here are representative of communities where only the WaterAid program has taken place.

5.2.2 Influence of other water, sanitation and health programs

There was a risk that other WASH or health interventions would take place in the project sites and therefore affect the findings. In some project sites there was evidence of, and community members described, previous interventions such as PAKSI, subsidised toilets, water supply systems and hygiene promotion. Given the challenging logistics of the field work (see Section 5.2.6) and the high proportion of WASH interventions that had previously taken place in Manufahi, I could not only include project sites where the WaterAid program would be the first WASH intervention. Instead, I only included villages where no intervention had taken place for at least one year prior to data collection and I made note of what interventions had previously taken place.

5.2.3 Social desirability bias

Phillips and Clancy (1972 p923) define social desirability as:

‘the tendency of people to deny socially undesirable traits or qualities and to admit to socially desirable ones’.

It would have been clear to the research participants that, according to WaterAid and WASH for Worms implementing staff, safe WASH practices and behaviour were ‘desirable traits’ and vice-versa. Given that my interpreter and I usually travelled with the

WaterAid and WASH for Worms teams, it is likely that the research participants affiliated us with them; and therefore, assumed that we defined desirable and undesirable traits in the same ways. This might have resulted in participants over-reporting safe WASH behaviours such as building toilets and under-reporting unsafe WASH behaviours such as open defecation.

To mitigate this, I informed participants that whilst this research was connected to the WASH for Worms trial, I represented the University of Melbourne and that I was interested in their own, expert knowledge about their household and community. I explained this verbally and in written form at the start, during and end of each interview or questionnaire. Where possible, I asked open-ended questions such as ‘where do you defecate?’ rather than ‘do you open-defecate?’ and reiterated that I was interested in their experiences. Where appropriate, I would follow-up interviews and questionnaires with observations of WASH infrastructure such as toilets.

5.2.4 Influence of the interpreter

There was a risk that an interpreter would influence the findings. This is partly because meaning can sometimes change in the process of translation. To mitigate this, my interpreter and I back translated and practised the question guides and questionnaires, before using them with participants. Furthermore, I learned Tetun over the course of data collection which meant that by the end I could clarify translations more accurately.

The interpreter was a woman from Same, the capital of Manufahi Municipality, and had worked in one of the villages previously with the United Nations (UN). Her association with foreign employers (the UN and then me), as well as her relative wealth, was potentially intimidating for some participants or could have made it difficult for them to trust her immediately. This might have influenced their responses in that they would have been less likely to share grievances with the intervention or challenges with achieving the outcomes of the program such as building toilets. Conversely, the fact that she was from a nearby town, was married with children (and therefore considered mature) and spoke the local language as well as Tetun and English were all characteristics that would mean participants were more likely to trust her and therefore speak openly with her.

Regardless of these potential biases, it would not have been possible for me to speak to participants without her; an interpreter was essential for both interpreting Tetun (until I was sufficiently proficient) and local languages as well as to act as a gatekeeper. This is because it would not have been appropriate for me, as a foreigner, to approach people in their homes on my own.

5.2.5 Hawthorne effect

Parsons (1974 p922) wrote that:

‘the Hawthorne effect in experimental research is the unwanted effect of the experimental operations themselves.’

There are two ways this might have occurred in this research. Firstly, my presence might have meant that the implementing staff conducted their activities differently. If this was the case, it is most likely that they would have changed their performance to align with how they had been instructed by senior staff in WaterAid and the local non-governmental organisations (NGOs). For example, perhaps they would have made more of an effort to encourage community members to participate than if I had not been there. This was somewhat mitigated by meeting with the implementing staff who would be working in the villages that were project sites for this research, before data collection

commenced. The staff said they feared I would be evaluating their performance, so I explained that was not the case; rather I would be observing the program in general and would not be reporting back to their managers about individual staff performance.

My presence may also have affected the outcomes of the WaterAid WASH program. As an Anglo-Australian, I was likely perceived as being wealthy (perhaps as a donor) and therefore someone to appease. In turn this might have added a false sense of importance to the activities conducted by WaterAid from the perspective of the attendees and resulted in greater participation than normal. I attempted to mitigate this by sitting at the back of any activities and saying as little as possible. However, in Timorese culture, visitors must be at the centre of activities and are always formally introduced, so it was usually challenging to maintain a low profile.

The data collection process for this research—asking questions and observing household WASH infrastructure— might also have influenced the outcomes of the WaterAid program. By asking questions, I was encouraging participants to focus on their WASH behaviour; and focusing on WASH behaviour is one of the strategies of the intervention itself. Furthermore, participants might have thought that my questioning was a form of monitoring for compliance rather than purely observational. Whilst I explained during every interview and questionnaire that I was not evaluating, merely observing, it is likely that at least some participants interpreted my presence differently. Where my presence did affect the outcomes of the WaterAid WASH program, it is likely that this would have resulted in greater improvements in WASH behaviour than otherwise.

5.2.6 Challenges of research in remote areas

The study sites for this research were all located in remote parts of Manufahi Municipality, Timor-Leste. Same, the capital of Manufahi, is only a 15-minute flight from Dili, but at the time of data collection it was, at best, a 4-hour drive in a four-wheel-drive vehicle. From Same, the study sites ranged in travel time from 25-minutes to 3-hours one-way in four-wheel-drive vehicles and some villages were unreachable if it had rained recently. Car hire in Timor-Leste is expensive so field work trips needed to be flexible enough to maximise the use of the vehicles. There were regular delays in project activities for both WaterAid and WASH for Worms because of community engagements such as funerals; and because most villages did not have phone reception, which impeded planning. Altogether, this meant things did not often go as planned and the study design had to be flexible. For example, I conducted a baseline in six communities for Study 2 but could only include data from three because the other three decided not to participate in the WaterAid program¹⁷.

5.3 Ethical considerations

The methods used in this research posed risks to the participants, WaterAid and the research team including the interpreter, driver, accompanying WASH for Worms staff and myself. These risks and the steps I took to avoid or mitigate these are described in the sections below.

¹⁷ In one community, this was because one of the chiefs was jailed for fraud when the program was due to commence and in another it was because the community had apparently started construction for a new water supply system the day before I started the baseline (although I only found out a few days later).

5.3.1 Taking up participants' time

To minimise the inconvenience of taking up participants' time, where possible, I travelled to wherever it was convenient for the participants to meet. This was mostly relevant for Study 1 because in studies 2 and 3, most data collection occurred in or near the participants' homes. For data collection in Dili, I would provide participants with refreshments. In villages in Manufahi, I gave participants paper and pencils; a small sachet of laundry powder; or chocolate as a token of appreciation. According to my interpreter, this was an appropriate gift, for 30-60mins of participants' time, without being an incentive to participate.

There was a risk that participants might feel compelled to participate in this research out of a sense of obligation or gratitude toward the WaterAid or the WASH for Worms trial. I made sure that participants knew their participation was voluntary before bringing the questionnaire out. During studies 2 and 3, approximately 10 household representatives declined my invitation to participate directly; either saying they were too busy or just did not want to. My interpreter also noticed that occasionally people would pretend not to be home to avoid being invited to participate. This reassured me that the community members did not feel pressured to participate.

5.3.2 Discomfort with discussing topics raised in the interviews or questionnaires

This risk was minimal. Prior to the interview or questionnaire, the participants were informed that they did not have to answer any questions they felt uncomfortable with and could stop participating at any time. If they had any concerns after the interview or questionnaire, they were advised that they could contact their village chief or the locally based co-investigators from the WASH for Worms team. My interpreter and I would remain in the villages for several hours or days after interviews and questionnaires were conducted so that participants also had a chance to talk to us informally.

5.3.3 Breaches of confidentiality and privacy

There was potential for participants' views to be discussed inappropriately with people outside of the research team. Wherever possible, interviews and questionnaires were conducted in a private setting: for example, the participants' home. However, in a small village setting, even this level of privacy was often difficult to achieve.

Outside of the communities, other strategies were put in place to ensure confidentiality. Each participant was given a unique identifier and the document linking participants to their identifying codes are kept separately from all other data. All participants, apart from Kamal Kar and Robert Chambers, and villages have been given pseudonyms. Kar and Chambers were invited to review the sections of the drafts which included direct quotations from their interviews to ensure that they had not been misinterpreted.

All data was kept either in a locked cupboard (in Timor-Leste, or at the University of Melbourne) or in password-protected files on the researchers' computers. Audio files were destroyed as soon as they were transcribed. Interview transcriptions and questionnaires will be destroyed five years after this thesis is published.

5.3.4 Managing participants' expectations

There was a high risk that participants from the villages would expect or hope that I, as an Australian, could support them with money or materials, either personally or through advocating to others. To mitigate this, I would explain at the beginning and at the end of

each interview or questionnaire that my purpose was to conduct research and that I could not provide money or materials. Occasionally, I would reiterate this during the interviews also.

5.3.5 Inconvenience to WaterAid

This research risked inconveniencing WaterAid in a practical sense. The presence of a foreigner during activities might have been distracting for community members. In Study 2, I needed to conduct questionnaires immediately before and after the WaterAid triggering activities which might have coincided with their other activities. To mitigate this, I tried to sit at the back of the triggering activities; and met regularly with the WaterAid staff to coordinate data collection times for when it best suited their schedule.

By allowing me to conduct this research in their project sites, WaterAid also risked their reputation. Any issues during the field work might have eventually reflected badly on WaterAid although I was not representing them. To mitigate this, I regularly consulted the WaterAid staff about the field work for this research. My interpreter assisted me greatly with understanding local norms and appropriate behaviour in the villages.

5.3.6 Informed consent process

Consent for the WASH for Worms trial, including this research, was granted by the Government of Timor-Leste's Ministry of Health and WaterAid Australia, prior to commencing data collection. I also sought informal approval of the data collection methods directly with the WaterAid Timor-Leste staff. The WaterAid staff and the WASH for Worms field officer, assisted me with getting research approval from the village chiefs.

Interview and questionnaire participants were asked to give individual informed consent. Initially, participants were given a written copy of the plain language statement (PLS) in Tetun (which had been translated and back translated to ensure accuracy). However, it was found that this was often daunting; either because the participant could not read Tetun or because of the formality of this process. Therefore, I always explained the content of the PLS verbally as well as offering a copy of the PLS to keep. The participants were encouraged to ask any questions, or for clarification at the start and end of the interview.

After the PLS was explained and the participant had no further questions about it, they were asked to sign a consent form. However, this was often daunting for the reasons outlined above. If the participant could not write or seemed daunted by this process, I would ask for verbal consent in the presence of my interpreter. Each consent form had a place to indicate that this had taken place and was signed by me and my interpreter as a witness that the participant had understood and agreed to everything in the plain language statement. See Appendix 1 – Plain Language Statements and Appendix 2 – Consent Forms for the plain language statements and consent forms for all studies in both Tetun and English.

5.3.7 Formal ethics approvals

Ethics approval for the WASH for Worms trial, which includes this research was obtained from the Government of Timor-Leste's Ministry of Health as well as the University of Queensland. Ethics approval for this research was also obtained from the University of Melbourne Health Sciences Human Ethics Sub-Committee.

5.4 Conclusion

So far, this thesis has described the background to this research; identified some of the main gaps in knowledge pertaining to CLTS implementation in Timor-Leste; defined research questions to address some of the more pertinent gaps in knowledge; and, in this chapter, described the methods used to respond to the research questions.

The remainder of this thesis will describe the three studies conducted for this research and discuss the main findings emerging from these studies.

6 Study 1 - Interpretations of Community-Led Total Sanitation in Timor-Leste

The first study in this research is about the ways in which Community-Led Total Sanitation (CLTS) is described and understood by its pioneer, Kamal Kar, and early supporters as well as those who are involved with planning and implementing CLTS in Timor-Leste. To properly understand the outcomes and impacts of an intervention such as CLTS, which the second and third studies in this research aim to do, it is not enough to assume that CLTS as it is described in the CLTS handbook was applied. It is also insufficient to assume that the WaterAid program implemented its sanitation intervention in accordance with PAKSI¹⁸: the Timor-Leste adaptation of CLTS. Instead, it is necessary to understand how CLTS and PAKSI were understood and applied in the context of Timor-Leste. Hence, the objective of this first study was:

- 1) To compare how CLTS and PAKSI are described and understood by the pioneer and early supporters of CLTS, as well as by those involved in planning and implementing PAKSI in Timor-Leste (pre-2014).

The research questions were:

- 1) How are the **‘essential elements’ of CLTS** described by the pioneer and early supporters of CLTS, as well those involved in planning and implementing PAKSI in Timor-Leste?
- 2) How is **PAKSI—the adaptation of CLTS in Timor-Leste**—officially described in manuals and guidelines?
- 3) How is the **implementation of PAKSI in Timor-Leste** described by those involved in its planning and implementation?
- 4) How do the descriptions of the **‘essential elements’ of CLTS, PAKSI, and the implementation of PAKSI in Timor-Leste** differ from each other?
- 5) How do the research participants’ descriptions of each of:
 - a. the **‘essential elements’ of CLTS,**
 - b. **PAKSI,** and
 - c. the **implementation of PAKSI in Timor-Leste**differ from each other?

The objective and research questions are described in more detail in Chapter Four.

This remainder of this chapter includes the methods, results and discussion for Study 1.

6.1 Methods

Given the exploratory nature of the research questions, qualitative research methods were appropriate for Study 1 because these offered flexibility in the range and depth of data which could be collected. Hence, Study 1 was a descriptive, observational, cross-sectional study.

¹⁸ *Planu Aksaun Komunitade Saneamentu no Ijiene* (Community Action Plan for Sanitation and Hygiene)

6.1.1 Data Collection Tools

Four types of data were collected for this study:

- 1) Secondary data such as CLTS manuals and reports
- 2) Notes from CLTS workshops attended by the researcher
- 3) Semi-structured interviews
- 4) Observations of the WaterAid program activities in project sites in Manufahi Municipality

The **CLTS manuals** were sourced online or from participating organisations' archives.

The CLTS Knowledge Hub and CLTS Foundation regularly conduct **workshops, lectures and training** and I was able to attend and take notes of several of these events between 2011 and 2018.

Kamal Kar (the pioneer of CLTS) and early supporters of CLTS as well as representatives of the groups involved in the planning and implementation of CLTS in Timor-Leste were invited to be **interviewed**. During the interviews, participants were asked open-ended questions about their water, sanitation and hygiene (WASH)-related experience (to familiarise them with the interview content) and then more specifically about CLTS generally and CLTS in Timor-Leste (See Appendix 3 – Study 1 Question Guides). The question guide was trialled with colleagues at the Nossal Institute for Global Health. In Timor-Leste, the question guide was then re-drafted several times with the assistance of my interpreter to ensure that the meaning of the questions was conveyed after being translated into Tetun.

Each of the participants was interviewed by me at their place of work, home or a public location of their choosing. Two interviews were conducted via Skype. All interviews took place in 2013; bar that with Kar and those with the early supporters of CLTS. If the participant did not feel confident speaking English, a Tetun-English interpreter assisted me with the interview. In a few cases, when my Tetun was sufficient, the interviews were conducted in Tetun without the use of an interpreter. Most of the interviews were audio-recorded although some participants requested that I only take notes.

Finally, I made **observations of the WaterAid program activities** in several project sites in Manufahi Municipality during 2013. An interpreter assisted me with understanding the activities that were conducted in Tetun. I recorded my observations as notes, maps and drawings.

6.1.2 Sampling Framework

Aside from the pioneer of CLTS, Kamal Kar, and the early supporters of CLTS, the participants in this study needed to represent the various groups involved in planning and implementing CLTS in Timor-Leste, and particularly in Manufahi Municipality. These groups were:

- National and district governments and the bilateral aid program for WASH in Timor-Leste: BESIK¹⁹
- Senior staff of WaterAid and local non-governmental organisations (NGOs) involved in implementing PAKSI in Manufahi Municipality
- PAKSI facilitators²⁰ in Manufahi Municipality—from WaterAid and local NGOs
- Leaders from communities in Manufahi where the WaterAid and WASH for Worms programs had taken place before or during 2013.

It was necessary to have representatives from a variety of groups to include as many perspectives as possible. Several members from each group were invited to participate and were identified either by WASH for Worms colleagues, WaterAid staff, or snowballing.

As described in the background chapter, water, sanitation and hygiene are responsibilities shared by the Ministry of Public Works and the Ministry of Health at both national and district levels. The Australian government provided aid for WASH in Timor-Leste through what was called the Rural Water Supply and Sanitation Program (RWSSP)—or *Bee, Saneamentu no Ijiene iba Komunitade* (BESIK) in Tetun. The focus of the BESIK program is to support and strengthen both ministries at the national level to provide improved WASH services to rural communities in Timor-Leste. Hence, representatives from both ministries at the national and local level as well as BESIK were invited to participate.

Several international NGOs conduct WASH programs in Timor-Leste and many of them include CLTS in their interventions. Given that the WASH for Worms trial sites were all part of the WaterAid program, only representatives from the WaterAid national and district offices were invited to participate in this study. The WaterAid approach is to work in conjunction with local NGOs at the district and community-level. Hence representatives of the district level staff from the two local NGOs WaterAid work with in Manufahi were also invited to participate.

The facilitators who worked in the WASH for Worms trial project sites came from WaterAid and the two local partner NGOs. Representatives of the facilitators from each of these three organisations were invited to participate.

The community leaders were selected for invitation to participate based on the year that the WaterAid program commenced in their community. This was to include any diversity in perspectives due to the length of the involvement of WaterAid with the community.

¹⁹ BESIK (*Bee, Saneamentu no Ijiene iba Komunitade*) is an Australian Government funded Rural Water Supply and Sanitation Program (RWSSP) in Timor-Leste.

²⁰ PAKSI facilitators are responsible for facilitating project activities and generally have the most contact with the community members in the WASH project sites.

Finally, the community where I made observations of the WaterAid PAKSI process were selected based on the timing of the WaterAid and WASH for Worms trial timelines as well as location. It was important to select project sites which varied in remoteness from Same (the main town of Manufahi Municipality) as this might have impacted the type of toilets built and in turn, the sustainability of households' improved sanitation behaviour.

6.1.3 Recruitment of Participants

The participants for this study were recruited either directly by me or by other field staff and researchers in the WASH for Worms team. The contact details of Kamal Kar; early supporters of CLTS; BESIK staff; and WaterAid staff were passed on to me via senior staff in the WASH for Worms team or my current contacts in the Australian WASH Reference Group.²¹

Interviews with the Government of Timor-Leste representatives and community leaders were generally set up by local WASH for Worms staff. The WaterAid senior staff introduced me to the senior staff in their local partner NGOs.

6.1.4 Analysis

After transcribing the interviews, I analysed the transcripts; secondary data; and observation notes thematically in NVivo. Thematic analysis generally involves the following steps:

- 1) familiarisation with the data
- 2) generating initial codes
- 3) searching for themes among codes
- 4) reviewing themes
- 5) defining and naming themes, and;
- 6) producing the final report

(Braun and Clarke 2006)

According to Boyatzis (1998 p63), a code is 'the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way.' In the analysis for Study 1 some of the codes were predefined based on the existing CLTS literature. For example, 'disgust motivation' was a predefined code. Other codes emerged from the raw data during the analysis. Later, the codes were grouped into themes such as 'the essential elements of CLTS'.

To detect whether there was any bias in the interpretation of the data, a second researcher coded a subset of the interview transcripts in NVivo. The two sets of coding were similar which suggested that interpretation bias did not substantially affect the results.

²¹ The Australian WASH Reference Group meets twice per year and comprises practitioners, researchers and government representatives who have an interest in the WASH sector.

6.1.5 Limitations

Several potential limitations of this study have been identified. These were described in Section 5.2 of the methods chapter because they potentially affect all three studies in this research. Steps taken to mitigate these limitations are also described in the methods chapter.

6.2 Results

The results include a description of, and the findings from, each group of data sources and participants.

6.2.1 Description of the participants and secondary data

The data for Study 1 were collected from the different groups of participants and sources summarised in Table 6-1 on the following page.

Table 6-1 Primary and secondary data sources for Study 1

Participant group	Primary data	Secondary data
Pioneer of CLTS	Interview with: • Kamal Kar	• CLTS manuals • Report on CLTS in Timor-Leste by Kamal Kar
Early supporter of CLTS	Interview with: • Robert Chambers Notes from: • CLTS Knowledge Hub workshop facilitated by Chambers at the Brisbane WASH Conference, 2018	
Government and bilateral aid program representatives	Interviews with representatives from: • National Directorate for Water and Sanitation (DNAS) x 2 • National Directorate for Environmental Health x 1 • Manufahi Office for Water and Sanitation (SAS) x 1 • Manufahi Office for Environmental Health x 1 • BESIK (Rural Water Supply and Sanitation Program) x 3	• PAKSI guidelines: 1. Preparation 2. Triggering 3. Follow-up
NGO senior staff	Interviews with senior staff from: • WaterAid head offices x 3 • Local NGO A* x 1 • Local NGO B x 1	
PAKSI facilitators in Manufahi Municipality	Interviews with representatives from: • WaterAid x 1 • Local NGO A x 1 • Local NGO A x 2	
Community leaders	Interviews with community leaders from: • Community A* • Community B	
Observations of WaterAid program activities	Observations took place in: • Community A • Community C • Community D • Community E • Community F	

*The local partner NGOs and communities have been given pseudonyms.

Dr **Kamal Kar**, the pioneer of CLTS, wrote several manuals which set out the critical aspects of CLTS; namely, a 'Practical Guide to Triggering CLTS' (2005); a 'Handbook on CLTS' (2008); and 'Facilitating "Hands-on" Training Workshops for CLTS: A Trainers' Training Guide' (2010). In 2009, he and Professor Lyla Mehta established the CLTS Knowledge Hub which is dedicated to documenting research and learnings about CLTS from all over the world. Later, Kar established the CLTS Foundation which focuses on supporting national governments, donor and implementing agencies to enhance access to sanitation by scaling up CLTS through 'building capacity, providing technical support, and influencing national sanitation policies' (CLTS Foundation 2018).

The **national and district government** representatives were either from the Ministry of Public Works or the Ministry of Health and all but one (who had lived in Timor-Leste for the past two years) were Timorese nationals. They were involved with the management of WASH in either an administrative or advisory capacity; none was involved directly with the implementation of programs. Of these participants, two were women and three were men.

At the time of data collection, the Australian government was funding BESIK (*Bee, Saneamentu no Ijiene ba Komunitade*) (Rural Water Supply and Sanitation Program). The BESIK staff worked closely with government staff in both the Ministries of Health and Public Works. The representatives I spoke to were from Timor-Leste, Indonesia or Australia. All these participants were women.

The **WaterAid senior staff representatives** worked in either the Timor-Leste or Manufahi Municipality office; none was Timorese. One participant no longer worked in Timor-Leste at the time of data collection. All participants had worked in WASH programs in other countries previously and were introduced to the CLTS approach in 2005. All these participants were men.

One **senior staff member each of two local NGOs** which partner with WaterAid were interviewed. Local NGO A is Japanese-funded, and its three main objectives are to support sovereignty, community aspirations and the development of community agriculture. They had been implementing their WASH program since 2011 in partnership with the government, WaterAid and Local NGO B. Local NGO B began operating in 2008 and their six areas of focus are natural disaster reduction; advocacy; civic education; agriculture; child protection; and WASH. Of these participants, one was a woman and one was a man.

Four **PAKSI facilitators** participated in this research: one from WaterAid, two from Local NGO B and one who worked for both Local NGO B and Local NGO A. Their roles were a mixture of hygiene education, technical support for the construction of water systems and toilets as well as PAKSI facilitation. Some were new to PAKSI facilitation and others were more experienced. Of these participants, two were women and two were men.

The **community leaders** were from two communities where the WaterAid program had taken place. In Community A, the chief of the *Grupo Maneija Facilidade* (GMF) (Water Management Group) and the schoolteacher were interviewed together. In Community B, the community chief (who was also the GMF chief) was interviewed. Community B is located approximately thirty minutes' drive from Same up a steep dirt track accessible by two-wheel-drive in the dry season. The leaders from Community B said there had been no NGOs in their community previously. I did not observe the WaterAid PAKSI process in this community because it took place in 2012, before I commenced field work. Both community leaders were men.

Community A is described in Table 6-2 below. In the past, a Korean NGO had implemented a program which included coffee production and a gravity-fed water system with a single tap in the downstream *bairo* of Community A.²² The upstream *bairo* did not have a piped water supply system but they had declined help from an agricultural NGO because the NGO had asked the community to contribute money.

I initially included community leaders as being part of the group of stakeholders involved in planning WASH interventions in Timor-Leste. However, the results suggest that community leaders are more like recipients than planners of the WaterAid program.

I **observed** some of the WaterAid program activities in five project sites during 2013. The WaterAid program could only commence in a project site once the feasibility study was complete and the community leaders gave permission during preliminary meetings. The first set of activities in the program were (ideally) conducted with the whole community and took approximately one week—hereafter referred to as the ‘inception meeting’. (Quotes from these meetings are referenced as ‘Meeting-Community A’.) The main activities were the introduction; explanation of the WaterAid program criteria; PAKSI activities; gender awareness and hygiene promotion training; GMF training and water system design. I usually only observed the first one to two days of the inception meeting which included the PAKSI activities. In Community F, I did not observe the PAKSI activities because the meeting was interrupted (and then postponed to a time I could not attend).

It was preferable that the project sites had not undergone another WASH program in the recent past. In at least two sites, there was evidence of prior water system interventions (only one was still functioning) and one site had undergone a CLTS-based intervention in the previous year. WaterAid preferred to limit their project sites to around 40-50 households; however, it was not always logical or possible to do so. For example, sometimes two or three *bairos* were located close together so it was more efficient to include them all in the same program. The characteristics of the five project sites are described in Table 6-2 on the following page.

²² As described in the background chapter, the municipalities are divided into administrative posts (previously ‘sub-districts’) which are further divided into *sucos* (villages). Villages are made up of several small hamlets or communities called *aldeias*. The smallest clusters of family groups are called *knuas* or *bairos*. (Leach 2017)

Table 6-2 Description of project sites where the WaterAid PAKSI process was observed

	Community A	Community D	Community C	Community E	Community F
Community structure	Single <i>aldeia</i> made up of 2 <i>bairos</i> .	Single <i>suco</i> made up of 3 <i>aldeias</i> (no <i>bairos</i>)***.	Single <i>bairo/ aldeia</i> .	Single <i>aldeia</i> made up of 3 <i>bairos</i> . (Program only in 2 <i>bairos</i> ****).	Single <i>bairo</i>
# Houses or Households* (data source)	26 (14 + 12) houses (Map) and 36 households (W4W)	138 houses and 163 households (Map)	53 houses (Map) and 33 households (CM)	20 (10 + 10) households (Map)	38 households (CM)
Approx. distance from Same** town centre	45-min drive (mostly 4WD, only when dry) or 6-8-hour walk	30-min drive (mostly 4WD) plus 90-min walk	2-hour drive (half of the journey requires powerful 4WD and is only passable when dry) or 70-min drive plus 2-hour walk	25-min drive (mostly sealed road, 2WD)	2-hour drive (4WD, two major river crossings)
Institutions	Upstream <i>bairo</i> : Primary school and <i>Uma Lulik</i> - sacred house	<i>Aldeia 1</i> : Clinic, <i>Uma Lulik</i> —sacred house <i>Aldeia 2</i> : Church, School, Cemetery Office**** in each <i>aldeia</i>	School, Cemetery, Church, Office	Roadside <i>bairo</i> : Church and School	Office and Cemetery
Geography	Steep and mountainous. Houses located along the road, some set back from the road. 2 <i>bairos</i> separated by 1km steep 4WD track.	Community located along the flat ridge-top of a steep mountain. Houses arranged along the road which followed the ridge.	Community located next to junction of two rivers. Flat, grassy and hot—likely due to being at sea-level but not coastal.	One <i>bairo</i> is located along the road. A river flows parallel to the road, bounding the first <i>bairo</i> . The 2 <i>bairos</i> where the program took place are on the other side of the river.	Steep and mountainous. Houses located along a road which is cut into the side of a steep hill, just below the ridgeline.
Date of meeting	May 2013	April 2013	May 2013	August 2013	September 2013

*The number of houses does not always equal the number of households. This is because several households/families might live in one dwelling, or a single family might occupy several dwellings. Occasionally, houses are empty for long periods because the household move elsewhere for work or school. This data was gathered from the mapping exercise (Map), reports from community members (CM) or WASH for Worms (W4W).

**Same is the main town of Manufahi Municipality.

***W4W only included two of the *aldeias* in their intervention, although WaterAid included all three.

****A community 'office' is a building dedicated to community events. It is usually a large, open-sided covered area which fits approximately 50 people underneath and many more outside. There is sometimes also a small lockable room, a notice board and public toilet nearby.

****This was because one *bairo* already had a functioning water system and most households had toilets.

6.2.2 ‘Essential elements’ of Community-Led Total Sanitation

The 2005 Practical Guide to Triggering states that:

Community-led total sanitation (CLTS) involves facilitating a process to inspire and empower rural communities to stop open defecation and to build and use latrines, without offering external subsidies to purchase hardware (Kar 2005 p2).

The perspectives of the founder and an early proponent of CLTS

‘Nothing changes’ said Kar, the founder of CLTS, when I asked him whether the definition of CLTS had altered since the first guidebook. He explained:

The principles remain the same. The basic overall principle that empowerment of the local community is *the* thing. Empowerment, empowerment, empowerment.

Kar explained that the approach of providing upfront subsidies for sanitation was based on ‘an incomplete explanation of the bigger picture’:

people are poor definitely. It’s also true that the government has money for their own poor people. No one is denying that. But the question is: “If you say that you are poor, and you shit, and I give you money, that is insulting humanity. If I am a human being, I have self-respect, I know not to eat my neighbour’s shit.

Hence, according to Kar, the important principles of CLTS are community empowerment as well as the assumption that ‘no human being wants to live in shit’.

Kar also described ‘three pillars of CLTS’ which need to ‘converge’ for CLTS to be effective. Firstly, personal, institutional and professional attitudes to behaviour change need to be oriented toward community empowerment. Secondly, CLTS tools and techniques need to be implemented properly. Thirdly, the enabling environment needs to be supportive of CLTS. Since Kar pioneered CLTS he, together with the CLTS Foundation and their network of trainers and practitioners, have continuously updated and fine-tuned the CLTS activities with respect to the needs of different countries and local contexts.

Chambers (an early supporter of CLTS), conversely, was reluctant to define the essential elements of CLTS:

There are questions about the essence, there are questions about what makes it a good process. [...] If you look at a participatory methodology, you can see stages or phases that it goes through. [...] The initiation is very exciting. People feel they have discovered something [...] And then the second and third phases it spreads very widely, [there can be] huge amount of bad practice, it gets discredited. It’s a time also when the originators may feel it necessary to write manuals [...] And then, interestingly the manuals can get out of date.

Despite his reluctance to define an essence of CLTS, Chambers was concerned about whether CLTS is done properly:

[Many people] say they’re doing CLTS over [in] India [...] but what it actually means and what they actually do—they’re very different but they’re also quite a long way from the original ideas of CLTS.

Chambers laments that the spread of CLTS has meant that its activities are:

selectively adopted, [...] the preliminaries and the follow-up are not [done properly]—ODF [open defecation free status] is regarded as a ‘tick’ [before going] onto something else.

The concern then, is that if so-called CLTS interventions do not work (in India or elsewhere), ‘then people will say that CLTS doesn’t work.’ Similarly, Kar was concerned about CLTS getting a ‘bad reflection’ when it is not implemented in accordance with the key principles.

Chambers explained that in the beginning ‘when it was necessary to protect CLTS’, the imperative to define key elements of CLTS was partly ‘tactical or strategic’. When CLTS began, the sanitation policies and funding patterns of governments, donors and NGOs were oriented toward hardware subsidies even though it was well known that this did ‘not work well’. Community-led Total Sanitation offered an alternative which required:

opposing and upending government policy. When those battles were going on, and to some extent, they’re still going on, you had to hold hard and fast [to CLTS principles].

Kar too, describes the continuing challenges to the CLTS approach:

That whole assumption that “people are poor so give them money” *must* be kicked out because CLTS was born from [challenging] that. “People are poor - give them money. People do not understand - teach them hygiene education”: [these ideas] *must* be kicked out. “People cannot construct toilets so prescribe technology from top-down”: *no*.

Both Kar and Chambers described the importance of preserving the quality of CLTS as its use becomes widespread. Kar emphasised the importance of doing ‘the groundwork at a very high quality because that sets the example [for] country-wide scaling-up. But if you do that job very badly [...] then you are ruling out that chance.’ Chambers also described the ‘decline in quality with going to scale very rapidly and the dilution which always takes place particularly within government.’

The ‘essential elements’ of PAKSI

The Timor-Leste adaptation of CLTS is called PAKSI and is the prescribed approach in the national rural sanitation policy. PAKSI guidelines are set out in a series of three manuals: Preparation (Government of Timor-Leste 2012); Triggering (Government of Timor-Leste 2012) and Follow-up (Government of Timor-Leste 2012). The first manual, ‘Preparation’ states that:

PAKSI is an approach to facilitate community-based planning and action to achieve Basic Sanitation. Communities come together to discuss open defecation and decide what they want to do about it (Government of Timor-Leste 2012 p5).

The PAKSI guidelines are very similar to the CLTS guidebook and manual in that community empowerment and the absence of hardware subsidies are emphasised and activities like those used in CLTS to bring about disgust and embarrassment are described.

The BESIK representatives described PAKSI as being ‘more than the CLTS’. (S1-05) It is ‘CLTS plus’ or ‘ALFA’ because the goal of ‘Basic Sanitation’ includes four elements: becoming open defecation free; hand washing with soap; management of liquid waste; and management of solid waste. In contrast, the CLTS guidebooks define 100-percent

ODF communities as the primary goal but suggests that once communities have achieved this, they are likely to move onto other goals such as handwashing.

A BESIK representative explained that PAKSI had been adapted somewhat to the Timor-Leste context after conducting ‘a sanitation evaluation [...] of all the sanitation projects up to [...] 2009’. (S1-05) They were aware of Kar’s concern about adhering to CLTS principles; however, they said that PAKSI ‘pretty much had sign off on it from Kamal Kar’. (S1-05) Similarly, the WaterAid senior staff were eager to explain that in Timor-Leste:

we try to do a similar approach as [the one] Kamal Kar promoted, like no subsidy, and that’s what we try to do still, because we wanted to keep this name CLTS [...]. So there are not many deviations from what Kamal Kar promoted. (S1-19)

One government representative described PAKSI as ‘a step forwards in the mindset of CLTS’ because of the additional goals. (S1-06)

Overall, it seems that PAKSI and CLTS shared many ‘essential elements.’ The official description of PAKSI indicates that it has been slightly adapted for the Timor-Leste context but apparently this was acceptable to Kamal Kar, at least when PAKSI was first established.

6.2.3 PAKSI activities

The PAKSI triggering activities are very similar to those set out in the CLTS handbook (Kar 2008) which include: defecation area transect; mapping of defecation areas; identifying the dirtiest neighbourhoods; calculations of shit and medical expenses and pathways of faecal contamination.

The first PAKSI manual, ‘Preparation’, sets out an overview of the phases in the PAKSI process, namely:

- Advance meeting;
- Triggering,
- Action Planning (at *sucu* level);
- Follow-up visits;
- ODF verification; and
- Continuing the Process (to solid waste management *etcetera*).

(Government of Timor-Leste 2012)

The second PAKSI manual sets out the activities from the ‘Triggering’ phase. These include:

- introductions;
- children’s activities;
- defecation mapping;
- transect walk;
- shit to home/food flows;
- water and shit demonstration;
- shit calculations; and

- handwashing and food demonstration
- (Government of Timor-Leste 2012)

The intended goal of CLTS and PAKSI activities

The descriptions of the intended goal of CLTS and PAKSI activities, by the participants and in the CLTS and PAKSI manuals, seemed to focus on inciting feelings of disgust, shame and embarrassment among the participants. This would ideally motivate them to take action to become open defecation free.

The CLTS handbook states that:

triggering is based on stimulating a collective sense of disgust and shame among community members as they confront the crude facts about mass open defecation and its negative impacts on the entire community (Kar 2008 p21).

Chambers felt that:

CLTS was based on disgust rather than shame. Unfortunately, the term ‘walk of shame’ got adopted and then we got all sorts of critique about how this was humiliating for people and so on. In fact, in a well-facilitated triggering, there’s lots of laughing and laughter is a lightening conductor for embarrassment. [...] It’s not shaming so much as embarrassing. And embarrassing because it’s disgusting. So that’s a very powerful motivator.

The PAKSI manual states that the purpose of the triggering activities is to ‘develop some embarrassment and disgust about open defecation’ (Government of Timor-Leste 2012 p11); however, it does not mention shame. The WaterAid senior staff felt that community members were:

probably more disgusted rather than ashamed’ [because of the PAKSI triggering activities because] basically, a lot of people used pig pens and sort of—they do open defecate, it’s sort of standard practice and traditional. You can have a good conversation about it. (S1-12)

The BESIK staff also felt that the PAKSI activities brought about a ‘level of disgust both at the household level and at the community level’. (S1-05) The district government representatives described the PAKSI activities as being about explaining ‘the impact of not having toilets and that this will affect the health of the community’. (S1-18)

This last description by the district government representatives has an educational focus, which is an approach that has been critiqued by WASH behaviour change practitioners. (See Section 2.1.4.2 of the literature review for this discussion.) The other participants’ descriptions summarised here are centred on stimulating emotions among community members to motivate their behaviour change which is more aligned to recent thinking among WASH practitioners. Nevertheless, there seems to be a lack of agreement on whether the purpose of CLTS and PAKSI activities are to incite disgust, shame or embarrassment.

6.2.4 The implementation of PAKSI by WaterAid

The WaterAid program included both PAKSI activities and activities for establishing or repairing a water supply system in the project sites. In the sites that I observed, the WaterAid PAKSI activities did not strictly occur in accordance with the descriptions in

the PAKSI manuals. For example, ideally, the triggering phase in CLTS should take about three hours and culminate in the ‘ignition moment’ where the community members decide to become ODF. After this, there is time for ‘Moving to Action’ which ideally leads to a ‘commitment from the community to take action and start planning.’ However, the first part of the WaterAid program would normally take one week (the inception meeting) and includes PAKSI and other activities.

I observed the first one to two days of the meetings, which usually included the following activities in approximately this order (PAKSI activities are listed in bold):

- Introductions
- Explanation of program criteria
- **‘Triggering’:**
 - **water and defecation mapping**
 - **transect walk**
 - **water and shit demonstration**
 - **shit to home/food flows**
- **‘Moving to Action’:**
 - **Public commitment to building toilets**
 - **Explanation of the sanitation ladder and toilet designs**
 - **Demonstration of toilet construction** (occasionally this took place after the GMF establishment)
- Venn diagram of community networks
- Yearly calendar of events (to determine when community members would be available to construct the water system)
- Explanation of the GMF regulations
- GMF establishment
- WASH for Worms program introduction (or as part of the introductions)

The ‘triggering’, ‘moving to action’ and ‘GMF establishment’ activities are described in more detail in the following three sub-sections.

6.2.4.1 Triggering

As described in Section 6.2.7, the WaterAid meetings would open with lengthy introductions and a discussion about the WaterAid program criteria, so it would normally take a few hours before the PAKSI activities could begin. Once the attendees had agreed to the program criteria, the triggering took place. This began with a community **mapping** exercise where attendees were invited firstly to draw the boundary, roads, and major water features of their community in chalk powder on the ground (see Figure 6-1). Attendees would place large cards, representing institutions such as schools, and smaller cards, representing households with the name and number of household members, on the map. This would usually take a long time and sometimes lead to detailed discussions or arguments between the attendees; or they people wandering away.



Figure 6-1 Community mapping exercise, Community E

(Photo: Naomi Francis)

When everyone was satisfied with the map, the facilitator would read out a name from one of the household cards and ask that person to mark, on the map with yellow powder, where they had defecated that day. The person would come forward, usually shyly, and mark the map. This was repeated four or five times with mixed responses from the rest of the attendees. Usually there would be some giggling or nervous laughter and people would talk quietly to each other; in one meeting the mood was more energetic with lots of people laughing and shouting with encouragement.

After a few people marked out where they had defecated, the facilitator would ask someone to lead everyone on a **'transect walk'** to the place where they defecated that day. This was usually met with laughter and some horrified looks. In one meeting, the person nominated said that there would be nothing to see because animals would have already eaten their faeces. Nevertheless, a few people would follow the person to find their faeces (most would stay behind). The facilitator would poke a stick into the faeces and lead the way back to the meeting.

At the meeting place, the facilitators would conduct a **'water and shit demonstration'**. A human hair was brushed over the faeces to represent the legs of a fly and placed into a clean glass of water. This would be offered to the attendees and they would decline. The facilitator would point out that so long as people in their community open-defecated, they would all be eating and drinking 'dirty things'. They would then quickly present some A4 laminated sheets with drawings representing various points in the **'shit to home/food flow'** and ask the attendees to arrange the pictures in order (see Figure 6-2). This activity could only be done by a few people at a time and usually involved lengthy discussions so sometimes the other attendees would lose interest.



Figure 6-2 Faecal-oral pathway exercise, Community E

(Photo: Naomi Francis)

According to the CLTS and PAKSI manuals, this was the point at which ‘ignition’ was supposed to occur and the ‘Moving to Action’ activities could begin.

6.2.4.2 Moving to Action

Usually, this phase of the meeting required some prompting of the attendees by the facilitator:

If you leave food uncovered, flies will come and if you don’t see them,
you’ll eat the food and end up eating shit. Who will build a toilet?
(Meeting-Community A)

Community members would **publicly commit to building toilets** by signing their names and a date of estimated completion on a pre-prepared signup sheet. At the end of two of the meetings, there were more names on the list than there were attendees which suggested that some people were committing others to build toilets, possibly without their knowledge.

After the ‘triggering’ activities, the facilitators presented a diagram of a **‘sanitation ladder’** (re-produced in Figure 6-3) and explained that: ‘this is not to teach you, but to remind you’ of how to build a toilet. Occasionally there would be a fifth step for a full-flush toilet.

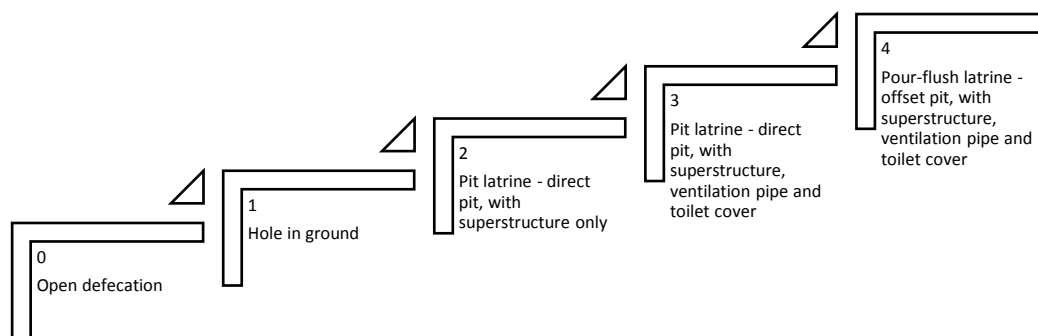


Figure 6-3 Sanitation ladder diagram (WaterAid)

The facilitators would then describe the **designs**, cost and materials procurement of three different toilets: one version of the toilet at step 3 and two versions of the toilet at step 4 on the sanitation ladder (see Figure 6-4).

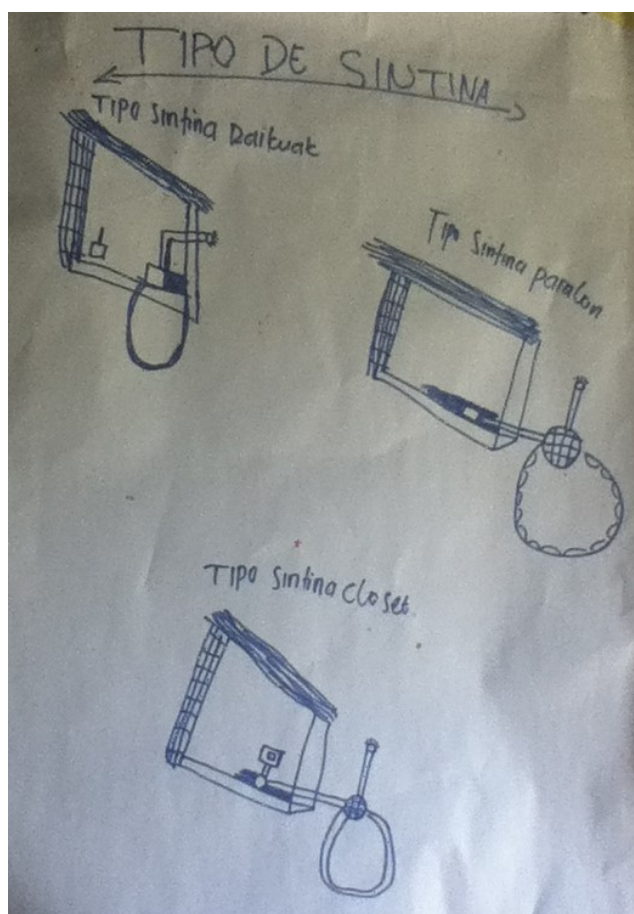


Figure 6-4 'Types of toilets' (WaterAid), Community A

(Photo: Naomi Francis)

After describing the designs, the facilitators would usually **demonstrate** the construction of the two toilet designs from step four on the sanitation ladder. If possible, they would do this at the home of an elderly widow or a female-headed-household. These toilets were made of concrete—in either a homemade box-shape (see Figure 6-5 below) or a mould provided by the facilitators (see Figure 6-6 below).



Figure 6-5 'Home-made' mould with pipe, Community A
(Photo: Naomi Francis)



Figure 6-6 WaterAid mould, Community A
(Photo: Naomi Francis)

6.2.4.3 *GMF establishment*

A substantial part of the inception meetings was dedicated to introducing the *Grupo Maneija Facilidade* (Water Management Group) regulations and selecting the members of the GMF. The GMF is a Timor-Leste government approved mechanism for managing water in remote communities. In the WaterAid program, the GMF also serves to

formalise the identification and organisation of those who will manage the community's activities toward becoming open defecation free.

In the CLTS and PAKSI manuals, the identification of 'natural leaders' from the community to 'lead the ongoing community action' toward becoming ODF after the facilitators leave is an important part of 'Moving to Action'. According to the CLTS handbook (Kar 2008 p4), 'natural leaders' 'are activists and enthusiasts' who will 'spontaneously emerge'. In the WaterAid program, this process is combined with the establishment of the GMF who are responsible for managing the water supply in each community. There is no equivalent management structure for sanitation in Timor-Leste. Hence, in integrated programs such as the WaterAid program, the responsibilities of the GMF include sanitation and hygiene as well as water.

The 21 articles of the government approved GMF regulations detail the composition of the GMF as well as the members' responsibilities. The composition (as it is described in the regulations) includes: a chief, secretary and treasurer (men or women); two technical officers (men); and two hygiene promoters (women). In most project sites, the attendees seemed to accept the regulations:

We will follow the instructions of the law. We need the law. Without it, we would not follow the instructions. (Meeting-Community A)

However, in some project sites, the attendees were concerned about their legal responsibilities regarding paying water tariffs and penalties for broken infrastructure.

The selection of the GMF took place in each project site; however, I only observed this process once. Despite the efforts of the facilitators to make the selection as democratic as possible, there were insufficient attendees, so the facilitators announced that:

It depends on you—do you want to just choose who is on the GMF or do you want to vote? (Meeting-Community D)

Consequently, three or four male community leaders had a private discussion and then announced the members of the GMF; inviting them to make an introductory speech. One of the leaders who was selected to be the GMF chief announced that:

The community has chosen me for the GMF. I will not refuse. I came here not to become a *xefi*, but the community has chosen me, so I will agree with you because it's to develop our community. (Meeting-Community D)

Two newly selected members were not present, so they could not make a speech. Some of the other members seemed confused about their selection. For example, one said that:

I am surprised that you have chosen me for finance [...] because on Monday and Tuesday I didn't attend [the meeting, but] I accept. (Meeting-Community D)

One of the new technical officers announced that:

I'm confused. I don't know what I will do with the technical stuff, but I will try to do the work. I don't understand. (Meeting-Community D)

Whilst the WaterAid senior staff were not present for this meeting, they were aware of the tension between the GMF establishment process and the community-driven process that CLTS and PAKSI are based on. One staff member explained that:

Ideally, in CLTS [the natural leaders] can be anyone. [...] In CLTS, we cannot push the community but people within community, they can push each other. [...] On CLTS view, you cannot make people just build this GMF. (S1-01)

However, to comply with government guidelines a GMF needed to be established in each project site and the same participant noted that this ‘violates’ the principles of CLTS somewhat. (S1-01)

In contrast, the facilitators did not seem to be aware of the dilemma of the GMF establishment. Two facilitators said the community would choose GMF representatives who they could trust, but one explained that:

I use my method to choose someone in the *aldeia* as a ‘power’, or someone to encourage their community to do sanitation and hygiene. (S1-02)

The community leaders’ description of the GMF establishment seemed to align with that of the last facilitator (although they had misunderstood that WaterAid was also managing a concurrent road improvement project):

WaterAid came for a meeting here to divide people into 2 working groups: roads and WaterAid. [...] [We are still] waiting for WaterAid to divide the 20 people who attended into each group. (S1-10)

The activities that took place in the WaterAid program described here are somewhat aligned with the descriptions of the PAKSI and CLTS activities in their respective manuals. These differences will be discussed in Section 6.3.1.

6.2.5 Whether to use subsidies and incentives to motivate people to become open defecation free

When asked to describe CLTS, most of the participants discussed the question of whether it was appropriate to use subsidies and incentives to motivate people to become open defecation free. This was also addressed clearly in the CLTS and PAKSI manuals which stated that upfront hardware subsidies for sanitation should not be used.

The perspectives of the founder and an early proponent of CLTS

The founder of CLTS, Kamal Kar, and an early proponent of CLTS, Robert Chambers, both broadly discouraged the use of hardware subsidies for sanitation. During his interview, Kar was clear about the importance of not having upfront hardware subsidies but also recognised that ‘definitely, there is a need to move along the sanitation ladder for the sake of sustainability’. He does not seem to be against governments helping with this, so long as there is ‘no interfering in [a community’s] decision to make collective behaviour change’. He explained that:

You have support mechanisms, you have resources but there are different ways of doing it without killing, and without dismissing, the force of local communities’ collective desire for change, prestige and pride that “we did it”. [...] How the nation [...] helps the poorest of the poor needs to be decided by the ODF community in equal participation with the external agency rather than unilateral external decision.

In a CLTS workshop conducted during the 2018 WASH Conference in Brisbane, Australia, Chambers said that ‘we must not undermine the ‘no subsidy’ aspect of CLTS

because it was too hard to get us to this point'. However, in his interview he explained the need for 'modifications of those principles [...] because we [are] not covering the last mile'. He was referring to 'poorest, least able people, the ten or twenty-percent' and described some pro-poor subsidies which are being applied in different countries. This is an example of what Chambers describes as the impossibility of having a 'one size fits all' description of CLTS:

What actually works in some contexts may not be anything you could call CLTS. Some things are called CLTS but diverge from the principles of CLTS which leads to a need to modify and adapt and adjust iteratively and context specifically those principles. Where I think we've come is that nothing is as hard and fast and black and white as it was earlier on when it was necessary to protect CLTS.

The official government stance on the use of sanitation hardware subsidies or incentives

In their descriptions of sanitation interventions in Timor-Leste, the participants all reported that there were no upfront hardware subsidies in government managed sanitation programs; rather the government funding allocated to sanitation was used for implementing PAKSI. They all described the justification for this approach by giving different examples of interventions where subsidies had not led to people becoming ODF; instead the recipients had sold the materials or would 'make their toilet as a warehouse or storage'. (S1-08) One district government representative added that the non-hardware subsidy approach of the 'CLTS program [means] that the community will feel that what they build is their own and they have to use it'. (S1-18)

The challenges of not using hardware subsidies or incentives

Whilst the participants understood the justification for not having upfront hardware subsidies, they described several challenges to the approach. Firstly, gaining institutional support for a non-hardware subsidy approach like CLTS in Timor-Leste had been challenging at times. A WaterAid senior staff member observed that a community empowerment approach which did not use hardware subsidies:

doesn't necessarily fit with the government's idea of how they implement or how they're structured, or their understanding of how to provide WASH to communities. They're much more focused on infrastructure and giving out contracts and building stuff. [...] So that doesn't necessarily fit with the community management model very easily. (S1-12)

Whilst one BESIK staff member noted that the government was having a 'mind shift' to believing that 'it's not about having an asset out the back, it's about improved health' (S1-05) another staff member thought there was still:

danger [...] that if [facilitators were] not fast enough with ODF, [the government would] say "well we have money to disperse [so] we are going to disperse it everywhere [...] ODF or not". (S1-15)

Several participants noted that aside from full government support for not using subsidies, it was also important to have the active support of all NGOs implementing WASH programs in Timor-Leste. The national government and BESIK staff critiqued one international NGO operating in Timor-Leste at the time because their provision of fully subsidised toilets contradicted PAKSI, was unsustainable and created an expectation

of subsidies in other communities. Kar and Pradhan (2014 p13) noticed this during their 2013 visit to Timor-Leste and reported that:

Upfront subsid[ies] for household toilet constructions needs be completely banned in [Timor-Leste] if collective [...] behaviour change is to occur for sustained improvement in sanitation.

One of the BESIK representatives argued that this issue could be resolved if the existing system of inviting NGOs to sign Memorandums of Understanding (MOUs) with the government was formalised and strengthened:

Health should say “now you should have an MOU with us, and we should agree [on] what you are going to do in this country” because we want one approach only. (S1-15)

The same participant felt that one of the ‘many factors that hinder the true success’ of CLTS in Timor-Leste is that:

people have been bombarded with subsidy before, people have all this political context. [...] People think that [because] they are an independent country now, the government should just subsidise [services]. (S1-15)

A local NGO senior staff member described a similar expectation from community members, but in this case that they get paid for constructing the water supply system:

The community [are] familiar with [...] projects always getting money from [the] government. So, if [a] local NGO implements a project in their area sometimes they think they’ll get money. (S1-08)

Managing the expectations of community leaders and residents

In Community A, the two leaders seemed to disagree about whether those who worked on the water supply system should be paid. One reported that:

people asked for money for [their] labour but [the facilitator] said WaterAid has no money, just materials. [...] I said if you are looking for workers, you should pay them. (S1-10a)

This expectation was partly due to there being a concurrent road project in the community which was paying community members USD4.50 per day for their work. However, the other leader did not share this expectation:

if they want water, they should work for free. People worry [about whether] WaterAid has money, but they should work voluntarily. (S1-10b)

None of the leaders from either community expressed an expectation that WaterAid provide them with materials or subsidies for household toilets:

in the meeting we asked for materials, but they said no. So, we’ll make it ourselves. It’s not [a] problem for us. (S1-10a)

Indeed, the WaterAid program did not include hardware subsidies for sanitation and this was explained to community members almost immediately during the observed PAKSI activities. Occasionally, the community members would express concern about these criteria: for example, ‘we don’t have enough people to do the necessary work’ or:

We don’t have materials to build toilets [and] if we make toilets with natural materials, they will break. (Meeting-Community E)

Sometimes the facilitators would then explain to them that:

if you get support from an NGO [for materials], you won't use them.
This should be led by the community, so you should buy the materials yourselves. (Meeting-Community D)

If the community members were still concerned, the facilitators would occasionally cut the discussion short, saying that they (the facilitators) too 'need to follow the criteria' (Meeting-Community D) but they would help them with appropriate toilet designs during the program.

Although this did not take place in the observed WaterAid PAKSI activities, some of the BESIK representatives reported that sometimes facilitators who are focused on delivering project outcomes 'often just agree with [community members, telling them]: "Yeah, someone will probably come" [to build toilets later]'. (S1-05) This had led to 'huge regression in some communities' because households:

dig the hole and [make] their own simple toilets but [...] once it collapses, they prefer to go back to [...] open defecation. They're not going to dig a new hole. (S1-16)

One participant feared that there was only 'one chance to trigger a community [and] if it doesn't work then it's really hard to go back and do the same exercise again.' (S1-05)

Subsidies for potentially disadvantaged households

The government and BESIK representatives described a recently introduced sanitation subsidy for potentially disadvantaged households which was managed by the Ministries of Social Solidarity and Public Works. 'Potentially disadvantaged' was generally defined as people with disabilities, older people, widows, those with very low incomes, those with low levels of formal education or socially isolated people. The subsidy is 'only dispersed or only implemented in the *sucos* that are already ODF [...] to make sure that people [...] are not just waiting for the subsidy'. (S1-16) One BESIK representative said they 'tried not to call it a subsidy. [Instead they] tried to call it an incentive' (S1-15) with another BESIK representative explaining that the 'difference being that subsidies are given before you've done [something and you give an] incentive once you've built [something]'. (S1-05)

Some of the BESIK and WaterAid senior staff suggested that a subsidy or incentive could be extended to everyone (not just potentially disadvantaged households) if this was after communities became 100-percent ODF:

If [the] government want to do subsidising, it will be fine, I mean at the end. [ODF is] the first big step and after that you can talk about [...] water and improving [toilets] or even about subsidies. But [...] you should make [the] committee aware that you're not offering anything [upfront for sanitation]. (S1-01)

Moreover, one of the WaterAid senior staff thought that introducing subsidies after communities became ODF might be more sustainable:

There're questions about how sustainable CLTS is, in terms of people not getting fed up at the quality of their toilets after a year or two. [...] So, I suppose the aspect of subsidy can come back in, but I think the big shift is you're not doing upfront subsidy [...] And you introduce support

that doesn't compromise the initial commitment to ending open defecation. Which is kind of tricky. (S1-12)

One of the BESIK staff described a trial in a district where:

if the whole *succo* became ODF, then they got [...] an incentive payment which was a grant which they could then use to build a community toilet...or actually make anything. (S1-05)

However, they did not say whether this approach had been effective.

It seems that the Government of Timor-Leste has adopted a similar stance on the use of subsidies for sanitation interventions as the CLTS founder. However, putting this approach into practice has been challenging in a context where subsidies and incentives have been used in the past, by other organisations in the present, and for different types of interventions (for example, water supply systems) in the present. The success in implementing a widespread approach, such as not using subsidies for sanitation, is dependent on the enabling environment which will be presented in the following section.

6.2.6 Enabling institutional environment

An enabling environment where institutions support community empowerment approaches is considered critical to the success of CLTS by both Kar and Chambers. Kar articulated this briefly in the 2005 CLTS guide and has since dedicated more of his time to 'building capacity, providing technical support, and influencing national sanitation policies' through the CLTS Foundation (CLTS Foundation 2018). Furthermore, his upcoming book is about 'Institutional Triggering'. Chambers too suggests that a supportive enabling environment is crucial to the sustainability of CLTS outcomes as well as its establishment. He argues that the success of CLTS 'depends on follow-up [...] you can't just walk away', which means that 'there's got to be a commitment by agencies - normally the government - to continuing' beyond the initial triggering phase.

As the national government and BESIK representatives explained, WASH services are administered by the Timor-Leste government and are supported by local and international NGOs. The Ministry of Public Works and the Ministry of Health manage CAP²³ (for rural water supply) and PAKSI (for rural sanitation and hygiene) respectively; however, there is occasional overlap.

The BESIK representatives pointed out some of the strengths as well as limitations about the way the government and NGOs operate together. For example, they explained that NGOs were 'able to dig quite deeply and really do some interesting stuff and trial and test' different approaches but anything the government does 'needs to be replicable across the country' at scale. (S1-05) This difference in scope together with the relative budgets of the government and international NGOs was raised as a potential source of misunderstanding or even resentment:

It's hard I think within the - you know - when the Ministry of Health looks at NGOs, they see that they've got these pretty big budgets. But they don't have money you see - the Ministry of Health - so they see this,

²³ As described in the background chapter, in rural areas, water supply systems are constructed and managed by communities at the village level through a process called *Planu Aksaun Komunitade* (Community Action Planning). Most of the research participants referred to this by the English acronym: CAP.

and they think “oh we could do this if we just [...] had that money. We could do a lot more and we’re always around so...” (S1-05)

One of the district government representatives was worried that:

in the future [when the government staff] come to check [the] water ... the people will say that this is not from [the government] but it’s from NGO WaterAid. (S1-13)

They pointed out that a strength of the government is their relative ability to retain staff. Whereas the project cycles of NGOs tend to be short, ‘government staff [will] be employed full time’ which supports the continuity of their work.

A desire to bring the government and NGO WASH facilitators closer together was expressed by one of the BESIK staff:

Everybody has to be led by [...] the Ministry of Health in a way ... It’s just so that we ensure the same approach [is used by everyone]. In the past, when things were not very well coordinated, the NGOs were very important to get to communities fast and to be kind of independent. But now it’s okay, we want to ensure a uniform approach towards communities and ensure that people know that we are working towards one target. Before the NGOs thought that they were closer to communities and [...] this is old style, I guess ... They think that the government is not good enough. [...] We don’t want to perpetuate this anymore. This is a partnership, we [want to] ensure that the government takes the lead. (S1-15)

This view was shared by the district government representative who ‘wanted [the] government to [be] included when the CAP meetings happen [...] to participate or to attend’ so that the program ‘would be strong’. (S1-13) As an example, another BESIK representative described the recent piloting of government-employed sanitarians which aimed to increase government ownership of the sanitation policy and reducing reliance on NGOs for implementation. They emphasised the importance of having the support of all levels of leadership:

although the sanitation policy’s passed and the Secretary of State for Water and Sanitation [...] know this process [and] there’s strong agreement [...] we’ve still got [to get] that very upper echelon, such as the prime minister [...] on board. (S1-05)

Given that the government’s rural sanitation policy had only been approved in 2012, the WaterAid staff pointed out that:

The government were also in a process of gaining knowledge about CLTS. [They] met Kamal Kar after the meeting in Bali [in late 2012] and [were] more confident. After meeting the guy himself and after the workshop in Timor, the government had some perspective on CLTS. (S1-01)

Even so, in 2013 when Kar and Pradhan (2014) visited Timor-Leste again, they found that the national budget and surveillance mechanisms for CLTS were insufficient. Kar brought high-level leaders together with people from ODF communities so the leaders could realise for themselves the rapid benefits of using a community empowerment approach rather than upfront hardware subsidies. In his interview Kar said that he had been back again in 2015 to work on district-level strategies for implementing PAKSI and

had since ‘been told that four or five districts are more than 90-percent ODF’ now. Kar described this process as ‘institutional triggering’:

triggering at the national level, institutional triggering of the highest leadership, followed by handholding [...] and support.

The institutional environment in which PAKSI was being implemented was changing rapidly at the time of this research. Overall, it seemed that participants felt that it was important that the NGO sector and the government aligned in their approaches but that there were strengths and weaknesses within each when it came to creating a supportive environment for PAKSI to be effective. Part of this alignment included discussions about whether to integrate water, sanitation and hygiene into a single approach or to keep these separate: this is summarised in the next section.

6.2.7 Water, sanitation and hygiene: an integrated approach

The national and district government and BESIK representatives all described the government’s WASH approach as being a combination of CAP for improving water supply and PAKSI for improving access to sanitation and hygiene. When I asked whether CAP and PAKSI were ever combined in the same government program one BESIK representative explained that whilst this had been raised, ‘it seems that the [water] engineers’ side [felt that] “We need to do survey. We need to do design. We can’t mix up with...” behaviour change activities. (S1-06) Conversely, the WaterAid approach integrates water, sanitation and hygiene and their senior staff said this was partly because it is more resource efficient but also because research suggests that integrated approaches achieve better health outcomes.

The BESIK representatives and WaterAid senior staff discussed whether, in cases where water and sanitation were implemented in close succession, water or sanitation should come first. One of the BESIK representatives saw ‘water as a big motivator’ for sanitation because the ‘public perception’ is that:

a nice toilet is one that’s got water. And there’s a perception too that if you’re sitting over a hole where shit’s underneath you, that’s not very nice and [people] like the idea that you [flush] it and it’s gone, it’s out of the way. (S1-05)

Another BESIK representative quoted community members as saying, “We don’t have water so we [cannot] be bothered to build a toilet”. (S1-16) An additional issue was the challenge of promoting handwashing in contexts where water was not available close to the home. Consequently, the BESIK representatives felt that it was ‘quite likely that [...] where there’s water supply the PAKSI will work much better than where there’s not’ (S1-05); hence, water implementation should come first.

Some of the WaterAid senior staff viewed the water component of integrated WASH programs as a means to ‘get more buy-in’ with communities:

Everyone’s priority number one, is water. [...] And sanitation—generally people are relatively happy with what they have already. [...] If we came in as a big NGO and say, “we’re just going to do sanitation”, the community would perceive us as not really offering a great deal. (S1-12)

Alternatively, when WaterAid offers to ‘support [the community] significantly in water supply, [WaterAid] can expect [the community] to partner with [WaterAid] and do all this work towards sanitation and hygiene’. (S1-12)

Similarly, one of the local NGO senior staff explained that the WASH program needed to be integrated for it to be attractive to remote communities:

Water and sanitation: it's together. [If] you just implement the—no water, to implement sanitation, it's difficult. [...] So, it's better to put them together, water and sanitation, so [the community] will agree. (S1-09)

Whilst two of the facilitators were aware that other organisations conducted CLTS or PAKSI activities independently of water supply activities (and some had received training in this format), they did not think this would be effective in their own work. They felt that communities:

will not agree with this because it's just for toilet. They will not agree because it's not water. (S1-04)

The other facilitator gave an example of a community where stand-alone CLTS had failed:

It would be difficult [to do stand-alone CLTS]. For example, in Community C, [another organisation] went in and did CLTS, but it's pure. And it failed. (S1-02)

Whilst he did not comment directly on the WaterAid program, Chambers explained during his interview that interventions that included incentives, perceived or not, had similar negative consequence as hardware subsidies. The WaterAid senior staff shared this view and were adamant that the new water supply system was not conditional on the community members constructing toilets, nor should community members get this impression. Instead, they want to:

communicate what the objectives and principles of CLTS are, and what the program is trying to do in terms of sanitation. [We're] not trying to get people to do toilets as a conditionality to gaining water supply, because that compromises the whole thing. (S1-12)

Nevertheless, the WaterAid senior staff were aware that community members were likely still perceiving the water system improvements as an incentive. This is partly

Because sometimes the communities just want to [...] have water, so they will do anything. "Work voluntarily?! Fine! You want us to build toilets? Fine!" (S1-01)

They acknowledged that 'we have to be very careful about how we couch everything' and 'we try and dissociate sanitation from water'. (S1-12) However, one of the senior WaterAid staff acknowledged that perhaps sometimes they gave a misleading impression:

When you come with your car, and you've got all these pipes and stuff—it doesn't give the impression that you're coming to do a study [about sanitation] with the community. (S1-12)

In the activities that I observed, it seemed that disassociating water and other elements of the program was difficult—both due to communities' focus on water as well as the facilitation approach. The meetings would often start with lengthy introductions and expressions of gratitude for the 'water' project. This was followed by an explanation of the WaterAid program criteria which the attendees would need to agree to for the program to proceed. At this point, the facilitators made it very clear that they would only provide materials for the water system, not for toilets, and that the community would need to work voluntarily for the program. This often generated a lengthy discussion

about the design of the water system and the procurement of materials. Furthermore, in two meetings, the facilitators told the attendees that they would check the toilets because the community members:

have to build toilets before WaterAid will provide the water system.
(Meeting-Community D)

The community leaders were also mostly focused on water. For example, the leaders in Community A described activities related to sanitation and the WASH for Worms trial. However, when I asked what the purpose of the WaterAid program was, they said that it was to ‘connect water to this community’ and ‘that’s it’. (S1-10) One of them added:

I’d like to remind you that we are waiting for water. If you come, don’t tell us lies. (S1-10)

Whilst the leaders from neither Community A nor Community B said they thought the new water supply was dependent on them constructing toilets, they did see water and sanitation as closely linked: for example, a leader from Community A said that a ‘toilet without water is no different to no toilet.’ (S1-10)

Both the BESIK representatives and the WaterAid senior staff felt that there were good reasons to consider separating water and sanitation interventions in Timor-Leste. The BESIK representatives said that:

the government [...] don’t have the luxury to only go where there’s water: they need to work on sanitation with everyone. [...] We will need to work out a way of doing sanitation where there’s no water. Because otherwise we’ll be cutting out 30-percent of the country’s rural population. (S1-05)

Hence, they explained that the ‘BESIK approach was trying to promote different types of toilets’ (S1-16), including designs which did not require water but also did not smell. The WaterAid senior staff had a slightly different proposal. One of the senior staff said:

[I would] prefer to do a proper sanitation process at the beginning—without mentioning that we will do water or hygiene interventions later on. So, we can do the “proper” steps of CLTS at the beginning. (S1-12)

Another WaterAid senior staff member felt that:

It’s good to have an integrated approach; though in my opinion it will be good if at the start there is some behavioural change...a willingness to change from the communities - not driven by us. (S1-01)

The participants’ descriptions summarised here present some key issues relevant to CLTS and community development in general. Those who advocate for water, sanitation and hygiene to be integrated approaches argue that this is necessary to for getting community members to participate and is possibly more effective for bringing about improvements in health. However, an integrated approach means that water becomes an incentive for becoming open defecation free and this contradicts the underlying principle of CLTS: something many of the participants were aware of. This will be discussed more in Section 6.3.

6.2.8 Facilitation style

The importance of good quality facilitation is emphasised in the CLTS handbook and guide, the PAKSI manuals and by several participants, including Kar and Chambers. All the WaterAid senior staff felt that the:

success of the CLTS approach really depends on how [to] create that demand in the community. So that means very good facilitation skill. So [if there is a] lack of those skilled facilitators, the effectiveness of the CLTS approach will be compromised. (S1-19)

How ‘good’ facilitation is officially defined

The CLTS handbook and guides (Kar 2005, Kar 2008, Kar 2010) provide several ‘dos’ and ‘don’ts’ for facilitators. These include:

- Not ‘**lecturing**’ or ‘**educating**’ the community about the health risks of open defecation. This is because ‘the most important element that ignites CLTS is not the knowledge of health hazards but the element of disgust, shame and the sense of un-cleanliness, dirty feeling and impurity’ (Kar 2005 p9).
- Not ‘**advising**’ or ‘**convincing**’ the community to cease open defecation or start constructing toilets ‘so that the community achieves its own understanding of the sanitation problem and takes full ownership of the task of dealing with it’ (Kar 2005 p13).

Chambers explained that good facilitation ‘comes down to personality’ and having the appropriate ‘behaviour and attitude’ to the work. Similarly, during his interview Kar explained the importance of facilitators having the appropriate attitude for effective ‘climate setting’:

If the climate setting is not done properly, then the basic equation that outsiders know more than [local people] about [their] own community [will prevail...]. It’s very important to break that notion. [...] So, if [...] role reversal doesn’t happen [...] outsiders continue to remain higher and upper. So, everything that happens in this CLTS triggering - it becomes mechanical or manual [...] and] the outside facilitators quickly tend to come back to their usual role of lecturing, telling, suggesting answers and solutions.

Like the CLTS guides, the PAKSI manuals describe the role of facilitators as not teaching or advising. Instead, ‘your job as a facilitator is to build up the ability of the community to do things on their own’ (Government of Timor-Leste 2012 p9). Metaphors are used to explain this further. For example:

As a facilitator, you are not the main actor. You have a BACKSEAT ROLE—the community is in the front seat in control. Your job is to help them make decisions “without taking over the wheel” so that they do the work on their own. Take your hands off the wheel and let the community do the driving! Let them do their own thinking and make their own decisions. This is the only way people learn to drive (Government of Timor-Leste 2012 p9).

And,

In the old system government as the PARENT did all the decision-making and planning to provide communities with toilets - but

communities (CHILD) cared very little about the facilities. Under the new system communities (ADULT) have to take responsibility and make decisions on their own. If you act like a PARENT towards communities, you can expect a CHILD-like response from them. They will depend on you to solve their problems and make decisions. If, on the other hand, you maintain ADULT to ADULT relationships, you can expect adult behaviour from them. They will take responsibility, solve their own problems and make their own decisions (Government of Timor-Leste 2012 p11).

Facilitation of PAKSI in the WaterAid program

The CLTS principle that instructing or telling people what to do should be avoided was understood well by the WaterAid senior staff: 'you can tell [community members] anything in one second, but they won't change'. (S1-01) Instead, another participant said:

you don't tell them anything. You facilitate the conversation, and they develop the realisation amongst themselves. (S1-12)

Instead of 'telling people the roots [of the faecal-oral pathway] they need to think [about how], if they defecate in the open, faeces can get back to the house'. (S1-12) Hence, the facilitators' task is to 'explain that [they] want to do a study with the community about their situation, relative to sanitation' rather than to teach them anything. (S1-12)

Some of the national government representatives' descriptions of PAKSI facilitation in Timor-Leste seemed like those in the PAKSI manuals. For example:

the [facilitators] don't do the...like teacher eh? They don't teach how to build the latrine, they just [...] encourage [the] community [...], raise their knowledge to know the importance of sanitation. (S1-14)

However, later in their interview the same representative said, 'the sanitarians are just teaching the community.' Similarly, one of the district government representatives said that facilitators did not make toilets; rather, they would 'advise' and 'explain that everyone needs to have a toilet'. (S1-13)

The local NGO senior staff participants said the facilitators' role was:

to encourage the people - manage the people - to use their toilets. [...] They will explain to the community [that] they have to build their own toilet without subsidy, and they have to use it. (S1-08)

Most of the facilitators seemed to understand that:

the objective of CLTS is [that] the community will [...] lead themselves to build something better, that belongs to them. And they can use it properly. (S1-07)

Occasionally, during the observed meetings, a facilitator would say:

We're not here to teach you, but to share knowledge and solve the problems that the community are facing. (Meeting-Community D)

However, during their interviews they all gave examples of where they had to 'explain to', 'teach' or 'remind' community members that they 'have to build their toilets'. For example:

CLTS can teach [the community] to change their behaviour, to build their toilets. Before they [would] defecate in open areas, so we

[facilitators] had to go directly to them, [to] teach them how to use toilets
- to build their toilets and how to use them. (S1-04)

One of the facilitators described their role during the triggering as:

mobilising the community to build their toilets. And sometimes we
forced them to build their toilets. (S1-04)

One of the community leaders recalled that the facilitators:

told us to dig [a] hole for the toilet and they taught us how to use and
make toilets. (S1-10)

Facilitation during the ‘moving to action’ phase

Kar explained in his interview that a common problem with CLTS generally is that facilitation during ‘triggering’ is done with the appropriate attitude but this changes beyond the moment of ‘ignition’. In the ‘moving to action’ phase, facilitators often revert to ‘teaching and advising’ rather than ‘sharing experiences’ about how the community can proceed.

The CLTS handbook (2008 pp35-36) gives specific instructions about what should happen at the ‘ignition moment’:

Don’t interrupt or advise. Quietly listen to the discussion. [...] DO NOT
prescribe models of latrines [...] [Instead] initiate local action for
communities to look for their own alternatives to open defecation.

The PAKSI manual (Government of Timor-Leste 2012 p24) also emphasises that the community should ‘develop THEIR OWN plans to stop open defecation’.

The WaterAid senior staff were aware that, ideally, the community would lead their own plans for becoming ODF but that the facilitators would instead ‘sit down and do a planning process [...] with the community’. (S1-12) One staff member added:

in [my] personal opinion, we’ve violated the CLTS approach because we
provide [community members] with some options for toilet designs. (S1-01)

He explained this was necessary, however, because in his experience ‘the community get desperate when they only have a [basic] toilet which breaks by the rain after two or three months.’ The local NGO senior staff also justified the provision of advice about toilet designs:

First [we] have to explain slowly for them how to use [a] toilet and then
[they can go up the sanitation ladder...] If they’re going step by step [up
the sanitation ladder, then] in future they are going to use it properly. But
if they’re [building a modern toilet] direct without explanation then
they’re going to make their toilet as a warehouse, as storage. (S1-08)

In addition, one of the BESIK representatives expressed concern that facilitators were promoting wet toilets²⁴ at the top of the sanitation ladder in places where there was no reliable water supply:

²⁴ A ‘wet’ toilet is one which needs water to function properly such as a flush or pour-flush toilet. A dry toilet, such as many composting and pit toilets do not need water to function (in fact some do not function if water is used in them).

I've been to some project sites [...] where 99-percent of them have a toilet [...] but they were pour-flush, and they didn't have enough water. So, they were all abandoned. So, all [these] toilets for the sake of toilets and not thinking in terms of water. (S1-06)

They understood that most Timorese preferred wet toilets and thought this was perhaps because of an aspiration towards the wet toilets commonly used in high-income countries or because the Timorese 'look at using water as hygienic'. However, they felt that dry toilets should be presented as an equally attractive option as wet toilets in contexts where water was scarce.

Time taken to facilitate PAKSI activities

The time taken to facilitate the PAKSI activities was another facilitation issue raised by the WaterAid senior staff. They were aware that the CLTS and PAKSI manuals stipulated that the triggering be quick:

you want to make it entertaining, and interesting, and develop an animated discussion. (S1-12)

Whilst the WaterAid senior staff shared this view, they explained that this was difficult to achieve because their program was integrated with water supply and the government insisted that the CAP process (for water) take place over one week together with PAKSI. Furthermore, they felt that the lengthy introductions that are customary at the beginning of any meeting in Timor-Leste made it challenging to foster an 'entertaining' and buoyant atmosphere at the start of the triggering activities.

Challenges with recruiting good facilitators

Despite their own understanding of the CLTS principles of facilitation, the WaterAid senior staff acknowledged that sanitation is 'a difficult topic and a challenging one to facilitate' (S1-12); and finding qualified and experienced 'field staff in Timor-Leste is a real challenge'. (S1-01) The BESIK representatives too felt that although 'there are some really good facilitators around' in general the facilitation of PAKSI in Timor-Leste was 'not so strong'.

The BESIK and WaterAid staff were concerned that facilitators were 'feeling really pressured to deliver' sanitation outcomes. Hence, when faced with community members who say 'we're poor, we can't afford products', facilitators sometimes resort to strategies that are not in accordance with community empowerment such as incentives. One WaterAid senior staff member said:

I suppose we're trying to stick relatively faithfully to the CLTS principles. Sometimes it's difficult to keep a hold of how local NGOs and field staff really understand it and implement it, and what their objective is, in terms of, [whether] they're just trying to get the project done and achieve this target by the end of the year. (S1-12)

A BESIK representative also wondered whether the issue with poor facilitation was that the staff 'don't necessarily believe [in the approach] themselves':

do they really understand what the triggering is? I think we've definitely seen people who are doing triggering who go through the process of, you know, the hair in the glass and they don't really ask afterwards why they were doing it. (S1-05)

Whilst each of the facilitators could list the PAKSI activities, only one described the desired facilitation approach; that is, that ‘we are not [supposed to work] as a teacher, and [we provide] no materials’. (S1-04)

To compound this issue, the BESIK representative had observed that the facilitators:

who were quite good, end up being managers of the NGOs, especially district NGOs, and the staff who end up out there doing the facilitation haven’t had the same level of training. (S1-05)

The WaterAid senior staff described precisely this issue in the context of the Manufahi Municipality. They admitted that facilitation is not easy and required proper training to ensure that field staff ‘understand the spirit of the approach, and how it should be done, not just doing the steps and telling people things.’ (S1-12) In acknowledgement of this, Kar was invited to conduct sector-wide training in November 2013.

During their visit, Kar and Pradhan (2014 p5) observed that ‘so far CLTS has been perceived as a bunch of triggering tools without understanding the complete approach’. They described the facilitation style at the time as being more one of trying to ‘convince and persuade the community’ than as ‘learners’ of the community members who should be treated as ‘teachers’. For example, the ‘transition from analysis [...] to ODF planning [...] is led and initiated by outside facilitators mechanically and as a routine’ (Kar and Pradhan 2014 pp7-8).

Facilitation is considered by many CLTS proponents as critical to the success of CLTS. At the time that this research took place, there were several unresolved issues with the facilitation of PAKSI in Timor-Leste. Whilst many of the planners and facilitators of PAKSI understood the need for an ‘inspiring’ rather than teaching’ approach to facilitation, this was not always being achieved. This was partly due to the difficulties with recruiting skilled facilitators and partly due to the expectations of the receiving communities. At the time that data collection for this research neared completion, there was a call for widespread training of PAKSI facilitators in Timor-Leste to resolve this issue.

6.2.9 Post-triggering activities and moving toward sustainability

After the initial week of PAKSI and CAP activities, the facilitators continue to visit project sites for approximately two years. Initially visits are weekly or fortnightly and later they are less regular. During visits, the facilitators coordinate the construction of the new water supply and conduct training in hygiene promotion, gender equity and water management.

Monitoring

The facilitators also regularly monitor the progress in WASH improvements. One of the WaterAid senior staff recalled that when Kar visited some of the WaterAid project sites in late 2012 and was told by a community member that it was the ‘guys from [the] NGO [who] did [the] monitoring’ Kar reminded the facilitators that they had no ‘right to do that monitoring’. (S1-01) The staff member agreed that ideally outsiders:

just help to do monitoring with the [people] who [the] community decided to get [to do the monitoring]. [...] You work with, through him or her but you’re not doing [it for them]. (S1-01)

The participants described two main purposes for monitoring during a project. Firstly, the WaterAid senior staff explained that it was necessary for their own reporting:

NGOs also have a timeline [by which they] should finish all this and [...] submit reports [...] [so they] have a baseline at the start and an end line at the end. (S1-01)

Secondly, monitoring was considered a way to get community members to become ODF. For example, a national government representative said that the sanitarians:

should follow up on the toilets to make sure it's good and [that households] maintain this toilet and [to remind households that] they have to use [the toilet]. (S1-14)

And one of the local NGO senior staff felt that:

sometimes the people, the community there, they promise to build [by] this date, and [...] finish on this date but it's in fact no. So [we] have to monitor it and encourage the people to build toilet. [...] Some of the people, they want staff to always monitor them. (S1-09)

The facilitators, too, explained that sometimes when they 'start going to monitor, [the toilets are] not [built] yet [...] so the staff have to give them more information'. (S1-04) In several of the observed meetings, the facilitators told the attendees that they would 'come to check in each household whether they had a toilet yet'. (Meeting-Community F)

Monitoring during the WASH program is also necessary for the verification and declaration of ODF communities. This was described by the BESIK, WaterAid and local NGO senior staff. In Manufahi Municipality, verification is done by representatives from the district water and health administration offices, local NGOs and WaterAid. Following this, the declaration of ODF status ideally 'come from communities. It's not from us' said one of the WaterAid senior staff. (S1-01)

Moving toward sustainability

The sustainability of sanitation outcomes achieved through the PAKSI process is something that concerned the participants from the national and district government, BESIK and WaterAid. One of the biggest challenges was the high rates of 'slippage'; that is, reversion to open defecation. Community members 'tend to go back [to open defecation] when their first latrine either doesn't work or they cannot upgrade' reported one of the WaterAid senior staff. (S1-19) Traditional toilets break easily in the rainy season in Timor-Leste and community members often do not have access to materials to build more durable latrines.

The participants spoke of several strategies for improving sustainability including monitoring (beyond the project); strengthening the involvement of the government at the district and local level in WASH activities; and strengthening sanitation markets.

Several participants felt that it was important for monitoring to continue beyond the completion of a project. One BESIK representative said this was because:

we're not sure that we really know anywhere how long it takes before [...] behaviour change becomes a sustained changed behaviour. (S1-05)

The WaterAid senior staff said that after the completion of WaterAid project sites a boundary-rider visits communities every six months to meet with the GMF, assist with minor repairs and link the community with their local government representatives. They also explained that where possible, this was conducted in partnership with the government who 'provide the sanitarian [with a] motorbike for the monitoring and the follow-up' activities. (S1-14)

A BESIK representative explained that once the funding for NGO projects is finished, 'there is no follow-up because the contract is done'. (S1-16) The WaterAid senior staff also recognised this issue and explained that they were trying to:

develop a realisation that the local government leads, rather than NGOs saying, "we're much better, you're rubbish, we'll do it". We want to lead it and develop that realisation and move in a sort of 'come and join the club', rather than antagonistic [way]. (S1-12)

However, the WaterAid senior staff suggested that this would be challenging for those within government who 'tend to focus more on curative rather than preventative' interventions. (S1-19) One staff member felt that unless there was funding for behaviour change activities in sanitation and hygiene as well as infrastructure he would 'have little optimism for long-term sustainability.' (S1-19)

The national government and BESIK representatives said the government had recently employed 15 sanitarians to work on coordinating WASH activities in rural areas and this would include joint monitoring with NGO-led WASH projects such as that of WaterAid. Furthermore, one of the district government representatives agreed that:

it's important to monitor always. [...] So together with WaterAid [our staff] always keep going, keep monitoring to encourage the people rebuild their broken toilets [...] until they have a permanent toilet. (S1-18)

Sanitation marketing

In addition to on-going monitoring and increased government involvement in WASH activities, the national government and BESIK representatives suggested that a more integrated approach to sanitation would be more sustainable. One BESIK representative explained that often even households that 'really want to make the change [to ODF] can't access products' to build or maintain their toilets. Therefore:

For me CLTS is one of the things. It's a great triggering tool. It's a great way of getting people motivated. But on its own here it will probably struggle. So, you need to have [...] other things as well. (S1-05)

She suggested that sanitation marketing could supply the improved sanitation infrastructure that PAKSI creates a demand for and described some of the work BESIK and the government had been doing towards product development.

The other BESIK representatives and some of the WaterAid senior staff agreed that sanitation marketing was a good idea but that there were many challenges with this approach in Timor-Leste. They explained that the issues facing sellers are manifold: they cannot sell enough products; the 'product is too heavy'; and they are 'not close enough to the community' and transportation is a problem. (S1-15) Compared to countries like Bangladesh where sanitation marketing has been very successful,

in rural Timor there's limited access, [and a] limited market, so we need to think about how we support and develop that market to help people upgrade. The government has lots of resources, rural communities don't. So, we want to help the government use those resources as effectively as possible to support the people. (S1-12)

An in-depth analysis of post-triggering activities and mechanisms within the PAKSI process which build the sustainability of ODF communities was beyond the scope of this

thesis. Nevertheless, these descriptions from the participants indicate that ongoing monitoring and strengthening sanitation markets are relevant for ongoing discussions about the sustainability of ODF communities in Timor-Leste.

6.2.10 Gender equity and social inclusion

Gender equity and the inclusion of potentially disadvantaged people such as people with a disability or extremely poor households is referred to in the CLTS and PAKSI manuals and was discussed by some of the participants. This is both in relation to participation in PAKSI activities as well as in terms of gaining access to the WASH improvements arising from PAKSI activities.

Participation by everyone

The CLTS handbook instructs facilitators to ‘ensure that the participants in the ‘triggering’ meeting are truly representative of the wider community’ and to ‘always encourage women and the poorer sections of the community to participate’. As well as ensuring that the team ‘includes women facilitators’, they should ‘look for, encourage and support women natural leaders’ (Kar 2008 p10). The PAKSI ‘Triggering’ manual also instructs facilitators to ‘emphasize the importance of women being invited to the triggering meetings and encourage them to take an active role in the meetings’ and ‘also ask about people with disabilities’ (Government of Timor-Leste 2012 p5).

According to one of the WaterAid senior staff:

to a certain extent, [WASH] is the biggest priority [of] the women in the household because family health, water collection, all this household work and the cooking *etcetera*, falls generally to the head woman of the household. [...] And women have the most need in terms of privacy and safety when it comes to sanitation. [...] And in terms of hand washing with soap, they’re really the primary target group. [...] So, to a certain extent, the WASH program could be considered a women-only program. (S1-12)

In the observed meetings, however, women only made up (on average) 25-percent of attendees and they spoke very little. In the breaks, meals would always be prepared and served by women who would generally not attend the other parts of the meeting. In three of the project sites, the community chiefs noticed the lack of women’s participation and raised this as a concern. One of them said that:

We should be giving time to women to talk also. Otherwise, if we finish the meeting and go home, the women will ask if the program has money *etcetera* and complain. (Meeting-Community F)

The facilitators were also concerned about having different age groups represented:

we need youth too. Here there are only old men and women. We can’t pick a GMF out of these people because the GMF members need to be able to do things. (Meeting-Community D)

A BESIK representative explained that when the GMF is formed, ‘there is criteria [that] maybe 30-percent’ of the committee should be women.²⁵ (S1-16) They felt that this had

²⁵ As described in Section 6.2.4.3, the GMF regulations require that the membership include a chief, secretary and treasurer (men or women); two technical officers (men); and two hygiene promoters (women).

been ‘quite successful’ because it also tapped into the largely unacknowledged influence that women have on their husbands in terms of decision-making about sanitation.

People with a disability were absent from all but one of the observed WaterAid meetings. One of the BESIK representatives said that designing the sanitation program ‘to be accessed by disabled people [was] still a challenge’ but the government, BESIK, WaterAid and other organisations were ‘reviewing PAKSI and CAP [...] to make it more [focused] on social inclusion’. (S1-16)

Access to WASH services for everyone

Regarding equitable access to WASH improvements, the 2008 CLTS handbook states that:

often as a result of good and powerful triggering of CLTS, better-off members of the community offer direct help and support to poorer members [and facilitators are instructed to] facilitate the linkages between the weaker and poorer and those who are better off and willing to help them (Kar 2008 p49).

Similarly, the PAKSI follow-up manual states that ‘usually community member will volunteer to assist widows, blind or disabled community members with their latrine construction’ (Government of Timor-Leste 2012 p6).

The WaterAid staff explained that after the PAKSI triggering activities, the facilitators conduct a ‘social mapping’ exercise with the community to identify households with people with disabilities and older people. (S1-01) They ask the community to consider what might happen if those households do not make a toilet.

As described in Section 2.3.3 of the background chapter, there is a government administered subsidy for potentially disadvantaged households to improve sanitation once their communities are 100-percent ODF. This assumes that potentially disadvantaged households can become ODF before receiving the subsidy though. When asked how such households might build even a basic toilet, a BESIK representative said that ‘you work with the *xefi aldeia* or *xefi suco* [and then] everybody helps them build something’. (S1-15) Another BESIK representative shared this view, arguing that ‘community spirit’ would mean that:

if there is a really old woman who can’t build her own toilet, then some others can help her. [...] While they can give their time to help dig a pit and put something there, they probably can’t give extra money to make them a nice toilet. (S1-05)

The ‘Follow-up’ PAKSI manual also includes a section dedicated to menstrual hygiene management; although, this was not mentioned during the PAKSI activities that I observed. However, one of the BESIK representatives raised the issue of insufficient menstrual hygiene facilities at schools for girls and said they were about to commence a menstrual hygiene management study to begin addressing this.

6.2.11 Community response to the WaterAid program

When I asked the participants how communities tended to respond to the PAKSI approach, their descriptions tended to fall into two categories: the community members’ participation in the facilitated group activities such as ‘triggering’ and the actions taken by community members toward becoming open defecation free.

Participation in PAKSI activities

Getting the community together for the meeting seemed to be challenging in each of the observed project sites. In two sites, the meeting was postponed. In one this was because most community members were away; probably to see Xanana Gusmão who was visiting a nearby town. In Community F, the local representative of SAS (*Serviço de Água e Saneamento*) (Water and Sanitation Service) arrived during the start of the meeting—upset because he was unaware of the WaterAid activities due to a miscommunication. The meeting was postponed so that the WaterAid and SAS staff could negotiate whether the program would be implemented by WaterAid or the government.²⁶

Generally, it would take one to two hours for enough community members to assemble and even then, sufficient participation for the entire duration of the meeting was a challenge in most of the project sites. On average there were 15 attendees at various points of the meeting in four of the project sites (there was an average of 24 attendees in the largest community). This was a constant concern for the facilitators who would tell the attendees: ‘if there is no participation, we can’t do anything.’ (Meeting-Community D)

In each of the project sites, the community chiefs were there for at least part of the meeting. In two sites, the chiefs seemed disengaged and did not return for the second day of the meeting which might have been because the new water system would not supply the *bairros* where they lived (where water systems already existed).

The attendees seemed to have mixed opinions about whether participation was important. In one project site, although most community members were absent, one elderly man announced that:

the important thing for us is water, and everyone agrees with this. [...] We just need water. If you bring materials [...] we’ll come and collect them because water is important to us. (Meeting-Community D)

In another site where several community members were absent, the attending community members said:

Some of the community who aren’t here will kill you if [we] agree to a program without them. There will be big problems. (Meeting-Community F)

The facilitators shared their concern, but the program continued regardless.

The lack of participation was occasionally attributed to community members prioritising other activities such as going to market, working in their gardens (food and cash crops); not knowing the meeting would take a whole week; cultural activities or other health programs: for example, mosquito net distribution. Attendees in two sites expressed their preference to focus on food supply rather than WASH.

In one community, an older woman explained to me that the lack of participation was because of a lack of trust amongst the community and a belief that a new water system would only be broken by some community members out of spite. Trust was also an issue between the community members and the facilitators. In three of the project sites, the community members were suspicious that the facilitators were only there because they had been paid or ‘forced to’. (Meeting-Community C)

²⁶ Eventually, WaterAid conducted the PAKSI process here, but did not complete the water supply aspects of the program due to technical issues.

When participation was low, the facilitators would tell those present that:

We won't force you to participate, it's up to you. (Meeting-Community C)

However, in several project sites, the chief's response to the lack of participation was angry; and occasionally threatening: 'If someone refuses, then I will beat them!' (Meeting-Community E)

Several participants including representatives of the national and district government and BESIK, WaterAid and local NGO senior staff and facilitators raised the issue of a lack of community participation in the PAKSI activities and that sometimes community members did not have time to build toilets either. A national government representative noted that:

[In] some places, the people agree but in some [other] places the people don't agree [to the triggering]. This is related to their culture; they don't have time. [...] So, they don't have time to participate in the triggering. (S1-14)

One of the senior staff from a local NGO thought that participation was sometimes low 'because some of them, they are doing their private things'. This means that it is difficult to get 'consent from [the community], so [the program is] postponed.' (S1-09) One of the facilitators agreed that it might be because community members were 'busy with their [...] things'. (S1-07) However, another facilitator felt that it was:

Because of money. Sometimes the people think [...] "NGO! They'll have lots of money, so they came here [to our community]. They'll give us lots of money." So, if [there is] no money, [then there is] no participation. (S1-02)

Ideas about how to improve participation were trialled during the observed meetings as well as discussed by interviewees. When one of the observed meetings was slow to start the WaterAid senior staff (who were unusually in attendance) encouraged the facilitators to visit people at their homes and invite them directly to the meeting. This approach seemed to work; however, the local facilitators seemed uncomfortable with this level of intervention. During their interview, one of the WaterAid staff admitted that 'this [work] is [...] quite tricky because we want to work with [the community] but at the same time we don't want to intervene'. (S1-01)

During one meeting, a community member observed that 'if there was a party with dancing, everyone would come!' (Meeting-Community D) Whilst they did not organise dancing, the facilitators sometimes tried to entice community members by screening a movie the night before the start of the program activities. Finally, a district government representative explained that participation was much better when pre-triggering activities were done properly. For example,

The participation of a community is good [when] before implementing triggering [...] in a community we [...] confirm with the stakeholders [who] come from church and social groups ... every stakeholder. (S1-18)

Actions taken by community members

Many of the participants reported that community members would improve their sanitation behaviour by building and using toilets, but that progress was slow and

sometimes inconsistent. For example, one of the national government representatives said that:

the triggering is good for the community [because it] increases their knowledge, their thinking, their negative [feelings] for open defecation [and] their positive [feelings] for [being] open defecation free. [...] Some people understand [but] some people [think] that “ahh, we don’t need a toilet, we just give [our faeces] to animals”. (S1-14)

The district government and local NGO senior staff both acknowledged the need to be patient in anticipating results. For example, one of the NGO staff members said that:

the triggering process: it’s enough for them [to build their toilets]. But people that want to use their toilets, need time. (S1-09)

The facilitators described a slightly less positive response from the community. They said that community members would declare when they planned to build their toilets: ‘like they start this date and finish this date [but] finally, [when] we start going to monitor, it’s not [happened] yet.’ And ‘if [community members] still want to [defecate] in open places, they will do it in open places’ or in their pig cages, even if they have a toilet. (S1-04)

One community leader reported that most households in his community now had at least a temporary toilet even though it had been ‘difficult to convince’ them. (S1-11) Overall, the leaders from both communities seemed satisfied and appreciative of the WaterAid program and valued the sanitation activities. When I asked why they thought sanitation was important, their responses included the need to prevent disease by interrupting the faecal-oral pathway; because ‘we have to follow what the NGO said’ (S1-10); and the need to modernise:

because now, we are independent. [We] can’t use old behaviour. We are a modern country now, so we have to change. (S1-10)

The achievement of the desired outcomes of PAKSI activities (for example, ODF communities) is dependent on the response of communities to the WaterAid program, or similar programs which include PAKSI. Community participation in the project sites in this research was an unresolved challenge that will be discussed more in Section 6.3.

6.2.12 Opinions about the appropriateness of PAKSI for Timor-Leste

One of the BESIK staff was not very hopeful about improving sanitation in Timor-Leste:

it’s quite a challenge—I don’t think we’re going to achieve the MDG [Millennium Development Goal] for sanitation. [...] I don’t know. We can’t think of a solution. (S1-16)

Kar and Pradhan’s (2014 p3) report revealed that they too felt ‘the progress of CLTS has not really been encouraging over the last five years of implementation’ in Timor-Leste. They thought that there was not:

adequate clear knowledge, understanding and capacity of CLTS facilitation and [a] lack of effective mechanisms of governance [which are] required as the enabling factor[s] for [the] implementation and scaling up of CLTS. In fact, there has been a lot of wrong practices in the field owing to incomplete and incorrect understanding or training inputs (Kar and Pradhan 2014 p3).

A government representative explained that in a place like Timor-Leste where the population is both small and very dispersed, CLTS does not work in the same way as places where CLTS has been successful such as Bangladesh. Therefore, they felt that perhaps a more supply-driven approach might be equally or more effective. For example, a large-scale information and education campaign to create demand for toilets followed up with substantial subsidies to everyone who asked for hygienic toilets. This would likely be too expensive in countries with larger populations such as Cambodia but would be affordable in a small country like Timor-Leste. They likened this to Australia's and Portugal's approach to managing solid waste disposal: education campaigns combined with subsidised or free rubbish bins and collection. They felt that this would resonate strongly with the Ministry of Public Works given that they are more infrastructure-driven than the PAKSI approach allows for.

However, in general most of the participants felt that, despite the challenges, PAKSI was an appropriate approach to improving sanitation in Timor-Leste. The WaterAid senior staff felt that CLTS was an appropriate for a resource-scarce context such as Timor-Leste partly 'because it empowers the community and then it builds on their pride'. (S1-19) They felt that the lack of functional sanitation markets and the need for better facilitation were 'the issues rather than the approach itself.' (S1-19) Another WaterAid staff member pointed out that the program was new to Manufahi Municipality and therefore might 'not be a perfect program at the beginning'. Therefore, it could take a few years for the program to 'reach [the] standard we want'. (S1-01) A BESIK staff member was also positive:

We [start] small. I believe very strongly that this is going to work but we [have] a lot of challenges but it's fine. We just started, what can you expect from us? (S1-15)

In Kar's 2018 interview he was far more positive than his report from four years earlier:

Timor-Leste is not what it was in 2012 and 2013 [...] it's a different story, it's an example, a role model.

He was hopeful that Timor-Leste might be one of the first nations to achieve 100-percent ODF status in the Sustainable Development Goal era. He attributed this progress to the connection made between the 'base'—that is, community-level success stories which had been brought about by the work of pioneers such as WaterAid—and the 'summit'—that is, the strengthening of the enabling environment through institutional triggering.

Chambers could not comment on the progress of CLTS in Timor-Leste but was positive about the success of CLTS in general. However, he noted that in many cases there are issues of sustainability because merely 'digging a simple pit' is not a long-term solution to sanitation. He observed that:

it's a bit like a Greek tragedy where everyone means well and the outcome's not good. But the outcome is better than it would have been. The tragedy is that there'll be a lot of unsustainable toilets.

Still, in Chambers' opinion, the 'change in consciousness' brought about by CLTS is 'a very good foundation for going on' and is certainly 'better than nothing'.

6.3 Discussion

This study set out to compare ‘pure’ CLTS; the official Timor-Leste adaptation of CLTS: PAKSI; and the implementation of PAKSI in the WaterAid and WASH for Worms project sites. The findings suggest that in general, PAKSI as it is set out in its manuals is very similar to ‘pure’ CLTS but the implementation of PAKSI in the observed project sites differs from both CLTS and PAKSI. The descriptions gathered from participants who are involved with planning and implementing PAKSI in Timor-Leste offered valuable insights into how those discrepancies came about.

6.3.1 Comparison of Community-Led Total Sanitation, PAKSI and the WaterAid program

Several of the participants involved in administering rural sanitation at a national level: for example, the WaterAid senior staff and BESIK staff, had a good understanding of CLTS as it is described by Kar. They were also aware of the need, expressed by Kar and Chambers, for CLTS to be done properly at scale. Given that some of them were involved in the adaptation of CLTS for Timor-Leste when the PAKSI manuals and the rural sanitation policy were being written, it follows that the PAKSI manuals are very similar to the CLTS manuals. They share the same intended outcome of 100-percent ODF communities; the philosophy of achieving that outcome through community empowerment and no hardware subsidies; and the types of activities that should be facilitated.

In the observed inception meetings of the WaterAid program, the intended outcome of becoming ODF and the activities were almost identical to the PAKSI manual. Key differences in the observed activities were that they were not quick or sufficiently entertaining to engage the interest of the community members for their full duration. Furthermore, there did not seem to be separate children’s activities.

Although the facilitators understood the theory of a community-driven approach, in practice this did not seem to take place in the observed project sites. The difficulty with getting enough attendance at the meetings alone signified that the potential for the intervention to be community-driven was low. Whilst the facilitators knew that they should not be ‘teaching’ and went so far as to announce this directly to the attendees, the facilitation style for most of the triggering activities was quite directive and the community members’ responses were mostly subdued.

Perhaps for this reason there was no clear ‘ignition moment’ between the ‘triggering’ activities and the ‘moving to action’ activities. The ‘ignition moment’ signifies that the community has decided for itself, rather than being told, that they want to become ODF and this is what sets CLTS apart from other approaches. However instead of observing a clear ‘ignition moment’ where community members declared that things must change, I found that the attendees tended to wait and see what would happen next.

In the ‘moving to action’ phase, where community leadership was crucial according to Kar, activities such as committing to building household toilets and the selection of the GMF were directed by the facilitators. The descriptions by the community leaders suggested that they too experienced these activities as facilitator led. For example, one community was waiting for WaterAid to return and select their GMF members.

The explanation and demonstration of toilet designs was justified by the WaterAid, local NGO and BESIK senior staff because this helped community members to build durable

toilets. One of the BESIK representatives said that there was only one chance to trigger a community and therefore building durable toilets was important for sustainability. This perspective is like that of some scholars who critique a 'barefoot engineering' approach in sanitation interventions. That is, when community members are only able to construct temporary or non-durable latrines, they quickly revert to ODF (Kalimuthu and Hossain 2008, Papafilippou et al. 2011, Ogunjobi et al. 2013).

However, explaining and demonstrating toilet designs without an invitation from community members is a direct contradiction of the instructions in the CLTS and PAKSI manuals, because it contravenes the community-led approach. Beyond the triggering and moving to action phases of the program, monitoring of progress was conducted by either NGO or government staff rather than community members which, again, contravenes the community-led approach.

The focus on not having upfront hardware subsidies, which was outlined in the CLTS and PAKSI manuals, was consistent amongst all the participants. Moreover, the participants at every level of involvement in the planning and implementation of PAKSI including the facilitators seemed to genuinely understand the motivation for this aspect of the approach. Whilst the government of Timor-Leste provides a subsidy for potentially disadvantaged household toilets, this is still in accordance with both CLTS and PAKSI guidelines because it is not an 'up-front' subsidy.

According to some of the participants, the integration of PAKSI with providing a new water supply compromised the purpose of not having upfront subsidies because it acted as an incentive. The use of incentives to become ODF, such as the *Nirmal Gram Puraskar* Scheme in India has been similarly critiqued because it does not result in sustainable ODF communities (Khale and Dyalchand 2011). According to Chambers, having an incentive has the same effect as an upfront subsidy: it means that there are external motivators for becoming ODF rather than this being a true demand, or self-identified need, from community members. Several participants who agreed with not having an upfront hardware subsidy said this was necessary because community members would not use or maintain their toilets otherwise—which is consistent with Chambers' perspective. They argued that the new water supply system was not conditional upon communities becoming ODF, so technically there was no direct incentive.

Several participants felt that the integrated program was essential for gaining enough trust and interest from the communities to be able to conduct the PAKSI activities. Despite this distinction, facilitators were observed in some meetings to tell attendees that they would only receive the water system once they had built their toilets. The community leaders did not identify a connection between constructing toilets and the new water system, but their descriptions of the WaterAid WASH program were almost completely about the new water system in their communities. This suggests that whilst water supply is an effective way to gain the interest and trust of communities, in the project sites observed here at least, it was very distracting from the efforts made by facilitators to stimulate true community-driven demand to become ODF. In this setting Chambers' claim, that an incentive has the same effect on people's motivation to change their behaviour as an upfront hardware subsidy, is supported.

Finally, a noticeable distinction between the CLTS and PAKSI manuals and the observed WaterAid activities was the inclusion of women. The CLTS and PAKSI manuals and the WaterAid senior staff were explicit about the need to include women in all activities. However, in the observed meetings, this seemed difficult to achieve despite the efforts of the facilitators to both include women in the meeting activities and ensure there were

female representatives on the GMF. The CLTS and PAKSI manuals do not refer specifically to the inclusion of people with a disability although this was under review for PAKSI. Only one of the observed meetings was attended by a person with a disability.

The Dynamic Responses Model described in the method chapter on Section 3.1.6 of the literature review proposes that there are discrepancies between a health intervention as it is set out formally in policy and manuals (*de jure*) and a health intervention as it is experienced by the users (*de facto*). The findings from this study suggest that there are similar discrepancies with respect to the sanitation aspects of the WaterAid program in the WASH for Worms project sites. The *de facto* sanitation intervention as it was observed and as it was described by the community leaders and some of the other participants is quite different from the *de jure* sanitation intervention as it is set out in the PAKSI manuals. Therefore, the findings in the remainder of this thesis should not be interpreted as being about PAKSI or CLTS as set out in their respective manuals and handbooks.

The identification of the discrepancies between the *de jure* and *de facto* versions of the sanitation intervention which took place in the WASH for Worms project sites should not be taken as negative critique of the work of WaterAid or their partners. Several participants representing these organisations recognised the discrepancies for themselves and the underlying reasons for the differences will be discussed in the following section. Nevertheless, these findings are a reminder that it is prudent to check the fidelity of an intervention rather than to immediately accept that what is said is happening is, in fact, happening.

6.3.2 Why were there differences between Community-Led Total Sanitation, PAKSI and the WaterAid program?

Kar explained there are three ‘pillars’ that must be properly functioning for CLTS to be effective: 1) personal, institutional and professional attitudes to behaviour change; 2) CLTS tools and techniques; and 3) the enabling environment. The CLTS tools were almost identically replicated in the PAKSI manuals and carried out in the observed WaterAid program meetings. An investigation of the other two pillars: attitudes to behaviour change, and the enabling environment in Timor-Leste provide some clues as to why the observed WaterAid program differed from CLTS and PAKSI.

6.3.2.1 Enabling environment

The incorporation of PAKSI into the rural sanitation policy; the piloting of government-employed sanitarians to administer PAKSI implementation; and the support of the government representatives who were interviewed suggested that there was growing institutional support for PAKSI. However, the findings also suggest that the enabling environment for PAKSI needed strengthening at the time of data collection. Kar and Pradhan’s 2014 report found that the financial and surveillance elements of the enabling environment were lacking. And although it was an isolated example in this study, the delay of the WaterAid program in Community F due to miscommunications with the local government staff showed how much the effectiveness of an intervention depends on its enabling environment.

Furthermore, the findings suggested that there was still a lack of consensus in Timor-Leste about whether a non-upfront hardware subsidy approach was preferential. WaterAid was clearly committed to a non-upfront hardware subsidy approach but some government representatives and other international NGOs operating in Timor-Leste were still pro-subsidy. As described in Section 3.1.4.1 of the literature review, some

practitioners argue that it is important to have a unified approach when it comes to using subsidies because of the expectations that arise in communities who have not yet or do not ever receive the subsidy. In Timor-Leste, these expectations and potential mistrust of facilitators who seem to come empty-handed are compounded by a history of outsiders, such as international NGOs, implementing projects in communities. Therefore, there is an even greater imperative to ensure that there is full institutional and organisational support for a non-subsidy approach if it is to be effective in Timor-Leste.

It is possible that the lack of full institutional support for a non-upfront hardware subsidy approach across the whole country at the time of data collection impacted the nature of the WaterAid program in Manufahi. Some community members, both during the observed meetings and in interviews, expressed their mistrust of the facilitators because they were not providing building materials to the communities. Although none of the communities rejected the program outright, their expectations and reluctant participation meant that the WaterAid and local NGO senior staff as well as the facilitators felt compelled to include the provision of water supply in their programs as 'buy-in'. This seemed to reinforce community members' focus on water supply and many participants felt that this contravened the basic principles of CLTS. Nevertheless, there seemed to be a feeling amongst the Timor-Leste-based participants that, at the time, this was the only way to gain the trust needed to work with communities on other issues such as sanitation.

6.3.2.2 Facilitators' and communities' attitudes and expectations

Aside from the challenges within the enabling environment, there were several aspects of the attitude and behaviour of the facilitators and community members that likely contributed to the divergence of the WaterAid program from PAKSI and CLTS. Many participants were aware of the similarities and differences between PAKSI as it was implemented in the WaterAid program at the time of data collection and PAKSI as it was set out in manuals. They were keenly aware of the need to strengthen the enabling environment and PAKSI facilitation. Almost all of them felt that PAKSI was the right approach for Timor-Leste and were therefore dedicated to aligning practice with PAKSI theory: for example, by inviting Kar to return and conduct institutional triggering and training. The quality of facilitation is considered an important factor for whether CLTS-based interventions bring about ODF communities (Tyndale-Biscoe et al. 2013). Hence, the importance of training facilitators has been raised by practitioners outside of this study also (see Haq and Bode (2011) and Crocker, Saywell and Bartram (2017)).

6.3.2.2.1 Facilitators

A few participants thought that one of the issues, with PAKSI in general, was that facilitators did not believe in the approach and therefore treated the implementation process like, as Kar described, a 'tick-the-box' exercise. One of the facilitators admitted that they did not think PAKSI would work without the integration with water supply. However, when the findings are contextualised with some of the historic and cultural aspects of Timor-Leste at the time, it seems possible that the facilitation style might have been affected by more than a lack of faith in PAKSI.

Firstly, it takes a specific skill set, or 'personality' as Chambers claimed, to facilitate a program that is supposed to be community driven. Whilst most of the participants understood that facilitators of PAKSI should 'not teach' or act like 'parents', it was not enough simply to know this. However, it is likely that many facilitators had little experience of heuristic approaches to learning. This, together with a tendency for highly

qualified or skilled staff to move away from facilitation and into management positions, meant that there was a limited group of proficient facilitators to trigger a substantial proportion of the country's rural population.

Another issue that facilitators face is the demands of their employers (who, in turn, are bound by donors, the government and other stakeholders) to deliver outcomes which at times conflict. Facilitators must ensure that communities lead their own course of action, without teaching or advising, but at the same time there is an imperative to make sure that their work results in 100-percent ODF communities. A program where communities decide not to become ODF is not considered successful in the context of PAKSI, even if the decision was made through a community-led process. So, as one facilitator announced during an observed meeting: 'we have to follow the criteria too'. This is not to say that community-led programs will not lead to ODF communities but that these two goals might be incongruous in some project sites. This leaves facilitators, and program coordinators, with a difficult choice. In a context where it is outcomes such as ODF communities that are measured and valued by most stakeholders, this is prioritised even if it means compromising the correct attitude to facilitate community-leadership. Some participants, such as the government representatives and some of the facilitators, claimed to use a non-teaching style whilst also reporting that they 'advise' and in some cases 'force' community members. This apparent cognitive dissonance is probably an attempt to reconcile an understanding of the correct attitude to facilitation with the challenge of meeting quotas of ODF communities.

The integration of PAKSI with the CAP process for water supply in the WaterAid program also presented some challenges. Given that the CAP activities are long and detailed, it was difficult to facilitate the WaterAid program in a 'quick' and 'entertaining' way which is what is required in CLTS and PAKSI interventions. Integrating the selection of 'natural leaders' for PAKSI with the GMF for water supply is efficient but also a site of struggle between the community-led style of PAKSI and government regulations. The GMF regulations are designed to support gender equity but, again, impede a community-led selection process of natural leaders because they stipulate that the hygiene promoters must be women and the technicians must be men.

6.3.2.2.2 Communities

The style of facilitation was probably also influenced by the attitudes of the receiving communities. PAKSI and CLTS are described in their manuals and by many of the research participants, including the facilitators, as community driven. However, there seemed to be some discomfort on the part of community members to take on the full responsibility of self-leadership. For example, in one observed meeting the community members' greatest concern was that the facilitators would leave them alone to construct toilets without guidance and in another, they were waiting for WaterAid to come and select their GMF for them. In another community, the attendees said that they 'needed the law'. This is not to say that remote communities in Timor-Leste are not capable of leadership, or responsibility. To the contrary, the Timorese have repeatedly demonstrated their self-determination throughout history; the most recent examples being during the Indonesian and Portuguese occupations (Centre of Studies for Peace and Development (CEPAD) 2009). Perhaps the reticence of remote communities to lead and take responsibility for something like sanitation in the context of the WaterAid program can be partly explained by the history of aid in Timor-Leste. As described in the background chapter, there is a long history of colonial powers and then external aid agencies doing things *to* and *for* remote Timorese communities. It is therefore understandable that

remote community members might receive a sanitation program that seemingly provides nothing tangible with hesitation or even suspicion rather than proactivity.

Adding further complexity to the way PAKSI was facilitated in the context of the project sites is the culture of leadership and power in Timor-Leste. As described in Section 2.2.3 of the background chapter, leaders are looked to as guides and people often feel reticent to challenge or question leaders' decisions (Centre of Studies for Peace and Development (CEPAD) and the National Working Group on Resilience 2016). The perception that leaders are role-models and the community should follow their example unquestioningly, might explain why PAKSI facilitators resort to directive strategies such as telling community members that they will only get a water supply once they have built toilets and that households will be monitored. This is as much about the attitudes of leaders and facilitators as it is about how community members construct their own capacity for self-determination in relation to leaders and facilitators.

Existing cultural norms about the way outsiders are welcomed into remote communities potentially influenced the way communities received, and in turn the way facilitators implemented, the WaterAid program. For example, although the CLTS manuals instruct facilitators to start with a transect walk of the community and keep a fast, entertaining pace during the activities, my observations of the WaterAid program suggested that Timorese protocol is that visitors are received at a community hall (if there is one) and welcomed with lengthy introductions. When the WaterAid senior staff attended one of the observed meetings and suggested that the facilitators move through the community and knock on people's doors, they did so but told me they were uncomfortable about this breach of protocol.

Similarly, the requirement that PAKSI and CLTS be inclusive of women was, in some ways, at odds with existing cultural norms. For example, Cummins (2010) found that even with the gradual democratisation of governance in Timor-Leste, women often have no right to speak during ceremonies and cultural activities. In the communities I visited during this study, it was protocol that the hosts cooked meals for visitors, and this was done by women, which means they could not attend all the activities. In one community, a leader remarked that there should be more women present but this seemed to be more about the men wanting to avoid complaints from their wives than a belief in women's right to participate. Despite the efforts of the facilitators to encourage women's participation (inviting them directly, asking those present to find more women), the small proportion of women who were present were mostly shy and did not speak much. The existing cultural norms which contradict some aspects of PAKSI does not mean that facilitators should not try to, respectfully, include women. However, there needs to be more understanding of ways to include women in a way that is appropriate for those women rather than through means prescribed in a manual.

6.3.3 Sanitation behaviour change factors

In comparing the descriptions of 'pure' CLTS, PAKSI and the WaterAid program in Timor-Leste from the perspectives of various stakeholders, some of the potential factors which were thought by the research participants to influence improved sanitation behaviour emerged. These are discussed in relation to the five behavioural factor groups that Mosler identifies in the RANAS (risk, attitudes, norms, abilities, and self-regulation) Model of Behaviour Change (see Section 3.2.4.1 in the literature review for more detail about the RANAS model) and summarised in Table 6-3 below. Behavioural factors identified during observations of the WaterAid meetings are categorised according to the nature of the activities themselves rather than their actual effect. For example, the

mapping exercise (as it is set out in the manuals) is designed to bring about feelings of disgust and embarrassment, so it is categorised in the ‘attitude factor’ group, regardless of whether attendees experienced such feelings.

Note that identifying the factors which influence the participants’ changes in sanitation behaviour was not the purpose of Study 1. However, some of these factors were identified during the analysis of the CLTS and PAKSI manuals and of the participants’ descriptions. The findings here and the corresponding findings about factors identified in Studies 2 and 3 will be analysed in relation to the RANAS Model in the final discussion chapter. Hence, the factors will only be described here briefly. Note also that the participants were not asked specifically about each of the factor groups, so it possible that some of the gaps in the table should be shaded. Therefore, this table possibly underrepresents the range of factors that are relevant.

Table 6-3 Behavioural factors identified in Study 1 categorised according to the RANAS model

			CLTS manuals	Kamal Kar	PAKSI manuals	Nat. and district gov.	BESIK	WaterAid senior staff	Local NGO senior staff	Facilitators	Observations of WaterAid inception meetings
Behavioural Factor Groups	Risk	Factual Knowledge									
		Perceived Vulnerability									
		Perceived Severity									
	Attitude	Instrumental Beliefs									
		Affective Beliefs									
	Norm	Descriptive Norm									
		Injunctive Norm									
		Personal Norm									
	Ability	Action Knowledge	*								
		Self-Efficacy (S-E)									
		Maintenance S-E									
		Recovery S-E									
	Self-Regulation	Action Planning									
		Action Control									
		Coping Planning									
		Remembering									
		Commitment									

*The light grey squares indicate behaviour factors that are influenced by post-triggering activities described in the CLTS and PAKSI manuals; that is, activities which are in theory only instigated by community members (which means they will not necessarily take place).

6.3.3.1 Risk factors

A person's understanding and awareness of the health risk of their behaviour.

Representatives of the national and district government as well as the facilitators described how the PAKSI approach in Timor-Leste increases community members' knowledge of the health risks of open defecation. The community leaders explained that one of the reasons for building toilets was to prevent diseases that travelled from faeces to food. One of the observed PAKSI activities was to correctly order a set of laminated sheets depicting various stages of the faecal-oral route: for example, flies landing on faeces; food preparation; and eating. This activity was intended to educate and bring attention to the faecal transmission of disease due to open defecation.

6.3.3.2 Attitude factors

A person's positive or negative stance towards a behaviour.

'Feelings' was probably the behaviour factor mentioned by the most participants. The CLTS manuals describe the approach as bringing about a 'collective sense of disgust and shame' through various activities. Kar did not mention feelings of shame or disgust in his interview but spoke frequently about 'self-respect' and pride.

Chambers said that CLTS was based on disgust, embarrassment and humour rather than shame. The WaterAid senior staff also felt that their approach was effective in stimulating feelings of disgust rather than shame. The PAKSI manual and national government and BESIK representatives all refer to negative feelings about open defecation including disgust and anger but not shame. Several of the observed PAKSI activities seemed designed to bring about disgust or embarrassment: for example, the mapping, transect walk and water and faeces demonstration. Occasionally, the community members participating in the PAKSI activities laughed nervously or seemed embarrassed but in general the mood was curious but subdued.

None of the community leaders described feelings that arose during the PAKSI activities, but they did refer to the need to be 'modern' as a reason for becoming ODF which is categorised in the RANAS model as a 'belief about costs and benefits'. Another 'belief about costs and benefits' was the promise of a water supply system. Although the water supply was not conditional on communities becoming ODF, several participants mentioned that it might have been perceived this way by community members. This perception was also apparent during the observed meetings.

6.3.3.3 Norm factors

The perceived social pressure towards a behaviour.

The perception of social pressure includes the 'awareness of institutional norms' ('injunctive norm') which people are reminded of when they are monitored (even if there are no penalties or rewards for compliance). The national government and BESIK representatives and local NGO senior staff all described regular monitoring by the government, an NGO or community leader as an effective strategy for ensuring community members became ODF. Facilitators also felt that monitoring was necessary, and they discussed various monitoring systems directly with community members during the observed WaterAid meetings.

One of the community leaders explained that his community had started to build toilets because 'we have to follow what the NGO said'. He did not elaborate further; however, this perceived pressure to conform to the requests of an outside NGO might be due to a sense of gratitude or obligation. It might also be due to cultural norms and expectations about leadership and governance in Timor-Leste generally (see Section 6.3.2.2.2 above). This was exemplified during

one of the observed meetings when one of the attendees said ‘we will follow the instructions of the law. We need the law’.

During the observed WaterAid meetings, attendees were invited to sign up their commitment to build a toilet in front of those present. In several meetings there were more names on the sheet than those who went to sign it which suggests that there is social pressure to become ODF from within the community as well as from outsiders such as the facilitators.

Finally, the community leader’s description of needing to be ‘modern’ as a reason for becoming ODF could also be categorised as a perceived social pressure (as well as being an attitude factor which was described in the previous section).

The community leaders’ descriptions of what had taken place in their community indicated that they saw the WaterAid and WASH for Worms programs as being fully integrated. Therefore, in addition to the WaterAid program activities, it is important to consider the impact of the WASH for Worms trial activities on community members’ behaviour change. These activities might have served as a motivator to improve sanitation behaviour. This is partly because the WASH for Worms team members were also ‘telling households what to do’, that is to build and use toilets, and conducting their own monitoring of this behaviour every six months. This likely served as an additional pressure which could be categorised as a ‘norm factor’ in the RANAS model.

6.3.3.4 Ability factors

A person’s confidence in her or his ability to practice a behaviour.

The importance of knowing how to procure materials, build and maintain a toilet was discussed by many of the participants. The CLTS and PAKSI manuals and Kar emphasise the need for allowing community members to work this out for themselves or at least for facilitators not to volunteer information or give advice unless asked by the community. In most of the observed WaterAid meetings the facilitators would demonstrate various toilet designs and provide guidance about procuring materials. According to the WaterAid and local NGO senior staff this was justified because it resulted in the construction of more durable toilets.

6.3.3.5 Self-regulation factors

A person’s attempts to plan and self-monitor a behaviour and to manage conflicting goals and distracting cues.

The monitoring of toilet construction by outsiders such as government or NGO staff is categorised as a ‘self-regulation factor’ under ‘action control’ (although it is also a ‘norm factor’). ‘Action control’ is ‘the extent of a person’s attempts to self-monitor a behaviour by continuously evaluating and correcting the ongoing behaviour toward a behaviour goal’ and it can be assumed that external monitoring will assist a person’s self-monitoring. The sign-up sheet for community members to publicly declare that they planned to build a toilet is an example of this. This sign-up sheet assists with ‘action planning’; that is, when and how the toilet will be built, as well as encouraging the person’s sense of ‘commitment’.

6.3.3.6 Factors not categorised by the RANAS model

In addition to the behaviour factors which comprise the RANAS model, there are also aspects of the WaterAid intervention itself which might have influenced whether community members changed their sanitation behaviour. As described in the results, it was challenging to get community members to attend the WaterAid inception meeting and attendance decreased substantially over the course of each day. This might have been due to the time commitment for the inception meeting and then multiple activities in the months thereafter, as well as the level of detail and formality of some of the activities.

Firstly, the time commitment for the week-long inception meeting and then follow-up activities over the next two years is substantial. Furthermore, there are multiple tasks that community members are expected to complete; that is, contribute to the construction of the community water system, build household toilets and promote and practice improved hygiene within the family. Although these activities are for the benefit of community members, they compete with higher-priority activities such as food and income generation and together may seem overwhelming for some households.

A related issue is the level of detail and formality with which some activities, such as the GMF regulations, were delivered. It is important that community members understand their rights and responsibilities. However, presenting this information in lengthy detail at the beginning of a program where trust in the facilitators might not yet have been established could have contributed to some attendees quickly losing interest.

6.3.4 Limitations

At the time of data collection, sanitation governance and implementation were changing rapidly in Timor-Leste. The rural sanitation policy was only approved in 2012 and the government was just beginning to trial a new system for implementation with government-employed sanitarians in 2013. At the same time, international NGOs were still implementing their own WASH programs but there was a desire on the part of the government that all WASH programs be gradually more aligned. Finally, the re-training of PAKSI facilitators by Kamal Kar just after data was collected for this study suggested that much of the current facilitation practices needed to change. Hence, it seems that data for this study were collected at a significant turning point for the nature of sanitation interventions in Timor-Leste. This means that any assumptions that the descriptions here apply beyond 2013 should be made with caution.

Nevertheless, the descriptions in this study are vital to understanding the findings from studies two and three. If it had been assumed that the sanitation component of the WaterAid WASH program was the same as PAKSI as it is set out in manuals or theory, it would not have been possible to correctly interpret the findings from studies two or three, or that of the WASH for Worms trial. Furthermore, this study demonstrates the importance of carefully describing interventions which are based on CLTS (rather than assuming they are like CLTS) before including them in studies of CLTS across different contexts.

6.4 Conclusion

This study set out to document how CLTS, PAKSI and the implementation of PAKSI was described in manuals, guidebooks and by participants who represented various stakeholder groups in Timor-Leste. The descriptions of the ‘essential elements’ of CLTS were fairly consistent: CLTS is an approach based on community empowerment which aims to bring about 100-percent ODF communities without hardware subsidies. The descriptions of PAKSI were very similar to this. The manuals for both CLTS and PAKSI stressed the importance of facilitation not being instructive and to allow community members to become ODF of their own volition.

The implementation of PAKSI in the WaterAid project sites diverged somewhat from the official descriptions of CLTS and PAKSI. Specifically, the activities took considerably longer, the facilitation style was often didactic and whilst there were no hardware subsidies for sanitation the promise of a new water supply system seemed to serve as an incentive to participate in the program.

As the Dynamic Responses Model (see Section 3.1.6) suggests, the findings in this study show that there are differences between the official description of CLTS and PAKSI, and the way PAKSI was implemented and experienced. This is something that most participants were aware

of and that those involved in planning sanitation interventions in Timor-Leste had started taking steps to change just after data collection for this research was completed. However, in interpreting the findings from Studies 2 and 3 which follow, it is important to remember that these do not represent the outcomes of an intervention which adheres to the essential elements of CLTS or PAKSI.

7 Study 2 - Outcomes of the WaterAid water, sanitation and hygiene program in Timor-Leste

Study 2 is about the changes in water, sanitation and hygiene (WASH)-related knowledge, attitudes and practices (KAPs) among participants in the WaterAid program in Manufahi Municipality, Timor-Leste. The WaterAid program included an improved water supply system, PAKSI²⁷: the Timor-Leste adaptation of CLTS, and hygiene behaviour change activities.

The specific objectives and research questions for Study 2 can be found in Chapter Four. Briefly, the objective was:

- 1) In communities²⁸ where the WaterAid PAKSI triggering activities²⁹ had taken place, to identify the changes in household members' knowledge, attitudes and practices regarding water, sanitation and hygiene.

The research question was:

- 1) In communities where the WaterAid PAKSI triggering activities had taken place, what were the changes, if any, in household representatives' knowledge, attitudes and practices regarding water, sanitation and hygiene between the time points listed below?
 - Up to a fortnight prior to the WaterAid PAKSI triggering activities
 - Up to a week after the WaterAid PAKSI triggering activities
 - 9-11 months after the WaterAid PAKSI triggering activities

This chapter presents the methods, results and discussion for the second study in this research.

7.1 Methods

The results of WASH interventions are often measured quantitatively with tools such as questionnaires and observations of WASH infrastructure. A similar approach was used for Study 2; that is, the data was collected with a questionnaire that had an observation component. The design of the questionnaire was informed by both examples found in the literature as well as an initial formative research phase. The responses to the questionnaires were later analysed statistically.

To remove the potential for recall bias, data was collected at three different points in time. The baseline data needed to be collected before and as close in time to the WaterAid PAKSI triggering activities as possible. This was both to ensure that a true baseline was collected (some WASH programs collect baseline data as part of their inception activities) but not so far ahead of the intervention commencing that other events might influence the findings. The first follow-up was timed for within a week after the WaterAid PAKSI triggering activities to capture any rapid change arising from the intervention. To detect whether any changes from earlier in the

²⁷ *Planu Aksaun Komunitade Saneamentu no Ijiene* (Community Action Plan for Sanitation and Hygiene)

²⁸ By 'community' I mean the people who live within the area WaterAid targeted for the WASH program. This was usually a *bairro* which is a group of 10-100 households, and is the smallest unit of measurement of groups of settled people in Timor-Leste. Several *bairros* form an *aldeia* and occasionally the WaterAid program would target a whole *aldeia*.

²⁹ See Section 3.1.2.2 in the literature review for a description of triggering activities.

intervention were on the path to sustainability³⁰, as well as to capture any new changes, the second follow-up was timed for 9-11 months after the end of the WaterAid PAKSI triggering activities. To measure the changes in KAPs over these three points in time as accurately as possible, the data was collected quantitatively rather than qualitatively. Quantitative methods were also chosen because this would mean that some of the findings from this research (that is, the findings from Study 2) could be generalised to all of the project sites in the WASH for Worms trial. (Once the data had been collected, however, it turned out that the findings could only be generalised with caution. This is explained further in the limitations presented in Section 7.1.5)

7.1.1 Data Collection Tools

The data for Study 2 was primarily collected with a knowledge, attitudes and practices (KAP) questionnaire which included a component for making observations of WASH infrastructure such as toilets. The KAP questionnaire used in this study was designed during a formative research phase, piloted with several households, and then administered at three different times.

Where possible, observations were also made of the WaterAid PAKSI triggering activities in the communities where questionnaires for this study were administered. These observations are described as part of Study 1 in Chapter Six.

7.1.1.1 Formative research phase

This component of the data collection consisted of qualitative research to inform the design of the KAP questionnaire. The data was collected in interviews with household representatives in remote communities which had poor access to WASH. The participants were asked open-ended questions about their knowledge, attitudes and practices regarding WASH and health. The question guide can be found in Appendix 4 - Study 2 Formative Research Phase Question Guide.

As described in Section 5.1.2 of the methods chapter, Study 2 sought to measure the ‘outcomes’ of the WaterAid WASH program. As described by Poulos, Pattanayak and Jones (2006) in their Generic Model of a Program, the ‘outcomes’ are one of several types of results of an intervention which can be measured (see Section 3.2.1 of the literature review for more detail about the Generic Model of a Program). The ‘outcomes’ of a program are defined as the changes in knowledge, behaviour or relationships in the short or medium term. Hence, in designing the question guide (which informed the questionnaire) used in this study, several existing knowledge attitudes and practices (KAP) questionnaires designed to measure WASH programs were drawn upon. These included the KAP surveys used to measure UNICEF’s WASH program in Myanmar (United Nations Children's Fund (UNICEF) Myanmar 2011); the BRAC WASH program in Bangladesh (Fisher et al. 2011); and the Action Against Hunger WASH project in South Sudan (Action Against Hunger (ACF) USA 2012). The question guide was also informed by the ‘Core questions on drinking-water and sanitation for household surveys’ (World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) 2006) and the Joint Monitoring Programme’s 2010 report: ‘Progress on Drinking Water and Sanitation’ (World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF) 2010).

Prior to commencing this phase of the data collection, my interpreter and I discussed the question guide thoroughly to ensure that she was familiar with the questions and confident she could convey their meaning accurately and sensitively. Over the course of the formative research

³⁰ The timeline for data collection in Study 2 was less than one year, therefore it did not measure sustainability.

phase, the question guide was adjusted so that it was more relevant and understandable to the participants and more effectively captured the data relevant to this research.

In planning for this qualitative research phase, it was thought that approximately 10-15 participants would be enough to reach saturation in the range of responses to the interview questions. With the assistance of an interpreter who could speak Tetun, Mumbai (local language to Manufahi) and English, I conducted interviews with 16 adult household representatives from 3 communities in Manufahi in May 2013. A summary of the participants and communities is shown in Table 7-1 below.

Table 7-1 Participants for the formative research phase in Study 2

Community	Number of participants	Approximate distance from Same* town centre	Size of community (# households)
Community A	3	45-min drive (mostly 4WD, only when dry) or 6-8-hour walk	36
Community G	9	25-min drive (mostly sealed road, 2WD)	23
Community H	4	2-hour drive (4WD) plus 2-hour walk	21

*Same is the main town of Manufahi Municipality (previously, Manufahi Municipality).

The communities were selected both for their diversity in remoteness as well as for logistical reasons. At the time that these interviews took place, WaterAid had not yet conducted PAKSI triggering activities in any of the three communities. The WASH for Worms team commenced working in Community A and Community H at the same time that I conducted these interviews; they had started working in Community G approximately 9 months earlier.

When we arrived in each community, the WASH for Worms team, my interpreter and I would have a brief meeting with the community chief and other leaders. They were already familiar with the WASH for Worms team and were usually expecting us. My interpreter and I walked to residents' houses to invite them to be interviewed. It was not necessary to get a random selection of participants for this phase, so we invited residents from houses at varying distances from the road or entrance to the community in case accessibility was a factor in their responses.

Together with my interpreter, I explained the purpose of the research and that participation was voluntary. This process, together with the interview took approximately 45-60mins. If the participants reported that they had a toilet, I asked to make observations and take photos. The interviews were either audio-recorded (with the participant's permission) or I took notes as we talked. The interviews and notes were roughly transcribed, and this data informed the design of the KAP questionnaire.

7.1.1.2 'Knowledge, Attitudes and Practices' (KAP) questionnaire

The KAP questionnaire consisted primarily of closed questions about water, sanitation, hygiene, and health. The questionnaire also included an observational component for the household toilet and hand-washing facilities (if present).

The questionnaire was piloted in August 2013 with 12 household representatives in Community J, on the outskirts of Same before the last changes were made and the questionnaire finalised (See Appendix 5 – Study 2 Questionnaire). The printed questionnaires included the most common responses that arose during the formative research phase and the piloting. Nevertheless, there was room on the questionnaires to record 'other' responses.

The baseline and first follow-up questionnaires were all administered in 2013 and the second follow-up questionnaires in 2014. The questionnaire was administered by me in English with the assistance of my interpreter in Tetun. As my Tetun improved, I was able to conduct some of the

questionnaire in Tetun directly with the participant, but my interpreter was always present. The questionnaires were not audio-recorded.

My interpreter and I would conduct the questionnaire at each participant's home. The interview component of the questionnaire took approximately 15-20 minutes to administer and the observational component took about 5 minutes.

At the end of each day of data collection I would check the questionnaires to ensure they had been filled in correctly. Digital copies of the questionnaires would be stored, together with any photos taken of WASH facilities, in separate folders for each participant. Later, the data was entered into a form in Access in preparation for analysis.

7.1.2 Sampling Framework

The objective of Study 2 was to detect changes in WASH-related KAPs at the household level, with statistical significance. The sample size needed depended on the size of change that was expected. At the time of data collection, monitoring conducted by WaterAid of their WASH program in Liquiça Municipality showed that the proportion of households using a toilet increased from 20-percent to 80-percent. It was assumed that changes in WASH practices in Manufahi might be similar; however, it was uncertain how great the changes in knowledge and attitude would be as such research had not yet been documented in Timor-Leste. Therefore, I made a conservative estimate of the anticipated change in proportions and decided to power the study to be able to detect changes as low as 30 percentage points with statistical significance.

The main analysis for this study was to calculate the change in proportions of participants who exhibited certain characteristics between two points in time. For example, the change in the proportion of households who had a toilet between baseline and first follow-up. Hence, the sample size for this study was powered for a two-sample z -test for the difference between two means. To calculate a sample size, a rearrangement of the following formula was used:

$$n = \frac{p_1(1 - p_1) + p_2(1 - p_2)}{(p_1 - p_2)^2} \times (Z_{\frac{\alpha}{2}} + Z_{\beta})^2$$

where,

n is the sample size,

p_1 and p_2 are the proportions of the two groups (in the example above, group 1 would be the baseline participants and group 2 would be the first follow-up participants),

$Z_{\frac{\alpha}{2}}$ is the critical value of the Normal distribution at $\frac{\alpha}{2}$ (for a confidence level of 95%, α is 0.05 and the critical value is 1.96),

Z_{β} is the critical value of the Normal distribution at β (for a power of 80%, β is 0.2 and the critical value is 0.84).

(Rosner 2011)

In calculating the sample size, it was assumed that the sample size in the two groups would be the same, that the samples from the two groups were independent and randomly selected and that the population of each group had a normal distribution.

This formula was used to make a table of sample sizes needed for different combinations of p_1 and p_2 where the confidence level was 95-percent and the power was 80-percent. This table revealed that **43** participants, or units of analysis, would be enough to detect changes as low as 30 percentage points.

It was anticipated that there would be a large loss of participants over the course of the study (estimated 20-percent loss of baseline participants by the time we did the second follow-up), potentially due to moving away, not being home at the time of data collection or research fatigue. Therefore, if x = the number of **actual** participants at baseline, then:

$$(x - 0.2x) = 43$$

$$\therefore x = 53.75$$

It was also estimated that approximately 10-percent of those invited would not want or be able to participate. Therefore, if y = the number of **invited** participants at baseline, then:

$$(y - 0.1y) = 53.75$$

$$\therefore y = 59.72$$

Hence, we aimed to invite **60** participants.

There were several requirements for the selection of the sample. The participants needed to be from communities that were part of the WASH for Worms trial and that would also be commencing the WaterAid program in August-September 2013. The 12 intervention communities³¹ in the WASH for Worms trial commenced the WaterAid WASH program in three separate rounds, with four communities in each round. The first round took place in 2012, before this research commenced. The second round took place in early 2013 at the same time as the formative research for this study. Hence, the participants for the KAP questionnaire needed to be selected from the four communities in the third and final round of intervention communities which were due to commence the WaterAid program in late 2013. The four communities were diverse in their level of accessibility, which was ideal for this study.

At the start of the data collection we sought to include a geographically representative sample of households from each community. The average number of households per community in the WASH for Worms trial was 28 which meant that out of the 4 communities, we would need to invite approximately every second household (28 households x 4 communities = 112 households and we were aiming to invite 60 household representatives). The communities we visited were either arranged along a road (with the occasional house set back from the road) or in a ring. This made it straight-forward to select every second house for invitation whilst getting a geographically representative sample of the community.

In choosing who would be suitable to represent the household in responding to the questionnaire both the age and the gender of the participant were considered. It was preferable to speak to someone who made the WASH-related decisions for the households: for example, the decision to build a toilet. During the formative research it became apparent that both men and women, usually of middle-age but also older³² people, were likely to be the household members who made WASH-related decisions. It was also apparent that middle-aged participants were easier to interview because they were more likely to speak Tetun and less easily confused by the research process than elderly participants. Hence, we generally aimed to invite middle-aged household representatives of either gender. We assumed that middle-aged people were more likely to be working away from the house during the day, so where possible, we collected data in the late afternoon or early evening.

³¹ WASH for Worms ‘intervention communities’ meant communities which underwent the WaterAid WASH program during the course of the trial. The ‘control communities’ also underwent the WaterAid WASH program but not until the trial was complete.

³² In this research, ‘middle-aged’ was defined as the generation which had children but not grand-children. ‘Elderly’ was defined as the generation which had children, grand-children and possible great-grand-children.

7.1.3 Recruitment of Participants

The recruitment of participants in this study was more challenging than in Studies 1 or 3 because I was inviting household representatives to participate prior to most of them having had any contact with the WaterAid or WASH for Worms teams. However, both the WaterAid and WASH for Worms staff had already been in regular contact with the community chiefs and had kindly sought permission for me to conduct my research in their communities.

I travelled to each community in the morning, usually with one of the field staff from the WASH for Worms team. When we arrived, we would have a brief meeting with the community chief and occasionally other community leaders. Introductions would take place and I would explain that I was conducting research about the WaterAid program in Manufahi Municipality on behalf of two Australian universities. After answering any questions the community leaders had for me, my interpreter and I would begin recruiting household representatives.

We walked through the community and approach houses, calling out to see if anyone was home. Usually we would be accompanied by the community chief or his wife to the first few houses and then they would leave us to recruit participants on our own. If someone was home, we would ask if there was an adult household member who might be willing to talk to us for about 25 minutes. If they agreed, we would carry out the process for informed consent which is explained in Section 5.3.6 of the methods chapter. In addition to the steps taken for informed consent in all three of the studies, my interpreter and I had to explain to each participant during the baseline that we would return within two weeks, and then again within a year, to invite them to participate again. We assured them that they did not have to participate in later visits if they did not wish to.

Approaching households to do the questionnaire was easier in the first and second follow-up visits. During the baseline I drew a rough map of each community with the locations of the participants' houses, so I could locate them again easily. In the follow-up visits, I would repeat the informed consent process in case participants had forgotten any details or changed their minds.

Given that Community I was so far from Same, we would occasionally stay overnight there during data collection.

7.1.4 Analysis

This study sought to identify the changes, if any, in household representatives' WASH-related knowledge, attitudes, practices and infrastructure in the three timeframes:

- Baseline to first follow-up (BL-FU1)
- First follow-up to second follow-up (FU1-FU2)
- Baseline to second follow-up (BL-FU2)

The main analysis was to calculate the change in the proportion of participants with a specific knowledge, attitude or practice within each of these timeframes; that is, a **change in two proportions**. For example, if at baseline 20-percent of the sample who responded to the questionnaire said they were accessing a toilet and at the second follow-up 80-percent of the sample who responded to the questionnaire said they were accessing a toilet, then the change in proportion of participants who practiced accessing a toilet was an increase of 60 percentage points between baseline and second follow-up.

The statistical significance for the change in two proportions was indicated with the p -value which was calculated with a two-sample z -test for the difference between two means with the following formulas:

$$\rho = \{1 - \phi|z|\}$$

where, $\varphi(\cdot)$ is the cumulative density function of a standard normal distribution and $|z|$ is an absolute value of z , and

$$z = \frac{(\overline{X}_1 - \overline{X}_2) - (\overline{\mu}_1 - \overline{\mu}_2)}{s_{d0}}$$

where, $(\overline{X}_1 - \overline{X}_2)$ is the observed difference between two proportions, with $\overline{X}_1$ and $\overline{X}_2$ being the proportions observed at time 1 and time 2,

$(\overline{\mu}_1 - \overline{\mu}_2)$ is the expected difference between the two proportions (which, for the null hypothesis is zero),

s_{d0} is the standard error of $(\overline{X}_1 - \overline{X}_2)$ under the null hypothesis of $X_1 = X_2$.

(StataCorp 2013)

A secondary analysis was to calculate the **change in a single proportion** which calculated the proportion of households which had changed their knowledge, attitude or behaviour within each of the timeframes. For example, if 100 households answered the question about where they defecated at both baseline and first follow-up, and 30 said they were open-defecating at baseline but were using a toilet at first follow-up, then the proportion of households which improved their sanitation behaviour was 30-percent. The statistical significance for the change in a single proportion is indicated by the confidence interval.

Raw data from the questionnaires were first recoded (using software packages: Access and SPSS) into 66 indicators. These indicators were grouped to respond to the knowledge, attitudes and practices questions which are set out in the results below.

Once the data had been recoded, the calculations for changes in two proportions and single proportions were made in another statistical software package called STATA. The 'do' files for this part of the analysis can be found in Appendix 6 – STATA 'do' Files.

7.1.5 Limitations

Aside from the general limitations which affected all three studies (described in Section 5.2 of the methods chapter) there were two other limitations specific to this study.

7.1.5.1 *The communities and household were not truly randomly selected*

The statistical method described above in Section 7.1.2 assumes that samples were randomly selected. In practice, a strict randomisation was not possible. The project sites in Study 2 needed to be selected from the intervention arm of the WASH for Worms trial; which originally included 12 communities. These communities had been purposely selected according to certain criteria: for example communities which did not have more than 50-percent toilet coverage (Vaz Nery et al. 2015). I was not able to randomly select communities for this study from the 12 intervention communities either, for logistical reasons. Hence, inferences about the population beyond the sample in this study should be made with caution.

7.1.5.2 *Questionnaire data cannot detect all changes in WASH-related knowledge, attitudes and practices*

Although the questionnaires included both direct questions and observations, these methods are limited in the extent to which they can detect changes in participants' knowledge, attitudes and practices. For example, asking participants about what illnesses people in their household have experienced in the last week is unreliable because of recall bias. Furthermore, this is probably a better indicator of how much the participant is concerned or aware of illness than how much

illness there has been. Similarly, asking participants about how they feel when they see faeces in the bush is not going to elicit the same response as observing their physical reaction or asking them how they feel directly after observing them see faeces in the bush. Whilst the questionnaire has its limitations, data has been interpreted with this in mind which makes it an adequate tool for this study.

7.2 Results

The results for Study 2 include a brief description of the participating communities and households, followed by the findings about changes in WASH-related knowledge, attitudes and practices. The results are focused on the sanitation and some of the water and hygiene-related indicators.

7.2.1 Description of the participating communities and households

As described in the sampling framework in Section 7.1.2 on page 144, the participants for Study 2 were from the intervention communities in the final round of the WASH for Worms trial.

Unfortunately, the WaterAid program was cancelled in the first two communities where I had collected baseline data (due to internal community politics or the communities implementing their own WASH interventions) and the WaterAid program was delayed by several weeks. This meant that out of the final four communities where the WaterAid program eventually took place, I was only able to collect baseline data in three communities. To get a sample size of at least 60, I needed to include as many households as possible; hence, I ultimately invited every household for which I could locate an adult representative.

As described in Table 7-2 below, the communities were approximately similar sizes but varied in their remoteness from Same.

Table 7-2 Study 2 Description of communities

	Community E	Community F	Community I
Community structure	Single <i>aldeia</i> made up of 3 <i>bairos</i> . (Program only in 2 <i>bairos</i> ***).	Single <i>bairro</i>	Single <i>bairro</i>
# Houses or Households* (data source)	20 (10 + 10) households	38 households	34 households
Approx. distance from Same** town centre	25-min drive (mostly sealed road, 2WD)	2-hour drive (4WD, two major river crossings)	3-hour drive (4WD)
Institutions	Roadside <i>bairro</i> : Church and School	Office**** and Cemetery	Church and School
Geography	One <i>bairro</i> is located along the road. A river flows parallel to the road, bounding the first <i>bairro</i> . The 2 <i>bairos</i> where the program took place are on the other side of the river.	Steep and mountainous. Houses located along a road which is cut into the side of a steep hill, just below the ridgeline.	Houses were arranged in a ring around a grassy field that had a creek running through it. Another creek flowed around the outside of the houses. One house was located about 100m outside of the main ring.
Date of WaterAid PAKSI activities	August 2013	September 2013	October 2013

* The number of houses does not always equal the number of households. This is because several households/families might live in one dwelling, or a single family might occupy several dwellings. Occasionally, houses are empty for long periods because the household move elsewhere for work or school.

**Same is the main town of Manufahi Municipality.

***This was because one *bairro* already had a functioning water system and most households had toilets.

****A community 'office' is a building dedicated to community events. It is usually a large, open-sided covered area which fits approximately 50 people underneath and many more outside. There is sometimes also a small lockable room, a notice board and public toilet nearby.

I observed parts of the WaterAid PAKSI triggering activities which took place in Community E and Community F. These activities are described as part of Study 1 in Section 6.2.4.1. There were some issues with the WaterAid intervention in Community F (see Section 6.2.1 in Chapter Six for a description). Whilst the WaterAid PAKSI triggering activities, *Grupo Maneija Facilidade* (GMF) (Water Management Group) formation, hygiene promotion and gender training took place, the water supply system was never constructed, and the project did not continue beyond the first six months. Nevertheless, this was long enough to be able to gather sanitation-related data about this community.

Unfortunately, I was unable to observe the WaterAid PAKSI triggering activities in Community I. However, the description from the WASH for Worms field staff who did attend indicated that it was similar to others I had observed with no disruptions.

A total of **65** households participated in the study—though not every household participated at each time point. See Table 7-3 below for the number of households from each community which participated at each time-point.

Table 7-3 Number of households which participated in the KAP Questionnaire for Study 2

Community	Baseline (#)	First follow-up (#)	Second follow-up (#)	Total (# which participated at least once)*
Community E	16	14	13	16
Community F	21	16	18	23
Community I	26	25	20	26
Total**	63	55	51	65

*This column shows the number of households which ‘ever’ participated in the study. These figures do not equal the sum of the previous columns, nor the maximum of the previous columns because not every household participated at every time point.

**This row shows the total number of households which participated at each point in time (that is, the sum of the three rows above).

During the baseline, if an adult household representative could be located when we visited their house they were invited to participate. At the first and second follow-ups we only approached those households who had participated in the baseline; and as expected, there were less participants in the follow-ups. The loss to follow-up was due to participants not being home; having moved out of the community; refusing to participate at that time; and in one case, having passed away. If the original participant was not available and another adult representative from the same household was willing to participate, then I would conduct the questionnaire with them instead. At the second follow-up there were two new participating households (they insisted on being interviewed even though we had not been able to locate them at baseline and first follow-up).

Given that not every participant answered every question in the questionnaire at every time point, the sample size is provided for each indicator reported in the following sections. The average sample size for the indicators which measured a change in two proportions was **46** which is generally enough to detect changes as small as 30 percentage points with a statistical significance of $p \leq 0.05$. The average sample size for indicators measuring a change in a single proportion was **32**. (As explained in Section 7.1.4 on page 146, the statistical significance of the changes in single proportions was indicated with the confidence interval.)

As explained in the sampling framework, I sought to invite respondents who were middle-aged. The demographics of the main respondents in Study 2 are shown in Table 7-4 below.

Table 7-4 Demographics of main respondents in Study 2

Main respondent	Percent of total at baseline (%)	Percent of total at first follow-up (%)	Percent of total at second follow-up (%)
Elderly* man	23	25	30
Elderly woman	14	13	12
Middle-aged** man	22	24	20
Middle-aged woman	36	31	34
More than 1 main respondent	2	2	2
Chief or other local authority	3	5	2

*‘Elderly’ broadly included people from the generation which had grandchildren or great-grandchildren.

**‘Middle-aged’ broadly included people who from the generation which had children, but not grandchildren.

In general, slightly fewer than half the main respondents were women. On average, about 40-percent of the main respondents were considered elderly, which is more than originally aimed for. This is probably due to most of the data collection occurring during the day when middle-aged people, especially men, tended to be working away from the home. Nevertheless, all the participants we spoke to were able to respond to the questionnaire with confidence.

The following sections describe the findings about changes in the participants' WASH-related knowledge, attitudes and practices. The findings are presented as changes in indicators which are grouped according to the specific research questions about WASH-related knowledge, attitudes and practices. As described in Section 7.1.4 on page 146, the changes were calculated either as a 'change in two proportions' or a 'change in a single proportion' which are presented in two types of tables in the sections below.

7.2.2 Changes in knowledge

7.2.2.1 K1 - Knowledge of the community water, sanitation and hygiene intervention

How did participants' understanding of what was happening in their community regarding WASH change?

In general, participants' understanding of what was happening in their community regarding the WASH programs increased over the course of the study. The proportion of participants who could describe the WaterAid and WASH for Worms interventions correctly was quite low at baseline (Table 7-5). By the second follow-up, most participants could describe the two interventions correctly. The greatest increase in knowledge of who WaterAid were occurred between baseline and first follow-up; whereas the greatest increase in knowledge of who the WASH for Worms team was occurred between first and second follow-up. The confidence intervals for each of these results are quite narrow.

Table 7-5 K1 - Knowledge of the community WASH intervention (change(s) in a single proportion)

Indicator	Time period	Change (%) [§]	95% CI	<i>n</i>	Proportion at BL (%) [∞]	Proportion at FU1 (%)	Proportion at FU2 (%)
Knows who WaterAid are	BL → FU1	76	61–86	49	Low - 90	Low - 19.5	Low - 4
	FU1 → FU2	18	8–33	40	Med - 8	Med - 6	Med - 23
	BL → FU2	93	81–98	46	High - 2	High - 74.5	High - 73
Knows who WASH for Worms are	BL → FU1	42	29–56	53	Low - 100	Low - 58	Low - 4.5
	FU1 → FU2	54	38–69	39	Med - 0	Med - 4	Med - 2
	BL → FU2	96	83–99	45	High - 0	High - 38	High - 93.5

§ In the tables describing the changes in a single proportion, the 'Change (%)' indicates the proportion of household representatives whose response to questions relating to the indicator changed in the positive direction (out of *n*, the total number of household representatives who responded to the questions at both time-points). For example, between baseline and first follow-up, 76% of household representatives who responded at both time-points indicated that their knowledge of who WaterAid were increased. If the 'Change' is 0%, this indicates that participants either did not change or they changed in the negative direction in that time-period: for example, from Medium to Low.

∞The data shown on the right side of the table show the proportions of participants who scored low, medium or high for each indicator (out of the total number of household representatives who responded to the questions related to each indicator at that time-point—note that this number is always, and sometimes significantly, higher than *n*). Note that occasionally the data on the left and right sides of the table appear to contradict each other. For example, on the left side a positive change will be recorded whilst on the right side the data will indicate that overall there has been a change in the negative direction. This is because the left side of the table only shows proportions of participants who have moved in the *positive* direction, thereby neither reporting the participants who have not changed nor those who moved in the negative direction. If, overall, a large proportion of participants moved in the negative direction, this would show up on the right side of the table only.

7.2.2.2 K2 - Knowledge of how to build a toilet

How did participants' understanding of how to acquire materials for and build a toilet change?

Out of those participants who were either planning to construct or had commenced constructing a new toilet, only about one-third knew which materials they needed to procure (Table 7-6). This proportion more than doubled between baseline and first follow-up (with statistical significance) but decreased somewhat between first and second follow-up (without statistical significance). Overall, the proportion of participants who knew which materials to procure for a new toilet more than doubled between baseline and second follow-up; a result which was statistically significant.

Table 7-6 K2 – Knowledge of how to build a toilet (change(s) in two proportions)

Indicator	Time period	Proportions (%) [§]	p-value	n _{t1} [∞]	n _{t2} [∞]
Knew what materials were needed to acquire a new toilet (and were planning or constructing a toilet)	BL → FU1 [†]	31 → 85	<0.0001	32	54
	FU1 → FU2	85 → 69	0.09	54	26
	BL → FU2	31 → 69	<0.01	32	26
Knew how to build a toilet (and were planning or constructing a toilet)	BL → FU1	81 → 100	<0.01	21	48
	FU1 → FU2	100 → 100	*	48	14
	BL → FU2	81 → 100	0.08	21	14

§ For all of the tables depicting changes in two proportions, 'Proportions (%)' refers to the proportion of household representatives who responded affirmatively to the questions relating to that indicator (out of the total number of household representatives who responded to the questions relating to that indicator at that time-point). The two proportions with an arrow between them are the proportions at two time-points. For example, 31 → 85 in this table means that 31% of all household representatives who responded to questions relating to knowledge about the materials needed to acquire a toilet at baseline, responded affirmatively; this proportion shifted to 85% at first follow-up.

[∞]t₁ and t₂ refer respectively to the first and second time-points listed under 'Time period'

[†]BL = baseline; FU1 = first follow-up; FU2 = second follow-up

*Note that p-values are not reported where the change in proportions was zero.

The proportion of participants who knew how to build a toilet was already quite high at baseline and increased to 100-percent at first follow-up (this change was statistically significant) (Table 7-6). This proportion was still 100-percent at second follow-up.

7.2.2.3 K3 - Knowledge of the connection between faeces and health

How did the participants' understanding of the connection between faeces and health change?

Several indicators were measured to determine the participants' understanding of the connection between faeces and health. There is much research that confirms that understanding the connection between faeces and health is not the primary motivation for people to change their sanitation behaviour (see Simpson-Hebert et al. (1997)). Nevertheless, this indicator was included because, to my knowledge, this has not been tested in the context of Timor-Leste. Furthermore, many of the WaterAid program sanitation activities were intended to increase community members' knowledge about the connection between health and faeces; hence it was important to measure the impacts of this.

None of the changes in the indicators shown in Table 7-7 was statistically significant. On average, at any of the three time-points, approximately one-quarter of the participants listed health as a reason for having built, planning to build or using a toilet or for being satisfied or dissatisfied with their current place of defecation. The results for participants' knowledge of the connection between health and both human and animal faeces were equivalent. At each of the

three time points, close to 100-percent of participants knew that human and animal faeces could cause illness.

Table 7-7 K3 – Knowledge of the connection between faeces and health (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Built (or were planning or constructing) a toilet for <i>health</i> reasons	BL → FU1	17 → 34	0.12	24	53
	FU1 → FU2	34 → 27	0.48	53	44
	BL → FU2	17 → 27	0.32	24	44
Defecate in toilet for <i>health</i> reasons	BL → FU1	25 → 14	0.66	4	7
	FU1 → FU2	14 → 41	0.19	7	37
	BL → FU2	25 → 41	0.55	4	37
Knew that human faeces can make them sick	BL → FU1	95 → 98	0.38	62	54
	FU1 → FU2	98 → 100	0.34	54	48
	BL → FU2	95 → 100	0.12	62	48
Knew that animal faeces can make them sick	BL → FU1	97 → 98	0.64	62	54
	FU1 → FU2	98 → 100	0.34	54	48
	BL → FU2	97 → 100	0.21	62	48

Table 7-8 (below) shows the proportions of participants who increased their understanding of the faecal-oral pathway and diseases as well as how to prevent animal faeces from causing disease.

Table 7-8 K3 - Knowledge of the connection between faeces and health (change(s) in a single proportion)

Indicator	Time period	Change (%)	95% CI	n	Proportion at BL (%)	Proportion at FU1 (%)	Proportion at FU2 (%)
Knows the faecal-oral pathway	BL → FU1	27	17–42	51	Low - 12	Low - 4	Low - 19
	FU1 → FU2	14	6–29	42	Med - 25	Med - 21	Med - 14.5
	BL → FU2	29	17–44	45	High - 63	High - 75	High - 66.5
Knows faecal-oral transmitted diseases	BL → FU1	29	18–44	51	Low - 44	Low - 19	Low - 27
	FU1 → FU2	12	5–26	42	Med - 44	Med - 75	Med - 63
	BL → FU2	24	14–40	45	High - 12	High - 6	High - 10
Knows how to prevent animal faeces from causing disease	BL → FU1	10	4–22	51	Low - 7	Low - 0	Low - 4
	FU1 → FU2	0	*	42	Med - 2	Med - 0	Med - 0
	BL → FU2	9	3–22	45	High - 91	High - 100	High - 96

*Note that confidence intervals are not reported for 0% or 100% change.

Between baseline and first follow-up close to one-third of participants increased their understanding of both the faecal-oral pathways and faecal-oral diseases. Between first and second follow-up, this trajectory continued albeit among a smaller proportion of participants. These results all had quite narrow confidence intervals.

A high proportion of participants already knew at baseline how to prevent animal faeces from causing disease. There was a slight increase between baseline and first follow-up at which point 100-percent of the participants indicated they knew how to prevent the spread of disease from animal faeces. Between first and second follow-up there was a slight decrease, but overall knowledge remained very high.

7.2.3 Changes in attitudes

7.2.3.1 A1 - The importance of water and sanitation

How did the importance of water and sanitation for participants change?

Table 7-9 shows the changes in proportions of participants' preferences for a water supply system and toilets relative to other public and private goods as well as to each other. This set of indicators was included in these findings because they contribute to an understanding of how the WaterAid program influenced community members' motivations for changing their sanitation practices (or not). For example, if the priority of having a toilet did not change relative to other private goods as a result of the WaterAid program, then this could explain an outcome where there was not change in the construction or use of toilets over the same time period.

Out of a selection of public goods, the proportion of participants who prioritised a water supply system more than halved over the course of the study. Most of this change took place between the first and second follow-ups. The proportion of participants who prioritised a toilet out of a selection of private goods almost halved between first and second follow-up.

Table 7-9 A1 – The importance of water and sanitation (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Out of a selection of public goods, water was the main priority	BL → FU1	84 → 77	0.35	63	53
	FU1 → FU2	77 → 35	<0.0001	53	48
	BL → FU2	84 → 35	<0.0001	63	48
Out of a selection of private goods, a toilet was the main priority	BL → FU1	35 → 47	0.20	62	53
	FU1 → FU2	47 → 25	0.02	53	48
	BL → FU2	35 → 25	0.24	62	48
Felt that a toilet was more important than a water system	BL → FU1	8 → 2	0.14	63	54
	FU1 → FU2	2 → 4	0.49	54	48
	BL → FU2	8 → 4	0.42	63	48
Felt that a water system was more important than a toilet	BL → FU1	49 → 39	0.26	63	54
	FU1 → FU2	39 → 54	0.12	54	48
	BL → FU2	49 → 54	0.60	63	48
Felt that water and toilets were equally important	BL → FU1	43 → 59	0.08	63	54
	FU1 → FU2	59 → 42	0.08	54	48
	BL → FU2	43 → 42	0.90	63	48

The relative importance participants placed on a new water supply and a toilet did not change with statistical significance throughout the study. The proportion who felt that a water system and toilets were equally important changed with close to statistical significance between baseline and first follow-up (when it increased) and again between first and second follow-up (when it decreased to almost exactly the baseline proportion).

In general, at each time-point, only a small proportion of the participants prioritised a toilet higher than a new water system; the remainder were approximately split between those who prioritised water or those who felt water and toilets were of equal priority.

7.2.3.2 A2 – Satisfaction with place of defecation

How did participants' satisfaction with where they defecate change?

Participants became increasingly satisfied with where they defecated (Table 7-10) and less inclined to prefer to defecate elsewhere (Table 7-11) over the course of the study. Most of this change occurred between first and second follow-up.

Table 7-10 A2 – Satisfaction with place of defecation (change(s) in a single proportion)

Indicator	Time period	Change (%)	95% CI	<i>n</i>	Proportion at BL (%)	Proportion at FU1 (%)	Proportion at FU2 (%)
Is satisfied with where they defecate	BL → FU1	6	2–17	53	Low - 85	Low - 83	Low - 14.5
	FU1 → FU2	73	57–85	41	Med - 5	Med - 8	Med - 14.5
	BL → FU2	74	60–85	47	High - 10	High - 9	High - 71

These indicators included all participants, regardless of whether they were defecating in a toilet. When only those who were open-defecating were considered, the proportion who preferred to defecate elsewhere was already high at baseline and increased to almost 100-percent at first follow-up (although this was just short of statistical significance) (Table 7-11).

Table 7-11 shows some of the reasons why participants were satisfied or dissatisfied with their place of defecation and how this changed before and after the WaterAid program.

Table 7-11 A2 – Satisfaction with place of defecation (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Preferred to defecate elsewhere	BL → FU1	90 → 98	0.07	60	53
	FU1 → FU2	98 → 50	<0.0001	53	48
	BL → FU2	90 → 50	<0.0001	60	48
Was open-defecating and preferred to defecate elsewhere	BL → FU1	89 → 98	0.09	54	45
	FU1 → FU2	98 → 100	0.71	45	6
	BL → FU2	89 → 100	0.39	54	6
Listed the following reasons for being satisfied or dissatisfied with where they defecated:					
<i>quality of place of defecation</i>	BL → FU1	2 → 13	0.01	61	52
	FU1 → FU2	13 → 8	0.41	52	48
	BL → FU2	2 → 8	0.10	61	48
<i>preference (for toilet or open defecation)</i>	BL → FU1	13 → 8	0.35	61	52
	FU1 → FU2	8 → 2	0.20	52	48
	BL → FU2	13 → 2	0.04	61	48
<i>convenience</i>	BL → FU1	8 → 6	0.62	61	52
	FU1 → FU2	6 → 4	0.71	52	48
	BL → FU2	8 → 4	0.39	61	48
<i>access to water for washing</i>	BL → FU1	10 → 8	0.69	61	52
	FU1 → FU2	8 → 19	0.10	52	48
	BL → FU2	10 → 19	0.18	61	48
<i>safety</i>	BL → FU1	3 → 2	0.65	59	51
	FU1 → FU2	2 → 0	0.33	51	48
	BL → FU2	3 → 0	0.20	59	48
<i>animals e.g. harassment from pigs</i>	BL → FU1	8 → 8	0.92	61	52
	FU1 → FU2	8 → 10	0.63	52	48
	BL → FU2	8 → 10	0.69	61	48
<i>social status</i>	BL → FU1	2 → 0	0.35	61	52
	FU1 → FU2	0 → 0	*	52	48
	BL → FU2	2 → 0	0.37	61	48
<i>privacy</i>	BL → FU1	11 → 13	0.75	61	52
	FU1 → FU2	13 → 15	0.87	52	48
	BL → FU2	11 → 15	0.63	61	48
<i>getting support or advice</i>	BL → FU1	0 → 0	*	61	52
	FU1 → FU2	0 → 4	0.14	52	48
	BL → FU2	0 → 4	0.11	61	48
<i>disgust or cleanliness</i>	BL → FU1	23 → 23	0.99	61	52
	FU1 → FU2	23 → 23	0.98	52	48
	BL → FU2	23 → 23	1.00	61	48
<i>at least having somewhere to defecate</i>	BL → FU1	3 → 8	0.30	61	52
	FU1 → FU2	8 → 6	0.78	52	48
	BL → FU2	3 → 6	0.46	61	48
<i>a sense of what they 'should' do</i>	BL → FU1	2 → 2	0.91	61	52
	FU1 → FU2	2 → 13	0.04	52	48
	BL → FU2	2 → 13	0.02	61	48

The items listed here are part of the range of factors which potentially influence where they defecate. Each item is a potential factor, regardless of whether it is something that brought the participants satisfaction or dissatisfaction. As Tyndale-Biscoe et al. (2013) explain in their study of ODF sustainability, such factors are often two-sided. For example, a lack of privacy might be a reason for being dissatisfied with where one defecates (this could be when using a toilet in the house where everyone can hear you going to the toilet but it could also be when defecating in a dry river bed where you might be discovered by others). Conversely, the provision of privacy might be a reason for being satisfied with where one defecates (this could be in a densely wooded forest but it could also be in a toilet built with a solid superstructure near the home). What is important, is that privacy is a factor which will influence one's degree of satisfaction with where one defecates and presumably, in turn, one's sanitation behaviour. (The limitations of this analysis of the data is discussed in Section 7.3.2.5.)

Only three reasons listed by participants as factors influencing how satisfied they were with where they defecated changed with statistical significance. Between baseline and first follow-up, the proportion of those who listed **quality of the place of defecation** increased more than six-fold. Between baseline and second follow-up, the proportion of those who listed **preference** decreased more than six-fold. The proportion of those who listed **a sense of what they 'should' do**³³ increased more than six-fold between first and second follow-up.

Most of the factors influencing whether participants were satisfied with their place of defecation were mentioned by less than 20-percent of the participants. The exceptions to this were **health** (Table 7-7) and **cleanliness or disgust** (Table 7-11). Both reasons were mentioned by approximately one-quarter of the participants. The proportion who listed **health** did not change substantially over the course of the study and **cleanliness or disgust** did not change at all.

7.2.3.3 A3 - Motivation for sanitation practices

How did participants' motivation for their sanitation practices change?

Table 7-12 shows the changes in whether participants felt externally motivated³⁴ to build, plan to build or use a toilet.

Table 7-12 A3 – Motivation for sanitation practices (change(s) in a single proportion)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
<i>Listed external reasons as motivation for having a toilet</i>	BL → FU1	0 → 45	<0.01	15	33
	FU1 → FU2	45 → 45	0.99	33	42
	BL → FU2	0 → 45	<0.01	15	42
<i>Listed external reasons as motivation for planning to build a toilet</i>	BL → FU1	7 → 56	<0.01	14	52
	FU1 → FU2	56 → 7	<0.01	52	14
	BL → FU2	7 → 7	*	14	14
<i>Listed external reasons as motivation for using a toilet</i>	BL → FU1	0 → 0	*	4	7
	FU1 → FU2	0 → 13	0.32	7	40
	BL → FU2	0 → 13	0.45	4	40

At baseline, no participants who had built a toilet and only a small proportion of participants who were planning to build a toilet listed **external reasons** such as being advised or supported

³³ This included responses such as 'because it is important'; 'because everyone should use a toilet'; 'because no one should open defecate'.

³⁴ 'Externally motivated' included reasons such as being advised or supported by, for example, the government or a non-governmental organisation (NGO).

by those outside the community as a motivation for doing so. This proportion increased to approximately half by first follow-up. This did not change further for those who built toilets; however, the proportion of those planning to build a toilet who were externally motivated decreased to baseline levels. Only a small proportion of participants listed external reasons for using a toilet across the course of the study and this did not change with statistical significance.

7.2.3.4 A4 - Association between water and sanitation

How did participants' association between water and sanitation change?

Table 7-13 shows the proportions of participants who felt there was a link between water and sanitation. As for the set of indicators in A1, this indicator was included because it helps to understand how the WaterAid program influenced community members' motivations for changing their sanitation practices (or not).

Table 7-13 A4 – Association between water and sanitation (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Felt that water and sanitation are connected: for example, water is needed for flushing or anal cleansing	BL → FU1	33 → 33	0.94	63	55
	FU1 → FU2	33 → 46	0.17	55	48
	BL → FU2	33 → 46	0.18	63	48

Over the course of the study approximately one-third of the participants felt that water was an integral part of sanitation: for example, for flushing toilets or for anal cleaning. This did not change with statistical significance over the course of the study.

7.2.3.5 A5 - Attitudes toward seeing human faeces in the bush

How did participants' attitudes toward seeing human faeces in the bush change?

At each of the three time points, the proportion of participants who responded to the idea of open defecation with disgust and embarrassment was approximately 70-percent (Table 7-14). This did not change with statistical significance.

Table 7-14 A5 – Attitudes toward seeing human faeces in the bush (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Responded to the idea of open defecation with disgust, repulsion or embarrassment	BL → FU1	72 → 68	0.62	61	53
	FU1 → FU2	68 → 70	0.81	53	47
	BL → FU2	72 → 70	0.83	61	47

7.2.4 Changes in practices and infrastructure

7.2.4.1 P1 - Sanitation practices

How did participants' sanitation practices change?

Table 7-15 shows where participants reported defecating and how this changed over the course of the study.

Table 7-15 P1 – Sanitation practices (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Were open defecating	BL → FU1	90 → 85	0.38	63	54
	FU1 → FU2	85 → 13	<0.0001	54	48
	BL → FU2	90 → 13	<0.0001	63	48
Were using another household's toilet	BL → FU1	0 → 2	0.28	63	54
	FU1 → FU2	2 → 6	0.25	54	48
	BL → FU2	0 → 6	0.04	63	48
Were using own household's toilet	BL → FU1	10 → 13	0.56	63	54
	FU1 → FU2	13 → 81	<0.0001	54	48
	BL → FU2	10 → 81	<0.0001	63	48

Most participants were open defecating at baseline and the remaining small proportion were using their household toilet. This did not change with statistical significance between baseline and first follow-up; however, between first and second follow-up the proportion who were open-defecating decreased more than six-fold. Similarly, the proportion who were defecating in their household toilet increased just over six-fold. The proportion who defecated in another household's toilet increased slightly (with statistical significance) between baseline and second follow-up.

7.2.4.2 P2 - Toilet ownership status

How did participants' toilet ownership status change?

Participants' households were assigned a toilet ownership status which considered how many toilets there were; whether these toilets were functioning; and at what stage of construction they were.³⁵ Table 7-16 shows the changes in proportions of households with a selection of toilet ownership statuses.

Table 7-16 P2 – Toilet ownership status (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Had at least one functioning toilet (regardless of level of construction)	BL → FU1	11 → 15	0.60	62	55
	FU1 → FU2	15 → 84	<0.0001	55	51
	BL → FU2	11 → 84	<0.0001	62	51
Had never had a toilet	BL → FU1	71 → 27	<0.0001	62	55
	FU1 → FU2	27 → 4	<0.01	55	51
	BL → FU2	71 → 4	<0.0001	62	51
Had two functioning toilets (regardless of level of construction)	BL → FU1	0 → 0	*	62	55
	FU1 → FU2	0 → 2	0.30	55	51
	BL → FU2	0 → 2	0.27	62	51
Only had toilets under construction	BL → FU1	5 → 60	<0.0001	62	55
	FU1 → FU2	60 → 6	<0.0001	55	51
	BL → FU2	5 → 6	0.81	62	51

At baseline and first follow-up, only a small proportion of participants' households had at least one functioning toilet; however, this increased more than five-fold between first and second follow-up. The proportion of participants who had never had a toilet more than halved between baseline and first follow-up and decreased almost to zero by second follow-up. Having more than one toilet was rare amongst the participants.

The proportion of participants whose households only had toilets under construction increased substantially between baseline and first follow-up and then returned almost to baseline levels by second follow-up.

7.2.4.3 P3 - Plans to build a toilet

How did participants' plans to build a toilet change?

'Planning to build a toilet' meant that the participant had gone beyond merely saying they wanted or intended to build a new toilet or fix an existing toilet; rather that they had thought through the steps needed to acquire or fix a toilet and could describe how they were going to execute some of these steps. Those who had started to procure materials or start construction already were no longer classified as 'planning to build a toilet'.

The proportion of participants who indicated that they planned to build a toilet changed substantially throughout the course of the study (Table 7-17). Between baseline and first follow-up this proportion increased five-fold and then by second follow-up had decreased again.

³⁵ There were four possible classifications of toilets: 1) Under construction and not-yet functioning, 2) Under construction but already functioning (useable), 3) Completed and functioning, and 4) Completed but no-longer functioning.

Table 7-17 P3 – Plans to build a toilet (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Planned to build (or had begun procurement for) a toilet	BL → FU1	16 → 80	<0.0001	58	20
	FU1 → FU2	80 → 33	<0.001	20	42
	BL → FU2	16 → 33	0.04	58	42

7.2.4.4 P4 - Position on the ‘pre-sanitation’ ladder

How did participants’ position on the pre-sanitation ladder change?

Sanitation practitioners refer to what is called the ‘sanitation ladder’ to describe the progression of households and communities towards improving their access to sanitation. This ladder begins at the point where households cease open defecation. However, there are a series of steps before a household ceases open defecation which can be influenced by a sanitation intervention and are important prerequisites for stepping onto the first rung of the conventional sanitation ladder. These steps include wanting to cease open defecation; making plans to build a toilet; procuring materials for the toilet; and constructing the toilet. I refer to these steps here as the ‘pre-sanitation ladder’ and measured participants’ trajectory on this ladder throughout the course of the study.³⁶

In each of the three time periods, most participants moved up the pre-sanitation ladder; that is, toward becoming open defecation free (ODF). Table 7-18 shows the change in proportion of households which moved either up or down the pre-sanitation ladder.

Table 7-18 P4 – Position on the pre-sanitation ladder (change(s) in a single proportion)

Indicator	Time period	Change (%)	95% CI	n
HH moved up the pre-sanitation ladder	BL → FU1	87	75–94	54
	FU1 → FU2	82	67–91	44
	BL → FU2	86	72–93	49
HH moved down the pre-sanitation ladder	BL → FU1	2	0–13	54
	FU1 → FU2	16	8–30	44
	BL → FU2	4	1–16	49

A small proportion of participants moved down the pre-sanitation ladder overall. The greatest proportion of households who moved down the pre-sanitation ladder did so between first and second follow-up.

7.2.4.5 P5 - Condition of toilets

How did the condition of participants’ toilets change?

Out of those who had a household toilet, the proportion that had at least one toilet made of durable materials such as concrete increased more than three-fold between first and second follow-up and more than six-fold over the entire course of the study (Table 7-19).

³⁶ There were 28 ‘steps’ defined for the pre-sanitation ladder. See Appendix 7 – ‘Pre-sanitation ladder’ for a list of these steps.

Table 7-19 P5 – Condition of toilets (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Had at least one toilet, and at least one of those toilets was made of some durable materials e.g. concrete	BL → FU1	11 → 23	0.31	18	40
	FU1 → FU2	23 → 73	<0.0001	40	49
	BL → FU2	11 → 73	<0.0001	18	49
Had at least one toilet, and at least one of those toilets had extra features e.g. gutter	BL → FU1	0 → 0	*	18	40
	FU1 → FU2	0 → 8	0.06	40	49
	BL → FU2	0 → 8	0.21	18	49
Had at least one toilet, and access to at least one of those toilets was not difficult	BL → FU1	100 → 95	0.33	18	40
	FU1 → FU2	95 → 94	0.82	40	49
	BL → FU2	100 → 94	0.28	18	49
Had at least one functioning toilet, and at least one of those toilets was not broken	BL → FU1	86 → 75	0.60	7	8
	FU1 → FU2	75 → 91	0.21	8	43
	BL → FU2	86 → 91	0.68	7	43
Planned to build a toilet (or had begun procurement), and planned to use at least some durable materials	BL → FU1	67 → 63	0.84	9	16
	FU1 → FU2	63 → 86	0.15	16	14
	BL → FU2	67 → 86	0.28	9	14

Of those participants who had a toilet, the proportion who had a toilet with extra features such as a gutter on the roof was zero at both baseline and first follow-up and this increased to almost 10-percent at second follow-up (with close to statistical significance).

At all time points, the proportion of observed toilets which were easy to access, and the proportion of intact toilets was quite high. This did not change with statistical significance over the course of the study.

7.2.4.6 P6 - Hygiene practices

How did participants' hygiene practices change?

Table 7-20 shows the proportions of participants' households which had hygiene facilities and how these changed over the course of the study.

Table 7-20 P6 – Hygiene practices (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Had at least one toilet, and toilet had facilities for washing body after defecating e.g. water tanki	BL → FU1	33 → 50	0.38	15	12
	FU1 → FU2	50 → 70	0.19	12	47
	BL → FU2	33 → 70	0.01	15	47
Facilities for washing body after defecating had water present	BL → FU1	20 → 67	0.12	5	6
	FU1 → FU2	67 → 82	0.40	6	33
	BL → FU2	20 → 82	<0.01	5	33
Had at least one tippy tap (regardless of functionality)	BL → FU1	0 → 0	*	16	53
	FU1 → FU2	0 → 67	<0.0001	53	46
	BL → FU2	0 → 67	<0.0001	16	46
Of the households with at least one tippy tap (regardless of functionality) the proportion that had at least one tippy tap that looked used (or functional)	BL → FU1	- → -	*	0	0
	FU1 → FU2	- → 84	*	0	31
	BL → FU2	- → 84	*	0	31
Handwashing facilities which had soap	BL → FU1	0 → 0	*	16	11
	FU1 → FU2	0 → 15	0.17	11	47
	BL → FU2	0 → 15	0.10	16	47

Out of the households which had toilets, the proportion which also had facilities for washing the body and hands after defecating more than doubled between baseline and second follow-up. Of those facilities, less than one-quarter had water in them at baseline, but this proportion increased more than four-fold by second follow-up.

The proportion of households which had a tippy tap for handwashing was zero at baseline and first follow-up but increased to around two-thirds by second follow-up. Of those tippy taps at second follow-up, most looked used or functional.

7.2.4.7 P7 - Reports of seeing human faeces in the bush

How did participants' reports of seeing human faeces in the bush change?

Table 7-21 shows the proportion of participants who reported seeing human faeces in the open at different time points.

Table 7-21 P7 – Reports of seeing human faeces in the bush (change(s) in two proportions)

Indicator	Time period	Proportions (%)	p-value	n _{t1}	n _{t2}
Saw human faeces in the open	BL → FU1	98 → 100	0.35	62	53
	FU1 → FU2	100 → 96	0.13	53	48
	BL → FU2	98 → 96	0.41	62	48

These proportions were high at each of the three time points of the study and did not change with statistical significance which suggests that none of the three communities was ODF during this research.

7.3 Discussion

This section discusses the changes in WASH-related knowledge, attitudes and practices that are described in the Results above.

7.3.1 Knowledge

7.3.1.1 Participants' understanding of the water, sanitation and hygiene program in their communities

In Study 1, the findings suggested that a priority for many of the participants who were involved in planning and designing WASH programs for remote communities in Timor-Leste was that communities lead and manage the process of improving WASH. As a minimum, this would require that participating community members knew about and understand the WASH interventions that were taking place in their communities. However, as discussed in Section 2.2.4 of the background chapter, participants do not always know the purpose and details of the development projects taking place in their communities (Rolling Think Tank Initiative 2004).

Hence, some of the questions about changes in participants' knowledge in Study 2 were about their understandings of the WaterAid and WASH for Worms programs. Over the course of the study, the proportions of participants who could accurately describe the WaterAid and WASH for Worms programs increased substantially. This is unsurprising given the relative contact the two project teams had with communities in the respective time periods. Community members being able to describe the purpose of an intervention that is taking place in their community does not imply that they are meaningfully participating (let alone leading) that process; however, this is an important first step to community-led development.

7.3.1.2 The connection between health and sanitation

The findings showed that participants' knowledge about the connection between health and sanitation increased somewhat over the course of the study. For just under one-third of the

participants, their knowledge about the faecal-oral pathway and faecal-transmitted disease improved between baseline and first follow-up. This corresponded with the WaterAid PAKSI activities which, as shown in Study 1, included a specific exercise to inform and remind participants about the faecal-oral pathway.

Although there were improvements in participants' ability to describe the mechanisms of the faecal-oral pathway of disease transmission, there were no substantial changes detected in participants' general understanding that faeces are bad for health. At all three time-points, close to 100-percent of the participants indicated that they understood that both human and animal faeces could make them sick, and most of the participants knew how to prevent the spread of animal faeces. Despite almost all the participants knowing the health risks of faeces at baseline and first follow-up; most were still practising open defecation at the same time-points. This aligns with evidence discussed in the literature (see Section 2.1.4.2 of the background chapter) about health behaviour change. Knowing the health risks of a behaviour is not a sufficient motivator for changing that behaviour and therefore, health education or health messaging have been shown to be less effective behaviour change than interventions which target other motivators (Simpson-Hebert et al. 1997).

The findings for this study also showed that the maximum proportion of participants who listed health as a reason for building, planning to build or using a toilet was 41-percent despite almost 100-percent knowing that faeces could make them sick. This further suggests that it was factors other than knowing the health risks of faeces which motivated the participants to take steps toward becoming ODF.

7.3.1.3 Knowledge of how to build a toilet and where to procure materials

Whilst the proportion of participants who reported that they knew how to build a toilet was already quite high at baseline (81-percent), this increased to 100-percent at first follow-up. In the same timeframe, the proportion of participants who reported that they knew where to procure the materials for a new toilet also increased. This was a much greater change in proportion: 31 to 85-percent. In the subsequent time-period (between first and second follow-up) the quality of toilets also improved. That is, out of those who had a toilet, the proportion of toilets that were made of durable materials increased substantially. Altogether, this suggests that the WaterAid PAKSI activities were effective in improving participants' practical knowledge about how to acquire toilets. This finding is unsurprising given that it was observed in Study 1 that part of the PAKSI activities were focused on informing participants about the sanitation ladder and the sanitation technology options available to them. This is in addition to the toilet construction demonstrations and information about how to budget and transport the necessary materials for more durable toilet models.

Although 100-percent of participants reported knowing how to build a toilet at both first and second follow-ups, this did not correlate with all participants owning a toilet. This suggests that it is factors other than practical knowledge about acquiring a toilet that determine whether participants build toilets and become ODF.

7.3.2 Attitudes

7.3.2.1 Demand for improved sanitation

Approaches based on CLTS are described by the sanitation sector as interventions which create demand rather than just supply sanitation infrastructure. This assumes that in many communities where rates of open defecation are high, the demand for improved sanitation is low. Therefore, in the context of this study, it might have been expected that a desire to defecate elsewhere would have been low amongst those who were open defecating at baseline. However, this was not the case: 89-percent of those open-defecating at baseline said they would prefer to defecate

elsewhere, such as in a toilet. This proportion did not increase with statistical significance between baseline and first follow-up.

It is possible that the high demand for toilets detected at baseline was because the participants thought that they might get a toilet if they said they wanted one. (I often needed to reiterate that I was not in the community to provide anything.) This finding might also suggest that merely wanting to defecate somewhere other than in the open is not enough to bring about behaviour change.

7.3.2.2 Disgust, repulsion, and embarrassment about open defecation

As described in Study 1, the PAKSI manuals (Government of Timor-Leste 2012 p11) explain that the purpose of the triggering activities is to:

‘develop some embarrassment and disgust about open defecation’.

At each of the three time-points in Study 2, the proportion of participants who responded to the idea of open defecation with disgust, repulsion or embarrassment was approximately 70-percent. This did not change with statistical significance throughout the course of the study which is an unexpected result given the way PAKSI is described in its manuals.

Out of all the reasons that participants gave for being either satisfied or dissatisfied with where they defecated, ‘disgust-cleanliness³⁷’ and ‘health’ were the most mentioned reasons at each time-point. The proportion of participants which mentioned ‘disgust-cleanliness’ did not change with statistical significance over the course of the study. These results are consistent with the findings of an ODF sustainability study conducted in Timor-Leste (not in Manufahi Municipality) after this research took place. This later study found that ‘shame, disgust, pride or fear’ and ‘health’ were mentioned by most of the participants as a motivator for sustaining their ODF status (Moran 2017).

Overall, these results suggest that it was not the components of the PASKI activities that were focused on stimulating disgust and embarrassment that were effective in bringing about improved sanitation practices for most of the participants in this study. This is not to say that disgust is not a motivating factor in the participants’ decision to be open defecation free; rather, as described above, this was the most mentioned reason for the level of satisfaction with where they defecated. However, perhaps feeling disgust about faeces, like knowing the connection between health and faeces, was a necessary but not sufficient motivator for these participants to change their behaviour.

7.3.2.3 ‘External’ motivations for improved sanitation practices

Although there was no single factor, or group of factors, identified in Study 2 as the main motivator for improving sanitation practices; it was the factors which broadly fall under the category of ‘external’ motivations which changed substantially and with statistical significance over the course of the study. For example, the proportion of participants who had built or were planning to build a toilet and said this was because they had been advised or supported to do so by the government or a non-governmental organisation (NGO), increased from zero to approximately half between baseline and first follow-up. Altogether, this suggests that perhaps what is effective about the WaterAid and WASH for Worms programs is the presence of outsiders making suggesting or giving instructions about what to do; rather than inciting feelings

³⁷ ‘Disgust’ and ‘cleanliness’ were broadly interpreted as two ends of a dyad which together represented a single factor influencing whether participants were satisfied or dissatisfied with where they defecated. ‘Disgust’ was listed a reason for dissatisfaction; whereas ‘cleanliness’ was listed as a reason for satisfaction.

of disgust or delivering health messages. However, this would only apply to building or planning to build a toilet because only a small proportion of participants reported being externally motivated to *use* a toilet at any of the three time-points. That is, once the participants owned a toilet, they did not seem to need any external motivation to use the toilet instead of open defecating.

7.3.2.4 Relative priority of access to safe water and sanitation

Study 1 suggested that community members in remote communities in Timor-Leste tend to be focused on improving their access to water and less focused on improving their sanitation. The findings from Study 2 suggested a similar prioritisation of water relative to sanitation. At baseline, only a small proportion felt that toilets were more important than water and the remainder were approximately split between those who prioritised water and those who felt that water and toilets were equally important. At first follow-up, there was an increase in the proportion of those who felt that water and toilets were equally important; but this returned to similar-to-baseline proportions at the second follow-up. This suggests that the WaterAid and WASH for programs had a short-term influence on the relative prioritisation of water and toilets by the participants; however, this did not last.

For about one-third of the participants, water and sanitation were interlinked in that water was seen as necessary for increasing access to improved sanitation: for example, for anal cleansing or toilet flushing. Some of the participants in Study 1 described a similar preference for ‘wet toilets’ across Timor-Lest; most likely because this symbolised modernity. This is consistent with the findings of the ODF sustainability study conducted in Timor-Leste after this research took place which found that the ‘accessibility of water’ was important for most participants to remain ODF (Moran 2017).

7.3.2.5 A more accurate way to analyse changes in satisfaction with sanitation practices

The changes in participants’ reasons for being satisfied or dissatisfied with their place of defecation were presented in Section 7.2.3.2. As described in that section, the items listed in Table 7-11 were all factors which influenced whether people were satisfied with their place of defecation (and in turn their behaviour), regardless of whether those factors were listed by individuals as sources of satisfaction or dissatisfaction and regardless of whether the place of defecation was in a toilet or the open. The data was presented this way because of the limited sample size of this study. A study with a greater sample size could measure changes in the ‘sub-factors’ in the items listed here. For example, the sub-factors of ‘privacy’ would be:

- Changes in the proportion of those who were **satisfied** with **open defecation** because it was **private**
- Changes in the proportion of those who were **dissatisfied** with **open defecation** because it was **not private**
- Changes in the proportion of those who were **satisfied** with a **toilet** because it was **private**
- Changes in the proportion of those who were **dissatisfied** with a **toilet** because it was **not private**

An additional four sub-factors would describe those who were satisfied with where they defecated (open defecation or toilet) because it was *not* private and those who were *dissatisfied* with where they defecated (open defecation or toilet) because it was private. However, this is likely to be a very small sub-set of the population.

Regardless, the added detail of this kind of data would better inform implementers about factors to consider when designing interventions to bring about open defecation free communities rather than assuming what it is that satisfies people and whether that satisfaction impacts where they decide to defecate.

7.3.3 Practices

7.3.3.1 Sanitation and hygiene practices improved

The findings showed that sanitation practices improved substantially following the WaterAid and WASH for Worms programs. Kar (2008) explains in the handbook that CLTS triggering, when done properly and in an enabling environment, rapidly incites a desire, and action, among participants to improve their sanitation practices. The communities in Study 2 cannot strictly be described as what Kar terms ‘a matchbox in a gas-station’ because there was no substantial increase in the proportion of households which became ODF within two weeks of the PAKSI triggering activities.

However, in the same timeframe there was a substantial increase in the proportion of participants who had toilets under construction (but not yet finished) and who were planning to build toilets which suggests that the PAKSI activities were inspirational for them. The most substantial increases in the proportion of households that were ODF and those that had at least one functioning toilet took place later; that is, between first and second follow-up. Whilst the findings from Study 1 suggested that the sanitation components of the WaterAid program were not closely aligned with CLTS, the findings from Study 2 suggest that the WaterAid program was still effective in bringing about improvements in sanitation for the project sites in this research.

It is logical that the increase in proportion of households with a functioning toilet coincided with a substantial decrease in open defecation and increase in those defecating in their own toilet. However, there was always a slightly higher proportion of participants who had at least one functioning toilet than those using a toilet. This implies that even when participants have the infrastructure needed to cease open defecation some will always continue to do so.

Hand-washing rates were not measured in this research; however, the presence of hand-washing facilities and whether they looked used increased substantially between first and second follow-up. This suggests that the follow-up visits, rather than the activities during the WaterAid program inception week were most correlated with improvements in hygiene.

7.3.3.2 Open defecation free status of the community

The goal of the WaterAid WASH program is for there to be no more open defecation in the project sites and the safe containment of faeces. One indication of this is the absence of human faeces in the open. Almost all participants reported seeing human faeces in the bush at each of the three time-points. This is perhaps unsurprising given that at least 13-percent of the participants were practicing open defecation at the same times. None of the communities in this study was declared or verified to be ODF before the second follow-up so it is possible that, with more time, they would eventually have reached 100-percent ODF status and the proportion of participants reporting that they had seen human faeces in the open would have decreased substantially.

This finding had implications for the WASH for Worms trial. One of the objectives of the trial was to compare the rates of infection with soil-transmitted helminths (STHs) in the intervention and control communities. Open defecation is a risk factor for STH infection so it was hypothesised that in the intervention communities, there would be less infections with STHs. However, the WASH for Worms trial found little difference in the STH infection rates between the intervention and controls villages (Campbell et al. 2016, Campbell et al. 2017, Vaz Nery et al.

2019). The findings from Study 2 suggested that even though the WaterAid intervention lowered the proportion of the community practising open defecation, there were always some households who defecated in the open which posed a risk of STH infection to the whole community.

7.3.3.3 *'Pre-sanitation' ladder*

As described in Section 3.1.2.2 of the literature review, there is an assumption that households, whose demand for improved sanitation has been triggered, will progress along what is called the 'sanitation ladder' to become ODF. However, this sanitation ladder only describes the various types of infrastructure and technology that a household might use to become ODF. Whilst collecting the data for Study 2, it became apparent that households did not just move from 'open defecation' to 'using a toilet and not open defecating'. Rather, there were a series of steps that came in between wanting to stop open defecation (whilst still defecating in the open) and reaching the first rung of the 'sanitation ladder'.

The Transtheoretical Model (described in Section 3.2.4) provides a framework for describing this process in the context of health seeking behaviour. The Model proposes that there are five stages of change: During **precontemplation**, someone will usually be unaware of the negative consequences of their behaviour and do not plan to change. In the **contemplation** stage, a person is usually aware of a problem with their behaviour and are thinking about changing it but have not yet committed to take action. In the **preparation** stage, a person has committed to taking action but has not yet done so. It is during the **action** stage that a person modifies their behaviour and during the **maintenance** stage they consolidate their new behaviour and prevent relapses (Prochaska et al. 1992).

The precontemplation, contemplation and preparation stages of the Transtheoretical Model can describe the steps that come between practicing open defecation and reaching the first rung of the 'sanitation ladder'. During the analysis of the findings of Study 2, 28 such steps were identified, forming what I call the 'pre-sanitation ladder' here. The steps are described in Appendix 7 – 'Pre-sanitation ladder' and include wanting to become ODF; making plans to become ODF; and preparations to make toilets.

At the time that conducted this research, I was unaware of any other attempt to conceptualise a sanitation intervention such as PAKSI using the Transtheoretical Model. However, in their description of the Rural Water Supply and Sanitation Project in Western Nepal (RWSSP-WN), Gerwel-Jensen, Rautanen and White (2015) depicted the stages of an approach that seems similar to CLTS. This depiction uses the language of the Transtheoretical Model to explain the shift from 'pre-contemplation' to 'use and maintenance' at the community level. The 'pre-sanitation' ladder I have presented here depicts the transitions that an individual might experience whilst participating in a sanitation intervention. To my knowledge, this has not been described elsewhere.

The steps of the 'pre-sanitation' ladder were arranged in an order corresponding to the Transtheoretical Model. That is, it was assumed that steps that were categorised as 'precontemplation' preceded steps that were categorised as 'contemplation' and in turn these preceded steps that were categorised as 'preparation'. Based on this order, the progression of participants in Study 2, that is whether they moved up or down the ladder, was also measured. The results showed that 86-percent of participants moved up the pre-sanitation ladder over the course of the study (between baseline and second follow-up).

Care should be taken with interpreting these findings. Firstly, the 'pre-sanitation ladder' is a description of the findings from Study 2 post data collection and the order of the behaviour change steps that it describes has not been verified with large groups of participants. Furthermore, I am not suggesting that progress on the pre-sanitation ladder should be the indicator by which the success of sanitation interventions is evaluated. The goal of 100-percent

open defecation free communities is key to bringing about changes in health and should therefore be the focus of monitoring and evaluation. However, in interventions where only a small proportion of participants become ODF, measuring progress on the pre-sanitation ladder might assist practitioners in understanding what it is about their intervention that does (and does not) work.

7.3.4 Sanitation behaviour change factors

Through analysing the changes in participants' knowledge, attitudes and practices in Study 2, some of the factors which influence participants to change their sanitation behaviour were identified. These have been categorised according to the behavioural factors identified in the RANAS (risk, attitudes, norms, abilities, and self-regulation) Model of Behaviour Change (see Section 3.2.4.1 in the literature review for more detail about the RANAS model) and summarised in Table 7-22 below. This summary only includes the factors for which statistically significant changes were detected.

As explained in Section 6.3.3 where the results of Study 1 were discussed, the main purpose of Study 2 was not to identify the factors which influenced the participants to change their sanitation behaviour. The factors that were identified in Study 2 are presented briefly here. Later, in the final discussion chapter, they will be analysed more thoroughly in relation to the RANAS Model together with the corresponding findings from Studies 1 and 3.

As was the case for Study 1, note that because the participants were not asked specifically about each of the factor groups, it possible that some of the gaps in the table should be shaded. Therefore, this table likely underrepresents the range of factors that are relevant.

Table 7-22 Behavioural factors identified in Study 2 categorised according to the RANAS model

			Study 2 KAP questionnaire
Behavioural Factor Groups	Risk	Factual Knowledge	*
		Perceived Vulnerability	
		Perceived Severity	
	Attitude	Instrumental Beliefs	
		Affective Beliefs	
	Norm	Descriptive Norm	
		Injunctive Norm	
		Personal Norm	
	Ability	Action Knowledge	
		Self-Efficacy (S-E)	
		Maintenance S-E	
		Recovery S-E	
	Self-Regulation	Action Planning	
		Action Control	
		Coping Planning	
		Remembering	
		Commitment	

* Dark grey indicates factors which participants identified themselves as being motivators for changing their sanitation behaviour. Light grey indicates factors which changed in correlation with improvements in sanitation behaviour but were not identified specifically by participants as motivators.

7.3.4.1 Risk factors

A person's understanding and awareness off the health risk.

Most of the indicators in Study 2 which pertained to changes in participants' knowledge about the link between faeces and health (a risk factor) did not change with statistical significance. The exception to this was a proportion of participants for whom increases in knowledge about the faecal-oral pathway were detected.

7.3.4.2 Attitude factors

A person's positive or negative stance towards a behaviour.

The proportion of participants who listed 'quality of place of defecation' as a reason for being satisfied with defecating in a toilet or dissatisfied with open defecation changed throughout the course of Study 2. This could be categorised as an 'affective belief' as well as any of the 'norms' factors.

7.3.4.3 Norm factors

The perceived social pressure towards a behaviour.

Participants who listed ‘external motivators’ for planning or building a toilet increased over the course of the study. ‘External motivators’ included being advised or supported to build a toilet by, for example, the government or an NGO. There was an increase in participants who said their satisfaction with their place of defecation was affected by a sense of what they should or should not do. These motivations could be categorised as any of the three ‘norm’ factors in the RANAS model.

7.3.4.4 Ability factors

A person’s confidence in her or his ability to practice a behaviour.

Across the course of the study there were substantial changes in participants’ knowledge of both how to build a toilet as well as where to procure materials to build a toilet. This is categorised in the RANAS model as ‘action knowledge’.

7.3.4.5 Self-regulation factors

A person’s attempts to plan and self-monitor a behaviour and to manage conflicting goals and distracting cues.

None of the factors categorised in the ‘self-regulation’ factor group of the RANAS model was identified as important for the participants in Study 2 with respect to their sanitation behaviour.

7.4 Conclusion

The purpose of Study 2 was to quantitatively measure the changes in household representatives’ WASH-related knowledge, attitudes, and practices since participating in the WaterAid WASH program. The findings presented here can only be generalised with caution. The randomisation process for selecting participants was compromised firstly because only sites from the WASH for Worms trial could be included and secondly due to the cancellation of the WaterAid intervention in two of the selected project sites for this research. (This has been described in more detail in section 7.1.5.1 of the methods and section 7.2.1 of the results.)

As described in the findings, the participants’ sanitation behaviour improved over the course of the study which was the goal of the PAKSI intervention implemented by WaterAid. Whilst Study 2 was not designed to measure causation, there were some findings about the participants’ changes (or lack therefore) in knowledge and attitudes that suggested factors which potentially influenced these improvements in participants’ sanitation behaviour. These factors should be measured more precisely in further research. This in turn could inform practitioners of the most effective interventions for bringing about open defecation free communities in contexts like the project sites.

For example, the participants’ knowledge of the connection between faeces and health increased in correlation with improvements in sanitation behaviour. This finding neither contradicts nor confirms the widely documented understanding that knowledge about the connection between faeces and health is not a primary motivator for improving sanitation behaviour (See Section 2.1.4.2 of the literature review). However, this finding does suggest that knowledge of the faecal-oral pathway *influences*, to some extent, participants’ improvement in sanitation behaviour. Perhaps, as Simpson-Hebert et al. (1997) suggest, knowledge of the health benefits of improving sanitation behaviour is a necessary but insufficient motivator for people to behave differently. This could be better understood by quantitative research which is designed to measure the way factors interrelate. It is unlikely that a person is motivated to change their behaviour because of

one single factor and understanding the combinations of different factors that are motivational will assist practitioners to deliver more targeted programs. For example, if understanding the connection between health and faeces was indeed a necessary factor for sanitation behaviour change (in combination with other factors such as feeling disgusted or being instructed about what to do), then this would justify the inclusion of educational activities in sanitation programs like PAKSI, even though this contradicts the CLTS approach to some extent.

Similarly, advising or instructing people to build toilets contradicts the CLTS approach; however, the findings in this study suggested that this might be a factor in people's decisions to start building and using toilets. Before advocating that future sanitation interventions should include an advisory or instructive (or mandatory compliance) component, further research should investigate whether this is indeed a causative factor. Furthermore, if it is a causative factor, such research should investigate whether this brings about short-term or sustainable improvements in sanitation behaviour.

The following chapter presents the findings from Study 3 which was a qualitative study focused specifically on the factors which influenced whether the participants became and continued to be open defecation free after participating in the WaterAid program.

8 Study 3 - Factors that influence whether households become and continue to be open defecation free in Timor-Leste

This third and final study is about the factors that influence whether households from the communities that participated in the WaterAid water, sanitation and hygiene (WASH) program and WASH for Worms program in Manufahi become and continue to be open defecation free (ODF). The specific objectives and research questions can be found in Chapter 4. Briefly, the objective of this study is:

- 1) To identify factors that influence whether households become and continue to be open defecation free after participating in the WaterAid WASH program.

The research questions are:

- 1) What are the factors that influence whether households become and continue to be open defecation free according to the stakeholders involved with the WaterAid WASH program in Manufahi Municipality? In particular:
 - Why do some households become and continue to be open defecation free?
 - Why do some households not become open defecation free?
 - Why do some households initially become open defecation free but later revert to open defecation?
- 2) How did households that might have faced additional barriers to becoming and continuing to be open defecation free because of being female-headed or having members who had a disability; chronic illness or age-related impairments experience and respond to the WaterAid program?

This chapter includes the methods, results and discussion for Study 3.

8.1 Methods

When considering an investigation of the factors that influence whether households become and continue to be ODF, I decided to adopt a qualitative approach. Much has been written about the factors that influence whether households become and continue to be ODF (see Section 3.3.3 of the literature review) but at the time this research took place there was not much focus on this in the context of Timor-Leste. A qualitative approach, partly guided by what had been discovered elsewhere in the world about factors that influence whether households become and continue to be ODF, allowed me to explore the range of possible factors freely.

The WASH for Worms team had collected quantitative data in the project sites for Study 3 about the WASH behaviour of community members (specifically where community members collected water; where they defecated; whether they had a toilet; and details about the features of the toilets). These quantitative data indicated that there were several households which did not cease open defecation and some where they temporarily used a toilet but then reverted to open defecation. The purpose of this third study was to better understand the motivations of these households' behaviour which were assumed to be complex and interlinking rather than a series of isolated factors. Thus, a qualitative research approach was chosen for its flexibility to engage with this complexity.

Finally, a qualitative approach was deemed most appropriate for investigating the WASH experience of households which include people with a disability (PWD) (including physical, intellectual or psycho-social disabilities); people who have a chronic illness; female-headed households; or people with age-related impairments. From here on I refer to this group

collectively as ‘potentially disadvantaged’ households; acknowledging that households which include people with these characteristics might (but will not necessarily) face more barriers to accessing safe WASH services than households which do not.³⁸

8.1.1 Data Collection Tools

Most of the data for this study was collected in late 2014 through semi-structured interviews. I conducted all the interviews, with the aid of a Tetun-English interpreter where necessary.

The interviews were structured around a question guide (see Appendix 8 – Study 3 Question Guide) which included questions about the participants’ perspectives on:

- what activities took place in the project sites as part of the WaterAid program;
- the successes and limitations of the programs;
- what had changed, if anything, within their households and community with respect to water, sanitation and hygiene because of the program;
- why they thought their household and community had made these changes; and
- how potentially disadvantaged households might have experienced the program

The first three sets of questions were included so that the participants were re-familiarised with the WASH program events that had taken place one or two years prior. The final two sets of questions listed here were the focus of the research questions in this study.

Ideally, all the data about the experience of potentially disadvantaged households would be gathered from the members of those households. However, all participants in this study were asked to give their perspective about this topic because it was envisaged that it might be difficult to include participants from potentially disadvantaged households.

The question guide was initially discussed at length with the interpreter to ensure that the translations from English to Tetun were accurate as well as appropriate to use with the participants. Following this step, the question guide was piloted with several household representatives and refined further.

All interviews were recorded with the participants’ permission and later transcribed. I also took notes throughout most of the interviews; and in households which had a toilet or several toilets, I asked if I could make observations.

8.1.2 Sampling Framework

To ensure a variety of perspectives were represented for triangulation purposes, it was important in this study to purposively select the participants according to their sanitation behaviour and whether they were potentially disadvantaged. They were also selected according to their role within the WASH program: for example, household representative, leader within the community, or implementing staff member.

Two communities where both the WaterAid and WASH for Worms programs had commenced at least 12 months prior were selected for inclusion in this study. It was necessary to only include communities where the programs had been in progress for at least 12 months because I was interested in why households might change their WASH behaviour both in the short-term as well as the medium-term.³⁹ The two communities (Community A and Community K) were

³⁸ See Section 3.3.3.3 in the literature review for a discussion of some of the literature about potentially disadvantaged households’ access to WASH.

³⁹ As explained in Section 1.4, this timeframe should not be interpreted as being able to measure the ‘sustainability’ of any changes related to water, sanitation and hygiene that took place. ‘Sustainability’ of WASH interventions would normally be measured after two or more years and

selected because they differed both in their accessibility as well as length of participation in the two programs.

The community chiefs; the chiefs of the *Grupo Maneja Facilidade* (GMF) (Water Management Group) from each community; and several household representatives were invited to be interviewed. Within each community, household representatives were selected for inclusion in the study based on 1) their potential disadvantage and 2) their sanitation performance prior to data collection for this study. See Table 8-1 below for the numbers and groups of household participants who were eligible to participate in the study. Again, participants were selected according to these characteristics to include as much diversity as possible.

Some households were eligible to participate based on their potential disadvantage (irrespective of their sanitation performance). The potential disadvantage of households was determined through data collected previously by WaterAid as well as WASH for Worms. The data from WaterAid and WASH for Worms included information about disability; chronic illness; age-related impairments; and female-headed-households.⁴⁰ As there was only a small number of households identified as potentially disadvantaged all were eligible to participate.

Sanitation performance (prior to the commencement of Study 3) was classified according to data from the WASH for Worms trial. As part of the trial, data were collected about toilet construction and use at baseline, and then every six months for the remainder of the trial. The data sets used to classify household sanitation performance in the two communities were:

- Community A – baseline and first follow-up (all available sets of data)
- Community K – first, second and third follow-ups (3 most recent sets of data)

The households in each community were classified into one of four ‘types’ of sanitation performance:

- **Always good** - had always reported defecating in a toilet
- **Improving** - had reported practicing open defecation at some point but the latest report was of defecating only in a toilet
- **Declining** - had reported defecating only in a toilet at some point but the latest report was of practicing open defecation
- **Always poor** - had always reported practicing open defecation⁴¹

The households in each of these four groups (that had not already been classified as eligible for participation due to their potential disadvantage or being the community or GMF chief) were randomly selected to be invited to be interviewed. Efforts were made to include an even (not proportional) representation of each of the four ‘types’ of sanitation performers from each of the two communities, based on their performance prior to data collection for this study. (Note that it was not possible to find all types of sanitation performers in both communities.)

only after the implementing agency had officially handed the project over to the community; neither community included in this study fulfilled both these criteria.

⁴⁰ I did not include other categories of potential-vulnerability such as extreme poverty because I did not have time to accurately measure these.

⁴¹ In all ‘types’ of sanitation performance, if there was no data for a household at a particular time (due to absence or refusal to participate) it was assumed that their performance was the same as the most recently collected data.

Table 8-1 Number of eligible participants for Study 3 from Communities A and K

Community	Households classified as potentially disadvantaged*	Household sanitation performance (according to prior records)**			
		Always 'good'	'Improving'	'Declining'	Always 'poor'
Community A	6	9	0	0	7
Community K	3	17	3	6	2

*Each of these participants was sought out for participation.

**Attempts were made to have an even (not proportional) representation of the four 'types' of sanitation performers from each community. The eligible participants were sought out (in a randomised order) to participate.

Finally, one representative each of the WaterAid field work team and the WASH for Worms field work team was invited to be part of the study.

Note that the data were not compared (for example according to sanitation performance) statistically because of the small sample sizes; the deliberate selection of diverse participants and communities was to maximise the inclusion of diverse perspectives. The number of participants was the maximum possible within the time and resources available. Given the small sample size, generalising the findings from this study beyond the project sites should be done with caution.

8.1.3 Recruitment of Participants

The data collection from community leaders and household representatives from the communities took place while WASH for Worms were also collecting data there. Given that the WaterAid and WASH for Worms had developed strong relationships with both communities already, the residents were not surprised by my presence there.

After being introduced to the community chief and explaining my purpose in the community I visited household representatives at their homes and invited them to participate in the study. I had established a list of participants to be invited (as explained in the Sampling Framework above) prior to arriving in the community and worked through the list until I had eight household participants from each community.

Participants' homes were identified by asking residents for directions. Usually one of the participants would accompany my interpreter and me to the next household. Once I had found the participant I was looking for, I briefly explained my purpose and what would take place during the interview. I would not begin asking questions until I had the participant's informed consent.

I invited staff representatives from WaterAid and WASH for Worms who had worked in Communities A and K to be interviewed; at a place and time that was convenient for them.

8.1.4 Analysis

The data for this study were analysed thematically (see Section 6.1.4 of Chapter Six for a description of thematic analysis). All interview transcripts were coded in NVivo according to the factors that the participants independently described as influencing their, or other people's, sanitation behaviour change. Before commencing coding, I was aware of some of the factors⁴²

⁴² Note that the RANAS model, which has been discussed in previous chapters, also refers to 'factors' which influence behaviour change. In Section 8.3.3 of this chapter, where the RANAS model is discussed directly, 'factors' refer to the motivators of behaviour change that are defined

influencing whether people become or continue to be ODF that have been identified in previous studies (see Section 3.3.3 of the literature review). However, the coding process was also inductive as I identified influencing factors as they appeared in the data. The final list of nodes which corresponded to the factors that participants independently described as influencing their sanitation behaviour is shown in Table 8-5 in the Results Section 8.2.2.2.

The transcripts were also coded according to the different types of potential disadvantage, such as physical impairments, female-headed-households or age-related impairments. All the participants' descriptions of the experience of potentially disadvantaged households were included in this analysis, regardless of whether they were from a potentially disadvantaged household.

A subset of the interview transcripts was coded by a second researcher to test for potential bias in my interpretation of the data. This subset was found to be similar (around 85-90-percent similarity).

8.1.5 Limitations

Aside from the general limitations described in Section 5.2 of the methods chapter, the following limitation pertains specifically to Study 3. The main data collection method used in this study—asking participants directly what they thought influenced the changes in their household's sanitation practices—assumes that people have a sense of what influences their behaviour. I acknowledge that this will probably not completely explain why they behave the way they (or others) do. For this reason, I sought to include many different perspectives in the sample of household representatives; as well as including the perspectives of the program staff.

8.2 Results

The results for Study 3 include a description of the participating communities; my observations of the community water supply system and the participating households' toilets; the participants' responses regarding the factors that influenced their sanitation behaviour; and the participants' responses regarding the experience of the WaterAid program by potentially disadvantaged households.

8.2.1 Description of the participating communities and households

The final sample included 21 participants who were connected to 2 different communities where the WaterAid and WASH for Worms programs had taken place. This included 3 community leaders, 16 household representatives and 2 project staff; 9 of whom were women and 12 were men.

by Mosler. In all other sections of this chapter, 'factors' refers to the barriers and enablers that were identified in the data from Study 3.

8.2.1.1 Communities A and K

Communities A and K are described in Table 8-2.

Table 8-2 Description of Study 3 project sites

	Community A	Community K
Community structure	Single <i>aldeia</i> made up of 2 <i>bairos</i> .	Single <i>aldeia</i> made up of 2 <i>bairos</i> .
# Houses or Households*	26 (14 + 12) houses and 36 households	42 households
Approx. distance from Same** town centre	45-min drive (mostly 4WD, only when dry) or 6-8-hour walk	30-min drive (2WD along mostly sealed road)
Institutions	Upstream <i>bairro</i> : Primary school and <i>Uma Lulik</i> (sacred house)	Upstream <i>bairro</i> : School
Geography	Steep and mountainous. Houses located along the road, some set back from the road. 2 <i>bairos</i> separated by 1km steep 4WD track.	The houses in both <i>bairos</i> were arranged along the road (separated by about 100m) as well as into the bush to the side of the road.
Date of meeting	May 2013	June 2012

*The number of houses does not always equal the number of households. This is because several households/families might live in one dwelling, or a single family might occupy several dwellings. Occasionally, houses are empty for long periods because the household move elsewhere for work or school.

**Same is the main town of Manufahi Municipality.

There was evidence that other organisations had worked previously in Community A. For example, in the upstream *bairro* there were some disused houses which had been built as part of a (since abandoned) Australian eco-tourism venture a few years prior. In the downstream *bairro* of Community A there was a coffee warehouse used for processing and storing coffee beans. The warehouse had been established by Cooperative Café Timor, a cooperative of organic coffee growers in Timor, and supported in 2011 by a Korean non-governmental organisation (NGO) or the Korean government (it was unclear which). The Korean organisation had supported the *bairro* residents by purchasing equipment for the warehouse; training local coffee growers and workers; and installing a gravity-fed water supply system (which was working at the time of data collection).

In Community A I observed the WaterAid program inception meeting which included PAKSI⁴³ activities: the Timor-Leste adaptation of Community-Led Total Sanitation (CLTS). See Section 6.2.4.1 of Chapter 6 for a description of these observations.

8.2.1.2 Community leaders

Both the *xefi aldeia* (village chief) and the *xefi* GMF (chief of the GMF) from Communities A and K were invited to participate in this study; however, I was unable to contact the chief of Community A. According to the residents, he lived quite far from the community.

All the community leaders who participated in this study were men. The chief of Community K lived on the very outskirts of the community. With respect to sanitation performance, his household was classified as 'Declining' although they were in the process of constructing a new

⁴³ *Planu Aksaun Komunitade Saneamentu no Ijiene* (Community Action Plan for Sanitation and Hygiene)

toilet. The GMF chiefs from both Communities A and K participated. Their households were both classified as 'Always good' in terms of sanitation performance. Neither of these participants' households were classified as potentially disadvantaged.

8.2.1.3 Household representatives

As described in Section 8.1.2 above, eligible households were sought out and invited to participate firstly based on whether they were female-headed, had people with disabilities or older people and secondly based on their sanitation performance. Once in the communities, I asked residents to help me find the people whose names were on my list. It was mostly straightforward to find the households that were female-headed or included older people. However, identifying and locating households with people with a disability was more complicated. For example, when I asked residents whether there were any people with disabilities in their community some, including the chief of Community K, said that there were none. Other residents helped me to find the households where people with disabilities lived so that I could invite them to participate but several times the information I received from the residents and from the WaterAid records was contradictory or incorrect. There were several households whom WaterAid had originally identified as having people with disabilities, older people or as being female headed whom I never located. However, some of the other households who I had included for participation based on their prior sanitation performance happened to have some of these characteristics. Despite the challenges of identifying and locating households with characteristics such as being female headed, having people with disabilities or older people, seven households with combinations of these characteristics at the time of data collection were included in the final sample.

In half of the household interviews in this study, the main respondent was a woman; in the other half the main respondent was a man. In some households, both the wife and husband participated in the interview but there was always one participant who did most of the talking and they were identified as the main respondent.

In Community K there were two female-headed-households. In one of the households, a single woman was living with her children, including several teenage sons. The other household had previously been two households: 1) a wife and husband and their children and 2) the husband's elderly parents; but were living together at the time of data collection. The parents had age-related impairments, and the father had issues with alcohol addiction according to the other family members present. The husband was in jail at the time of the interview, so the household was female headed in practice. Both female-headed-households were probably very poor as they had received a materials subsidy from the government to repair their houses which had been damaged in a recent natural disaster. Neither of these households had a toilet and both were open defecating.

A third household in Community K was an older couple whose children lived outside of the community for work and study. Although they were older and on their own, they seemed fit still and were in the process of constructing a 'permanent' toilet.

In Community A there were two older men with hearing difficulties (for one man this was only a mild impairment). Both were in the process of constructing a 'permanent' toilet. One, who had almost finished, said he had paid someone to build it. The other man had only dug a pit at the time of data collection. I interviewed these two men together with one of the community leaders (at their insistence) and although I had already had a conversation with them prior to the interview, the community leader asked me to just interview him because the older man would not be able to understand me. Nevertheless, I managed to ask the older man several questions toward the end of the interview.

A man who WaterAid had identified as having a foot impairment in Community A, turned out to have an arm impairment which hindered his mobility and he also said he had difficulty with his vision. He had a good quality, 'permanent' toilet.

There was one female-headed-household in Community A: several older women were living with their children. The woman we spoke to had difficulty speaking and understanding us so one of her children helped us to communicate. It is possible that this woman had a stroke previously. WaterAid had started to build their demonstration toilet here but it had never been completed.

It was difficult to ascertain to what extent representatives from the potentially disadvantaged households discussed here participated in the inception meetings in the two communities. I did not attend the meeting in Community K but in Community A there were older people present at the meeting and some of the older men spoke and participated in the activities. One man had an impairment which caused his back to be hunched over. He explained that this had prevented him from going to Korea for training with the NGO that had come to their community to support their coffee industry. He also said he was losing his memory now that he was older. It was unclear whether representatives from other potentially disadvantaged households were present.

I recorded each participating households' sanitation performance at the time of data collection for this study. Together with the data collected previously by the WASH for Worms team this enabled me to describe the *overall* sanitation performance of the participating households according to the same four types used during the sampling. The final selection did not have an equal representation of the four types of overall sanitation performance within each community for several reasons: 1) some households sanitation performance changed between the time of sampling and data collection 2) all households classified as potentially disadvantaged were included regardless of their sanitation performance and 3) some sanitation performance 'types' were not represented at all in the respective communities and so there was no one to invite for participation in those categories. Nevertheless, the final selection includes a substantial diversity of participants which is shown in Table 8-3 below.

Table 8-3 Numbers of household participants for Study 3 according to sanitation performance and observed indicators for potential disadvantage

Type of sanitation performance	# participants (# of these with observed indicators for potential disadvantage)		Observed indicators for potential disadvantage
	Community A	Community K	
Always 'good'	1 (0)	4 (0)	0
'Improving'	2 (1)	1 (0)	1 – physical impairment (arm mobility and vision)
'Declining'	1 (1)	3 (3)	1 – female-headed-household, 1 – female-headed-household, age-related-impairments, poor mental health, 1 –age-related impairments*, 1 – age-related impairments, physical impairment (hearing)*
Always 'poor'	4 (2)	0 (0)	1 - female-only-household, physical or intellectual impairment (difficulty speaking) 1 - age-related impairments, mild physical impairment (hearing)*

*Note that these households were well advanced in the construction of toilets so could almost have been classified as 'Improving'.

8.2.1.4 Implementing staff members

A representative of each of the WaterAid and WASH for Worms field work teams was interviewed for this study. One was a woman and one was a man.

8.2.2 Observations

Aside from interviews with participants from Communities A and K, the findings for this study also include observations of the **household toilets** of the participants (if they had them) and the **community water supply systems**.

8.2.2.1 Household toilets

Each of the household participants and community leaders I interviewed who had a toilet, agreed to let me observe and photograph their sanitation and hygiene facilities. The details of the toilet types, condition, use, hygiene features as well as the potential disadvantage of the households are summarised in Table 8-4 below.

Table 8-4 Observations of household toilets at the time of data collection

Household participants - Community A (Upstream)				
Toilet – type*	Toilet - Condition	Toilet - use	Hygiene features	Observed indicators for potential disadvantage *****
Simple pit	Broken, no superstructure	Not used		
Pour-flush (cement)	Under construction	Not used		
Pour-flush (cement)	Good	Used	Cement <i>tanki</i> with water and soap**	
Pour-flush (cement)	Under construction	Used	Cement <i>tanki</i> , no water	
Household participants - Community A (Downstream)				
Toilet - type	Toilet - Condition	Toilet - use	Hygiene features	Observed indicators for potential disadvantage *****
Pit only	Under construction	Not used		ARI, mild PI (hearing)
Pour-flush (porcelain sanplat)	Under construction	Not used	Cement <i>tanki</i> under construction	ARI, PI (hearing)
Pour-flush (porcelain sanplat)	Good	Used	Cement <i>tanki</i> with water	PI (arm mobility and vision)
Pour-flush (cement)	WaterAid demonstration toilet - unfinished, with no indication of intention to complete.	Not used	Shower next to house	FHH, Physical or Intellectual impairment (difficulty speaking)

Household participants - Community K				
Toilet - type	Toilet - Condition	Toilet - use	Hygiene features	Observed indicators for potential disadvantage *****
Simple pit	Broken	Not used		FHH, ARI, Poor mental health
Pour-flush (porcelain sanplat)	Good	Looks used	Cement <i>tanki</i> with water	
None	NA	NA		FHH
Simple pit ***	Good	Used****		
Simple pit	Broken	Used		
Simple pit	Excellent	Used****	Bucket of water and soap inside. Tippy-tap nearby.	
1. Pour flush (cement) 2. Simple pit	1. Under construction 2. Broken	1. Not used 2. Not used	Cement <i>tanki</i> under construction	ARI
Pour-flush (porcelain sanplat)	Good	Probably used	Cement <i>tanki</i> - unused. Shower under construction. Bucket and scrubbing brush next to toilet.	
Community Leaders				
Toilet - type	Toilet - Condition	Toilet - use	Hygiene features	Observed indicators for potential disadvantage *****
Pour-flush (cement)	Good	Used	Cement <i>tanki</i> with water	
Pour-flush (porcelain sanplat)	Under construction	Not used	Cement <i>tanki</i> under construction	
Hanging latrine (over stream)	OK	Used		

*Toilets were broadly categorised as Simple Pit latrines (direct pit) or Pour-flush latrines (off-set pit). These are described in more detail in Section 2.3 of the background chapter.

**A *tanki* is a tub, usually made of cement, in the washroom which stores water for bathing and cleaning clothes.

***This house also had two pits from previous toilets which had been filled and covered.

****This toilet also had a toilet cover which was in use at the time of observation.

*****FHH = Female-Headed-Household; ARI = Age-Related Impairments; PI = Physical Impairment

I observed one public toilet which was next to the coffee warehouse in the downstream *bairro* of Community A. This pour-flush toilet had a 'porcelain sanplat' with a bucket of water next to it. It was very clean and seemed quite new.

8.2.2.2 Community water supply systems

Whilst the focus of this study was on the sanitation components of the WaterAid program, I made some observations of the water supply systems in both communities.

During my first visit to Community A, I noticed that there were several water tanks between the upstream and downstream *bairros*. I gathered, during the conversations I had over the course of

the study with the WaterAid staff and residents, that some of the tanks were constructed during Indonesian times and at least one of the tanks was made with the support of the Korean organisation who had also helped to make the coffee warehouse. The tanks made during Indonesian times were no longer working (it seemed) but during each of my visits, there was a constant stream of water from the outlet pipe of the Korean-funded tank.

I saw several communal tap-stands in Community K, most of which had a fence to prevent animals from getting near the tap or onto the cement apron. The taps were either flowing when I saw them or had obviously been recently used which indicated that the system was working, at least during my visits.

When I arrived in Community K, the first thing I was shown was a pond which a household had constructed for breeding fish to sell. Apparently, there were several similar ponds in the community which had been made possible by the WaterAid water supply system.

8.2.3 The factors that influenced participants' sanitation behaviour

This section presents a summary of the factors raised by participants in the interviews when I asked them to describe the programs' activities and events; their opinions about the programs; and why they thought households might or might not build, maintain and use toilets. This summary does not include the participants' responses when I asked directly about their perceptions of the experience of households that were potentially disadvantaged, described in section 8.2.4 as these are not unprompted responses.

The data for this section was gathered by asking participants both why *their* household was or was not ODF as well as why they thought *other* households were or were not ODF. The results presented in Table 8-6 do not differentiate between whether a participant was referring to their own household or other households. Hence, these results should be interpreted as a possible range of factors influencing household ODF status in Communities A and K.

When participants mentioned a factor, they tended to also indicate the influence they thought that factor had on becoming and continuing to be ODF (the desired behaviour). This was either a motivator or a barrier:

- Motivator – where it is believed that the 'factor' leads to the 'desired behaviour'
- Barrier – where it is believed that the 'factor' leads to the opposite of the 'desired behaviour'.

As described in Table 8-4, the types of toilets households built and used to become ODF generally fell into one of two categories: 1) a 'simple pit' toilet, also referred to as a '*rai kuak*' or a 'basic' or 2) a 'pour-flush toilet', also known as a 'permanent' toilet, 'modern' toilet, 'piped' toilet or 'closet' toilet. Pour-flush toilets were usually partially or fully constructed from cement and porcelain. Occasionally participants would raise factors that explained why a household might have and use a 'permanent' toilet versus a 'basic' toilet ('Upgrading') rather than why they might have and use any toilet versus no toilet ('Acquisition'). Where possible, this is clarified in the presentation of results.

Table 8-5 below summarises the descriptions of the factors; whether the factors were generally expressed as motivators or barriers (or both); and the behaviour each factor influences; that is, 'acquisition' or 'upgrading' or 'participating in sanitation intervention activities'.

Table 8-5 Factors that participants in Study 3 described as influencing their sanitation behaviour change

Factor	Definition of factor	Motivator or barrier	Sanitation behaviour this factor affects
Aspirations	Having a 'permanent' toilet is associated with being 'modern'.	Motivator	Upgrading (and potentially Acquisition)
Being told what to do	When participants felt that they had been told, advised, instructed or forced to build toilets.	Motivator (and potentially Barrier)	Acquisition
Community conflict	Community conflict—either pre-existing or arising during the programs	Barrier	Maintaining any toilet
Do not value toilets (no specific reason)	Does not value or is not interested in constructing or making a toilet	Barrier	Acquisition or Upgrading
Effort is too much	The effort needed to construct a toilet, e.g. collecting sand, is too much.	Barrier	Acquisition or Upgrading
Female-headed-household	Households which are led by women (usually because there are no men, or the men are unable to lead).	Barrier	Acquisition (and participating in the inception meeting)
Financial cost is too much	The cost of purchasing cement (and possibly also sand) to construct a 'permanent' toilet is too high. This might be in comparison to other household expenses or because the household is extremely poor.	Barrier	Upgrading (and potentially Acquisition)
Financial cost - competing priorities	The cost of a toilet is too much compared to other expenses such as school fees (subset of the factor 'financial cost').	Barrier	Upgrading (and potentially Acquisition)
Financial cost - poverty	Household income is extremely low, so any financial expense is a barrier (subset of the factor 'financial cost').	Barrier	Upgrading (and potentially Acquisition)
Lack of community leadership	Leadership in the community is weak or absent.	Barrier	Attending the inception meeting, Acquisition or Upgrading
Lack of knowledge	Not knowing how to build a toilet	Barrier	Acquisition
Laziness	Household members are too lazy to build a toilet	Barrier	Acquisition
Living close to the road	Household is located close to the road	Motivator	Acquisition or Upgrading
Monitoring	When behaviour change such as toilet construction, maintenance or ODF status is monitored by an NGO, government or community leaders etc.	Motivator	Acquisition, Upgrading or Maintaining
Natural disasters (or similar external shock)	Disasters including extreme weather events, landslides, fire etc. which act as a set-back to being able to build or maintain toilets	Barrier	Acquisition or Upgrading
Non-durability of 'basic' toilets	'Basic' toilets break easily in the rain and wind.	Barrier (to rebuild 'basic' toilet) or Motivator (to build 'permanent' toilet)	Acquisition or Upgrading

Factor	Definition of factor	Motivator or barrier	Sanitation behaviour this factor affects
Perceived incentive of water supply	Perception that the community will receive a new water supply system only once household toilets are constructed (regardless of whether this is true).	Motivator	Acquisition
Prefer 'permanent' toilet	Likes or prefers 'permanent' toilets to 'basic' toilets—may or may not provide reason.	Motivator (to build 'permanent' toilet) or Barrier (to build 'basic toilet')	Acquisition or Upgrading
Pressure from children	Children who have become accustomed to 'permanent' toilets whilst boarding in town put pressure on their parents in the community to also have 'permanent' toilets.	Motivator	Upgrading (and potentially Acquisition)
Sense of obligation	A feeling that toilets 'should' be constructed—not necessarily for a particular reason.	Motivator	Acquisition
Sharing toilets	Household is using another household's toilet	Barrier	Acquisition or upgrading
Subsidy - expected	When subsidies are expected or anticipated—that is, the participant believes they will receive a subsidy.	Motivator and Barrier	Acquisition or Upgrading
Subsidy - fulfilled	Where a subsidy in the form of materials or cash is provided.	Motivator and Barrier	Acquisition or Upgrading
Time to build is too much	The time needed to construct a toilet is too much, particularly when compared with other necessary tasks.	Barrier	Acquisition or Upgrading
Toilets perceived as good for health	Value having a toilet over open defecating for health benefits.	Motivator	Acquisition or Upgrading

Table 8-6 **Error! Reference source not found.** below summarises the number of participants who mentioned each factor as well as what kind of influence they thought the factors had on whether households became or continued to be ODF. These factors are organised into the RANAS Model 'factor groups': Risk Factors; Attitude Factors; Norm Factors; Ability Factors; and Self-Regulation Factors.

Table 8-6 Number of participants in Study 3 who mentioned various factors.

RANAS factor group (# of times factors in this group were mentioned)	Factor Dark Grey = motivators Light Grey = both motivator and barrier White = barriers	Number of participants who mentioned the factor as a 'motivator' or 'barrier'
	TOTAL:	104
Risk Factors (5)	Toilets perceived as good for health	5
Attitude Factors (43)	Financial cost - competing priorities	8
	Prefer 'permanent' toilet	7
	Perceived incentive of water supply	6
	Time to build is too much	6
	Effort is too much	4
	Subsidy - fulfilled	4
	Do not value toilets (no specific reason)	3
	Subsidy - expected	3
	Living close to the road	1
	Being told what to do	13
Norm Factors (20)	Sense of obligation	2
	Aspirations	1
	Lack of community leadership	1
	Lack of knowledge	1
	Pressure from children	1
	Sharing toilets	1
	Financial cost is too much	15
Ability Factors (32)	Non-durability of 'basic' toilets	5
	Financial cost -poverty	4
	Female-headed-household	3
	Natural disasters (external shock)	2
	Laziness	1
	Monitoring	1
	Community conflict	1
Self-regulation Factors (1)		

8.2.3.1 Household representatives

About half of the household representatives referred to a variety of ways of **being told what to do** as a motivating factor for building (any type of) toilets. For example, several participants said that WaterAid had come to 'advise us' (S3-03) or 'tell us' (S3-05) to build toilets.

Three participants referred to the government or the law as motivators for building a toilet: for example, 'the government came to teach us [to make toilets] already, so we had to'. (S3-08) One participant explained that they built a toilet 'because it's...it's led by the government, it's legal. Like it's all under the government, so we want to use toilets.' (S3-09) One participant explained that:

'you can't go to the bush and just defecate in the bush. It's according to the law [...] I don't know which law, but it's according to the government. We are just uneducated people, so we just follow the law. [...] We don't know how to choose which [law] is good and which one is not good. But it's run by the government, so we have to agree with it.' (S3-17)

Two participants, one from each community, mentioned that WaterAid had **monitored** their community's sanitation performance but they did not indicate whether they believed this was a factor influencing whether households became or continued to be ODF.

Several of the household participants raised the issue of **subsidies**. Some referred to the **expectation of subsidies**; that is, they believed they would get a subsidy. One reported that they had started building a 'permanent' toilet 'because the government will provide [materials] for the toilet'. (S3-09)

The **fulfillment of subsidies** was reported to be a motivator for one participant. Even though they were not under the impression that they would receive a materials subsidy they nevertheless said they would upgrade their 'basic' toilet to a 'permanent' one if there was any support for materials in the future. (S3-05)

One participant seemed to be motivated by a **sense of obligation** and said that they had built a toilet 'because we already got water from the government so now we need to eat and drink cleanly. [...] we cannot just throw our shit there, everywhere.' (S3-08)

The **financial cost** of materials was raised as a barrier to constructing a 'permanent' toilet by many of the household representatives. (No one raised financial cost as a barrier to constructing a 'basic' toilet.) Two of these participants explained that for some people, the barrier was not just that the materials were expensive but that their households were **poor** or 'underprivileged'. (S3-15 and S3-20) About half of those who mentioned financial cost also talked about the barrier of **competing priorities for household finances** which were either paying for their children's studies or building their houses.

Several participants said that they **valued toilets for their health benefits** either outright or in comparison to defecating in the open. A couple of participants gave more detail about how toilets interrupted the faecal-oral pathway by keeping flies away from their faeces: 'if we defecate in the bush, then the flies will step on it and will come inside and touch the food we eat. Then we get sick.' (S3-17)

One participant also mentioned that it was easier to wash their hands after defecating in a toilet, presumably because water can be stored there. Another participant said that aside from the health benefits, they also valued having a toilet for ensuring that visitors would be comfortable in their home.

Two household participants said that perhaps some people did not finish constructing their toilets because they simply were not interested or **did not value having a toilet** (without explaining why this might be).

Several participants reported that the *rai kuak* or **'basic' toilets were not very durable** and would break easily in the rain. This was a barrier for people to re-build their 'basic' toilets because they would just 'break again'. (S3-02) For those who could afford it, this was a motivator to build 'permanent' toilets but if they could not afford it, they risked reverting to open defecation. One participant added that the 'basic' toilets did not last long because the pits filled up too quickly: 'we use *rai kuak* toilets and when they get full, we cover them and dig another one, just the same.' (S3-15) They were hoping to get enough materials together for a 'permanent' toilet to avoid this problem.

Other participants reported that some people **preferred 'permanent' toilets** for reasons other than the non-durability of 'basic' toilets. For example, it is easier to make a concrete tub to hold water for washing after defecating in a 'permanent' toilet than in a 'basic' toilet.

The participants from two of the **female-headed households** in this study, explained that being from a female-headed household was a barrier to becoming ODF. One woman did not have a household toilet and when I asked her whether she planned to get one, she said that 'I don't

have anything. And also, [...] we're all just women. There are no men in this house.' (S3-04) Her house was being renovated at the time of the interview and when I asked, she said the work was being done by her 'household', indicating the teenage boys sitting nearby. In another female-headed-household, where the WaterAid demonstration toilet had been started, the interviewee said that there were no men to help finish it. She explained that 'we already told the men, but they said that they have no time to help us make a toilet [...] even if we pay them, they don't want to.' (S3-16)

The **perceived incentive of a new water supply system** was a motivating factor mentioned by some of the participants. One explained that 'after the toilet is ready, then they'll connect the water.' (S3-08) Another said that they were building their toilet 'because the government will provide water'. (S3-09)

Knowledge about how to build a toilet was raised by two household participants. One participant explained that part of the reason some people did not build toilets was because 'they don't understand how to make toilets' and that others who did make a toilet 'knew how to make a toilet.' (S3-02) They said that for their own household they were slowly learning how to make a toilet. The other household reported that the problem for households who did not build toilets was not a lack of knowledge; rather it was a lack of money. (S3-03)

The **time** needed to construct a toilet was a barrier for a couple of household participants because they had 'a lot of work to do, many things to do, so [they] didn't have time to build a toilet.' (S3-05)

About half of the household participants reflected on the **effort** it took to construct toilets. Half of these felt that the effort required was minimal, that is, building a toilet was 'not so difficult'. (S3-08) For the others the effort of collecting bamboo or sand which were often 'too far away' (S3-17) or digging into 'land that is full of stone' (S3-09) was a barrier for constructing a toilet.

One participant said that a reason for some households not building a toilet could be that they are **lazy**. (S3-08) This was said only about *other* people's households; not the participant's own.

One participant mentioned that those who **live close to the road** might be more likely to build a toilet because they have better access to cement and also because 'they know how to make a toilet', implying those who live close to the road have greater knowledge. (S3-02)

Two of the household representatives explained that they had experienced hardship due to **natural disasters** where wind and rain had severely damaged their houses. They had both received assistance from social security in the form of materials to rebuild their houses and this was their focus; thus, delaying the construction of toilets.

In Community A, one household participant explained that some people who do not have a household toilet of their own **share** others'.

8.2.3.2 Community Leaders

Both community leaders referred to **being told what to do** as a factor for becoming ODF. One leader said that 'WaterAid came to force us to build our toilets.' (S3-12) A leader from the other community explained that 'the NGO had told them to make [toilets]' and that in turn, 'as the one who leads this [community] I will always remind them to make their toilets'. (S3-11)

A **sense of obligation** was raised as a factor by the GMF representative in Community K. He said that they 'must make' toilets. When asked to elaborate on this, he said 'because if they don't, the street will be dirty.' (S3-06)

Aspirations was mentioned as a factor influencing sanitation behaviour by the GMF representative from Community A:

[WaterAid] told us to make toilets, and some people here, they don't want to use [a 'basic' toilet], because now they have modern lives, so they want a permanent [toilet].’ (S3-12)

Whilst he went on to say that everyone in his community had at least a ‘basic’ toilet (apart from one household which had a ‘permanent’ toilet), he reiterated that everyone wanted a ‘permanent’ toilet.

The same participant was also the only one to raise the factor of **pressure from children** which is likely linked to the **aspirations** factor. He explained that the children who attend high school must board in the nearby town (because the nearest high school to Community A is a day’s walk away). When they come home to their parents, they want to have ‘the good toilets’ which are presumably what they are accustomed to in town.

Leaders from both communities mentioned the **fulfillment of subsidies** as a potential motivator to build toilets. The GMF representative from Community A felt that ‘WaterAid came to force us to build our toilets, but some of [the residents] don’t have money to buy cement and sand, so [someone should] just send cement and sand to us, so that we can build our toilets.’ (S3-12) The chief of Community K said that he hoped that an NGO could ‘maybe help them make another modern toilet’ even though he was already in the process of making one. (S3-11)

All three community leaders talked about the **financial cost** of cement and sand being a barrier to constructing a ‘permanent’ latrine. The two leaders from Community K both had ‘permanent’ toilets and made their comments about financial cost in reference to other people. The leader from Community A only had a ‘basic’ toilet and was referring to his own household’s financial situation as being a barrier to acquiring a ‘permanent’ toilet. All three leaders mentioned that building a house was a **competing priority for finances** in many households; one leader added that having ‘parties’, likely for weddings and funerals, was also a competing priority.

Valuing a toilet for health benefits was only raised as a factor by one of the community leaders. The chief of Community K explained that he had originally thought to make a ‘basic’ toilet but decided that a ‘permanent’ toilet would be better for their health.

All three of the community leaders mentioned the general **preference for a ‘permanent’ toilet**. Some of the reasons for this were that ‘permanent’ toilets were perceived to be healthier and more comfortable because they did not smell (like ‘basic’ toilets).

The **new water supply system** was not raised explicitly as an incentivising factor by the community leaders in this study; however, one leader from Community K explained that the water supply and toilets were connected issues: ‘if there are toilets, then they have water. Because toilets and water, they are [...] connected together.’ (S3-11)

The amount of **time** needed to participate in the program, including to build toilets was mentioned by all three leaders from Community K and Community A. The GMF representative from Community A explained that ‘some [residents] didn’t participate [in the CAP meeting⁴⁴] because they were busy, or some of them went to their farms or coffee plantations.’ (S3-12) The other leaders agreed that some residents just ‘don’t have enough time to make’ toilets.

None of the leaders referred to **effort** as a barrier; conversely one, the leader from Community K, said that making a toilet is ‘easy’.

⁴⁴ As described in the background chapter, in rural areas, water supply systems are constructed and managed by communities at the village level through a process called *Planu Aksaun Komunidade* (Community Action Planning). Most of the research participants referred to this by the English acronym: CAP.

8.2.3.3 Program implementing staff

Both the staff representatives spoke about **being told what to do** as a potential factor for households becoming and continuing to be ODF. The WaterAid staff representative made it very clear that within ‘this program, [WaterAid] cannot force people to build their toilets. So through [giving] information, we explain; then the community will understand.’ (S3-21)

The staff representative from WASH for Worms described WaterAid as ‘saying that the villagers should build their own latrines’ during the discussions in the inception meetings. (S3-22) However, whether this was a barrier or motivator (or indeed inconsequential) to households constructing their own latrines depended on ‘the character of the people’. (S3-22) In Community K toilet construction was very slow to start with. According to the WASH for Worms representative, this could be because the residents there ‘are very hard people to organise [because] they are kind of like clandestine people, so they are supporting more independence, so they [...] don’t want to be under pressure’. Conversely, in Community A people readily built toilets and ‘think it’s important to have latrines’ which the WASH for Worms representative thought was perhaps because the ‘Korean company [working there previously] also convinced them to have latrines.’ (S3-22)

Community conflict was raised as a potential factor by the WaterAid staff representative. She explained that the upstream and downstream *bairos* in Community K have a ‘problem with each other, so they don’t have the initiative to build [their toilets] again’ after their existing toilets fill up or break. (S3-21) The WaterAid staff representative thought that the conflict had existed prior to the WaterAid intervention. The WASH for Worms staff representative identified a conflict between the two *bairos* in Community A which he thought might be due to the unequal supply of water. However, he did not think this influenced the residents’ sanitation behaviour.

The WaterAid staff representative was very aware that most residents in the communities where WaterAid work, including Community K and Community A, had an **expectation of subsidies** for toilet construction:

‘Some of the community think that programs that are implemented by NGOs have a lot of funds [...] so they think that they will get paid by NGOs. [...] Some communities think that all NGOs are the same [but] some give money, some don’t.’ (S3-21)

She did not comment on whether this was a factor influencing participants’ sanitation behaviour. Instead, she explained that as a facilitator, she put a lot of effort into ensuring participants understood the WaterAid policy of not providing subsidies:

‘I explain the WaterAid criteria so [communities] can understand. [...] If they agree, then we implement our program in their village, but if they don’t agree then we don’t.’ (S3-21)

The WASH for Worms staff representative also spoke about the expectation of subsidies in reference to Community K, where the residents had been slow to become ODF at the start of the WaterAid program. Initially, he said the community had

‘expected that WaterAid would support them in building their latrines, [for example] giving materials, but [...] I don’t think they really understood the discussion during the CAP meeting [where WaterAid said] that the villagers should build their own latrine by themselves.’ (S3-22)

He explained that later, when the community realised they would not be getting a subsidy, they became less motivated to build their toilets.

The WaterAid staff representative felt that the lack of **fulfillment of subsidies** was not a barrier to becoming ODF because ‘most of the people, they [still] build toilets [after] getting the explanation from the staff about the criteria [of no subsidy].’ (S3-21) Furthermore, she cited examples of projects where subsidies had been provided but had not resulted in positive sanitation outcomes: ‘some used the materials, some didn’t’. (S3-21) In general, she felt that whether subsidies enabled households to become ODF depended on the community, but warned that:

‘If they always get subsidies, then they just depend on what they are given, they just depend on the government. But if they build their own [toilet], then they will take care of it, and it’s their own.’ (S3-21)

The **financial cost** of the materials was alluded to by the WaterAid staff representative as a barrier to constructing toilets: ‘Some people didn’t build a toilet because they needed materials, and some people don’t need materials [to build a toilet]’. (S3-21)

The WaterAid staff representative referred to **the perceived health benefits of toilets** as a motivating factor. She explained that ‘through the information [the program provides], the community will understand [and] build their toilets, to prevent disease’, and thus become ODF. (S3-21)

She also referred to community members **not valuing toilets**. Sometimes people ‘just aren’t interested’ which acts as a barrier for both building a toilet (and becoming ODF) or maintaining a toilet (and continuing to be ODF). (S3-21)

Both the WaterAid and WASH for Worms staff representatives identified the **perceived incentive of a new water supply system** as a motivator for people to construct toilets. The WaterAid staff representative explained that ‘sometimes communities understand the importance of building a toilet but sometimes they just see it as a way to get water.’ (S3-21) The WASH for Worms staff representative also thought that the residents built toilets ‘just to fulfil the criteria to get water’ (which is ‘80-percent [of the households] building toilets’).⁴⁵ (S3-22)

The **time** needed to build toilets was acknowledged by the WaterAid staff representative to be a barrier for some people to build their toilet because ‘some [people] are busy with their work’. (S3-21)

⁴⁵ The ‘criteria’ referenced here is for the WASH for Worms trial: there needed to be 80-percent household toilet coverage in a community for it to be categorised as an ‘intervention village’ in the randomised-control-trial. The WASH for Worms representative suggests here that residents have the impression that they will only receive the new water supply once there is 80-percent household toilet coverage in their village. In informal correspondence, senior WaterAid staff said that receiving a new water supply was not conditional on sanitation behaviour and that this was not a message that implementing staff would have given to participants in their programs.

8.2.4 The experience of the WaterAid program by potentially disadvantaged households

This section describes the way in which participants explained how they thought potentially disadvantaged households experienced the WaterAid WASH program, regardless of whether they were from such households. The characteristics of potentially disadvantaged households that were identified by the participants (regardless of whether their households had such characteristics) included:

- Age-related impairments
- Female-headed or female-only households
- Incarceration
- Addiction to alcohol or other drugs
- Mental illness
- Physical impairments

The results present the participants' descriptions of the possible experience of the WaterAid program by households with these characteristics. Note that comments expressed by people who had one or more of the characteristics of potential disadvantage listed above are attributed specifically in the text to those people. All other findings presented here were expressed by people who did not identify as having any of these characteristics.

8.2.4.1 Household representatives

When I asked participants about what they thought the sanitation experience of people with disabilities was, their responses were almost always limited to discussions of people with **physical disabilities** such as vision or mobility impairments. Several participants denied that there were people with disabilities in their communities although some of them changed their minds later in the interviews.

A few participants, none of whom I had identified as being from households with people with disabilities, said they were unsure about whether it was difficult for people with disabilities to make a toilet. Two participants did not comment on whether it was difficult but were adamant that:

‘they should make it even if it is [difficult]—they have to make their own toilet’
or at least a *fabi luban*.⁴⁶ (S3-20)

The remainder of the participants who were asked about this felt that it was either difficult or impossible for people with disabilities to make a toilet without assistance. Several said that if the person had children then the children should assist in making a toilet and others thought that any relatives should help. One participant from Community K felt that it was up to community leaders such as the community chief to help people with disabilities acquire a toilet. A few other participants agreed that others should help people with disabilities but were not specific about who.

Two participants explained that people with disabilities were themselves responsible for ensuring they could access a toilet. One man said that he was willing to help people with disabilities to construct a toilet but that ‘they have to tell’ people about it and ‘if they don’t tell anyone, then no

⁴⁶ A *fabi luban* is a pig cage which some households in Timor-Leste defecate into to both dispose of faeces as well as feed their pigs.

one knows their problem.’ (S3-17) Another man (who had impaired mobility and vision) who had a recently constructed toilet said that whether people with disabilities were assisted:

‘depended on his or her behaviour. If it’s good behaviour, then the people will like to help them. But if it’s bad behaviour, then people don’t want to help. [...] I have good behaviour, so the people came to help me.’ (S3-15)

Two household participants talked about the difficulty for people with disabilities in using a toilet. They both explained that if someone had mobility issues then they would need to defecate inside their homes and be reliant on other household members to dispose of their waste. One suggested that if the household toilet was inside the house, this would be easier for people with mobility impairments. When I asked a couple of the participants about whether they thought heavily pregnant women would have difficulty using a toilet they said this would not be a problem at all.

A few participants talked about whether the newly installed WaterAid taps were easy for people with physical impairments to use but only one reported that it was difficult, and this was for a woman who was blind and could not leave her house. No one reported that the taps were particularly difficult for older people to use, although one person remarked that it was difficult for older people to walk to the spring to wash when there were queues at the taps.

About two-thirds of the household participants explained how they thought that **older people** might experience the WaterAid program. Many of these participants were, themselves, older people. None of the older people felt that the WaterAid inception meeting had been difficult to understand. One older man, who had difficulties hearing, said that rather than participate, he ‘just listened [which was] fine for me as an old man’. (S3-14)

When I asked about whether making a toilet was difficult or easy for older people, most of the household participants said that it would be difficult, if not impossible. This was especially thought to be the case if the older people lived on their own, that is, without their children or grandchildren who would often move to attend schools outside of the community. Others said it might be difficult for older people because the labour required to construct a toilet was too much and one said it was because they might not understand how to build a toilet.

A few participants said that if an older person could not build their toilet on their own they were not certain that others would assist and they would have to resort to open defecation; using a *fahi luban* (pig-pen); or persist in building their own toilet slowly and with difficulty. However, several other participants felt that older people would be helped—either by relatives or non-relatives. One participant from Community A was adamant that others would assist because:

‘in their community here, we are united, yeah? So, we will help each other. For those people who [...] don’t have the strength to make a toilet by herself or himself [there is] no need to pay. [...] I will help them make a house or a toilet.’ (S3-15)

In Community A, one of the participants who was older and had difficulty hearing showed me the ‘permanent’ toilet that was being constructed behind his house and explained that he had paid someone to build it. (S3-14)

The experience of **female-headed-households** was something nearly every household participant had a perspective on. All these participants felt that it would be difficult for a female-headed-household to make a toilet apart from one who said it would ‘depend on the household’. Several people said that it would be especially difficult if the woman leading the household was on her own:

‘for some widows, the children are away at school, and some have families [of their own], so she is alone. So, nobody will [...] make a toilet for her.’ (S3-18)

Of the three female-headed-households that were participants in this study, none had a toilet. In Community K, one of these households had no younger family members around to build a toilet and there were other issues of poverty and house damage due to a natural disaster which made it especially difficult to make a toilet. This household did not think that anyone else in the community would assist them. The other female-headed-household in Community K initially said that making a toilet would be difficult for her because she was on her own (even though she had several children including teenagers), but later in the interview said she planned to make one and did not need any help.

The female-headed-household in Community A consisted only of a few older women and girls and it seemed that one of the older women might have had a stroke in the past as her responses were slow and her speech was slurred. She explained that building a toilet would be difficult for them. However, she showed me the shower room they had outside the house as well as the remains of the demonstration toilet squat plate and drain which WaterAid staff had constructed on their property during the inception meeting. She explained she had offered to pay some men to help her household to make a toilet, but they had all refused saying they had too much other work. In another interview, with one of this woman's relatives, the participant said that he planned to encourage her household to move closer to his so that they could share a water tap and he would also make them a toilet.

The remainder of the participants gave a wide range of responses regarding whether and how female-headed-households should receive assistance to make toilets. One person said that if a woman had the materials to make a toilet, then her male relatives would help her because they would be able to 'use the materials together'. (S3-20) Several participants explained that female-headed-households could offer to pay others to help them if they had money; one participant adding that they should have money because widows receive social security in Timor-Leste. However, another participant said that widows would not receive government money specifically for building a toilet. Whilst a few participants said that others in the community would help female-headed-households (without mentioning an exchange of money or materials), others said that although they would like to help, they have too much other work to do. One participant doubted that anyone aside from a woman's relatives or children would be willing to help.

8.2.4.2 Community Leaders

Only the leaders from Community K had anything specific to say about the experience of the programs by people with **physical disabilities**. The representative of the GMF emphasised the importance of relatives and family, saying that all people with disabilities lived with their families and their relatives would help them to make as well as use their toilets. He added that the new water supply system was accessible by everyone including people with disabilities and older people. When I asked the chief of Community K, he explained that there were people in his community with vision and hearing impairments and that they had access to toilets which their children helped them to use. He also explained that 'some NGOs give us support [and] then we work together to make [toilets]' for people with disabilities. (S3-11)

When I asked about the experience of **older people** the GMF representative from Community K explained that even though it was more challenging for older people to build a toilet, they could still do it. The chief of Community K said that the children of older people would help them to construct toilets.

The leader from Community A did not have anything to say directly about the experience of people with physical disabilities or older people except that they had been able to participate in the program inception meeting. However, during the interview he advised us to speak to him rather than the two older men who were sitting nearby because they 'didn't understand' (even though we had already started a conversation with them). (S3-12) He was the only participant to

refer to people with **intellectual disabilities** and when I asked about participation in the inception meeting, he said that:

‘Some people, they have...mental...yeah? Like, mental. They can talk, but some can’t...so they just keep quiet.’ (S3-12)

Again, only the leaders from Community K shared their perspective about the experience of **female-headed-households**. The GMF representative said that there were ‘no houses that have only women [in my community]. But even if there was a household with just women, they should make a toilet themselves.’ (S3-06) Whilst he felt that a female-headed-household would not be able to make a ‘good’ (‘permanent’) toilet, it would not be difficult for them to make a ‘simple’ toilet. The chief of Community K felt that it would be difficult for a female-headed-household to build their own toilet and again suggested that an NGO such as WaterAid could assist.

8.2.4.3 Program implementing staff

The program implementing staff both spoke about the experience of **people with disabilities** (without specifying which type of disability). The WaterAid staff representative focused on how difficult it was to include people with disabilities in the program activities. She explained that in Community A they had identified two or three families with people with disabilities—one with a 15-year-old child who was housebound and defecated inside—during the pre-inception visits and had invited them specially to attend the inception meeting. However, they did not attend and she thought this might be because they were embarrassed about being in public. When they had tried to enlist the help of the community chief to include these families in the program activities it had seemed that he was unsure how to also. She added that it had been easier in other communities to include people with disabilities.

Whilst the WaterAid staff representative felt that it was especially difficult for people with disabilities to make a toilet, she explained that the WaterAid policy is not to help anyone with materials or subsidies. However, they do provide help with advice for people who need specific design features to enable them to use a toilet or water tap. During the inception meeting activities that I observed in Community A, the demonstration toilet was deliberately constructed at the female-headed household from this study.

During the interview with the WaterAid staff representative, another staff member overheard our discussion about the inclusion of people with disabilities. It seemed that she was new to the municipality office of WaterAid and her role was to assist the organisation in its new policy to mainstream inclusion within their programs globally. She explained that ‘our program has the global standard for mainstreaming the inclusion of people with disabilities’. She went on to say that the policy was still in draft form and being adapted to the Timor-Leste context. They would be conducting training about equity and inclusion with all staff members in the coming weeks. She also pointed out that the municipality office employed a few staff members who had disabilities and that they had recently constructed a ramp for wheelchair users to access the office.

The WASH for Worms staff representative agreed that building a toilet would be difficult for people with a disability: ‘It’s already difficult [for people without a disability] to build a latrine. How can people with a disability do it?’ (S3-22) He was dubious about whether others in the community would help them to build toilets: ‘They need to do it for themselves before they help other people. So, I...I have no idea.’ (S3-22) However, he did think that **older people** would be assisted by others in the community: ‘if they—the old people—really want help to get a latrine, then if they ask, people will obey’ and they will help for free. (S3-22) Similarly, he thought that **female-headed-households** would be assisted by their relatives to build toilets and get food.

8.3 Discussion

This section discusses the possible factors influencing whether households in remote communities of Manufahi, such as Communities A and K, become or continue to be ODF. The factors identified by the participants as well as by me are discussed and categorised according to the RANAS (risk, attitudes, norms, abilities, and self-regulation) Model of Behaviour Change.

8.3.1 Factors influencing whether households become and continue to be open defecation free

In their review of the literature which discusses the factors which influence sustainable access to water, sanitation and hygiene services, Hulland et al. (2015) found that 27 of the 33 articles included in their review that the costs of establishing and maintaining sanitation (and water and hygiene) hardware was of high importance to users. In many cases, they found that psychosocial factors were meaningless if the cost of such hardware was too high. Several other studies have also found that financial cost is a significant factor influencing people's decisions to build and maintain toilets (see Sara and Graham (2014); Whaley and Webster (2011); O'Connell and Devine (2015); and Odagiri et al. (2017)). It was unsurprising therefore, that the factor mentioned by the greatest number of participants was the **financial cost** of building a toilet. Closely linked to this factor is **competing priorities for household income**; almost everyone who mentioned cost also talked about the other expenses they needed to spend money on such as school fees.⁴⁷ Therefore, it is not an absolute dearth of resources which is the barrier for most households in these communities; although some households are extremely poor. Similarly, when participants said that the **time to build toilets is too much** the barrier was not that they had no time; rather that there were competing priorities for their time such as work.

Whether financial cost is truly a barrier to becoming ODF is closely linked with factors such as the **preference for a 'permanent' toilet, valuing a toilet for health benefits** and the **non-durability of 'basic' toilets**. Making a 'basic' toilet costs nothing financially so theoretically financial cost should not be a barrier to becoming ODF. However, 'basic' toilets are not durable and need regular repair or replacement which left households frustrated and the feeling that the only reasonable alternative was to make 'permanent' toilets.⁴⁸ This meant that in practice, financial cost was not only a barrier to having a 'permanent' toilet, but also to becoming ODF. This barrier to sustainable ODF communities is noted by Tyndale-Biscoe et al. (2013) in their desktop review of ODF sustainability studies.

The **preference for a 'permanent' toilet** was also one of the most-mentioned factors in this study. It is a complex factor in that it was a motivator for both becoming and continuing to be ODF but was potentially also a barrier. On one hand, the features of 'permanent' toilets such as comfort, less smell, modern style and 'built-in' water storage facilities⁴⁹ might have motivated

⁴⁷ An important consideration in the discussion of 'competing priorities' is that this factor refers to the perspective of *those who decide how money is spent* and may not represent the entire household. Others in the household may prioritise acquiring and maintaining a toilet, and they may have influence on others, but the final decision is ultimately made by those who control the household finances.

⁴⁸ The question of whether 'basic' toilets can be considered a means to becoming ODF even when they are functional and replaced when needed is discussed below.

⁴⁹ Some participants mentioned that a 'permanent' toilet is preferable because it has a *tanki* (a concrete tub built into the floor to store water for body and handwashing). Such a tub could technically also be installed in a 'basic' toilet, but is probably not considered practical because

participants to go directly from open defecation to using a ‘permanent’ toilet (this was not measured in this study). For others, the desirability of ‘permanent’ toilets motivated people to upgrade from ‘basic’ toilets.

However, if the financial cost of a ‘permanent’ toilet is a barrier for someone, then their preference for a ‘permanent’ toilet might prevent them from becoming ODF, or at least delaying doing so. This is because they might feel that unless they can have their preferred model of toilet, they will not make a basic toilet first. This research did not measure this; however, this question could be answered in a study where participants are presented with the option of a basic toilet or several ‘permanent’ models at different price ranges.

Another factor raised by participants was that of **valuing toilets for health benefits**. Several of the participants who said they valued toilets for their health benefit did not have even a ‘basic’ toilet. This suggests that factors do not operate in isolation; rather they operate in combination with other factors. For example, it may be that for some people the health benefits of toilets are a lesser priority than other expenses such as school fees in a context where finances are low. This factor is mentioned in several studies and literature reviews of the barriers and enablers to ODF communities (see Hulland et al. (2015); Sara and Graham (2014); Mosler et al. (2018)) However, in none of these studies does it seem to be a major factor, and in the desktop review by Tyndale-Biscoe et al. (2013) health outcomes were not mentioned as either a barrier or an enabler for sustaining ODF status. Similarly, health was only mentioned by a small proportion of the participants in Study 3.

One participant mentioned that a **‘basic’ toilet would not be effective in preventing disease** so he would rather have a ‘permanent’ toilet. My observations of the ‘basic’ toilets in both communities aligned with this view: only two toilets had a cover in use, and several had unsealed pits meaning that they did not contain faeces safely and technically did not qualify their users for ODF status. This has implications both for the findings of the WASH for Worms trial as well as the goals of the WaterAid program as both seek to improve health outcomes through interrupting the faecal-oral-pathway effectively. Given that the WASH for Worms trial did not detect any differences in health outcomes related to the containment of faeces between their control and intervention communities one explanation may be that building and using a ‘basic’ toilet did not actually contain faeces in practice in these communities.

Being told what to do was the second-most mentioned factor, and the most-mentioned motivator, by participants. This corroborates the findings from Study 1 which suggested that there was an instructive quality to the WaterAid intervention and there were several moments in the inception meeting in Community A where it seemed that the residents needed to be cajoled into participating. The WaterAid representative I interviewed summarised the role of WaterAid as being one of ‘explaining’ so that the community would understand. This aligns with the perceptions of the residents but contrasts with her colleague’s opening lines during the inception meeting which were almost direct quotes from the CLTS handbooks. This suggests that there might be some tension between how the implementing staff feel they should conduct their intervention (especially in front of their managers) and what they do in practice.

The importance placed by participants on the law and the authority of the government (or those who they perceived to be the government) was apparent not only in their descriptions of what motivated them to build toilets but also in the discussion about the water supply system during the inception meeting (described as part of Study 1 in Chapter Six). Furthermore, the community leaders referenced the importance of their own authority for motivating others when they explained that they would tell their residents to build toilets if they had not already done so. This

‘basic’ toilets are not constructed with concrete and are known to be less durable (and therefore not worthy of the time, effort and materials required to make the tub).

type of factor is part of a group of factors O’Connell and Devine (2015) call ‘sanctions and enforcement’. In their study of rural sanitation programs in Tanzania, Indonesia and India, they found that in communities where there were rules against OD or pressure was placed on community members to become ODF, the rates of latrine ownership and use increased (O’Connell and Devine 2015).

Whilst being told what to do and respecting authority seem to be important motivating factors for behaviour change, there were some findings which suggested this was not always the case. Residents from Community A explained that even though WaterAid had asked them to cover the pipes for the new water supply system, they had decided not to because it was a ‘waste of time’ given that the system did not function properly. Furthermore, the WASH for Worms representative spoke about the initial difficulty in convincing the residents of Community K to build toilets because many of them had been part of the clandestine movement and were therefore suspicious of anyone trying to tell them what to do. This suggests that the effectiveness of ‘being told what to do’ is mitigated by other factors such as whether community members have respect and trust in whoever is delivering such messages.

Although WaterAid opened their inception meeting with a declaration that they would not be providing materials for toilet construction, there still seemed to be an **expectation for subsidies** among several participants. This might be because there is a long history of NGOs providing basic infrastructure and services to remote communities in Timor-Leste. (See Section 2.2.4 of the background chapter for a discussion about this.) Out of the households who said they had started constructing their toilets because they expected to receive a subsidy, one had completed their toilet using their own finances and the other two were still waiting for materials (including one who had reverted to open defecation). This suggests that the expectation of subsidies can be an initial motivator and might lead some (but not all) people to become ODF even if the expectation is not fulfilled. The findings from this study did not suggest clearly whether subsidies—expected or fulfilled—in this context were a motivator or a barrier to becoming and continuing to be ODF.

Although none of the participants said this explicitly, the unfulfillment of an expected subsidy might be a barrier for some households to finish their toilets. This could be for practical reasons; that is, they believe they cannot become ODF because they were not provided with the materials to do so or it could be due to feeling frustrated with not receiving subsidies in a context where this is common practice.

The influence of **fulfilled subsidies** on sanitation behaviour was also complex. Whilst several participants said a subsidy would mean they could upgrade their toilets, the only household in Community A to receive a subsidy had not completed the toilet and was still open defecating at the time of data collection.⁵⁰ The WaterAid representative suggested that fulfilled subsidies have little impact on whether households build toilets initially but for those who do construct a toilet that is subsidised, the subsidy can decrease their sense of ownership of the toilet which can negatively impact sustainability. (This is discussed by Tyndale-Biscoe et al. (2013) in their review of the barriers and enablers to ODF sustainability.) Her perspective is based on experience from programs in several sites (including Communities A and K) and was likely also informed by the general discouragement of hardware subsidies by CLTS proponents. (See Section 3.1.4.1 of the literature review for a discussion about subsidies.)

In the time since data collection for this research took place, WaterAid has piloted the use of ‘smart subsidies’ in Liquiça and Manufahi Municipalities. In communities that have already been

⁵⁰ There were clearly factors other than subsidies determining whether this household became ODF. I suspect that being female-headed and unable to recruit help to finish the construction was preventing them from taking advantage of the materials donated by WaterAid.

declared ODF, vouchers to help purchase a lightweight plastic pan called a 'SaTo Pan' is offered to households that are potentially disadvantaged (WaterAid 2017). This partial subsidy pilot was deemed a success and is now being trialled in other parts of the country.

It is unclear to what extent the **leadership** in Communities A and K influenced whether residents became and continued to be ODF. Certainly during the inception meeting in Community A, the participants noted the importance of having a leader to remind them of their commitment to build a toilet. However, it seemed both from the WASH for Worms representative's descriptions and my observations that the chiefs of both communities were not very involved with their communities. Hanchett et al. (2011) found that a lack of leadership impacted negatively on the long-term sustainability of ODF status in rural Bangladesh (but did not comment on whether this impacted households' initial decision to become ODF). The residents in Study 3 did not mention their chiefs' lack of involvement; although, if it had been an issue for them, they might not have been comfortable sharing this with me anyway.

The GMF representatives from Communities A and K both seemed to feel that their role was a big responsibility and one of them was concerned that he was not being paid for this work. This may not have any direct impact on households becoming ODF in the first year or two after the formation of the GMF. However, if the GMF are influential in ensuring the sustainability of the new WASH infrastructure and behaviour change, their dissatisfaction with their role might eventually be a barrier to maintaining ODF status. The chief of Community K also suggested that the responsibility of maintain a community's access to safe WASH might be beyond the means of the community on its own. For example, he suggested that households who have extra difficulty acquiring a toilet should get support from 'an NGO' rather than others in the community (including leaders).

The participant who felt that a **lack of knowledge** about how to build toilets was a barrier also said that people who **lived close to the road** (another factor) could build toilets because they knew how to. This participant was the only one to mention these two factors and she linked them. Perhaps those who live closer to the road can access education more easily which means they might more easily grasp how to build a toilet. Hulland et al. (2015) and Mosler et al. (2018) found that knowledge of how to construct and maintain a toilet as well as the confidence to be able to do this (self-efficacy) were factors influencing whether people built and maintained toilets. It is possible that those who have better educations also have higher incomes and can afford or are given priority to live close to the road. Living closer to a road also means having easier access to materials, which is not something this participant mentioned but may be a relevant factor.

As described in the results, some of the household participants as well as one of the community leaders **perceived the new water supply as an incentive** to construct toilets. It is difficult to ascertain to what extent this (incorrect) perception is based on messages given by the implementing staff from WaterAid and WASH for Worms. Based on the WASH for Worms representative's responses, it seems that he had an incorrect understanding of the connection between the water supply system and toilet construction and this may have been communicated to the residents of communities in the trial. However, the WaterAid staff representative explained that it was not only in communities where the WASH for Worms trial had taken place that participants in the WaterAid program perceived that the new water supply system was conditional on toilet construction. Perhaps this is because some of the WaterAid implementing staff are inadvertently conveying this message. Alternatively, it could be because presenting an attractive 'gift' together with a request to perform a potentially undesirable task, means that participants interpret a connection between the two.

8.3.2 The experience of the WaterAid program by potentially disadvantaged households

The findings from this study suggest that female-headed-households find it particularly challenging to become ODF. All three of the female-headed-households in this study were open-defecating at the time of data collection, with no indication that they would have access to toilets soon. Furthermore, each of the female-headed-household representatives independently explained that their inability to build a toilet was due to their being women with no men to help them. This contrasts with the older people and people with disabilities in the sample who did not say these characteristics were an issue until I asked directly (and were all using toilets or well on the way to having 'permanent' toilets).

Most participants felt that whilst people with disabilities or age-related impairments would face extra difficulties in acquiring a toilet, they would be assisted by their relatives or others in the community. One man described this as being due to the 'unity' of the community and the WASH for Worms representative added that older people are highly respected in Timor-Leste which meant others would help them.

The finding in this study that female-headed-households experienced this as a barrier to becoming ODF, contrasts with the findings of Hanchett et al. (2011) in their study of rural communities in Bangladesh. There, it was found that female-headed-households were more likely to own or at least share a latrine than male-headed-households. The authors suggested this was because of the requirement that Muslim and Hindu women adhere to *purdah* which means they need to urinate, defecate and manage menstrual hygiene in private. Whilst privacy was important for the women (and the men) in Study 3, there was no mention of a religious requirement such as *purdah* which could have acted as an enabler for owning a toilet.

Although most of the participants thought that others would assist female-headed-households to build toilets, this was not the experience of the female-headed-households in this study. Some participants said they would like to help women who were on their own but did not have time. Perhaps the reluctance to help female-headed-households is connected to the overall lower status of women which was acknowledged by the WASH for Worms representative. This was also evident in the inception meeting in Community A where the percentage of participants who were women was never higher than one-third and those who were present rarely spoke. Furthermore, whilst the demonstration toilet was constructed at the home of the female-headed-household in Community A, there were some potentially negative remarks made about the household members being 'spinsters' by those constructing the toilet.

The findings suggest that the main avenue for seeking assistance in constructing a toilet was through family relationships. This is perhaps compounded because in remote communities such as these where government services are minimal, there are no other avenues for assistance than the social network. Even so, as the WASH for Worms representative pointed out, the social network is unreliable because when most people are struggling to maintain ODF behaviour themselves, it is difficult to expect them to help others.

It seemed that the people in this study with physical impairments had better sanitation performance than expected as they were all in the process of making 'permanent' toilets. However, I suspect this does not reflect the full range of experiences of those with physical impairments in the community and certainly does not reflect the experience of those with intellectual disabilities. Some of the participants with physical impairments said they received assistance from others, but one explained that this depended on him 'behaving well'. This suggests that there is a power imbalance between those with and without disabilities and that there might be other people with disabilities who are not assisted.

The GMF chief from Community A requested that we speak directly to him rather than the interviewee who had a hearing impairment, directly after I had a coherent conversation with the interviewee. This suggests that even when people with disabilities are present, there seems to be an expectation that they will not be able to participate.

It is reassuring that at the time of data collection WaterAid were focusing on making their programs more inclusive of people with disabilities. This study suggests that there may also need to be extra work done to ensure that female-headed-households are not left behind in programs such as the WaterAid program.

Due to the small sample size and the focus on the experience of potentially disadvantaged households in this study, it was important to specifically include participants from potentially disadvantaged households. The final sample had representatives from potentially disadvantaged households with sanitation performances ranging from 'Always poor' to 'Improving'. Even so, it is possible that the participants from potentially disadvantaged households in this study do not represent the *most* disadvantaged households in either of the communities due to the difficulties with recruiting such participants.

To begin with, the list of potentially disadvantaged households provided by WaterAid had some inconsistencies: both because some of the listed households did not report having any potential vulnerabilities when I spoke to them (or to other community members when I was looking for them) and because during the data collection I was able to identify potentially disadvantaged households which were not already on the list. This may be due to misclassification on the behalf of WaterAid; however, through discussions with WaterAid staff as well as my own experience in trying to locate potentially disadvantaged households there seems to be other underlying factors.

One possible factor is the shame surrounding potentially disadvantaged households, in particular those with people with a disability. In general, community members were happy to help me locate the households of older people or female-only-households but locating households with people with disability was more difficult. In both communities there were community members, and one community chief, who reported that there were no people with disabilities in their communities even though there clearly was. (Note that I asked specifically about people with vision, hearing or mobility impairments to ensure that the word 'disability' was not just being miscommunicated.) It is possible that they preferred to keep outsiders away from community members with a disability to protect those people or because of the shame around disability.

Although there were representatives from potentially disadvantaged households in this study, given the difficulties with locating and inviting such participants, it is probable that those who did participate were more autonomous and socially included than their peers. It is likely that I did not have contact with the most disadvantaged households and therefore their experiences are not represented in this study. The inclusion of the most disadvantaged members of a community is challenging even for an organisation such as WaterAid with a long-term presence. Therefore, it is unsurprising that a short-term study such as this one was not able to capture the full range of perspectives of potentially disadvantaged households. Hence, the findings here likely underrepresent the challenges that households with potentially disadvantaged people face in becoming and continuing to be open defecation free.

8.3.3 Sanitation behaviour change factors

As in the previous two studies of this research, the factors identified in this study are categorised here according to the RANAS (risk, attitudes, norms, abilities, and self-regulation) Model of Behaviour Change (see Section 3.2.4.1 in the literature review for more detail about the RANAS model) and summarised in Table 8-7 below.

Table 8-7 Behavioural factors identified in Study 3 categorised according to the RANAS model

			Study 3 interviews
Behavioural Factor Groups	Risk	Factual Knowledge	
		Perceived Vulnerability	
		Perceived Severity	
	Attitude	Instrumental Beliefs	
		Affective Beliefs	
	Norm	Descriptive Norm	
		Injunctive Norm	
		Personal Norm	
	Ability	Action Knowledge	
		Self-Efficacy (S-E)	
		Maintenance S-E	
		Recovery S-E	
	Self-Regulation	Action Planning	
		Action Control	
		Coping Planning	
		Remembering	
		Commitment	

8.3.3.1 Risk factors

A person's understanding and awareness of the health risk.

Some of the participants in Study 3 mentioned that they improved their sanitation behaviour for health reasons. This is categorised as a 'health knowledge' factor in the RANAS model.

8.3.3.2 Attitude factors

A person's positive or negative stance towards a behaviour.

Several factors raised by participants in Study 3 are categorised as 'attitude factors' in the RANAS model. 'Instrumental beliefs' include:

- Believing that building or maintaining a toilet was too much effort or cost too much
- Believing that there was no point in making a simple toilet because it would break anyway
- Believing that the construction of the new water supply was contingent on improving sanitation behaviour
- Believing that there would be subsidies for toilets

Factors that were categorised as 'affective beliefs' in Study 3 were:

- Believing that improving sanitation was a sign of being modern or developing

8.3.3.3 Norm factors

The perceived social pressure towards a behaviour.

Believing that improving sanitation was a sign of being modern could also be categorised as a ‘descriptive norm’ if this belief arises from an awareness of others’ behaviour. It could also be categorised as a ‘personal norm’.

‘Injunctive norms’ which were identified in Study 3 included participants saying they improved their sanitation behaviour because they had been ‘told’ to do so or because their children had pressured them to do so. Some participants mentioned that regular monitoring (which can be categorised as an ‘injunctive norm’) was a motivator for improving sanitation behaviour. Others felt that a lack of leadership in their community meant that people were demotivated to improve their sanitation behaviour.

8.3.3.4 Ability factors

A person’s confidence in her or his ability to practice a behaviour.

Some of the participants from female-headed-households mentioned that the lack of men in their households meant they felt unable to build a toilet. Participants from other households also mentioned that female-headed-households would find it challenging to improve their sanitation behaviour without men to help them build toilets.

Participants’ ‘confidence in performance’ in terms of improving their sanitation behaviour was affected by the perceived amount of effort and cost of building toilets; how close households lived to a main road (presumably for the transportation of materials); and receiving subsidies.

The factors that participants raised in Study 3 which related to their ‘confidence in continuation’ (of good sanitation behaviours) included the regular monitoring of sanitation behaviour by, for example, the government; and the durability of their toilets.

Several participants mentioned that the regular threat of natural disasters such as landslides were likely to affect their ‘confidence in recovering’.

8.3.3.5 Self-regulation factors

A person’s attempts to plan and self-monitor a behaviour and to manage conflicting goals and distracting cues.

The only factors raised by participants in Study 3 which may have related to ‘action planning’ and ‘action control’ were regular monitoring (as a motivator) and a lack of community leadership (as a barrier). Monitoring is also related to ‘remembering’ to do positive sanitation behaviours: for example, maintaining toilets.

Several factors raised by participants related to ‘coping planning’, including:

- the durability of household toilets;
- the availability of subsidies;
- the financial cost and effort to maintain, repair or rebuild toilets;
- the risk of natural disasters such as landslides; and,
- being a female-headed-household.

None of the participants in Study 3 mentioned factors relating to ‘commitment’ to improve their sanitation behaviour.

8.4 Conclusion

Study 3 set out to identify factors that influence whether households become and continue to be open defecation free after participating in the WaterAid WASH program in Manufahi, Timor-Leste. The factors identified in this study are broadly consistent with what has been documented about barriers and enablers to ODF in the literature.

A large proportion of the factors mentioned by participants in Study 3 are categorised in the **‘Attitude Factors’** group of the RANAS Model. This includes the perceived cost (financial and time) of establishing and maintaining sanitation infrastructure (an ‘instrumental belief’) as well as the perceived incentive of the water supply system. Feelings of disgust or embarrassment, which are also part of the ‘Attitude Factors’ group of the RANAS model (categorised as ‘affective beliefs’) were not mentioned by any of the participants as might be expected from an intervention that is based on CLTS. However, as established in Study 1, the sanitation component of the WaterAid program diverged from the essential elements of CLTS and PAKSI which might explain some of these findings about the outcomes that were relevant for participants in Study 3.

Many of the participants also mentioned factors from the **‘Ability Factors’** group of the RANAS Model. This included factors such as not being able to pay the costs of a toilet relative to competing priorities such as school fees, inability to build durable toilets, experiencing shocks such as natural disasters and coming from female-headed-households where there seemed to be a belief that women could not build toilets on their own. Again, the essential elements of CLTS and PAKSI are not intended to affect these ‘ability factors’; however, given that the intervention that took place in the project sites was not strictly CLTS or PAKSI, these findings are not surprising.

Factors from the **‘Norm Factors’** group are important in both CLTS and PAKSI as well as for the participants in this study. However, the individual factors for each are different. CLTS and PAKSI intend to affect participants’ ‘personal norms’; however, the factors raised by the participants were categorised as ‘injunctive norms’: for example, ‘being told what to do’.

The global literature about factors influencing ODF suggests that factors categorised in the **‘Risk Factors’** group, such as knowing the connection between health and faeces, are less important and this was consistent with the findings from Study 3 and what would normally be expected in a CLTS or PAKSI intervention. Factors from the **‘Self-regulation Factors’** group were also not mentioned by many of the participants.

Study 3 was a qualitative study intended to explore the potential factors influencing ODF in the project sites. Further research should include quantitative studies which measure these factors across larger samples of the population in Timor-Leste, and over longer time-frames, to identify what is important for supporting rural communities to be ODF sustainably. Such research should also measure the interrelation of the factors: for example, whether financial barriers become less important in communities where there is higher social pressure or sanctions for OD.

Study 3 also set out to better understand the experiences of potentially disadvantaged people in the context of the WaterAid program. This was firstly because such experiences are often not captured by WASH research that does not specifically seek the perspectives of these groups of people. Secondly, it has been documented globally that being disadvantaged (for example because of having an impairment, being chronically unwell, being extremely poor, or being a female-only household) is often a barrier to becoming and continuing to be ODF. Such experiences had not yet been documented in the context of sanitation interventions in Timor-Leste, so it was important to address this in this research.

Unfortunately, the sample sizes for this part of Study 3 were smaller than expected due to challenges with recruiting participants. Coming from a household where there is a person with a disability or age-related impairments, or where the household is female-only or extremely poor seemed to be a barrier to ODF status in this study. However, the findings likely underestimated how much these factors were a barrier because I did not recruit the most vulnerable households. Further research, conducted in partnership with local organisations that work directly with groups such as people with a disability, female-only households, and older people, is needed in the context of Timor-Leste. In particular, research that better understands the experiences of female-only households is needed because this study suggested that they might be the most vulnerable and least likely to be assisted by others to become ODF.

9 Discussion

This chapter draws on the findings from Studies 1, 2 and 3 (presented in Chapters 6, 7 and 8 respectively) to address the two main purposes of this research. That is, firstly, to complement the epidemiological findings of the WASH for Worms trial and, secondly, to explore the outcomes of the WaterAid water, sanitation and hygiene (WASH) program and how these came about. This chapter will also describe some of the recommendations for WASH practitioners and researchers.

9.1 The ‘WASH for Worms’ trial

The ‘WASH for Worms’ cluster-randomised control trial (RCT), described in the introduction chapter, set out to determine the effectiveness of the WaterAid community-based WASH program on reducing the rates of infection with soil-transmitted-helminths (STHs) (above the effects of mass albendazole treatment). Prior to the trial, some evidence suggested that poor access to WASH is a risk factor for STH infection and that behaviours such as handwashing after defecation, the use of soap and wearing of shoes are protective against STH infection (Ziegelbauer et al. 2012, Strunz et al. 2014, Tomczyk et al. 2014). The WASH for Worms trial, which included 18 villages in Manufahi Municipality found that overall STH prevalence was 69-percent (95-percent confidence interval 67-71-percent) (Campbell et al. 2016). Half of these villages underwent the WaterAid WASH program and in the following 2 years, all 18 villages received de-worming treatment every 6-months.

The trial found few statistically significant associations between WASH indicators and STH infection (Campbell et al. 2016, Campbell et al. 2017, Vaz Nery et al. 2019). Similarly, no statistically significant associations were found between WASH indicators and faecal markers of environmental enteropathy (inflammation and hyperpermeability of the small intestine which is thought to contribute to malnutrition) (Vaz Nery et al. 2018). Nery et al. (2019) suggested that the lack of association between WASH and STH indicators detected in the trial was possibly because of the greater effects of the 6-monthly de-worming treatment which took place during the 2 years following the WASH intervention.

The WASH for Worms team conducted a further analysis using a mathematical model called WORMSIM which included data from previous models such as ONCHOSIM, SCHISTOSIM and LYMFASIM as well as the WASH for Worms trial (Bakker et al. 2018). This analysis calculated the associations between WASH and STH infection indicators in the short-term (when the effects of de-worming treatment were likely to be present) and the long-term (when the effects of de-worming treatment were likely to be absent). No observable association was found in the short-term; however, the analysis suggested that there was an association between WASH indicators and reduced STH infection in the long-term (Bakker et al. 2018). This suggests that further study of the association between WASH and STH infection beyond the effects of de-worming treatment is worthwhile (Bakker et al. 2018).

The findings of this research about the outcomes of the WaterAid WASH program suggest additional explanations for the lack of association between WASH indicators and STH infection in the WASH for Worms trial. Studies 2 and 3 showed that in at least four of the intervention villages, 100-percent open defecation free (ODF) status was not achieved. (The lack of intervention fidelity shown in Study 1 and the barriers to becoming and continuing to be ODF identified in Study 3 partially suggests why this might have been the case.) Given that STH and schistosome eggs and larva persist in the environment for long periods of time (Arfaa 1984, Brooker et al. 2004), even a small number of households practicing open defecation potentially puts all members of a village at risk of infection.

The improvement in health experienced by people who participate in sanitation interventions has been found to be associated with that individual's sanitation behaviour as well as the sanitation behaviour of their neighbours. (This is discussed in Section 3.3.1 of the literature review.) The WASH for Worms trial found no association between an individual's STH infection and their sanitation behaviour. However, it did not measure the association between an individual's STH infection and the sanitation behaviour of their neighbours. Further research could investigate the question: What proportion of households in a village need to have improved sanitation for individuals to be protected against STH infection? The same question could be asked about access to safe water or combinations of access to safe water and improved sanitation. Furthermore, 'individuals' could be categorised as those who practise safe access to WASH themselves and those who do not. These variables could potentially be controlled for in a cluster randomised control trial with a sufficiently large sample size and several study arms defined by the level of access to WASH at community and individual levels. However, for such an RCT to be meaningful, there are many other factors which are potentially associated with STH infection that would need to be controlled for. The WASH for Worms trial considered some of these in their analyses.

The WASH for Worms trial included some analysis of environmental factors. A separate observational analysis of the WASH for Worms baseline data was conducted to assess risk factors for infections with two STHs: *Necator americanus* and *Ascaris* (by calculating adjusted risk ratios) (Campbell et al. 2017). This found that several environmental factors were associated (with statistical significance) with infestation rates of these two STHs. For example, increased precipitation; the presence of sandy-loam soil around the house; and increasing normalised difference vegetation index (NDVI) were all risk factors for *N. americanus* infection. The environmental variables that were statistically significant factors for infection with *Ascaris* were increased elevation (risk); increased NDVI (risk) and alkaline soil (protective) (Campbell et al. 2017).

These findings suggest some of the factors which future designers of research and interventions could consider in their work. The findings from Study 1 showed that the WaterAid program did not include specific messages about wearing shoes outside which could be protective activities against STH infection in environments with sandy-loam soils. Furthermore, the relationship between exposure to animals and STH infection should be further investigated in the context of WASH programs. Study 2 revealed that most participants knew that animal faeces could potentially be harmful to health but in each of the villages in this research, animals such as pigs, chickens and dogs roamed freely. Study 1 showed that the WaterAid intervention did not include explicit messaging about reducing contact between animals and people. Perhaps the effects of good access to WASH on reducing STH infection are undetectable in contexts where there is regular contact between animals, soil and people. Further research could ask what the rate of STH infection is in individuals from villages where: 1) access to WASH is poor and there is high contact between animals and people, 2) access to WASH is poor but there is minimal contact between animals and people, and 3) access to WASH is good but there is high contact between animals and people. Like improvements to WASH, the reduction of contact between animals and humans could be brought about through behaviour change interventions.

9.2 Outcomes of the WaterAid water, sanitation and hygiene program

The findings from this research suggest that the WaterAid program led a substantial proportion of households to become ODF within nine months or less. However, some households never became ODF and some reverted to open defecation meaning that, at least in the project sites in this study, no communities became 100-percent ODF. This finding helps to explain why there were not more significant differences found in the health impacts measured by the WASH for

Worms trial. This demonstrates the importance of measuring the ‘outcomes’ of an intervention as well as the ‘impacts’ as described in The Generic Model of a Program (see Section 3.2.1 for more detail about this model). The other two conceptual frameworks underpinning this research—the Dynamic Responses Model and the RANAS Model—provide ways to understand how and why the WaterAid program in Timor-Leste brought about the outcomes described above and other changes in community members’ knowledge, attitudes and practices regarding WASH.

9.2.1 Analysis of sanitation behaviour change factors according to the RANAS model of behaviour change

The RANAS (risk, attitudes, norms, abilities, and self-regulation) Model of Behaviour Change categorises 17 behavioural factors (organised in five groups) which are thought to be important in affecting behaviour change (see Section 3.2.4.1 in the literature review). According to the model’s creators, Contzen and Mosler (2015), two conditions must be met for behaviour change to take place as a result of an intervention:

- 1) the intervention needs to effectively activate or influence a particular behaviour change factor(s); and
- 2) that particular behaviour change factor(s) needs to be a relevant motivator for the individuals whose behaviour it is intended will change.

According to the Community-Led Total Sanitation (CLTS) and PAKSI⁵¹ manuals, and several CLTS supporters and implementers in Timor-Leste, the key behaviour change factor that is relevant in CLTS-based approaches is the feeling of disgust or shame about open defecation and the idea of ingesting human faeces. Kar referred to feelings of ‘self-respect’ and pride in his interview. Pride is a self-conscious emotion which is described in opposition to shame by Lewis (2000). (See Section 3.1.4.3 in the literature review.) This is categorised in the RANAS model as an ‘**affective appraisal**’ behaviour factor within the ‘**attitude factor**’ group. There is an assumption that 1) CLTS-based approaches, when facilitated properly, activate feelings of disgust or shame; and that 2) people are universally disgusted by human faeces and therefore these feelings will motivate them to become ODF. The findings from studies 1, 2 and 3 suggest that although community members changed their sanitation behaviour, their feelings of disgust and shame about open defecation did not seem to be primary motivators. This can be better understood by examining the two conditions for behaviour change that are described in the RANAS model.

Community members’ feelings of disgust and shame about open defecation did not change significantly in Study 2. This suggests that the WaterAid program did not influence community members’ feelings of disgust and shame about open defecation and, therefore, that the first condition of the RANAS model was not met. This also shows that, in the project sites for this research at least, that the WaterAid implementation of PAKSI did not eventuate in the way PAKSI is described in its manuals. (The PAKSI manual for Triggering states that the participants should ‘develop some embarrassment and disgust about open defecation’ (Government of Timor-Leste 2012 p11).

In Study 1, the Dynamic Responses Model provided a framework for understanding the fidelity of the WaterAid program. That is, to what extent the experiences of the program by community members and observations of PAKSI activities were like the official description of PAKSI as set out in policy and manuals. Study 1 showed that the WaterAid program, as it was implemented

⁵¹ *Planu Aksaun Komunitade Saneamentu no Ijiene* (Community Action Plan for Sanitation and Hygiene)

during the time of data collection, diverged greatly from PAKSI (and from CLTS); in particular because of the style of facilitation and co-delivery with a water supply intervention.

This finding is similar to those arising from other studies which used the Dynamic Responses Model as a platform for assessing intervention fidelity. For example, in a study of Performance-Based Contracting (PBC) in a Ugandan health system where PBC had been declared ineffective after a ‘black-box’ evaluation, an examination of the context in which PBC had been implemented revealed that its *de facto* implementation diverged substantially from its *de jure* description. This finding helped to explain why the desired outcomes from the PBC intervention had not been achieved and instead of declaring PBC a failure, recommendations were made for the correct implementation of PBC in low-income settings (Ssengooba et al. 2012).

Similarly, the findings from Study 1 offer a possible explanation for why, in Study 2, no significant change in community members’ feelings of disgust about open defecation was detected in an intervention that officially claimed to do just that. This difference between the theory and practice of an intervention reflects a debate among sanitation practitioners about what interventions can be called CLTS and to what extent those interventions can be adapted for scalability. This debate was described in Section 3.1.5 of the literature review and was again referred to by Kar, Chambers and other participants in Study 1.

The second condition for behaviour change is that the behaviour factor—in this case ‘affective appraisal’ regarding feelings of disgust—is a relevant motivator for community members. The assumption in CLTS that everyone is disgusted by faeces is discussed in the literature described in Section 3.1.4.3 of the literature review. However, only 70-percent of all participants in Study 2 reported feeling disgusted or ill about finding faeces ‘in the bush’ which seems much lower than expected. This low figure might be explained by the data collection method: asking people in a questionnaire how they felt about coming across faeces in the bush is not as rigorous a method for detecting their true response as measuring their response in the moment when they actually find faeces in the open. Many studies which measure disgust use the Disgust Sensitivity Questionnaire (DSQ) developed by Haidt, McCauley and Rozin (1994) which involves asking participants to describe how they feel about various vignettes or scenarios that are written or read out for them, much like the questionnaire in Study 2 of this research. However, there is discussion in the literature, which is beyond the scope of this thesis, that questions whether this is the most accurate way to measure disgust (for example, see Cusimano et al. (2018)).

Regardless, even during the observed PAKSI activities, where the attendees were invited to ingest faeces (through water which they had witnessed being contaminated), community members did not seem to respond with disgust, and only minimal embarrassment. Some of the participants in Study 1, and the PAKSI manuals also, reported that remote communities in Timor-Leste often use *fahi luban*—pig cages—which people defecate directly into or throw their faeces into as pig fodder. In the open, faeces often get eaten by roving pigs and dogs. Hence, perhaps in this context where open defecation is normalised and human faeces are ‘useful’ (as pigfeed), residents are less prone to feeling disgust or shame about open defecation. This suggests that the second condition for the RANAS model—that is, that feelings of disgust and shame are a relevant motivator for participants’ behaviour change—was not met in the WaterAid program at the time of data collection. Furthermore, this would suggest that PAKSI, CLTS or other approaches which are premised on stimulating feelings of disgust and shame about open defecation are not the most appropriate behaviour change intervention for this context.

Despite these two conditions not being met, community members’ sanitation practices still improved substantially. This suggests that it is behavioural factors other than ‘affective appraisal’ (feelings of shame and disgust) that are 1) effectively influenced through the WaterAid program activities and 2) relevant motivators for these community members. Indeed, in their literature review of studies which identified the factors which influence whether people adopt sanitation

infrastructure, Hurland et al. (2015) only found two studies which mentioned disgust as a factor. Therefore, it was important to consider the other factors influencing the participants' sanitation behaviour. As part of each of the three studies in this research, the behavioural factors which emerged as playing an important role in influencing participants' sanitation behaviour were categorised according to the RANAS behavioural factor groups (see Table 9-1).

Table 9-1 Behavioural factors identified in Studies 1, 2 and 3 categorised according to the RANAS model

			CLTS manuals	Kamal Kar	PAKSI manuals	Nat. and district gov.	BESIK	WaterAid senior staff	Local NGO senior staff	Facilitators	Observations of WaterAid inception meetings	Study 2 KAP questionnaire	Study 3 interviews
Behavioural Factor Groups	Risk	Factual Knowledge											
		Perceived Vulnerability											
		Perceived Severity											
	Attitude	Instrumental Beliefs											
		Affective Beliefs											
	Norm	Descriptive Norm											
		Injunctive Norm											
		Personal Norm											
	Ability	Action Knowledge	*										
		Self-Efficacy (S-E)											
		Maintenance S-E											
		Recovery S-E											
	Self-Regulation	Action Planning											
		Action Control											
		Coping Planning											
		Remembering											
		Commitment											

*The light grey squares indicate behaviour factors that are influenced by post-triggering activities described in the CLTS and PAKSI manuals; that is, activities which are theoretically only instigated by community members.

This analysis reveals that the WaterAid program in Manufahi at the time of data collection was interpreted, understood and experienced in several different ways. Aside from the government representatives' and some of the facilitators', the participants' descriptions suggested that providing information about the health risks of open defecation was a minor part of the PAKSI process. This is consistent with the argument that knowledge of health risks is not a substantial motivator for behaviour change. (See Section 2.1.4.2 of the background chapter.) Some of the observed PAKSI activities such as the 'glass of water' exercise and the faecal-oral pathway exercise are included in the PAKSI (and CLTS) manuals because they are designed to incite disgust. However, when observed in practice, they seemed to be more informative than disgust-inducing. This difference is likely due to the facilitation style described in Study 1 (see Chapter 6). Nevertheless, Study 2 suggested that community members' knowledge of the health risks of open defecation was not a key motivator for behaviour change which is consistent with literature and the CLTS and PAKSI manuals.

The CLTS manuals clearly explain the importance of communities becoming 100-percent ODF because a person's health is impacted not only by their own sanitation behaviour but also that of their neighbours. The PAKSI manuals define 'open defecation free' as 'no open defecation in the community' (Government of Timor-Leste 2012 p12). This focus on community-level rather than household-level outcomes diverges from historical approaches to improving sanitation (see Section 2.1.4.2 in the background for more detail). However, neither the participants in Study 2 nor 3 mentioned the importance of the sanitation behaviour of their neighbours or others in the community. The only participants to mention the importance of 100-percent ODF communities were the WaterAid senior staff which suggests that this message is not being conveyed to target communities. It is therefore unclear whether this health knowledge (a 'risk' factor in the RANAS model) would be a motivator for sanitation behaviour change amongst these communities.

The new water supply system was not conditional on community members changing their sanitation behaviour and the WaterAid staff did not wish for it to be interpreted this way. The findings from Study 3 suggest that this was perhaps a motivation for some community members (categorised as an 'instrumental belief' in the RANAS model), but Study 2 found no substantial evidence that this was the case.

9.2.2 Applicability of the RANAS model of behaviour change to water, sanitation and hygiene programs

As explained in the literature review, Contzen and Mosler (2015) intended the RANAS model to be used by practitioners to firstly identify a communities' key motivators for behaviour change and secondly to design behaviour change interventions in accordance with those motivators. This contrasts with more conventional program designs which involve trial-and-error or scaling-up after piloting an intervention. Contzen and Mosler's call for interventions to be tailored specifically to communities' unique set of motivators is alluring because it promises to be both more effective and efficient; effective because each community receives what it needs; and efficient because resources used to implement scaled-up interventions which only work in a proportion of communities are not wasted. As described in Section 3.2.4.1 of the literature review, whether tailored approaches are, in fact, more effective than a generalised approach implemented at scale is yet to be properly understood. This is currently being investigated in a study of WASH interventions in rural Tanzania by Dockx et al. (2019).

However, understanding which behavioural factors are relevant for an individual community is time-consuming at best and is still elusive for psychologists let alone WASH practitioners not trained in psychology. The ‘doer/non-doer analysis’ described as part of the RANAS model for determining which behavioural factors are relevant for a community is complex and involves conducting and analysing detailed and lengthy one-on-one questionnaires with community members. (See Section 3.2.4.1 of the literature review.) Furthermore, merely asking people direct questions about their practices, and beliefs about what motivate those practices, cannot give a full description of what actually motivates them. As described in Section 3.2.4.1 this limitation of the RANAS model has been discussed by several authors (see Dreibelbis et al. (2013); Seimetz et al. (2017); Harter et al. (2020); and Nunbogu et al. (2019))

Despite the limitations of the RANAS model, it was a valuable framework in this research for analysing what it was about the WaterAid program that influenced whether participants became and continued to be ODF. For example, the findings suggest that ‘injunctive norms’ such as being told or asked to do something by outsiders were an effective motivator for many participants but were not described to be a legitimate part of the PAKSI process by planners and implementers. Conversely, other behaviour factors such as ‘affective appraisal’ (feeling disgust about open defecation) which are described as relevant in the CLTS and PAKSI manuals, were not identified as important motivators for the behaviour change of the community members in this research.

In Timor-Leste, the approach to improving sanitation in remote communities is not tailored to the needs of individual communities as suggested in the RANAS model. Timor-Leste is not unique in this sense; applying a single intervention, or a standard combination of two or three interventions, to all communities in a country program is the norm (Briscoe and Aboud 2012). Even if the steps of the RANAS model as set out by Contzen and Mosler are not strictly followed, the model is still a valuable tool for WASH practitioners in that it encourages the investigation, rather than assumption, of what motivates people to change their WASH behaviour. Programs which begin with a brief investigation of which behaviour factors motivate a community and then, as Mosler suggests, implement interventions which are known to respond to those factors will likely be more effective and efficient than programs which are based upon broad assumptions.

9.3 Community development

The findings from this research invited reflection upon some of the tensions that exist in community development. These are discussed briefly here with respect to CLTS in the context of Timor-Leste.

9.3.1 Standard versus tailored approaches to development

The RANAS model encourages practitioners to tailor their behaviour change interventions to the specific motivators that are relevant to a target community. In practise, interventions are often applied at scale without a clearly defined theoretical basis. (See Aboud and Singla (2012); Stanton et al. (1992); Sigler et al. (2014); Briscoe and Aboud (2012) and, Dreibelbis et al. (2013).) Even when scaled-up approaches, such as India’s Total Sanitation Campaign, have been found to not bring about their desired outcomes (see Patil et al. (2014)), there is more critique about the interventions themselves than the fact that they are done at scale (see Brocklehurst (2014)).

There are several reasons why there is such support for scaled-up interventions. Firstly, I suggest that it is partly because of the human tendency to create order and balance in a

world that is disordered and chaotic: a theory that is discussed by game theorists and practitioners. Poulsen, runs an organisation dedicated to personal and organisational growth through games and play which builds on the work of games theorists such as Henricks (2015). Poulsen (2018) argues that

‘while a funambulist⁵² and a player know that any state of equilibrium can only ever be momentary, a proper citizen in 2018 is taught to believe that if only the right systems, models and rules are applied and followed, no balancing is required. We can turn off our inner gyroscope, we can stop balancing, thinking, sensing, we can just follow the manual.’

However, ‘it’s the process of striking the balance, not the balance itself, that is interesting to us’ Poulsen goes on to argue. I would add that the ‘process of striking the balance’ is not only interesting, but necessary for implementing behaviour change interventions at scale. In Study 1 Chambers, who is an early supporter of CLTS, pointed out that for:

‘a participatory methodology [such as CLTS] originators may feel it necessary to write manuals. [...] And then, interestingly the manuals can get out of date.’

He went on to describe the importance of constantly adapting participatory methodologies such as CLTS to the contexts in which they are applied—much as a funambulist is always adjusting their inner gyroscope to be able to stay balanced on a rope.

Aside from the attraction of simplicity, there are several reasons why planners and implementers might choose to design their programs as a single or standard set of interventions applied at scale. In Study 1, Chambers described the need to clearly define CLTS in its early days to counter the strong preference at the time for using up-front hardware subsidies which tended not to be effective. Hence, a single or standard approach might be used for ‘tactical or strategic’ reasons.

A second reason may be that a scaled up, standard approach is believed to cost less resources than a tailored approach. To calculate this, the costs of an intervention must be balanced with its sustained effectiveness. Too often, this calculation is only made with respect to short-term cost and effectiveness, and this is partly due to the project cycles of programs that rely on donor funding. Given that a tailored approach requires more resources up-front than a scaled-up approach, the tailored approach appears to be costlier and is therefore not preferred.

A third reason may be that programmers believe a particular intervention will be effective for most, or all, of the target population. Despite there being a lack of evidence for the effectiveness of CLTS in peer-reviewed literature (see Section 3.3.2 of the literature review), the CLTS approach is popular and has been implemented in more than 60 countries to date. This is likely because of the documentation of successful CLTS projects in grey literature (such as the monitoring and evaluation reports of implementers) and the promotion of CLTS at international conferences and meetings of sanitation practitioners.

The final possible reason considered here for choosing to implement a standard intervention rather than having a tailored approach is that the standard intervention (in this case: CLTS) may address the priorities of donors or the international development

⁵² A ‘funambulist’ is a tight-rope walker.

sector. As discussed in Section 2.2.4 of the background chapter, the long-standing top-down, technocratic approaches to development have been critiqued by post-development scholars such as Escobar (1995, 1999), Ferguson (1994), Makuwira (2006) and Rahnema and Bawtree (1997). Instead, these scholars encourage the adoption of participatory and community-driven approaches which properly consider local knowledge. Community-led total sanitation is popular, probably at least partly, because its community-led basis aligns with the trend in community development to counter hegemonic, colonialist or neo-colonialist approaches to development. The preference for community-led, and government-led, development in the context of Timor-Leste will be discussed in the following section.

9.3.2 Community-led versus top-down approaches to development in Timor-Leste

The findings from this research suggest that there is a desire to move away from top-down styles of development in the sanitation sector in Timor-Leste. The PAKSI manuals, which were described in Study 1, explain to facilitators that they are not ‘parents’ teaching ‘children’ as in the old system. Instead, the facilitators are ‘adults’ who should treat community members as ‘adults’ who ‘will take responsibility, solve their own problems and make their own decisions’ (Government of Timor-Leste 2012 p11). This preference was shared by representatives of BESIK⁵³ and the WaterAid staff in Study 1.

Despite the desire from actors such as BESIK and WaterAid senior staff, and as articulated in the government PAKSI manuals, for approaches to sanitation to be community driven, there are potential barriers to this approach in Timor-Leste. As discussed in the Section 2.2.4 of the background chapter, there is a history of colonial governments and international non-governmental organisation (NGOs) alike adopting a paternalistic approach to community development in Timor-Leste. This, together with existing hierarchical power structures in customary law (*lisan*), has led to what Freitas (2005 p20) describes as ‘a rule-driven, hierarchical administration with overbearing bureaucracy, often concerned more with compliance with rules and procedures than with results’. Altogether this has led to an expectation that remote communities will be led by their government, or outsiders such as international NGOs. In turn, the findings from Studies 1 and 3 revealed that the government, and local PAKSI facilitators, feel the pressure of improving community members’ access to sanitation.

Furthermore, the findings from all three studies suggested that although top-down approaches might not be desirable, in some cases at least, they seemed to be effective in bringing about behaviour change. For example, some households reported building toilets because they were ‘told to’ or because they needed to ‘follow the law’. Several actors at different levels of planning and implementation referred to external monitoring—which is a top-down mechanism—as being a key motivator for sustained behaviour change. In Study 1, some of the participants’ suggestions for how to improve the sanitation program in remote Timor-Leste included approaches of a top-down nature. For example, a BESIK representative suggested that an education campaign combined with the supply of toilets and regulatory system, like waste disposal programs managed by local councils in Australia, would perhaps be more effective than PAKSI.

⁵³ BESIK (*Bee, Saneamentu no Ijiene ba Komunitade*) is an Australian Government funded Rural Water Supply and Sanitation Program (RWSSP) in Timor-Leste.

The desire for a non-paternalistic approach to international development was paralleled at the national government level. Much international aid requires that national governments which receive aid adhere to specific conditions (for example, structural adjustment programs). In contrast to this kind of approach, the BESIK and WaterAid senior staff representatives in Study 1 explained that they needed to ‘ensure that the government takes the lead’ rather than international NGOs or bilateral aid programs and that this should be done in a ‘sort of “come and join the club” rather than antagonistic’ way. This contrast in approaches is similar to the broader comparison of paternalistic and community-led approaches in international development discussed by Escobar (1995, 1999) and others.

The government’s *Programa Nasional Dezenvolvimentu Suko* (PNDS—the National Program for Village Development—could be described as a middle-ground between top-down and community-led approaches. In this program, *sucos* were granted up to USD50 000 for ‘the construction of small-scale infrastructure projects which the local communities have selected and built themselves’ (Cardno 2017 p3). Around 40-percent of the projects between 2013 and 2016 selected by the communities themselves were WASH projects. Granted, these WASH projects were focused on public access to water and sanitation rather than household-level access. However, this program is an example of an approach which is responsive to the priorities of communities even though it is not completely community led.

9.3.3 How community-led is Community-Led Total Sanitation?

As discussed in the previous section, many of the participants in this research who were involved with planning and implementing sanitation interventions in Timor-Leste expressed a desire for more community-driven approaches. Therefore, it is necessary to consider the extent to which PAKSI (or CLTS) is truly community driven. The name, Community-Led Total Sanitation, suggests that this approach is about community leadership. However, it is necessary to establish whether ‘community-leadership’ is the intended outcome of CLTS or merely a mechanism for achieving ODF communities; that is, whether community-leadership is an ‘end’ or a ‘means’.

In an approach where community-leadership is a ‘means’, there is already a pre-defined outcome (such as achieving ODF) before the intervention or program begins. Conversely, in an approach where community-leadership is the ‘end’, the community would define their own priorities and decide for themselves how to go about realising their aspirations. In his book ‘Health by the People’, Newell (1975 p192) explains this difference:

It is easy to say that food is what is needed by a malnourished child and that community development is a mechanism that can be used to supply it. It is hard to say that community development is a goal and that communities in the process of developing find a way of seeing that children get food.

Kar, and some supporters of CLTS, describe the approach as being community-led because from the moment of triggering onward, the process is completely driven by the community rather than the facilitators. The CLTS manual and guidelines instruct the facilitators to thank the community members and leave the village straight after the triggering activities. Only if the community insist are the facilitators permitted to stay and assist. Hence, if CLTS is facilitated according to the guidelines described here, CLTS is a community-led process from the ignition moment onwards. However, in both CLTS and

PAKSI, there is a clearly defined goal which is separate from community-leadership; that is, 100-percent ODF communities. In this sense, CLTS and PAKSI appear to be approaches where community-leadership is a ‘means’ rather than an ‘end’. This was evident in the WaterAid program at the time of data collection, firstly because of the reluctance to participate by community members in the observed inception meetings. In a truly community-led process, the community members would not need to be coerced into participating. Secondly, community members were not able to fully discuss their self-identified needs and priorities. When they raised their concerns about having poor access to water this discussion was eventually diverted by the facilitators to focus on sanitation which generally seemed to be of less interest to the attendees.

A similar tension appeared to take place at the government-level. ‘Institutional triggering’ seems to be a parallel mechanism to ‘triggering’ at the community-level in that its intention is to bring about a realisation among government staff that CLTS is an appropriate approach to improving sanitation on a country-wide scale. However, the pre-determined goal of this process is that the government will apply CLTS at scale, and, to the exclusion of other approaches which include up-front hardware subsidies. This seemed evident in the context of this research when some participants expressed disagreement with the preference among sections of the national government to use hardware subsidies or to promote ‘wet’ toilets. In this case, ‘government-leadership’ was the ‘means’ rather than the desired ‘end’ of ‘institutional triggering’.

I think the popularity of CLTS, and its many adaptations, has come about partly in response to the critique of top-down approaches to development. Although the name suggests that it is community-led, it is important to be clear about the extent to which CLTS is actually community driven rather than just another set of activities that make up the global toolbox of ‘community development’. I believe that the pioneer and supporters of CLTS intend the approach to be community driven but in the context of Timor-Leste, I did not find this to be the case. This does not mean that CLTS or PAKSI are not suitable for Timor-Leste (this research did not set out to answer this question).

For PAKSI to be more aligned with the essential elements of CLTS (and PAKSI as it is described in its manuals) the facilitation of PAKSI in Timor-Leste needs to change dramatically from the style that was observed and described in this research. At the time that data collection finished the Government of Timor-Leste, together with several NGOs and CSOs including WaterAid, UNICEF and others, recruited Kamal Kar to return to Timor-Leste to deliver facilitator training. UNICEF reported that this training greatly benefited PAKSI facilitators and sub-district facilitators (SDFs) (Rall 2015). The report added that facilitators needed

to be able to adapt their messages and approaches in accordance with local conditions [and that] the standard “shock and disgust” triggering strategy may not work in every community. Recruiting facilitators from the same area is essential (Rall 2015 p40).

Furthermore, I would add that the style of PAKSI facilitation would need to be more like the style described in CLTS and PAKSI manuals if it is to be called ‘community-led’. For example, whilst it is challenging to arrive empty handed in a remote community in Timor-Leste, facilitators need to leave communities after the triggering activities take place. This way, the decision to become ODF is completely community-led and any input that is requested of the external facilitators by the community after this point has a greater chance of being community-controlled as well.

PAKSI interventions, even when done with community leadership, is still what Newell (1975) would describe as community development as a ‘means’ (to achieving ODF communities). However, supporting the kind of community leadership that Kar and other proponents of CLTS and PAKSI advocate for is a step closer to allowing all people to be the ‘master over one’s own fate’ (Newell 1975 px).

9.4 Recommendations for practitioners and further research

What has been discussed here is relevant for the way international development is done. The findings from this research suggested that sometimes top-down mechanisms lead to positive WASH behaviour change which in turn, it is hoped, saves lives. But these mechanisms are unpopular with a development sector for which there is an imperative to prioritise community-led processes, even when these processes are, ironically, somewhat top-down. In the fixation with community-led processes, and the reluctance to consider top-down approaches, perhaps the sector is not doing the work of reducing global inequity as effectively or efficiently as it otherwise could. Similarly, the tendency to scale-up standardised approaches rather than tailoring solutions to the needs and priorities of so-called beneficiaries might also be less effective and efficient than is currently thought. At the same time, there are constraints—some of which have been described in this research—on implementing agencies in terms of the design of development programs. With these constraints in mind, I make the following recommendations for future practice and research in the area of WASH for contexts that are similar to remote villages in Manufahi Municipality, Timor-Leste.

9.4.1 Further investigation of the factors that are important for becoming and continuing to be open defecation free after PAKSI has been implemented

This research identified a range of possible factors that influence whether households that participated in the WaterAid program become and continue to be ODF. However, this research was exploratory and could not measure which factors were most important for a representative sample of participants. Quantitative research about factors influencing ODF sustainability has been conducted in Liquiça, Ermera and Aileu Municipalities (see Moran (2017) and Abdi (2016)) and this should be repeated in Manufahi Municipality. This research should respond to the question:

- 1) Which factors influencing whether households become and continue to be ODF are identified as most important by residents in communities where PAKSI has taken place in Manufahi Municipality?

This quantitative investigation might include a ‘doer/non-doer’ analysis such as that suggested by Contzen and Mosler (2015) in the RANAS model (see Section 3.2.4.1 of the literature review). The ‘doers’ are those who have become and continued to be ODF and the ‘non-doers’ are those who never became ODF or reverted. The data collection tools could be informed by the findings from Study 3 as well as the findings from the research undertaken in Liquiça, Ermera and Aileu Municipalities.

9.4.2 Understanding the experiences of PAKSI in Timor-Leste by people of different genders and people who are marginalised

Whilst Study 3 sought to better understand the experiences of the WaterAid program by potentially marginalised people, this research revealed several ways in which this could be done more rigorously with more time and resources than are available in a PhD project.

Firstly, such research would be strengthened by doing formative research that invites potential participants to self-identify as marginalised (rather than inviting participants based on assumptions about who is marginalised). Secondly, conducting the research in a participatory way meaning that participants can identify research questions and design the research in ways that are meaningful to them is desirable. Finally, such research would be strengthened by partnering with local civil society organisations or government ministries that are focused on working with groups of people who are potentially marginalised: for example, disabled peoples' organisations, women's groups, community health workers who work specifically with older people and religious organisations who might be networked to religious or ethnic minorities. These partnerships would be beneficial for several reasons: to enable recruitment; to ensure the safety and comfort of participants; to ensure that the research is designed and undertaken in a way that collects meaningful data in a respectful way; and to increase the likelihood that research findings translate into desired outcomes for the participants. As mentioned in Section 8.3, WaterAid had already begun to form such partnerships towards the end of my data collection demonstrating that opportunities for such research were possible in the context of WASH programs in Timor-Leste.

Whilst this research collected data about the gender of the participants and some of the findings focused on the specific experiences of women in the WaterAid program, this research lacked a rigorous gendered analysis of the findings. This was largely due to not having sufficient sample sizes, which in turn was due to a lack of time and resources in the context of a PhD project. Further research is needed which disaggregates quantitative data in gender categories about the outcomes of PAKSI interventions in Timor-Leste. This is challenging to do because many participants, at least in the remote project sites I visited, find it uncomfortable to speak to an enumerator alone. This is not to say that it would be impossible; rather, that time would need to be budgeted for socialising such an approach in each project site. Qualitative research which seeks to better understand the distinct experiences of the PAKSI intervention by people of different genders is also needed.

It is important that 'gender' does not become conflated with 'women', as is often the case in such research. The experiences of transgender, gender non-binary people and men are also important to focus on. I acknowledge that there are additional challenges to conducting research about the experiences of transgender and gender non-binary people, especially in the context of Timor-Leste where these groups are often stigmatised. However, this should not be a deterrent to conducting such research.

9.4.3 Identifying which approaches to sanitation are most effective for bringing about open defecation free communities in remote Timor-Leste

There is little rigorous evidence about the relative effectiveness of different approaches to sanitation in Timor-Leste. This research did not seek to provide this evidence, but the findings suggest that approaches other than PAKSI as it was observed in this research—or at least combinations of different approaches with PAKSI—might be more effective for bringing about ODF communities in remote parts of Timor-Leste.

Contzen and Mosler (2015) propose a method for identifying the most effective interventions for a given community with their 'doer/non-doer' analysis as part of the RANAS model for behaviour change. A benefit of this method is that it does not

prioritise certain types of interventions: it is theoretically neutral in that regard. However, it is a very time-consuming and expensive method.

Instead, the most important factors for becoming and continuing to be ODF emerging from the research question posed above could be used to suggest a range of interventions to be trialled and compared for their effectiveness. For example, if the most important factors which determined whether households become and continue to be ODF were:

- the relative financial and time cost of building a toilet;
- preference for high-quality toilets;
- being instructed to build toilets; and
- the incentive of a water supply system

then interventions to be trialled could include:

- PAKSI + full or partially subsidised toilets;
- PAKSI + access to a functioning sanitation market with a range of products;
- Enforced regulation that communities must become ODF
- PAKSI + the incentive of a water system; or
- PAKSI (with no other intervention)⁵⁴

To determine the influence of these factors on whether a larger sample size of communities become and continue to be ODF, they should be tested in different project sites. This research should respond to the following question:

- 2) To what extent do interventions x, y, z, etcetera bring about 100-percent ODF communities?

These interventions could be piloted separately or in combinations in different communities. The desired outcome of 100-percent ODF should be measured at the community- rather than the household-level. In each case, the intervention fidelity would need to be assessed. Qualitative data about what factors were important for a sample of communities from each of three groups should be collected: those which became and stayed 100-percent ODF for at least two years post-implementation; those which became 100-percent ODF but reverted before two years; and those which never became 100-percent ODF. This data should be collected for each type of intervention piloted.

Given the resource-intensive nature of this type of analysis, and the typically small budgets most implementing organisations have for research, this type of study would best be implemented in partnership with a research institution.

9.4.4 Understanding what it is about Community-Led Total Sanitation that works

There are three important assumptions in CLTS-based approaches. Firstly, that feelings such as disgust, embarrassment or shame (categorised as ‘affective appraisal’ in the ‘attitude’ factor group) are important and relevant factors for influencing people’s behaviour change. Secondly, that CLTS triggering activities activate the ‘affective

⁵⁴ Note that some of these approaches are being piloted and implemented in Timor-Leste already. For example, the partially subsidised ‘Sato Pan’ piloted by WaterAid (2017). However, there is no research, to my knowledge, which compares multiple approaches.

appraisal’ factor through inciting feelings of disgust, shame or embarrassment in the participants. Thirdly, that CLTS is effective in bringing about behaviour change primarily because it activates the ‘affective appraisal’ factor (rather than other factors).

The first assumption was discussed in the context of Timor-Leste in Section 9.2.1. There is evidence to suggest that human beings are almost universally disgusted by faeces (see Section 3.1.4.3 of the literature review). The findings in this research suggest that the feeling of disgust about human faeces is not necessarily a sufficient motivator for bringing about behaviour change. The role of disgust as a motivator for behaviour change is likely context-dependent and should be investigated through research such as that summarised in Section 9.4.1 above.

The findings from this research cannot suggest anything about the second and third assumptions described above because the observed PAKSI intervention diverged substantially from CLTS as it is set out in its manuals and guidelines. An investigation to clarify the second assumption would ask:

- 3) When CLTS is facilitated according to its guidelines, are (more than usual) feelings of disgust and shame about open defecation activated in the participants—immediately/a few days/one day/one week/one month—later?

Methods for responding to this question should include asking participants how they feel about open defecation and ingesting other people’s faeces as well as observing their reactions to seeing faeces in their environment or people ingesting faeces (through contaminated water or food).

The findings from this research suggest that factors other than feelings of disgust and shame about open defecation were effective in bringing about sanitation behaviour change. Although the WaterAid intervention was not the same as CLTS as it is defined in the handbook, this finding questions the third assumption outlined above: that is, that CLTS is effective primarily because it incites feelings of disgust and shame about open defecation. Perhaps, as in the WaterAid intervention, it is other factors such as ‘injunctive norms’ which are what makes CLTS approaches effective. This could be investigated with the following research question:

- 4) When CLTS is facilitated properly according to its guidelines, what behavioural factors does it activate?

This study could be designed in a similar format to that of Study 3. This would include formative qualitative research about what motivated households in communities that have undergone properly facilitated CLTS to become or continue to be ODF or to revert to open defecation. A quantitative survey of a greater sample of communities post-CLTS implementation would indicate which factors were most commonly activated by CLTS interventions. A separate qualitative study to verify the validity of the CLTS implementation would also need to be conducted.

Questions 3 and 4 posed here do not relate directly to what interventions are most effective for bringing about ODF, and in turn healthier, communities and therefore should not be prioritised for research resources. However, as described in Section 3.1.4.3 of the literature review, there is some debate about whether CLTS breaches human rights because it brings about shame and embarrassment for its participants. For this reason, the questions posed here are worth clarifying

9.5 Conclusion

In the preceding sections I have offered recommendations for practitioners and researchers in the WASH sector, with consideration for the practical constraints we face in our work. Our work is somewhat bound by the overall structure of the international development sector; in terms of funding mechanisms as well as prevailing paradigms. A practitioner who works for a WASH organisation that is dependent on donor funding has limited freedom to facilitate community development where the intended beneficiaries have full control over articulating their priorities and how these should be addressed. That is, it is challenging to facilitate, what I would argue is, true community-led development in the current context of the global WASH sector.

I think that facilitating genuine community-leadership and control should be the philosophy underpinning all endeavours to reduce global inequity and reduce human suffering. That is, approaches to development should consider community-leadership as the ‘end’ goal rather than the ‘means’ to some other outcome. However, I am aware of the impracticality of this in a context such as the WASH sector which is based upon clearly defined goals that rarely include ‘complete community control’ as an outcome.

I am not going to try to completely reconcile this dilemma here. To attempt to do so would require, as the metaphor of the tight-rope walker presented earlier suggests, switching off an inner gyroscope that is essential for maintaining balance in a complex context. Instead, I hope that this research, focused as it is on one part of the world, invites the global WASH sector to reflect on its practice. In one respect, the life-saving nature of improving access to safe water, sanitation and hygiene is the ultimate approach to ensuring people have greater control over their lives. However, I also argue that we can be more critical of the extent to which our approaches for improving WASH are truly community-controlled; and in doing so strive for approaches which are increasingly ‘community-led’. This will require changes in localised practice as well as advocacy at national, regional and global levels for funding structures and paradigm shifts that support development approaches which facilitate greater community-control.

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Appendix 1 – Plain Language Statements

Estetmentu Lingua Simplis

**Interpretasaun NGO WaterAid nia programa
iha Manufahi, Timor-Leste**



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Co-Peskizador	Susana Nery	s.nery@uq.edu.au
Estudante Peskizador	Naomi Francis	n.francis@student.unimelb.edu.au

Estudu ida ne'e konaba saida?

Objetivu husi estudu ida ne'e atu buka hatene liu tan konaba rezultadu husi NGO WaterAid nia programa sira nia komprensaun husi involve sira nia aan iha planu no implementasaun. NGO WaterAid nia programa hanesan metodu ida ne'ebé uza ona iha Timor Leste atu ajuda maneja saneamentu iha area rurais. Husu ona ba ita-boot partisipa tanba ita boot sira involve iha planu no jestaun husi NGO WaterAid nia programa iha Timor Leste no ami interese tebes ita-boot nia esperensia ba metodu ida ne'e.

Peskiza ba PhD ida ne'e hanesan parte projetu boot iha ne'ebé ezeke husi Universidade Queensland. Projeitu ida ne'e foka liu ba komprensaun husi NGO nia programa atu sai susesu diak liu husi aimoruk lumriga ho naran Albendazole. Iha estudu ida ne'e, konvida ita-boot sira atu partisipa iha "Interpretasaun NGO WaterAid nia programa iha Manufahi, Timor Leste". No sei focus ba deit NGO WaterAid nia programa, maibe husi rezultadu ne'e sei uza atu hodi ajuda/asiste projetu boot. Projeitu boot rua no estudu ida nee hetan ajuda husi Instituisaun Saude Nasional Australia no Komisaun Peskiza Mediku.

Saida maka ita-boot sei husu atu halo wainhira partisipa?

Karik ita-boot sira hili atu partisipa, ita-boot sei husu atu halo entrevista ho estudante peskizador. Entrevista sei halao durante 45-60 minutos. Estudante peskizador sei husu pergunta ba ita-boot konaba NGO WaterAid nia programa, no oinsa ida ne'e bele halao iha Timor Leste. Sei aranja Tradutor karik persija. Iha entrevista ne'e uza audi rekorda, ita-boot la persija atu responde ba pergunta balun, karik iha neba la persija atu responde no husu atu peskizador liu tiha ba pergunta saluk.

Antes husi entrvista, ita-boot sei husu atu assina formulariu Konsentimentu. Peskizador sei rai Formulariu konsentimentu hanesan evidensia ida katak ita-boot aseita ona atu partisipa iha projetu ida ne'e.

Involvementu ita-boot nian iha estudu ida ne'e voluntariu no ita-boot sei livre atu para partisipa iha tempu ne'ebé deit no ita-boot persija atu hatete deit katak ita lakohi ona atu partisipa ona. Ita-boot mós livre atu foti fila fali data ne'ebé maka ita-boot foó ba peskizador.

Ita-boot livre atu husu pergunta konaba estudu ida ne'e iha tempu ne'ebé deit. Favor kontaktu ba peskizadores sira ou ekipa projetu, estudante peskizador (tradutor) mós desponivel atu koalia konaba estudu ida ne'e depois husi ita nia entrevista

Oinsa maka Resultado ne'e uza?

Gravasaun husi entrevista sei transfere ba transkripsaun hakerek no dadus ida ne'e sei uza iha artigu akademika ne'ebe karik bele. Artigu sira ne'e sei iha iklui/hatama ba iha skripsi/tesis estudante peskizador PhD sira nian no bele mos apresenta iha konferensia.

Relatoriu badak ne'ebé hetan husi estudu ida ne'e, ho ingles no Tetun, sei bele halo fo ba ita-boot sira nia organizasaun/Xefe suku wainhira estudu ne'e remata.

Confidentiality

Ita-boot sira nia konfidensialidade sei iha maneira balun. Premeiru, nota balun, audio rekorda ou korespondensia entre ita-boot ho peskizador sira nia dokumentus sei rai ho protesaun ba password no komputador mós save ho seguru iha residencia peskizador nian iha Timor leste, ou Universidade Melbourne iha Australia. Sira ne'e sei asesu deit ba peskizador sira naran alista iha leten. Depois husi transfere gravasaun ba transkripsaun hakerek, file audio sei destroi/estraga. Digital rekorda husi transkripsaun no formulariu konsentimentu sei estraga/destroy tinan 5 depois husi estudante peskizador PhD kompleta/hotu ona.

Sei la identifika ita-boot nia naran iha notas ou publikasaun. Sei fo deit numeru ID, ne'ebé sei hakerek iha formulariu konsentimentu no transkripsaun. dokumentasaun husi ita-boot nia naran ID korespondensia sei rai keta-ketak husi questionari no sei rai ho protesaun password ne'ebé maka seguru no metin.

Preokupasaun

Karik iha pergunta ou duvidas balun, favour kontaktu:

Susana Nery +67 77005990
Salvador Amaral +67 77273290

Ita-boot sira mós bele kontaktu ba peskizador sira ne'ebé maka naran alista iha leten ba sira nia email.

Estudu ida ne'e hetan ona autorizasaun komisaun peskija etnik umanu husi Universidade Melbourne no Ministeriu Saude, Timor Leste. Karik ita-boot iha pergunta ou preokupasaun konaba estudu ida ne'e bele kontaktu:

Ofisiais Ezekutivu
Human Research Ethics
The University of Melbourne
Phone: +61 3 8344 2073
Fax: +61 3 9347 6739

Ministeriu Saude, Timor-Leste
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Plain Language Statement

**Interpretations of Community-Led Total Sanitation
in Manufahi, East Timor**



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Co-Researcher	Susana Nery	s.nery@uq.edu.au
Student Researcher	Naomi Francis	n.francis@student.unimelb.edu.au

What is this study about?

The aim of this study is to find out more about the ways in which Community-Led Total Sanitation is understood by those involved in its planning and implementation. Community-Led Total Sanitation is a method that is being used in East Timor to help manage sanitation in rural areas. You have been asked to participate because you are involved with the planning and management of Community-Led Total Sanitation in East Timor and we are interested in your knowledge and expertise about this method.

This PhD research is part of a larger project which is being run by the University of Queensland. The larger project is focussed on understanding whether Community-Led Total Sanitation improves the success rate of a de-worming drug called albendazole. This study, which you are being invited to participate in, is called 'Interpretations of Community-Led Total Sanitation in Manufahi, East Timor' and is focussed only on Community-Led Total Sanitation, but the findings will be used to assist the larger project. Both the larger project and this study are funded by the Australian National Health and Medical Research Council.

What will you be asked to do if you participate?

If you choose to participate, you will be asked to do an interview with the student researcher. The interview will last 1-1.5 hours. The student researcher will ask you questions about Community-Led Total Sanitation, and how this is done in East Timor. A Tetum-English interpreter will be provided if necessary. The interview will be audio-recorded. You do not have to answer every question. If there is a question you would prefer not to answer, just ask the researcher to skip the question.

Before the interview, you will be asked to sign a consent form. The consent form will be kept by the researcher as evidence that you agreed to participate in the study.

Your involvement in the study is voluntary and you will be free to cease your participation at any time. All you need to do is say that you do not want to participate anymore. You are also free to withdraw any data that you have provided to the researcher.

You are free to ask questions about the study at any time. Please contact any of the researchers or project staff. The student researcher (and interpreter) will also be available to talk about the study with you in person after your interview.

How will the results be used?

The recordings of the interviews will be transferred to written transcripts and this data will be used to write published academic articles which will be publicly available. The articles will be included in the student researcher's PhD thesis and may be presented at conferences.

A brief report of the findings of this study, in English and Tetum, will be made available to your village head at the end of the study.

Confidentiality

Your confidentiality will be protected in a number of ways. Firstly, any notes, audio recordings or correspondence between you and the researchers will be kept in password protected files and computers or in a locked safe at the researcher's residence in East Timor, or at the University of Melbourne in Australia. These will only be accessible by the researchers listed above. As soon as the audio recordings are transferred to written transcripts, the audio files will be destroyed. Digital recordings of the transcripts as well as the consent forms will be destroyed 5 years after the completion of the student researcher's PhD.

Your confidentiality will be protected in a number of ways. You will not be identified by name on any notes or publications. You will be given an ID number, which will be written on your consent forms and transcripts. A record of your name matching your ID will be kept separately to any notes or questionnaires and will be stored in a password-protected and/or locked facility.

Concerns

If you have any questions or concerns, please contact:

Susana Nery	+67 77005990
Salvador Amaral	+67 77273290

You can also contact any of the researchers listed at the top of this letter via email.

This study has received clearance from the University of Melbourne Human Research Ethics Committee and the Government of East Timor's Ministry of Health. If you have any questions or concerns about the conduct of this study you can contact:

Manager
Human Research Ethics
The University of Melbourne
Phone: +61 3 8344 2073
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Ministry of Health of Timor-Leste
Phone: +67 333 1113

Estetmentu/Deklarasaun Lingua Simplis

Mudansa iha Koñesementu, Maneira/hahalok
no Pratika entre xefe familia ne'ebé maka
partisipa iha CLTS iha Manufahi, Timor-Leste.



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Co-Peskizador	Susana Nery	s.nery@uq.edu.au
Estudante Peskizador	Naomi Francis	n.francis@student.unimelb.edu.au

Peskiza ida ne'e konaba Saida?

Objetivu husi estudu ida ne'e atu buka hatene liu tan konaba rezultadu husi total saneamentu comunidade lideradu iha ita-boot sira nia suku ou villa. Total Saneamentu Komunitade lideradu hanesan metodu ida maka uza ona iha Timor Leste atu hodi ajuda maneja saneamentu iha area rurais. Husu atu ita-boot partisipa tanba ami interesante tebes ba ita-boot nia esperensia ba metodu ida ne'e.

Peskiza ba PhD ida ne'e hanesan parte projetu boot iha ne'ebé ezeke hosi Universidade Queensland. Projetu ida ne'e foka liu ba komprensiaun husi Total Saneamentu komundade Lideradu atu sai susesu diak liu husi aimoruk lumriga ho naran Albendazole. Iha estudu ida ne'e, konvida ita-boot sira atu partisipa iha " Resultadu husi Total saneamentu comunidade Lideradu iha Manufahi, Timor Leste. No sei focus ba deit Total Saneamentu Komunitade Lideradu, maibe husi rezultadu ne'e sei uza atu hodi ajuda/asiste projetu boot. Projetu boot rua no estudu ida nee hetan ajuda husi Instituisaun Saude Nasional Australia no Komisaun Peskiza Mediku.

Saida maka ita-boot sira sei atu halo karik ita-boot sira Partisipa?

Karik ita-boot sira hili atu partisipa, ita-boot sei husu atu halo entrevista ho estudante peskizador. Entrevista sei halao durante 45-60 minotus. Estudante peskizador sei husu pergunta konaba ita-boot nia koñesementu, opiniaun, no pratika relasiona ho saneamentu no Total Saneamentu Komunitade liderado no sei husu atu hare ita-boot sira nia dapur no sentina. Sei aranja Tradutor karik persija. Iha entrevista ne'e uza audi rekorda, ita-boot la persija atu responde ba pergunta balun, karik iha neba la persija atu responde no husu atu peskizador liu tiha ba pergunta saluk.

Antes husi entrvsta, ita-boot sei husu atu assina formulariu Konsentimentu. Peskizador sei rai Fomulariu konsentimentu hanesan evidensia ida katak ita-boot aseita ona atu partisipa iha projetu ida ne'e.

Involvementu ita-boot nian iha estudu ida ne'e voluntariu no ita-boot sei livre atu para partisipa iha tempu ne'ebé deit no ita-boot persija atu hatete deit katak ita lakohi ona atu partisipa ona. Ita-boot mós livre atu foti fila fali data ne'ebé maka ita-boot foó ba peskizador. Ita-boot livre atu husu pergunta konaba estudu ida ne'e iha tempu ne'ebé deit. Favor kontaktu ba peskizadores sira ou ekipa projetu, estudante peskizador (tradutor) mós desponivel atu koalia konaba estudu ida ne'e depois husi ita nia entrevista

Oinsa maka Resultado ne'e uza?

Gravasaun entrevista sei transfere atu halo transkripsaun hakerek no data ida ne'e sei uza atu halo questionari konaba koñesementu komunidadan nian, opiniaun no pratika relasaun ho saneamentu no total saneamentu komunidadan liderado. Estudante peskizador sei usa questionari sira ne'e atu halo survey ba populasan iha Manufahi, Timor leste.

Dadus husi husi questionari sei uza atu hakerek artigu akademiku publikadu ida ne'ebé iha. Artigu sira sei inklui iha tesis estudante peskizador PhD (doutoradu) no bele mós apresenta iha konfrensia.

Relatoriu badak ne'ebé hetan husi estudu ida ne'e, ho ingles no Tetun, sei bele halo ba Xefe suku wainhira estudu ne'e remata.

Konfidensialidade

Ita-boot sira nia konfidensialidade sei iha maneira balun. Premeiru, nota balun, audio rekorda ou korespondensia entre ita-boot ho peskizador sira nia dokumentus sei rai ho protesaun ba password no komputador mós save ho seguru iha residencia peskizador nian iha Timor leste, ou Universidade Melbourne iha Australia. Sira ne'e sei asesu deit ba peskizador sira naran alista iha leten.

Depois husi transfere gravasaun ba transkripsaun hakerek, file audio sei destroi/estraga. Digital rekorda husi transkripsaun no formulariu konsentimentu sei estraga/destroy tinan 5 depois husi estudante peskizador PhD kompleta/hotu ona.

Sei la identifika ita-boot nia naran iha notas ou publikasaun. Sei fo deit numeru ID, ne'ebé sei hakerek iha formulariu konsentimentu no transkripsaun. dokumentasaun husi ita-boot nia naran ID korespondensia sei rai keta-ketak husi questionari no sei rai ho protesaun password ne'ebé maka seguru no metin.

Preokupasaun

Karik iha pergunta ou duvidas balun, favour kontaktu:

Susana Nery	+67 77005990
Salvador Amaral	+67 77273290

Ita-boot sira mós bele kontaktu ba peskizador sira ne'ebé maka naran alista iha leten ba sira nia email.

Estudu ida ne'e hetan ona autorizasaun komisaun peskija etnik umanu husi Universidade Melbourne no Ministeriu Saude, Timor Leste. Karik ita-boot iha pergunta ou preokupasaun konaba estudu ida ne'e bele kontaktu:

Ofisiais Ezekutivu
Human Research Ethics
The University of Melbourne
Phone: +61 3 8344 2073
Fax: +61 3 9347 6739

Ministeriu Saude, Timor-Leste
Phone: +67 333 1113

Plain Language Statement

**Changes in Knowledge, Attitudes and Practices
among heads of households participating in
Community-Led Total Sanitation
in Manufahi, East Timor**



QUALITATIVE PHASE

The Nossal Institute for Global Health
Faculty of Medicine, Dentistry and Health Services
The University of Melbourne
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Researchers

Principal Researcher	James Black	jim.black@unimelb.edu.au
Co-Researcher	Martha Morrow	martham@unimelb.edu.au
Co-Researcher	Susana Nery	s.nery@uq.edu.au
Student Researcher	Naomi Francis	n.francis@student.unimelb.edu.au

What is this research about?

The aim of this study is to find out more about the outcomes of the Community-Led Total Sanitation program which has taken place in your village. Community-Led Total Sanitation is a method that is being used in East Timor to help manage sanitation in rural areas. You have been asked to participate because we are interested in your experience of this method.

This PhD research is part of a larger project which is being run by the University of Queensland. The larger project is focussed on understanding whether Community-Led Total Sanitation improves the success rate of a de-worming drug called albendazole. This study, which you are being invited to participate in, is called 'Outcomes of Community-Led Total Sanitation in Manufahi, East Timor' and is focussed only on Community-Led Total Sanitation, but the findings will be used to assist the larger project. Both the larger project and this study are funded by the Australian National Health and Medical Research Council.

What will you be asked to do if you participate?

If you choose to participate, you will be asked to do an interview with the student researcher. The interview will last 45-60mins. The student researcher will ask you questions about your knowledge, opinion and practices regarding sanitation and Community-Led Total Sanitation and will ask to see your kitchen and your toilet. A Tetum-English interpreter will be provided if necessary. The interview will be audio-recorded. You do not have to answer every question. If there is a question you would prefer not to answer, just ask the researcher to skip the question.

Before the interview, you will be asked to sign a consent form. The consent form will be kept by the researcher as evidence that you agreed to participate in the project.

Your involvement in the study is voluntary and you will be free to cease your participation at any time. All you need to do is say that you do not want to participate anymore. You are also free to withdraw any data that you have provided to the researcher.

You are free to ask questions about the study at any time. Please contact any of the researchers or project staff. The student researcher (and interpreter) will also be available to talk about the study with you in person after your interview.

How will the results be used?

The recordings of the interviews will be transferred to written transcripts and this data will be used to make a questionnaire about people's knowledge, opinion and practices regarding sanitation and Community-Led Total Sanitation. This student researcher will use this questionnaire to survey people in Manufahi, East Timor.

The data from the questionnaires will be used to write published academic articles which will be publicly available. The articles will be included in the student researcher's PhD thesis and may be presented at conferences.

A brief report of the findings of this study, in English and Tetum, will be made available to your village head at the end of the study.

Confidentiality

Your confidentiality will be protected in a number of ways. Firstly, any notes, audio recordings or correspondence between you and the researchers will be kept in password protected files and computers or in a locked safe at the researcher's residence in East Timor, or at the University of Melbourne in Australia. These will only be accessible by the researchers listed above. As soon as the audio recordings are transferred to written transcripts, the audio files will be destroyed. Digital recordings of the transcripts as well as the consent forms will be destroyed 5 years after the completion of the student researcher's PhD.

You will not be identified by name on any notes or publications. You will be given an ID number, which will be written on your consent forms and transcripts. A record of your name matching your ID will be kept separately to any notes or questionnaires and will be stored in a password-protected and/or locked facility.

Concerns

If you have any questions or concerns, please contact:

Susana Nery	+67 77005990
Salvador Amaral	+67 77273290

You can also contact any of the researchers listed at the top of this letter via email.

This study has received clearance from the University of Melbourne Human Research Ethics Committee and the Government of East Timor's Ministry of Health. If you have any questions or concerns about the conduct of this study you can contact:

The Executive Officer
Human Research Ethics
The University of Melbourne
Phone: +61 3 8344 2073
Fax: +61 3 9347 6739

Ministry of Health of Timor-Leste
Phone: +67 333 1113

Stetmentu Liungua Simplis

Mudansa ba koñesimentu, opiniaun
no pratika entre familia iha partisipasaun iha
NGO WaterAid nia programa iha Manufahi, Timor-Leste



THE UNIVERSITY OF
MELBOURNE

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Peskizador Sira

Xefe Peskizador	James Black	jim.black@unimelb.edu.au
Co-Peskizador	Martha Morrow	martham@unimelb.edu.au
Co-Peskizador	Susana Nery	s.nery@uq.edu.au
Estudante Peskizador	Naomi Francis	n.francis@student.unimelb.edu.au

Peskiza ida ne'e konaba Saida?

Objetivu husi estudu ida ne'e atu buka hatene liu tan konaba rezultadu husi NGO WaterAid nia programa iha ita-boot sira nia suku ou villa. Husu atu ita-boot participa tanba ami interesante tebes ba ita-boot nia esperensia ba programa ida ne'e.

Peskiza ba PhD ida ne'e hanesan parte projetu boot iha ne'ebé halao husi Universidade Queensland – projetu nee hetan ajuda husi Instituisaun Saude Nasional Australia no Komisaun Peskiza Mediki. Projetu ida ne'e foka liu ba komprensaun husi NGO WaterAid nia programa atu sai susesu diak liu husi aimoruk lumriga ho naran Albendazole. Iha estudu ida ne'e, konvida ita-boot sira atu participa iha " Resultadu husi NGO WaterAid nia programa iha Manufahi, Timor Leste. No sei foka ba deit WaterAid nia programa WaterAid nia programa, maibe husi rezultadu ne'e sei uza atu hodi ajuda/asiste projetu boot.

Saida maka ita-boot sei husu atu halo wainhira participa?

Karik ita-boot hili ona atu participa, ita-boot sei husu atu kompeta questionariu/perguntas ne'ebé estudante peskiza sei le'e ba ita-boot. Pergunta sei husu mais ou menus minute 45-60.

Ita-boot sei fila fali atu hatan questionariu/perguntas iha tempu hanesan tuir mai ne'e:

- 1) Semana 4-6 husi agora
- 2) Fulan 4-9 husi agora

Questionariu sei iha tempu hanesan. Estudante peskiza sei husu perguntas konaba ita-boot nia koñesimentu, opiniaun no pratika ne'ebé relata ho saneamentu no WaterAid nia programa no sei husu ba ita-boot atu hare ita-boot nia sentina. Tradutor sei ajuda wainhira persija. Ita-boot la persija atu hatan kada pergunta, karik iha pergunta balun ita-boot ladun hakarak atu responde, husu ba peskizador atu sai tiha ba perguntas seluk.

Antes questionariu, ita-boot sei husu atu assina formulariu konsentimentu. Formulariu konsentimentu ne'e peskizador sei rai hanesan evidensia kata ita-boot hatan/aseita atu participa iha projetu ne'e.

Ita-boot nia involvment iha estudu ida ne'e voluntariu no sei livre atu hapara ita-boot nia partisipasaun iha tempu ne'ebé deit. Ita-boot persija hateten deit kata ita-boot lakohi atu participa ona. Ita-boot mós livre atu foti fila fali dadus balun ne'ebé ita fo ona ba peskizador.

Stetmentu Liungua Simplis

Mudansa ba koñesimentu, opiniaun
no pratika entre familia iha partisipasaun iha
NGO WaterAid nia programa iha Manufahi, Timor-Leste



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Peskizador Sira

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Co-Peskizador	Susana Nery	s.nery@uq.edu.au
Estudante Peskizador	Naomi Francis	n.francis@student.unimelb.edu.au

Peskiza ida ne'e konaba Saida?

Objetivu husi estudu ida ne'e atu buka hatene liu tan konaba rezultadu husi NGO WaterAid nia programa iha ita-boot sira nia suku ou villa. Husu atu ita-boot partisipa tanba ami interesante tebes ba ita-boot nia esperensia ba programa ida ne'e.

Peskiza ba PhD ida ne'e hanesan parte projetu boot iha ne'ebé halao husi Universidade Queensland – projetu nee hetan ajuda husi Instituisaun Saude Nasional Australia no Komisaun Peskiza Mediku. Projetu ida ne'e foka liu ba kompensasaun husi NGO WaterAid nia programa atu sai susesu diak liu husi aimoruk lumriga ho naran Albendazole. Iha estudu ida ne'e, konvida ita-boot sira atu partisipa iha " Resultadu husi NGO WaterAid nia programa iha Manufahi, Timor Leste. No sei foka ba deit WaterAid nia programa WaterAid nia programa, maibe husi rezultadu ne'e sei uza atu hodi ajuda/asiste projetu boot.

Saida maka ita-boot sei husu atu halo wainhira partisipa?

Karik ita-boot hili ona atu partisipa, ita-boot sei husu atu kompeta questionariu/perguntas ne'ebé estudante peskiza sei le'e ba ita-boot. Pergunta sei husu mais ou menus minute 45-60.

Ita-boot sei fila fali atu hatan questionariu/perguntas iha tempu hanesan tuir mai ne'e:

- 1) Semana 4-6 husi agora
- 2) Fulan 4-9 husi agora

Questionariu sei iha tempu hanesan. Estudante peskiza sei husu perguntas konaba ita-boot nia kofesementu, opiniaun no pratika ne'ebé relata ho saneamentu no WaterAid nia programa no sei husu ba ita-boot atu hare ita-boot nia sentina. Tradutor sei ajuda wainhira persija. Ita-boot la persija atu hatan kada pergunta, karik iha pergunta balun ita-boot ladun hakarak atu responde, husu ba peskizador atu sai tiha ba perguntas seluk.

Antes questionariu, ita-boot sei husu atu assina formulariu konsentimentu. Formulariu konsentimentu ne'e peskizador sei rai hanesan evidensia kata ita-boot hatan/aseita atu partisipa iha projetu ne'e.

Ita-boot nia involvment iha estudu ida ne'e voluntariu no sei livre atu hapara ita-boot nia partisipasaun iha tempu ne'ebé deit. Ita-boot persija hateten deit kata ita-boot lakohi atu partisipa ona. Ita-boot mós livre atu foti fila fali dadus balun ne'ebé ita fo ona ba peskizador.

Plain Language Statement

Changes in Knowledge, Attitudes and Practices among heads of households participating in Community-Led Total Sanitation in Manufahi, East Timor



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Principal Researcher	James Black	jim.black@unimelb.edu.au
Co-Researcher	Martha Morrow	martham@unimelb.edu.au
Co-Researcher	Susana Nery	s.nery@uq.edu.au
Student Researcher	Naomi Francis	n.francis@student.unimelb.edu.au

What is this research about?

The aim of this study is to find out more about the outcomes of the Community-Led Total Sanitation program which has taken place in your village. Community-Led Total Sanitation is a method that is being used in East Timor to help manage sanitation in rural areas. You have been asked to participate because we are interested in your experience of this method.

This PhD research is part of a larger project which is being run by the University of Queensland. The larger project is focussed on understanding whether Community-Led Total Sanitation improves the success rate of a de-worming drug called albendazole. This study, which you are being invited to participate in, is called 'Outcomes of Community-Led Total Sanitation in Manufahi, East Timor' and is focussed only on Community-Led Total Sanitation, but the findings will be used to assist the larger project. Both the larger project and this study are funded by the Australian National Health and Medical Research Council.

What will you be asked to do if you participate?

If you choose to participate, you will be asked to complete a questionnaire which the student researcher will read out to you. The questionnaire will last between 45-60mins.

You will be asked to do this questionnaire again at the following times:

- 1) 4-6 weeks from today
- 2) 4-9 months from today

The questionnaire will be the same each time. The student researcher will ask you questions about your knowledge, opinion and practices regarding sanitation and Community-Led Total Sanitation and will ask to see your toilet. A Tetum-English interpreter will be provided if necessary. You do not have to answer every question. If there is a question you would prefer not to answer, just ask the researcher to skip the question.

Before the questionnaire, you will be asked to sign a consent form. The consent form will be kept by the researcher as evidence that you agreed to participate in the project.

Your involvement in the study is voluntary and you will be free to cease your participation at any time. All you need to do is say that you do not want to participate anymore. You are also free to withdraw any data that you have provided to the researcher.

You are free to ask questions about the study at any time. Please contact any of the researchers or project staff. The student researcher (and interpreter) will also be available to talk about the study with you in person after your interview.

How will the results be used?

The data from the questionnaires will be used to write published academic articles which will be publicly available. The articles will be included in the student researcher's PhD thesis and may be presented at conferences.

A brief report of the findings of this study, in English and Tetum, will be made available to your village head at the end of the study.

Confidentiality

Your confidentiality will be protected in a number of ways. You will not be identified by name on any questionnaires, notes or publications. You will be given an ID number, which will be written on your questionnaires so that the researchers can match each of the questionnaires you complete. A record of your name matching your ID will be kept separately to any notes or questionnaires and will be stored in a password-protected and/or locked facility.

The completed questionnaires, consent forms and any notes by the researcher will be kept in password protected files and computers or in a locked safe at the researcher's residence in East Timor, or at the University of Melbourne in Australia. These will only be accessible by the researchers listed above. The questionnaires, ID list and consent forms will be destroyed 5 years after the completion of the student researcher's PhD.

Concerns

If you have any questions or concerns, please contact:

Susana Nery +67 77005990
Salvador Amaral +67 77273290

You can also contact any of the researchers listed at the top of this letter via email.

This study has received clearance from the University of Melbourne Human Research Ethics Committee and the Government of East Timor's Ministry of Health. If you have any questions or concerns about the conduct of this study you can contact:

Manager
Human Research Ethics
The University of Melbourne
Phone: +61 3 8344 2073
Fax: +61 3 9347 6739

Ministry of Health of Timor-Leste
Phone: +67 333 1113

Estetmentu Lingua Simplis

**Fator pozitivu no negativu konaba NGO WaterAid nia programa
iha Manufahi, Timor Leste**



Nossal Instituisaun ba Saudi Mundial
Fakuldade Medicina, Dentistry no Servisu Saude
Universidade Melbourne
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Fax: +61 3 93476872

Peskizadores

Principal Peskizador	James Black	jim.black@unimelb.edu.au
Co-Peskizador	Martha Morrow	martham@unimelb.edu.au
Co-Peskizador	Susana Nery	s.nery@uq.edu.au
Estudante Peskizador	Naomi Francis	n.francis@student.unimelb.edu.au

Estudu ida ne'e konaba saida?

Objetivu husi estudu ida ne'e atu buka hatene liu tan konaba pozitivu ho negativu fator konaba NGO WaterAid nia programa iha Manufahi. NGO WaterAid nia programa hanesan metodu ida ne'ebé uza ona iha Timor Leste atu ajuda maneja saneamentu iha area rurais. Husu ona ba ita-boot partisipa tanba ami interese tebes ita-boot nia esperensia ba metodu ida ne'e.

Peskiza ba PhD ida ne'e hanesan parte projetu boot iha ne'ebé ezekeuta husi Universidade Queensland. Projeitu ida ne'e foka liu ba komprensaun husi NGO nia programa atu sai susesu diak liu husi aimoruk lumriga ho naran Albendazole. Iha estudu ida ne'e, konvida ita-boot sira atu partisipa iha "Interpretasaun NGO WaterAid nia programa iha Manufahi, Timor Leste". No sei focus ba deit NGO WaterAid nia programa, maibe husi resultadu ne'e sei uza atu hodi ajuda/asiste projetu boot. Projeitu boot rua no estudu ida nee hetan ajuda husi Instituisaun Saude Nasional Australia no Komisaun Peskiza Medik.

Saida maka ita-boot sei husu atu halo wainhira partisipa?

Karik ita-boot sira hili atu partisipa, ita-boot sei husu atu halo entrevista ho estudante peskizador. Entrevista sei halao durante 45-60 minutos. Estudante peskizador sei husu pergunta ba ita-boot konaba NGO WaterAid nia programa iha bairo nee. Karik ita-boot hela iha bairo nee, estudante peskizador atu husu pergunta konaba ita-boot nia actividade konaba bee, saneamentu ho hijien ho karik ita-boot iha sentina, estudante peskizador atu husu bele haree ita-boot nia sentina. Sei aranja tradutor karik persija. Iha entrevista ne'e uza audi rekorda. Ita-boot la persija atu responde ba pergunta balun. Karik iha neba la persija atu responde no husu atu peskizador liu tiha ba pergunta saluk.

Antes husi entrvsta, ita-boot sei husu atu assina formulariu konsentimentu. Peskizador sei rai formulariu konsentimentu hanesan evidensia ida katak ita-boot aseita ona atu partisipa iha projetu ida ne'e.

Involvementu ita-boot nian iha estudu ida ne'e voluntariu no ita-boot sei livre atu para partisipa iha tempu ne'ebé deit no ita-boot persija atu hatete deit katak ita lakohi ona atu partisipa ona. Ita-boot mós livre atu foti fila fali data ne'ebé maka ita-boot foó ba peskizador.

Ita-boot livre atu husu pergunta konaba estudu ida ne'e iha tempu ne'ebé deit. Favor kontaktu ba peskizadores sira ou ekipa projetu, estudante peskizador (tradutor) mós desponivel atu koalia konaba estudu ida ne'e depois husi ita nia entrevista.

Oinsa maka Resultado ne'e uza?

Gravasaun husi entrevista sei transfere ba transkripsaun hakerek no dadus ida ne'e sei uza iha artigu akademika ne'ebe karik bele. Artigu sira ne'e sei iha hatama ba iha skripsi/tesis estudante peskizador PhD sira nian no bele mos apresenta iha konferensia.

Relatoriu badak ne'ebé hetan husi estudu ida ne'e, ho ingles no Tetun, sei bele halo fo ba ita-boot sira nia organizasaun/Xefe suku wainhira estudu ne'e remata.

Konfidensialidade

Ita-boot sira nia konfidensialidade sei iha maneira balun. Premeiru, nota balun, audio rekorda ou korespondensia entre ita-boot ho peskizador sira nia dokumentus sei rai ho protesaun ba password no komputer mós save ho seguru iha residencia peskizador nian iha Timor leste, ou Universidade Melbourne iha Australia. Sira ne'e sei asesu deit ba peskizador sira naran alista iha leten. Depois husi transfere gravasaun ba transkripsaun hakerek, file audio sei estraga. Digital rekorda husi transkripsaun no formulariu konsentimentu sei estraga tinan 5 depois husi estudante peskizador PhD kompleta/hotu ona.

Sei la identifika ita-boot nia naran iha notas ou publikasaun. Sei fo deit numeru ID, ne'ebé sei hakerek iha formulariu konsentimentu no transkripsaun. dokumentasaun husi ita-boot nia naran ID korespondensia sei rai keta-ketak husi questionari no sei rai ho protesaun password ne'ebé maka seguru no metin.

Preokupasaun

Karik iha pergunta ou duvidas balun, favour kontaktu:

Susana Nery +67 77005990
Salvador Amaral +67 77273290

Ita-boot sira mós bele kontaktu ba peskizador sira ne'ebé maka naran alista iha leten ba sira nia email.

Estudu ida ne'e hetan ona autorizasaun komisaun peskija etnik umanu husi Universidade Melbourne no Ministeriu Saude, Timor Leste. Karik ita-boot iha pergunta ou preokupasaun konaba estudu ida ne'e bele kontaktu:

Oficiais Ezekutivu
Human Research Ethics
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Fax: +61 3 9347 6739

Ministeriu Saude, Timor-Leste
Phone: +67 333 1113

Plain Language Statement

**Factors associated with the success or failure of
Community-Led Total Sanitation in Manufahi, East Timor**



THE UNIVERSITY OF
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Researchers

Principal Researcher	James Black	jim.black@unimelb.edu.au
Co-Researcher	Martha Morrow	martham@unimelb.edu.au
Co-Researcher	Susana Nery	s.nery@uq.edu.au
Student Researcher	Naomi Francis	n.francis@student.unimelb.edu.au

What is this research about?

The aim of this study is to find out about the factors associated with the success or failure of the Community-Led Total Sanitation program which has taken place in your village. Community-Led Total Sanitation is a method that is being used in East Timor to help manage sanitation in rural areas. You have been asked to participate because we are interested in your experience of this method.

This PhD study is part of a larger project which is being run by the University of Queensland. The larger project is focussed on understanding whether Community-Led Total Sanitation improves the success rate of a de-worming drug called albendazole. This study, which you are being invited to participate in, is called 'Factors associated with the success or failure of Community-Led Total Sanitation in Manufahi, East Timor' and is focussed only on Community-Led Total Sanitation, but the findings will be used to assist the larger project. Both the larger project and this study are funded by the Australian National Health and Medical Research Council.

What will you be asked to do if you participate?

If you choose to participate, you will be asked to do an interview with the student researcher. The interview will last 45-60 minutes. The student researcher will ask you questions about the water and sanitation program which has been implemented in this village. If you live in this village, you will also be asked about your water, sanitation and hygiene practices and the student researcher will ask to see your toilet if you have one. A Tetum-English interpreter will be provided if necessary. The interview will be audio-recorded. You do not have to answer every question. If there is a question you would prefer not to answer, just ask the researcher to skip the question.

Before the interview, you will be asked to sign a consent form. The consent form will be kept by the researcher as evidence that you agreed to participate in the project.

Your involvement in the study is voluntary and you will be free to cease your participation at any time. All you need to do is say that you do not want to participate anymore. You are also free to withdraw any data that you have provided to the researcher.

You are free to ask questions about the study at any time. Please contact any of the researchers or project staff. The student researcher (and interpreter) will also be available to talk about the study with you in person after your interview.

How will the results be used?

The recordings of the interviews will be transferred to written transcripts and this data will be used to write published academic articles which will be publicly available. The articles will be included in the student researcher's PhD thesis and may be presented at conferences.

A brief report of the findings of this study, in English and Tetum, will be made available to your village head at the end of the study.

Confidentiality

Your confidentiality will be protected in a number of ways. Firstly, any notes, audio recordings or correspondence between you and the researchers will be kept in password protected files and computers or in a locked safe at the researcher's residence in East Timor, or at the University of Melbourne in Australia. These will only be accessible by the researchers listed above. As soon as the audio recordings are transferred to written transcripts, the audio files will be destroyed. Digital recordings of the transcripts as well as the consent forms will be destroyed 5 years after the completion of the student researcher's PhD.

You will not be identified by name on any notes or publications. You will be given an ID number, which will be written on your consent forms and transcripts. A record of your name matching your ID will be kept separately to any notes or questionnaires and will be stored in a password-protected and/or locked facility.

Concerns

If you have any questions or concerns, please contact:

Susana Nery	+67 77005990
Salvador Amaral	+67 77273290

You can also contact any of the researchers listed at the top of this letter via email.

This study has received clearance from the University of Melbourne Human Research Ethics Committee and the Government of East Timor's Ministry of Health. If you have any questions or concerns about the conduct of this study you can contact:

The Executive Officer
Human Research Ethics
The University of Melbourne
Phone: +61 3 8344 2073
Fax: +61 3 9347 6739

Ministry of Health of Timor-Leste
Phone: +67 333 1113

Appendix 2 – Consent Forms

Fomulariu Consentimentu

**Interpretasaun NGO WaterAid nia programa
iha Manufahi, Timor-Leste**

Peskizadores

Principal Peskizador	James Black
Co-Peskizador	Martha Morrow
Co-Peskizador	Susana Nery
Estudante Peskizador	Naomi Francis

Naran Partisipante: _____

Hau hetan autorizasaun ona atu partisipa iha estudu ne'e no komprende no iha koñesementu katak:

1. Estudu ida ne'e nia objetivu atu halao peskiza. Hau hetan ona esplikasaun konaba estudu ida ne'e no hau hetan ona stementu lian klaru atu rai.
2. Hau sei husu atu partisipa iha entrevista ho estudante peskizador no interpreter karik persija, no sei uza audiu rekorder.
3. Audiu rekorder sei halo aat depois sira transfere ba transkripsaun hakerek.
4. Nota balun, transkripsaun hakerek husi entrevista no korespondensia ho peskizador sira sei rai didiak husi estudante peskizador, ho uza protesaun-password ba dokumentus sira no komputador ou sei xave, no mós iha residencia peskizador sira nia iha Timor-leste, ou Universidade Melbourne iha Australia.
5. Depois hau asina fomulariu consent ida ne'e enstudante peskizador sei rai ho aseguara.
6. Hau nia envolvementu iha estudu ida ne voluntariu no hau sei hapara hau nia partisipasaun iha tempu ne'ebé deit. Hau mós livre atu foti data ne'ebé hau fo ona ba peskizador.
7. Resultadu husi estudu ida ne'e sei publika iha artigu akademika, tesis PhD estudante peskizador sira nian no bele mós apresenta iha konfrensia.
8. Hau nia naran sei la uza iha nota balun, transkripsaun ou material.
9. Hau nia naran sei la uza iha material ne'ebé relata ho estudu ida ne'e, no loron ikus ba numeru partisipante ne'ebé oituan, hau bele atu identifika.

Assinatura Partisipante: _____ Data: _____

(*Karik partisipante la bele atu asina*) Hau estudante peskiza rekoñese katak informasaun iha fomulariu consent ida ne'e komunika klaru ona, no partisipante ne'ebé naran mensiona iha leten komprende ona no sira fo sira nia konsiensia atu partisipa iha estudu ida ne'e.

Assinatura husi Estudante Peskizador: _____ Data: _____

Assinatura husi testamuña _____ Date: _____

Consent Form

**Interpretations of Community-Led Total Sanitation
in Manufahi, East Timor**



Researchers

Principal Researcher	James Black
Co-Researcher	Martha Morrow
Co-Researcher	Susana Nery
Student Researcher	Naomi Francis

Name of participant: _____

I consent to participate in this study and understand and acknowledge that:

1. This study is for research purposes. The study has been carefully explained to me and I have been given a Plain Language Statement to keep. ☐
2. I will be asked to participate in an interview with the student researcher and an interpreter if necessary, and that this will be audio recorded. ☐
3. The audio recordings will be destroyed after they have been transferred to written transcripts. ☐
4. Any notes, written transcripts of interviews and correspondence with the researchers will be kept securely by the student researcher, in password-protected files and computers or a locked safe, either in the researcher's residence in East Timor, or at the University of Melbourne in Australia. ☐
5. After I sign this consent form it will be kept securely by the student researcher. ☐
6. My involvement in the study is voluntary and I will be free to cease my participation at any time. I am also free to withdraw any data that I have provided to the researcher. ☐
7. The results of this study will be published in academic articles, the student researcher's PhD thesis and may be presented at conferences. ☐
8. My name will not be used in any notes, transcripts or published material. ☐
9. Although my name will not be used in material related to this study, due to the small number of participants, I may be able to be identified. ☐

Participant signature: _____ Date: _____

(If participant unable to sign) I, the student researcher acknowledge that the information in this consent form has been clearly communicated to, and is understood by the participant named above and they give their consent to participate in this study.

Student researcher signature: _____ Date: _____

Witness' signature: _____ Date: _____

Formuláriu Konsentimentu

Mudansa iha koñesementu, hahalok no pratika entre partisipasaun xefe da família iha total saneamentu comunidade Lideradu iha manufahi, Timor-leste.



THE UNIVERSITY OF
MELBOURNE

FAZE QUALITATIVU

Peskizador Sira

Principal peskizador	James Black
Co-peskizadores	Martha Morrow
Co-peskizador	Susana Nery
Estudante peskiza	Naomi Francis

Naran Partisipante: _____

Hau hetan autorizasaun ona atu partisipa iha estudu ne'e no komprende no iha koñesementu katak:

1. Estudu ida ne'e nia objetivu atu halao peskiza. Hau hetan ona espikasau konaba estudu ida ne'e no hau hetan ona stementu lian klaru atu rai ☐
2. Hau sei husu atu partisipa iha entrevista ho estudante peskizador no interpreter karik persija, no sei uza audiu rekorder. ☐
3. Audiu rekorder sei halo aat depois sira transfere ba transkripsaun hakerek. ☐
4. Nota balun, transkripsaun hakerek husi entrevista no korespondensia ho peskizador sira sei rai didiak husi estudante peskizador, ho uza protesaun-password ba dokumentus sira no komputador ou sei xave, no mós iha residencia peskizador sira nia iha Timor-leste, ou Universidade Melbourne iha Australia. ☐
5. Depois hau asina formuláriu konsent ida ne'e enstudante peskizador sei rai ho aseguara. ☐
6. Hau nia envolvimentu iha estudu ida ne voluntariu no hau sei hapara hau nia partisipasaun iha tempu ne'ebé deit. Hau mós livre atu foti data ne'ebé hau fo ona ba peskizador. ☐
7. Resultadu husi estudu ida ne'e sei publika iha artigu akademika, tesis PhD estudante peskizador sira nian no bele mós apresenta iha konfrensia. ☐
8. Hau nia naran sei la uza iha nota balun, questionnaire ou material ne'ebé publika. ☐
9. Iha neba sei tau numeru ID atu proteje hau nia identidade ne'ebé sei hakerek iha hau nia questionnaire sira atu nune peskizador sira bele apar questionnaire ne'ebé hau halo kompleta. ☐
10. Iha rekorda/grava hau nia naran par ho hau nia ID sei rai keta-ketak ba notas ruma o questionnaire sira no sei fahe ida-idak ho password ne'ebé proteje ona no facilidade ida ne'ebé xave. ☐

Assinatura Partisipante: _____ Data: _____

(Karik partisipante labele atu asina) Hau estudante peskiza rekoñese katak informasaun iha formuláriu konsent ida ne'e komunika klaru ona, no partisipante ne'ebé naran mensiona iha leten komprende ona no sira fo sira nia konsiensia atu partisipa iha estudu ida ne'e.

Assinatura husi Estudante Peskizador: _____ Data: _____

Assinatura husi testamunha _____ Date: _____

Consent Form

Changes in Knowledge, Attitudes and Practices
among heads of households participating in
Community-Led Total Sanitation in Manufahi, East Timor



QUALITATIVE PHASE

Researchers

Principal Researcher	James Black
Co-Researcher	Martha Morrow
Co-Researcher	Susana Nery
Student Researcher	Naomi Francis

Name of participant: _____

I consent to participate in this study and understand and acknowledge:

1. That this study is for research purposes. The study has been carefully explained to me and I have been given a Plain Language Statement to keep. ☐
2. I will be asked to participate in an interview with the student researcher and an interpreter if necessary, and that this will be audio recorded. ☐
3. The audio recordings will be destroyed after they have been transferred to written transcripts. ☐
4. Any notes, written transcripts of interviews and correspondence with the researchers will be kept securely by the student researcher, in password-protected files and computers or a locked safe, either in the researcher's residence in East Timor, or at the University of Melbourne in Australia. ☐
5. That after I sign this consent form it will be kept securely by the student researcher. ☐
6. That my involvement in the study is voluntary and I will be free to cease my participation at any time. I am also free to withdraw any data that I have provided to the researcher. ☐
7. That the results of this study will be published in academic articles, the student researcher's PhD thesis and may be presented at conferences. ☐
8. That my name will not be used in any notes, questionnaires or published material. ☐
9. That I will be given an ID number to protect my identity which will be written on my questionnaires so that the researchers can match each of the questionnaires I complete. ☐
10. That a record of my name matching my ID will be kept separately to any notes or questionnaires and will be stored in a password-protected and/or locked facility. ☐

Participant signature: _____ Date: _____

(If participant unable to sign) I, the student researcher acknowledge that the information in this consent form has been clearly communicated to, and is understood by the participant named above and they give their consent to participate in this study.

Student researcher signature: _____ Date: _____

Witness' signature: _____ Date: _____



THE UNIVERSITY OF
MELBOURNE

Formuláriu Konsentimentu

Mudansa ba koñesimentu, hahalok/opiniaun? no pratika entre familia iha partisipasaun iha NGO WaterAid nia programa iha Manufahi, Timor-Leste

Peskizador sira

Xefi Peskizador	James Black
Co-Peskizador	Martha Morrow
Co-Peskizador	Susana Nery
Estudante Peskizador	Naomi Francis

Naran partisipante: _____

Hau autoriza ona atu participa no iha komprensaun no koñesimentu iha estudu ida ne'e:

1. Katak estudu ida ne'e nia prinsipiu atu halao peskiza. Esplika ona ba hau ho didiak konaba estudu ida ne'e no hau hetan ona deklarasaun/stetmentu lian simplis atu rai. ☐
2. Iha neba sei husu atu kompleta questionariu/perguntas iha ne'ebé estudante peskiza sei le'e ba hau no sei ajuda tradus husi tradutor karik persiza. ☐
3. Estudante peskiza sei rai ho seguru questionariu/perguntas ne'ebé kompleta ona, iha arquivu ne'ebé seguru no protégé ho password iha komputador ou safe metin, nomos iha residencia peskizador sira iha Timor Leste, ou Universidade Melbourne iha Australia. ☐
4. Depois assina tiha fomuláriu konsentimentu estudante peskizador sei rai ho seguru. ☐
5. Hau nia envolve-an iha estudu ida e'e voluntariu no hau sei livre atu hapara hau nia partisipasaun iha tempu ne'ebé deit. Hau mos livre atu foti fali data balun ne'ebé ha/ fo ona ba peskizador.. ☐
6. Resultadu husi estudu ida ne'e sei publika iha artigu akademika, skripsi PhD/Doutoramentu estudante peskizador sira nian no bele mos apresenta iha konfrensia. ☐
7. Hau nia naran sei la uza iha notas, questionariu/pergunta ou informasaun material balun. ☐
8. Sei tau numeru ID atu hodi protégé hau nia identidade ida ne'ebé sei hakerek iha hau nia questionariu/pergunta atu nune peskizador sir abele apar kada questionariu/pergunta ne'ebé hau kompleta. ☐
9. Dokumentasaun husi hau nia naran apar ho hau nia ID sei rai keta-ketak iha notas ou questionariu/perguntas balun no sei rai ho protesaun password no fasilidade ne'ebé maka save. ☐

Assinatura partisipante: _____ Data: _____

(karik partisipante labele assina) Hau, estudante peskizador iha koñesimentu katak informasaun iha formuláriu konsentimentu ne'e komunika ona ho klaru, no partisipante komprende ona husi naran partisipante nian iha leten no sira iha konsensia atu participa iha estudu ida ne'e.

Assinatura estudante peskizador _____ Data: _____

Assinatura testamuña _____ Data: _____

Consent Form

**Changes in Knowledge, Attitudes and Practices
among heads of households participating in
Community-Led Total Sanitation
in Manufahi, East Timor**



Researchers

Principal Researcher James Black
Co-Researcher Martha Morrow
Co-Researcher Susana Nery
Student Researcher Naomi Francis

Name of participant: _____

I consent to participate in this study and understand and acknowledge:

1. That this study is for research purposes. The study has been carefully explained to me and I have been given a Plain Language Statement to keep. ☐
2. That I will be asked to complete a questionnaire which the student researcher will read out to me with the assistance of an interpreter if necessary. ☐
3. That any completed questionnaires will be kept securely by the student researcher, in password-protected files and computers or a locked safe, either in the researcher's residence in East Timor, or at the University of Melbourne in Australia. ☐
4. That after I sign this consent form it will be kept securely by the student researcher. ☐
5. That my involvement in the study is voluntary and I will be free to cease my participation at any time. I am also free to withdraw any data that I have provided to the researcher. ☐
6. That the results of this study will be published in academic articles, the student researcher's PhD thesis and may be presented at conferences. ☐
7. That my name will not be used in any notes, questionnaires or published material. ☐
8. That I will be given an ID number to protect my identity which will be written on my questionnaires so that the researchers can match each of the questionnaires I complete. ☐
9. That a record of my name matching my ID will be kept separately to any notes or questionnaires and will be stored in a password-protected and/or locked facility. ☐

Participant signature: _____ Date: _____

(If participant unable to sign) I, the student researcher acknowledge that the information in this consent form has been clearly communicated to, and is understood by the participant named above and they give their consent to participate in this study.

Student researcher signature: _____ Date: _____

Witness' signature _____ Date: _____

Fomulariu Consentimentu

Fator pozitivu no negativu konaba NGO WaterAid nia programa iha Manufahi, Timor Leste



Peskizadores

Principal Peskizador	James Black
Co-Peskizador	Martha Morrow
Co-Peskizador	Susana Nery
Estudante Peskizador	Naomi Francis

Naran Partisipante: _____

Hau hetan autorizasaun ona atu partisipa iha estudu ne'e no komprende no iha koñesementu katak:

1. Estudu ida ne'e nia objetivu atu halao peskiza. Hau hetan ona espilikasaun konaba estudu ida ne'e no hau hetan ona stementu lian klaru atu rai.
2. Hau sei husu atu partisipa iha entrevista ho estudante peskizador no interpreter karik persija, no sei uza audiu rekorder.
3. Audiu rekorder sei halo aat depois sira transfere ba transkripsaun hakerek.
4. Nota balun, transkripsaun hakerek husi entrevista no korespondensia ho peskizador sira sei rai didiak husi estudante peskizador, ho uza protesaun-password ba dokumentus sira no komputador ou sei xave, no mós iha residensia peskizador sira nia iha Timor-leste, ou Universidade Melbourne iha Australia.
5. Depois hau asina formulariu consent ida ne'e enstudante peskizador sei rai ho aseguara.
6. Hau nia envolvimento iha estudu ida ne voluntariu no hau sei hapara hau nia partisipasaun iha tempu ne'ebé deit. Hau mós livre atu foti data ne'ebé hau fo ona ba peskizador.
7. Resultadu husi estudu ida ne'e sei publika iha artigu akademika, tesis PhD estudante peskizador sira nian no bele mós apresenta iha konfrensia.
8. Hau nia naran sei la uza iha nota balun, transkripsaun ou material.
9. Hau nia naran sei la uza iha material ne'ebé relata ho estudu ida ne'e, no loron ikus ba numeru partisipante ne'ebé oituan, hau bele atu identifika.

Assinatura Partisipante: _____ Data: _____

(Karik partisipante labele atu asina) Hau estudante peskiza rekoñese katak informasaun iha formulariu consent ida ne'e komunika klaru ona, no partisipante ne'ebé naran mensiona iha leten komprende ona no sira fo sira nia konsiensia atu partisipa iha estudu ida ne'e.

Assinatura husi Estudante Peskizador: _____ Data: _____

Assinatura husi testamunia _____ Date: _____

Consent Form

**Factors associated with the success or failure of
Community-Led Total Sanitation in Manufahi, East Timor**



Researchers

Principal Researcher	James Black
Co-Researcher	Martha Morrow
Co-Researcher	Susana Nery
Student Researcher	Naomi Francis

Name of participant: _____

I consent to participate in this study and understand and acknowledge that:

1. This study is for research purposes. The study has been carefully explained to me and I have been given a Plain Language Statement to keep. ☐
2. I will be asked to participate in an interview with the student researcher and an interpreter if necessary, and that this will be audio recorded. ☐
3. The audio recordings will be destroyed after they have been transferred to written transcripts. ☐
4. Any notes, written transcripts of interviews and correspondence with the researchers will be kept securely by the student researcher, in password-protected files and computers or a locked safe, either in the researcher's residence in East Timor, or at the University of Melbourne in Australia. ☐
5. After I sign this consent form it will be kept securely by the student researcher. ☐
6. My involvement in the study is voluntary and I will be free to cease my participation at any time. I am also free to withdraw any data that I have provided to the researcher. ☐
7. The results of this study will be published in academic articles, the student researcher's PhD thesis and may be presented at conferences. ☐
8. My name will not be used in any notes, transcripts or published material. ☐
9. Although my name will not be used in material related to this study, due to the small number of participants, I may be able to be identified. ☐

Participant signature: _____ Date: _____

(If participant unable to sign) I, the student researcher acknowledge that the information in this consent form has been clearly communicated to, and is understood by the participant named above and they give their consent to participate in this study.

Student researcher signature: _____ Date: _____

Witness' signature: _____ Date: _____

Appendix 3 – Study 1 Question Guides

S1 Question Guide – Original Proponents of CLTS

Thank you for speaking to me today – I understand you're very busy!

- The 'essential elements' of CLTS are referred to in your practical guide and handbook.
 - What would you say these are?
 - Have these changed since the guidebooks were written?
- Parts of CLTS get adapted to local contexts.
 - What does an approach need to be called CLTS?
 - If CLTS can be adapted to local contexts, what is it OK to adapt and what elements need to remain fixed?
- I've noticed a tension between practitioners (government and NGO) understanding the community-driven nature of CLTS and the difficulty with doing this at scale which needs to be efficient (not to mention hierarchies getting in the way).
 - How can CLTS be done at scale without losing its community-driven nature?
 - How can CLTS be done at scale without becoming mechanical and allowing flexibility for facilitators and communities alike?
- What are the key motivators in CLTS that are activated? Are they still disgust, shame and shock?
- Who should be allowed to define CLTS?
- If you are aware, what is your opinion of how CLTS is being implemented in Timor-Leste?

S1 Question Guide – Govt and BESIK Reps

- Briefly, can you tell me about your background?
 - Education
 - Work experience
 - How did you come to start working at SAS/MOH?
- What is your role at SAS/MOH?
- What is the role of SAS/MOH?
 - What is their purpose?
 - What do they do?
- Please describe how SAS/MOH deliver WASH interventions to rural areas in Manufahi/Timor-Leste?
 - What approaches are used?
 - Why these approaches? Who introduced these approaches to Timor-Leste? When?
 - Where do these approaches come from? Who designed them?
 - Who does what, coordination (e.g. with NGOs)?
 - Who does your department collaborate with to manage WASH?
 - What kind of WASH training do employees get/does SAS/MOH provide?
 - Do you conduct monitoring or verification of WASH interventions? If so, please describe how this happens.
 - What activities are in place to ensure WASH improvements are sustainable?
- What is your opinion of the WASH approach used in Manufahi/Timor-Leste?
- What are the biggest challenges in the way WASH is managed in Manufahi/Timor-Leste?
- How would you change the approach/improve the approach? Is this the best way to deliver WASH to Manufahi/Timor-Leste's rural areas? Is it appropriate for Timor-Leste?

S1 Question Guide – Implementing Staff

- Briefly, can you tell me about your background?
 - Education
 - Work experience
 - How did you come to start working at your organisation?
 - What is your role at your organisation?
- What is the role of your organisation? What is their role in delivering WASH programs in Manufahi/Timor-Leste?
- Please describe the approach your organisation uses to deliver WASH interventions to rural areas in Manufahi/Timor-Leste.
 - What approaches are used?
 - Why these approaches? Who introduced these approaches to your you/your organisation?
 - Where do these approaches come from? Who designed them?
- What are the WASH activities your organisation take part in/organise?
 - What kind of WASH training do staff in your organisation get? Do you have manuals or guidebooks that you use?
 - How do you consult with new project sites?
 - Please describe the activities you do with community members.
 - Do you use subsidies at all?
 - Which other organisations do you collaborate with?
 - Do you conduct monitoring or verification of WASH interventions? If so, please describe how this happens.
 - What activities are in place to ensure WASH improvements are sustainable?
- What is your opinion of the WASH approach used in Manufahi/Timor-Leste?
- What are the biggest challenges in the way WASH is managed in Manufahi/Timor-Leste?
- You are implementing this first hand, so you are the expert on it. How would you change the approach/improve the approach? Do you think this is the best way to deliver WASH to Manufahi/Timor-Leste's rural areas? Is it appropriate for Timor-Leste? How would you do things differently if you had more resources or power?
- (If relevant) Is the application of CLTS in Manufahi/Timor-Leste different from the way it was taught to you or described in the handbook? If so, how?
- (If relevant) How do you think me being at the inception/CAP meeting affects the meeting?

S1 Question Guide – NGO Senior Staff

- Briefly, can you tell me about your background?
 - Education
 - Work experience
 - How did you come to start working at your organisation?
 - What is your role at your organisation?
- What is the role of your organisation? What is their role in delivering WASH programs in Manufahi/Timor-Leste?
- Please describe the approach your organisation uses to deliver WASH interventions to rural areas in Manufahi/Timor-Leste.
 - What approaches are used?
 - Why these approaches? Who introduced these approaches to your you/your organisation?
 - Where do these approaches come from? Who designed them?
- What are the WASH activities your organisation take part in/organise?
 - What kind of WASH training do staff in your organisation get? Do you have manuals or guidebooks that you use?
 - How do you consult with new project sites?
 - Please describe the activities you do with community members.
 - Do you use subsidies at all?
 - Which other organisations do you collaborate with?
 - Do you conduct monitoring or verification of WASH interventions? If so, please describe how this happens.
 - What activities are in place to ensure WASH improvements are sustainable?
- What is your opinion of the WASH approach used in Manufahi/Timor-Leste?
- What are the biggest challenges in the way WASH is managed in Manufahi/Timor-Leste?
- How would you change the approach/improve the approach? Is this the best way to deliver WASH to Manufahi/Timor-Leste's rural areas? Is it appropriate for Timor-Leste?
- (If relevant) Is the application of CLTS in Manufahi/Timor-Leste different from the way it was taught to you or described in the handbook? If so, how?

S1 Question Guide – Village Leaders

- Please tell me about the NGOs that have visited your village recently.
 - What was their purpose here?
 - What did they do here?
 - Were there any meetings? What happened in the meetings?
 - What else happened?
 - When did the NGO come to your village? How often do they visit?
 - Who is involved with the activities? What do they have to do?
 - Did anyone in the community get any training? If so, please describe.
 - Have you received any materials for the activities? What are they for?
- How do people in the community feel/think about the activities by the NGO?
 - What do you think about the NGO program?
 - Sometimes, people are really happy and sometimes people are really frustrated or unhappy with some activities. Did that happen in your community?
 - What do the people in your community like about the program?
 - What were the difficulties with the program?
 - I'm interested in your opinion about the program. What about the program would you like to be different? How could it be better?
 - Is it difficult or easy to build toilets?
 - Is it difficult or easy to build the water supply system?
- Before the NGO came, how was the water and sanitation situation in your village?
 - How did the community collect water?
 - Where did they defecate?
 - Were there any problems?
 - Has this changed since the NGO came?
 - Do you think it's better to have toilets or water?
 - Have you talked to other NGOs or government about water and sanitation in your village? Have any others come to visit?

Appendix 4 - Study 2 Formative Research Phase Question Guide

S2 Formative Phase Question Guide v2

Remember, there are no wrong answers. You are the experts about your community. I'm interested in your opinions and knowledge. You are the experts about your community. You can ask me questions at any time.

1.
Who lives in this house?/Who sleeps in this house usually?
How old are they?
Who is the head of the house? Who makes decisions?

2.
What work do people in this house do?
Does anyone work in Same or elsewhere sometimes?
Do you ever sell your produce?

3.
Is there a school in your aldeia/bairro?
Which classes?
Where do children go to school after this?

4. (Refer to the photos found at the end of this document.)
Please look at these photos (explain the photos as you show them). Which of these things do you have? (Put these pictures to the side)

Do you want any of these things?/Which of these do you want the most? Choose 3. Would you buy/get them?

Why do you want these things?

5.
Do people in this house ever get sick?
What kind of sicknesses? What about the kids?
Why do you get x, y, z (list the ones they mention)?
How do you treat the sickness?
Can you prevent the sickness from happening again? If yes, how?
Is anyone in your house unwell a lot of the time? Does anyone in your house have a disability?

6.
What food do you eat?
Where do you get the food from? Do you need to buy any food?
How do you prepare it?
Where do you prepare it?

7.
Where does the water for your house come from?
How far away is this source/connection? What is the connection like? Who made the connection?
When? If you did it, how much did it cost?
Can you always use this source or do you have to go somewhere else sometimes? Why?
How do you collect the water? Who collects it? How much do you collect?
Where do you store it?

What do you use this water for? Do you just drink the water or boil/treat it first?
Do you ever collect rainwater? How? What do you use it for?

8.

When should you wash your hands? (Potential for using pictures here) Why?
How do you wash your hands? (Where, which water, with soap?)
Do you ever have difficulty washing your hands?

9.

Where do you have a shower?
Where do you wash your clothes?
How far away is this source?
Can you always use this source or do you have to go somewhere else sometimes? Why?

10.

Are you satisfied with your water supply or would you like a different water supply? If so, what kind?
How much would you pay for a different water supply?

Sanitation

And now, some questions about sanitation.

11.

Where do people in your house defecate?

If they have a toilet:

What kind of toilet?
Do you always use a toilet or sometimes use something else?
What if you're sick/pregnant/just given birth (3 months)/old/have a disability?
What about when it is dark/raining?
Where do the kids defecate? What do you do if they shit around the house?
What do you do with baby poo?
What about when you are menstruating? Can you still use the toilet?
How do you clean yourself afterwards? (Where, which water, with soap?)

How long have you had this toilet? What did you have before this?
Why did you build the toilet?
Who decided to build the toilet?
How did you build the toilet? With what materials/resources/money/people?
Are you satisfied with your toilet or would you like a different kind (Maybe show pictures)? Why?
Do other people you know have toilets? Are there any other toilets in town e.g. at the office, school?
Some people shit in the bush – do you ever find it? What do you think about this? Why?
Is it a problem for you if other people don't have a toilet?

If they shit in the bush:

Ok, how far away?
What happens to the shit? Do you cover it?
What if you're sick/pregnant/just given birth (3 months)/old/have a disability?
What about when it is dark/raining?

Where do the kids defecate? What do you do if they shit around the house?
What do you do with baby poo?
What about when you are menstruating?
How do you clean yourself afterwards? (Where, which water, with soap?)
It must be difficult to wash afterwards. Do you take water with you or do you come back to the house or go to the water source?

Are you satisfied with shitting in the bush? Would you prefer to have a toilet? Why?
Do other people you know have toilets? Why did they build toilets? Are there any other toilets in town e.g. at the office, school?
If you could build a toilet, what kind would you like (show pictures)? Why?
What would you need to build a toilet? Is this possible? Why/why not?

12.

Do you have any animals? Which ones?
Do you use their faeces for anything? E.g. fertilizer?
(If it's been raised already, could animal faeces make you sick? Why/why not?)

13.

Does anyone in your house ever get (if yes, ask why and probe):

- diarrhoea
- malnutrition
- cough
- chest pain

(If none, ask if they know other people who have and ask why and probe)

14.

If it hasn't already been raised:

Do you think you can sick from human faeces? How? How does the disease get from your shit to inside your body?
What kind of sickness?
How can this be prevented?

15.

Could animal faeces make you sick? Why/Why not?

Ok, the last questions are about your village.

16.

Do you ever have village meetings? Who attends? Do you attend?
What is the purpose of the meetings?

17.

How do problems in the village get resolved?
What kind of problems are there?
Are there many problems?
Can your chefe fix them?

18.

Have any NGOs or government projects come to your village?
If so, who, what did they do and when?

Appendix 5 – Study 2 Questionnaire

Study 2 KAP Questionnaire

Unless specifically mentioned, questions are open-ended and no prompts are given.

Date: / /

Participant ID:

S	2			

(circle) BL FU1 FU2

W4W Household ID:

Consent given?

Yes	
No	➔ Do not proceed

GPS Coordinates: _____

Notes to help re-identify the house: _____

Suco	
Aldeia	
Bairro	

People helping to answer questions: (Indicate how many, and circle the main person answering questions)

Grandma	
Grandpa	
Mum	
Dad	
Teenage boy	
Teenage girl	
Male child	
Female child	

PRIORITIES

1. (Lay out the picture cards of the 'village facilities') Out of these items, please tell me what is most important to you. (Encourage the participant to choose the top three, and then the top item).

Clinic	
School	
Road	
Water	
Public Toilet	
Church/capela	
Don't know	
Declined to answer	

It

2. *(Lay out the picture cards of the 'household items')* Out of these items, please tell me what is most important to you. *(Encourage the participant to choose the top three items, and then the top item).*

Toilet	
Motorbike	
Radio	
Bike	
Satellite dish	
Pigs	
Buffalo	
Rooster	
Rice	
Electricity	
House/fixing the house	
Hand cart	
Don't know	
Declined to answer	

3. *(Lay out the picture of the toilet and the water)* Out of these items, please tell me what is more important to you.

Toilet (individual)	
Water	
Both	
Don't know	
Declined to answer	

WATER

4. What is your current water source? *(Don't need too much detail – this is to find out if they end up using the WaterAid water source)*

	Water source 1	Water source 2
Rain water		
Spring via pipe		
Well		
Borehole with hand-pump		
River		
Other		
.....		
Don't know		
Declined to answer		

5. Why do you use these options?

Water source 1	Water source 2

6. Did your household help construct any of the water sources which you use?

No			
Yes	➔ If yes, how?	Water source 1	Water source 2
	Money		
	Materials		
	Labour		
	Other		
			
	Don't know		
	Declined to answer		

7. Are you satisfied with your household's water source

Yes	➔ If no, why not?	Water source 1	Water source 2
No	➔ If yes, why ?		
	Distance		
	Waiting in line		
	Flow rate		
	Reliability		
	Cleanliness		
	Tast		
	Other		
	 Why		
	Don't know		
	Who		
	Declined to answer		

8. Do you prefer option 1 or 2?

9. Would you prefer a different water source?

No	→ If no, go to Q12
Yes	→ If yes, what kind?
Spring water via pipe and tap near house, shared with others	
Spring water via pipe and tap near house, not shared with others	
Well, near house, shared with others	
Well, near house, not shared with others	
Borehole/tube well, with hand pump, near house, shared with others	
Borehole/tube well, with hand pump, near house, not shared with others	
Rainwater from a tank near house, shared with others	
Rainwater from a tank near house, not shared with others	
River	
Other.....	
Don't know	
Dedined to answer	

10. Who do you think should provide this water source?

Me	
My household	
My household together with others in the community	
Xefi suco	
Xefi aldeia	
Others in my community, not including me	Who
NGO	Which.....
Government	
Foreign aid	
Me (Naomi)	
Other.....	
Don't know	
Dedined to answer	

11. Is the water construction finished? Are there plans to fix/change/finish it?

No	➔ If no, go to Q12	
Yes	➔ If yes, what has been done already? (<i>Indicate by whom</i>)	
	Collected free local materials	
	Bought local materials	
	Have money to pay for it	
	Have paid for it	
	Have physical ability to construct	
	Have the tools to construct	
	Have people who know how to build it	
	The government has promised it	
	NGO has promised it	
	Acquired permission to make it	From whom.....
	Other	
	Don't know	
	Declined to answer	

12. What still needs to be done/acquired to get a new water source in your community? (*Prompt here if participant has trouble answering the question*)

Money	
Free local materials	
Bought local materials	<i>Do you know where to buy these from?</i>
Bought materials transported from elsewhere	<i>Do you know where to buy these from?</i>
Knowledge on how to construct	
Correct tools to construct	
Physical ability to construct	
Arrangements for others to do construction	<i>Who, how would you ask?</i>
Sufficient support for building the toilet e.g. permission from chief/household head	
Other.....	
Don't know	
Declined to answer	

SANITATION

13. Where do the people who live in your house usually defecate? For example, over the past week or so.

	Children => 3 and adults	Babies and toddlers < 3
Open defecation	Where _____ How far from house (m) _____	Where _____ How far from house (m) _____
Into water (river/lake)		
<i>Fahi luhan</i> (pig cage)		
<i>Sentina</i> (Toilet)		
Public toilet		
Nappy		
Other		
Don't know		
Dedined to answer		

14. Why do you defecate here?

	Children => 3 and adults	Babies and toddlers < 3
Don't have anywhere else		
Private		
Clean		
Healthy		
Socially acceptable		
Comfortable		
Convenient		
Safe	Why	
Someone said I have to	Who	
Other		
Don't know		
Dedined to answer		

15. Are you satisfied with where you defecate? (Prompts: Why are you satisfied? Why are you happy with where you defecate? Why is it good? Why are you unhappy with it? Why is it bad?)

Yes	➔ If yes, why? (Then go to Q19)
No	➔ If no, why not?
Privacy	
Cleanliness	
Health	
Social acceptability	
Comfort	
Convenience	
Safety	Why
Other	Who
Don't know	
Dedined to answer	

16. Would you prefer to defecate somewhere else?

Yes	➔ If yes, go to next question
No	➔ If no, go to question 19

17. Where would you prefer to defecate?

Open defecation	
Fahi luhān (pig cage)	
Toilet: What type? (DON'T PROMPT)	Direct pit toilet (<i>Rai kuak</i>) with wooden slats as a squat plate
	Offset pit toilet (<i>Rai kuak</i>) with concrete box squat plate
	Offset pit toilet (<i>Rai kuak</i>) with concrete mould squat plate
	Modern flush toilet
	With ventilation pipe
	With water
	With permanent superstructure e.g. concrete, wood
	With non-permanent superstructure e.g. bamboo, cloth
	Other
	Don't know
	Declined to answer
Public toilet	
Other.....	
Don't know	
Declined to answer	

18. (If they mention a toilet) Who should provide the new toilet? /Who should make the toilet?

Me	
My household	
My household together with others in the community	
Xefi suco	
Xefi aldeia	
Others in my community, not including me	Who
NGO	Who.....
Government	
Foreign aid	
Me (Naomi)	
Other.....	
Don't know	
Declined to answer	

19. Do you have a toilet?

No	→ If not, why not?
Yes	→ If yes, why did you build it?
Private	
Clean	
Healthy	
Socially acceptable	
Comfortable	
Convenient	
Safe	Why
Someone said I have to	Who
Have always had one	
Was there when I moved here	
Too expensive	
No access to materials	
Prefer to defecate elsewhere	
Not a priority	
Have a <i>fahi luhan</i>	
Other	
Don't know	
Decided to answer	

If they have a toilet:

20. Who built the toilet?

Current toilet:	Previous toilet:

21. When was it built?

Current toilet:	Previous toilet:

22. What materials is it made of?

Current toilet:	Previous toilet:

23. Who provided the materials?

Current toilet:	Previous toilet:

24. If you are not using the toilet, why not?

Current toilet:	Previous toilet:

25. Do you plan to build/fix your own toilet?

Yes	
No	→ Go to Q24

26. Why are you planning to build/fix your toilet?

Privacy	
Cleaner	
Healthier	
Socially acceptable	
Status	
Comfort	
Convenience	
Safer	
Used to do it this way	
Someone said I should	Who.....
So the new water source is connected	
So I will get albendazole medicine	
Other.....	
Don't know	
Dedined to answer	

27. What kind of toilet/repairs are you going to make?

Direct pit toilet (<i>Rai kuak</i>) with wooden slats as a squat plate	
Offset pit toilet (<i>Rai kuak</i>) with concrete box squat plate	
Offset pit toilet (<i>Rai kuak</i>) with concrete mould squat plate	
Modern flush toilet	
With ventilation pipe	
With water	
With permanent superstructure e.g. concrete, wood	
With non-permanent superstructure e.g. bamboo, cloth	
Add a ventilation pipe	
Add a squat plate	
Add a toilet (squat plate, bowl, pipe)	
Add superstructure	
Dig another pit	
Other	
Don't know	
Dedined to answer	

28. What have you done already (about building your new toilet)? (Prompt here if participant has trouble answering the question)

Collected free local materials	
Bought local materials	
Have money to pay for it	
Have paid for it	
Have physical ability to construct	
Have the tools to construct	
Have organised people who know how to build it to help me	
Have dug pit	
Have made toilet	
Have made superstructure	
The government has promised it	
NGO has promised it	
Acquired permission to make it	From whom.....
Other	
Don't know	
Declined to answer	

29. What still needs to be done to make your new toilet?

Money	
Free local materials	
Bought local materials	Do you know where to buy these from?
Bought materials transported from elsewhere	Do you know where to buy these from?
Knowledge on how to construct	
Correct tools to construct	
Physical ability to construct	
Arrangements for others to do construction	Who, how would you ask?
Need to make superstructure	
Need to make toilet	
Need to dig pit	
Sufficient support for building the toilet e.g. permission from chief/household head	
Other.....	
Don't know	
Declined to answer	

30. Do you ever see human faeces in the bush?

Yes	
No	
Don't know	
Declined to answer	

31. If you did see human faeces in the bush, what would you think?

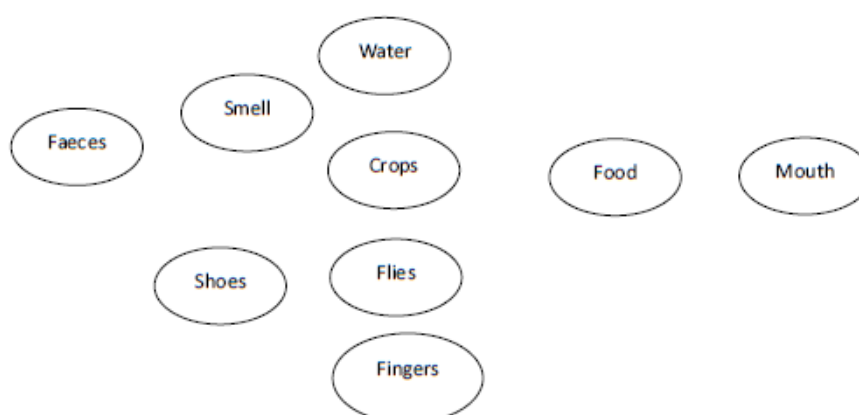
Don't care	
It's just the way things are	
Unacceptable	
Disgusting	
Angry	
Hopeless	
Frustrated	
Want to help others to have a toilet	
Other	
Don't know	
Dedined to answer	

FAECAL-ORAL PATHWAY

32. Do you think you can get sick from human faeces?

No	➔ If no, go to Q27	
Yes	➔ If yes, what illnesses/conditions does faeces cause?	
	<i>Kabun moras</i> (tummy ache, diarrhoea)	
	<i>Ukun moras</i> (headache)	
	<i>Kaban bubu</i> (swelling stomach)	
	<i>Bubu isin</i> (swelling body)	
	Fever	
	TB	
	Childbirth problems	
	Cough	
	Tired	
	Back pain	
	Chest pain	
	Malaria	
	Dengue	
	Worms	
	Malnutrition (stunting, big belly)	
	Vomiting	
	Other.....	

33. How does the disease travel from your faeces to your body? (Draw in any pathways mentioned and add in other nodes as necessary).



34. Do you think animal faeces could make you sick?

No		
Yes	➔ If yes, how could this be prevented?	
	Pen the animals up	
	Don't touch their faeces	
	Don't use their faeces for fertilizer	
	Other.....	

HYGIENE

35. When do you wash your hands?

	Yes	No
Before eating		
Before listening to the radio		
After waking up in the morning		
Before sleeping		
After defecating		
After taking a bath		
After cleaning a baby who has defecated		
Before cooking		

36. Why should you wash your hands at these times?

To be clean	
To prevent disease	
Because someone said I should	Who said.....
Because everyone else does	
Other	
Don't know	
Dedined to answer	

GENDER

37. Who has more free time: men or women?

(Is it a man or women answering this question? Man Woman Both)

Yes				
No	→ If not, who has more free time and why?	Men	Women	Both
	They don't work in the fields as much			
	They don't do as much housework			
	They don't look after children as much			
	They don't look after old people as much			
	They want more free time			
	They are lazy			
	That's just the way it is			
	It has always been like this			
	They can't work as much			
	Other.....			
	Don't know			
	Dedined to answer			

UNDERSTANDING OF PROGRAM

38. Do you know about WaterAid or the people who work with WaterAid?

No		
Yes	→ If yes, what is their purpose here?	
	To make a new water supply	
	To make toilets	
	To tell us about water	
	To tell us about toilets	
	To tell us about hygiene	
	To tell us about the law about WASH	
	To tell us about gender	
	To tell us about health	
	To tell us about worms	
	To do research	
	Because they get paid to be here	
	Other.....	
	Don't know	
	Dedined to answer	

39. Do you know about WASH for Worms? (Prompt: the people giving out worm medicine/*nasi kotak*)

No		
Yes	→ If yes, what is their purpose here? (After, go to Q33)	
	To make a new water supply	
	To make toilets	
	To tell us about water	
	To tell us about toilets	
	To tell us about hygiene	
	To tell us about the law about WASH	
	To tell us about gender	
	To tell us about health	
	To tell us about worms	
	To give us medicine/albendazol	
	To do research	
	Because they get paid to be here	
	Other.....	
	Don't know	
	Dedined to answer	

40. Had the WASH for Worms team been to visit recently?

Yes – in the village but not to this household yet	
Yes – visited house in last 1-3 days	
No	
Unsure	

HEALTH

41. What illnesses have you or anyone in your household had in the last month?

<i>Kabun moras</i> (tummy ache, diarrhoea)	
<i>Ulun moras</i> (headache)	
<i>Kaban bubu</i> (swelling stomach)	
<i>Bubu isin</i> (swelling body)	
Fever	
TB	
Childbirth problems	
Cough	
Tired	
Back pain	
Chest pain	
Malaria	
Dengue	
Worms	
Malnutrition (stunting, big belly)	
Vomiting	
Mobility impairment	
Mentally ill	
Other... ..	
Don't know	
Declined to answer	

OBSERVATIONS

If they have a toilet, ask to see it and take a photo. If they don't want to let me see it, ask them to describe it.

Observed?	
Described?	
Dedined both	

Type/features:

<i>Fahi luhan</i> (pig cage)	Yes	No
Distance from house		
Walls	Concrete	Wood <i>Bebak</i> Leaves Bamboo Cloth Plastic None Other.....
Roof	Concrete	Wood <i>Bebak</i> Leaves Bamboo Cloth Plastic None Other.....
Floor	Concrete	Wood slats Bamboo slats Dirt Other
Entrance	No door	Wooden door Plastic sheet Ramp Other
Toilet	Concrete squat plate from mould Improved concrete squat plate Porcelain squat plate Wooden slats Raised seat Other.....	
Toilet cover	None	Plastic lid Stone Wooden cover Concrete cover Other
Outflow	Direct pit	Offset pit Stream/River Hanging Other
	Covered	Covered with gaps Uncovered
Pit (if exists)	Direct	Offset
	Full	In-between Empty Couldn't see
Ventilation pipe	Yes	No Yes, but ineffective Has flyscreen
Gutter collecting water from roof to tank?	Yes	No
Water	Open stream Plastic pipe Bamboo pipe Drum Basin 5L container Other.....	
Soap	No	Yes Yes, but not used
Features to make easier use	Bars	Hanging rope Light source Other
Other		

Condition:

Clean?	
Used?	
Toilet cover in use?	
Broken?	
Other.....	

If they have a handwashing station, ask to see it and take a photo. If they don't want to let me see it, ask them to describe it.

	Yes - working	Yes – but broken	Yes – but no water	Soap? (Yes/No)
Station near house				
Station near toilet				
Station in other location				

Ask to see water source and take photo.

Photos – public goods



Photos – private/household goods





Appendix 6 – STATA ‘do’ Files

```

*****
*****

* Stata DO file for testing the proportions with positive answers in variables recorded as
0, 1 or Null                                *

*                               Written by Jim Black and Naomi Francis on 25-02-2016
*

*   Uses data from NF_STATA_Single_Prop_do_file.dta and sends output to a log file
NF_STATA_Single_Prop_do_file.log                                *

*                                                                    *

*****
*****

use "C:\NOMES\S2 - STATA\NF_STATA_Single_Prop.dta"

log using "C:\NOMES\S2 - STATA\NF_STATA_Single_Prop.log", replace


* Calculate proportion and CI of participants who scored 1 for
K1_2KnowMoreWaterAidBL_FU1.

proportion K1_2KnowMoreWaterAidBL_FU1


* Calculate proportion and CI of participants who scored 1 for
K1_2KnowMoreWaterAidFU1_FU2.

proportion K1_2KnowMoreWaterAidFU1_FU2


* Calculate proportion and CI of participants who scored 1 for
K1_2KnowMoreWaterAidBL_FU2.

proportion K1_2KnowMoreWaterAidBL_FU2


* Calculate proportion and CI of participants who scored 1 for
K1_3KnowMoreW4WBL_FU1.

```

proportion K1_3KnowMoreW4WBL_FU1

* Calculate proportion and CI of participants who scored 1 for K1_3KnowMoreW4W4FU1_FU2.

proportion K1_3KnowMoreW4W4FU1_FU2

* Calculate proportion and CI of participants who scored 1 for K1_3KnowMoreW4WBL_FU2.

proportion K1_3KnowMoreW4WBL_FU2

* Calculate proportion and CI of participants who scored 1 for K3_5KnowMoreFOPathBL_FU1.

proportion K3_5KnowMoreFOPathBL_FU1

* Calculate proportion and CI of participants who scored 1 for K3_5KnowMoreFOPathFU1_FU2.

proportion K3_5KnowMoreFOPathFU1_FU2

* Calculate proportion and CI of participants who scored 1 for K3_5KnowMoreFOPathBL_FU2.

proportion K3_5KnowMoreFOPathBL_FU2

* Calculate proportion and CI of participants who scored 1 for K3_6KnowMoreFODiseasesBL_FU1.

proportion K3_6KnowMoreFODiseasesBL_FU1

* Calculate proportion and CI of participants who scored 1 for K3_6KnowMoreFODiseasesFU1_FU2.

proportion K3_6KnowMoreFODiseasesFU1_FU2

* Calculate proportion and CI of participants who scored 1 for K3_6KnowMoreFODiseasesBL_FU2.

proportion K3_6KnowMoreFODiseasesBL_FU2

* Calculate proportion and CI of participants who scored 1 for K3_8KnowMorePrevAniPooBL_FU1.

proportion K3_8KnowMorePrevAniPooBL_FU1

* Calculate proportion and CI of participants who scored 1 for K3_8KnowMorePrevAniPooFU1_FU2.

proportion K3_8KnowMorePrevAniPooFU1_FU2

* Calculate proportion and CI of participants who scored 1 for K3_8KnowMorePrevAniPooBL_FU2.

proportion K3_8KnowMorePrevAniPooBL_FU2

* Calculate proportion and CI of participants who scored 1 for A2_1MoreSatWaterSystBL_FU1.

proportion A2_1MoreSatWaterSystBL_FU1

* Calculate proportion and CI of participants who scored 1 for A2_1MoreSatWaterSystFU1_FU2.

proportion A2_1MoreSatWaterSystFU1_FU2

* Calculate proportion and CI of participants who scored 1 for A2_1MoreSatWaterSystBL_FU2.

proportion A2_1MoreSatWaterSystBL_FU2

* Calculate proportion and CI of participants who scored 1 for
A3_1MoreSatWhereDefBL_FU1.

proportion A3_1MoreSatWhereDefBL_FU1

* Calculate proportion and CI of participants who scored 1 for
A3_1MoreSatWhereDefFU1_FU2.

proportion A3_1MoreSatWhereDefFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
A3_1MoreSatWhereDefBL_FU2.

proportion A3_1MoreSatWhereDefBL_FU2

* Calculate proportion and CI of participants who scored 1 for
A4_1MoreProvNewLooIntBL_FU1.

proportion A4_1MoreProvNewLooIntBL_FU1

* Calculate proportion and CI of participants who scored 1 for
A4_1MoreProvNewLooIntFU1_FU2.

proportion A4_1MoreProvNewLooIntFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
A4_1MoreProvNewLooIntBL_FU2.

proportion A4_1MoreProvNewLooIntBL_FU2

* Calculate proportion and CI of participants who scored 1 for
A4_2MoreProvNewH2OIntBL_FU1.

proportion A4_2MoreProvNewH2OIntBL_FU1

* Calculate proportion and CI of participants who scored 1 for A4_2MoreProvNewH2OIntFU1_FU2.

proportion A4_2MoreProvNewH2OIntFU1_FU2

* Calculate proportion and CI of participants who scored 1 for A4_2MoreProvNewH2OIntBL_FU2.

proportion A4_2MoreProvNewH2OIntBL_FU2

* Calculate proportion and CI of participants who scored 1 for A7_1MoreHaveLooMotIntBL_FU1.

proportion A7_1MoreHaveLooMotIntBL_FU1

* Calculate proportion and CI of participants who scored 1 for A7_1MoreHaveLooMotIntFU1_FU2.

proportion A7_1MoreHaveLooMotIntFU1_FU2

* Calculate proportion and CI of participants who scored 1 for A7_1MoreHaveLooMotIntBL_FU2.

proportion A7_1MoreHaveLooMotIntBL_FU2

* Calculate proportion and CI of participants who scored 1 for A7_2MorePlanLooMotIntBL_FU1.

proportion A7_2MorePlanLooMotIntBL_FU1

* Calculate proportion and CI of participants who scored 1 for A7_2MorePlanLooMotIntFU1_FU2.

proportion A7_2MorePlanLooMotIntFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
A7_2MorePlanLooMotIntBL_FU2.

proportion A7_2MorePlanLooMotIntBL_FU2

* Calculate proportion and CI of participants who scored 1 for
A7_3MoreNoLooCosRstrcBL_FU1.

proportion A7_3MoreNoLooCosRstrcBL_FU1

* Calculate proportion and CI of participants who scored 1 for
A7_3MoreNoLooCosRstrcFU1_FU2.

proportion A7_3MoreNoLooCosRstrcFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
A7_3MoreNoLooCosRstrcBL_FU2.

proportion A7_3MoreNoLooCosRstrcBL_FU2

* Calculate proportion and CI of participants who scored 1 for
A7_4MoreUseLooMotIntBL_FU1.

proportion A7_4MoreUseLooMotIntBL_FU1

* Calculate proportion and CI of participants who scored 1 for
A7_4MoreUseLooMotIntFU1_FU2.

proportion A7_4MoreUseLooMotIntFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
A7_4MoreUseLooMotIntBL_FU2.

proportion A7_4MoreUseLooMotIntBL_FU2

* Calculate proportion and CI of participants who scored 1 for
A7_5MoreODCosRstrcBL_FU1.

proportion A7_5MoreODCosRstrcBL_FU1

* Calculate proportion and CI of participants who scored 1 for
A7_5MoreODCosRstrcFU1_FU2.

proportion A7_5MoreODCosRstrcFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
A7_5MoreODCosRstrcBL_FU2.

proportion A7_5MoreODCosRstrcBL_FU2

* Calculate proportion and CI of participants who scored 1 for
A9_1MoreSeeFaecesNegBL_FU1.

proportion A9_1MoreSeeFaecesNegBL_FU1

* Calculate proportion and CI of participants who scored 1 for
A9_1MoreSeeFaecesNegFU1_FU2.

proportion A9_1MoreSeeFaecesNegFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
A9_1MoreSeeFaecesNegBL_FU2.

proportion A9_1MoreSeeFaecesNegBL_FU2

* Calculate proportion and CI of participants who scored 1 for
P4_1MoveUpSanLaddBL_FU1.

proportion P4_1MoveUpSanLaddBL_FU1

* Calculate proportion and CI of participants who scored 1 for
P4_1MoveUpSanLaddFU1_FU2.

proportion P4_1MoveUpSanLaddFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
P4_1MoveUpSanLaddBL_FU2.

proportion P4_1MoveUpSanLaddBL_FU2

* Calculate proportion and CI of participants who scored 1 for
P4_2MoveDownSanLaddBL_FU1.

proportion P4_2MoveDownSanLaddBL_FU1

* Calculate proportion and CI of participants who scored 1 for
P4_2MoveDownSanLaddFU1_FU2.

proportion P4_2MoveDownSanLaddFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
P4_2MoveDownSanLaddBL_FU2.

proportion P4_2MoveDownSanLaddBL_FU2

* Calculate proportion and CI of participants who scored 1 for
P5_2LooMoreSHBL_FU1.

proportion P5_2LooMoreSHBL_FU1

* Calculate proportion and CI of participants who scored 1 for
P5_2LooMoreSHFU1_FU2.

proportion P5_2LooMoreSHFU1_FU2

* Calculate proportion and CI of participants who scored 1 for
P5_2LooMoreSHBL_FU2.

proportion P5_2LooMoreSHBL_FU2

* Calculate proportion and CI of participants who scored 1 for P6_2SaferH2OBL_FU1.

proportion P6_2SaferH2OBL_FU1

* Calculate proportion and CI of participants who scored 1 for
P6_2SaferH2OFU1_FU2.

proportion P6_2SaferH2OFU1_FU2

* Calculate proportion and CI of participants who scored 1 for P6_2SaferH2OBL_FU2.

proportion P6_2SaferH2OBL_FU2

* Close data and log file to tidy up:

log close

clear

* If we want we can also close Stata, so this can run independently from a command line
or Windows Explorer

exit, STATA clear

```
*****
*****
```

```
* Stata DO file for testing the proportions with positive answers in variables recorded as
0, 1 or Null *
```

```
*
    Written by Jim Black and Naomi Francis on 25-02-2016
*
```

```
* Uses data from NF_STATA_Comp_Of_2_Prop_do_file.dta and sends output to a
log file NF_STATA_Comp_Of_2_Prop_do_file.log
*
```

```
*
                                                                    *
```

```
*****
*****
```

```
use "C:\Users\Nomes\SkyDrive\Nomes' Stuff\Seriously\PhD\Analysis\Analysis -
Study 2\STATA\2018-02-15\STATA files\NF_STATA_Comp_Of_2_Prop.dta"
```

```
log using "C:\Users\Nomes\SkyDrive\Nomes' Stuff\Seriously\PhD\Analysis\Analysis
- Study 2\STATA\2018-02-15\STATA files\NF_STATA_Comp_Of_2_Prop.log",
replace
```

```
* Compare proportion of participants who scored 1 for over three time periods: BL-
FU1, FU1-FU2 and BL-FU2
```

```
prtest K1_1BLKnowWaterPlans == K1_1FU1KnowWaterPlans
```

```
prtest K1_1FU1KnowWaterPlans == K1_1FU2KnowWaterPlans
```

```
prtest K1_1BLKnowWaterPlans == K1_1FU2KnowWaterPlans
```

```
* Compare proportion of participants who scored 1 for over three time periods: BL-
FU1, FU1-FU2 and BL-FU2
```

```
prtest K2_1BLKnowLooMat == K2_1FU1KnowLooMat
```

```
prtest K2_1FU1KnowLooMat == K2_1FU2KnowLooMat
```

```
prtest K2_1BLKnowLooMat == K2_1FU2KnowLooMat
```

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest K2_2BLKnowLooBuild == K2_2FU1KnowLooBuild

prtest K2_2FU1KnowLooBuild == K2_2FU2KnowLooBuild

prtest K2_2BLKnowLooBuild == K2_2FU2KnowLooBuild

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest K3_1BLBuildLooCosHealth == K3_1FU1BuildLooCosHealth

prtest K3_1FU1BuildLooCosHealth == K3_1FU2BuildLooCosHealth

prtest K3_1BLBuildLooCosHealth == K3_1FU2BuildLooCosHealth

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest K3_2BLDefHereCosHealth == K3_2FU1DefHereCosHealth

prtest K3_2FU1DefHereCosHealth == K3_2FU2DefHereCosHealth

prtest K3_2BLDefHereCosHealth == K3_2FU2DefHereCosHealth

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest K3_3BLSatDisWhereDefCosHealth == K3_3FU1SatDisWhereDefCosHealth

prtest K3_3FU1SatDisWhereDefCosHealth == K3_3FU2SatDisWhereDefCosHealth

prtest K3_3BLSatDisWhereDefCosHealth == K3_3FU2SatDisWhereDefCosHealth

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest K3_4BLHumanFaecesMakeSick == K3_4FU1HumanFaecesMakeSick

prtest K3_4FU1HumanFaecesMakeSick == K3_4FU2HumanFaecesMakeSick

prtest K3_4BLHumanFaecesMakeSick == K3_4FU2HumanFaecesMakeSick

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest K3_7BLAnimalFaecesMakeSick == K3_7FU1AnimalFaecesMakeSick

prtest K3_7FU1AnimalFaecesMakeSick == K3_7FU2AnimalFaecesMakeSick

prtest K3_7BLAnimalFaecesMakeSick == K3_7FU2AnimalFaecesMakeSick

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest K4_1BLSatDisH2OCosHealth == K4_1FU1SatDisH2OCosHealth

prtest K4_1FU1SatDisH2OCosHealth == K4_1FU2SatDisH2OCosHealth

prtest K4_1BLSatDisH2OCosHealth == K4_1FU2SatDisH2OCosHealth

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest K5_1BLHandWashCritTime == K5_1FU1HandWashCritTime

prtest K5_1FU1HandWashCritTime == K5_1FU2HandWashCritTime

prtest K5_1BLHandWashCritTime == K5_1FU2HandWashCritTime

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A1_1BLWaterPriorityPubGd == A1_1FU1WaterPriorityPubGd

prtest A1_1FU1WaterPriorityPubGd == A1_1FU2WaterPriorityPubGd

prtest A1_1BLWaterPriorityPubGd == A1_1FU2WaterPriorityPubGd

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A1_2BLLoopriorityPrvGd == A1_2FU1LoopriorityPrvGd

prtest A1_2FU1LoopriorityPrvGd == A1_2FU2LoopriorityPrvGd

prtest A1_2BLLoopriorityPrvGd == A1_2FU2LoopriorityPrvGd

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A1_3BLPrefLooOverH2O == A1_3FU1PrefLooOverH2O

prtest A1_3FU1PrefLooOverH2O == A1_3FU2PrefLooOverH2O

prtest A1_3BLPrefLooOverH2O == A1_3FU2PrefLooOverH2O

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A1_4BLPrefH2OOverLoo == A1_4FU1PrefH2OOverLoo

prtest A1_4FU1PrefH2OOverLoo == A1_4FU2PrefH2OOverLoo

prtest A1_4BLPrefH2OOverLoo == A1_4FU2PrefH2OOverLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A1_5BLH2OLooEqual == A1_5FU1H2OLooEqual

prtest A1_5FU1H2OLooEqual == A1_5FU2H2OLooEqual

prtest A1_5BLH2OLooEqual == A1_5FU2H2OLooEqual

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A2_2BLPreferNewH2OSys == A2_2FU1PreferNewH2OSys

prtest A2_2FU1PreferNewH2OSys == A2_2FU2PreferNewH2OSys

prtest A2_2BLPreferNewH2OSys == A2_2FU2PreferNewH2OSys

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A2_3BLH2OSatDisBCAccss == A2_3FU1H2OSatDisBCAccss

prtest A2_3FU1H2OSatDisBCAccss == A2_3FU2H2OSatDisBCAccss

prtest A2_3BLH2OSatDisBCAccss == A2_3FU2H2OSatDisBCAccss

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A2_4BLH2OSatDisBCQual == A2_4FU1H2OSatDisBCQual

prtest A2_4FU1H2OSatDisBCQual == A2_4FU2H2OSatDisBCQual

prtest A2_4BLH2OSatDisBCQual == A2_4FU2H2OSatDisBCQual

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A2_5BLH2OSatDisBCOwn == A2_5FU1H2OSatDisBCOwn

prtest A2_5FU1H2OSatDisBCOwn == A2_5FU2H2OSatDisBCOwn

prtest A2_5BLH2OSatDisBCOwn == A2_5FU2H2OSatDisBCOwn

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_2BLPrefDefElsewhere == A3_2FU1PrefDefElsewhere

prtest A3_2FU1PrefDefElsewhere == A3_2FU2PrefDefElsewhere

prtest A3_2BLPrefDefElsewhere == A3_2FU2PrefDefElsewhere

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_2_1BLODPrefDefEW == A3_2_1FU1ODPrefDefEW

prtest A3_2_1FU1ODPrefDefEW == A3_2_1FU2ODPrefDefEW

prtest A3_2_1BLODPrefDefEW == A3_2_1FU2ODPrefDefEW

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_3BLDefSatDisBCQual == A3_3FU1DefSatDisBCQual

prtest A3_3FU1DefSatDisBCQual == A3_3FU2DefSatDisBCQual

prtest A3_3BLDefSatDisBCQual == A3_3FU2DefSatDisBCQual

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_4BLDefSatDisBCPref == A3_4FU1DefSatDisBCPref

prtest A3_4FU1DefSatDisBCPref == A3_4FU2DefSatDisBCPref

prtest A3_4BLDefSatDisBCPref == A3_4FU2DefSatDisBCPref

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_5BLDefSatDisBCConv == A3_5FU1DefSatDisBCConv

prtest A3_5FU1DefSatDisBCConv == A3_5FU2DefSatDisBCConv

prtest A3_5BLDefSatDisBCConv == A3_5FU2DefSatDisBCConv

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_6BLDefSatDisBCH2O == A3_6FU1DefSatDisBCH2O

prtest A3_6FU1DefSatDisBCH2O == A3_6FU2DefSatDisBCH2O

prtest A3_6BLDefSatDisBCH2O == A3_6FU2DefSatDisBCH2O

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_7BLDefSatDisBCHealth == A3_7FU1DefSatDisBCHealth

prtest A3_7FU1DefSatDisBCHealth == A3_7FU2DefSatDisBCHealth

prtest A3_7BLDefSatDisBCHealth == A3_7FU2DefSatDisBCHealth

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_8BLDefSatDisBCSafety == A3_8FU1DefSatDisBCSafety

prtest A3_8FU1DefSatDisBCSafety == A3_8FU2DefSatDisBCSafety

prtest A3_8BLDefSatDisBCSafety == A3_8FU2DefSatDisBCSafety

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_9BLDefSatDisBCAnimals == A3_9FU1DefSatDisBCAnimals

prtest A3_9FU1DefSatDisBCAnimals == A3_9FU2DefSatDisBCAnimals

prtest A3_9BLDefSatDisBCAnimals == A3_9FU2DefSatDisBCAnimals

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_10BLDefSatDisBCStatus == A3_10FU1DefSatDisBCStatus

prtest A3_10FU1DefSatDisBCStatus == A3_10FU2DefSatDisBCStatus

prtest A3_10BLDefSatDisBCStatus == A3_10FU2DefSatDisBCStatus

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_11BLDefSatDisBCPrivacy == A3_11FU1DefSatDisBCPrivacy

prtest A3_11FU1DefSatDisBCPrivacy == A3_11FU2DefSatDisBCPrivacy

prtest A3_11BLDefSatDisBCPrivacy == A3_11FU2DefSatDisBCPrivacy

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_12BLDefSatDisBCSupport == A3_12FU1DefSatDisBCSupport

prtest A3_12FU1DefSatDisBCSupport == A3_12FU2DefSatDisBCSupport

prtest A3_12BLDefSatDisBCSupport == A3_12FU2DefSatDisBCSupport

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_13BLDefSatDisBCDisgust == A3_13FU1DefSatDisBCDisgust

prtest A3_13FU1DefSatDisBCDisgust == A3_13FU2DefSatDisBCDisgust

prtest A3_13BLDefSatDisBCDisgust == A3_13FU2DefSatDisBCDisgust

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_14BLDefSatDisBCAccess == A3_14FU1DefSatDisBCAccess

prtest A3_14FU1DefSatDisBCAccess == A3_14FU2DefSatDisBCAccess

prtest A3_14BLDefSatDisBCAccess == A3_14FU2DefSatDisBCAccess

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A3_15BLDefSatDisBCShould == A3_15FU1DefSatDisBCShould

prtest A3_15FU1DefSatDisBCShould == A3_15FU2DefSatDisBCShould

prtest A3_15BLDefSatDisBCShould == A3_15FU2DefSatDisBCShould

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A5_1BLMenMoreFreeTime == A5_1FU1MenMoreFreeTime

prtest A5_1FU1MenMoreFreeTime == A5_1FU2MenMoreFreeTime

prtest A5_1BLMenMoreFreeTime == A5_1FU2MenMoreFreeTime

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A5_2BLWomenMoreFreeTime == A5_2FU1WomenMoreFreeTime

prtest A5_2FU1WomenMoreFreeTime == A5_2FU2WomenMoreFreeTime

prtest A5_2BLWomenMoreFreeTime == A5_2FU2WomenMoreFreeTime

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A5_3BLWomMenEqFreeTime == A5_3FU1WomMenEqFreeTime

prtest A5_3FU1WomMenEqFreeTime == A5_3FU2WomMenEqFreeTime

prtest A5_3BLWomMenEqFreeTime == A5_3FU2WomMenEqFreeTime

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A6_1BLNewH2OXtraFeat == A6_1FU1NewH2OXtraFeat

prtest A6_1FU1NewH2OXtraFeat == A6_1FU2NewH2OXtraFeat

prtest A6_1BLNewH2OXtraFeat == A6_1FU2NewH2OXtraFeat

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A6_2BLNewLooXtraFeat == A6_2FU1NewLooXtraFeat

prtest A6_2FU1NewLooXtraFeat == A6_2FU2NewLooXtraFeat

prtest A6_2BLNewLooXtraFeat == A6_2FU2NewLooXtraFeat

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A7_6BLHasLooCosExt == A7_6FU1HasLooCosExt

prtest A7_6FU1HasLooCosExt == A7_6FU2HasLooCosExt

prtest A7_6BLHasLooCosExt == A7_6FU2HasLooCosExt

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A7_7BLPlanLooCosExt == A7_7FU1PlanLooCosExt

prtest A7_7FU1PlanLooCosExt == A7_7FU2PlanLooCosExt

prtest A7_7BLPlanLooCosExt == A7_7FU2PlanLooCosExt

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A7_8BLUseLooCosExt == A7_8FU1UseLooCosExt

prtest A7_8FU1UseLooCosExt == A7_8FU2UseLooCosExt

prtest A7_8BLUseLooCosExt == A7_8FU2UseLooCosExt

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A7_9BLHPULooCosExt == A7_9FU1HPULooCosExt

prtest A7_9FU1HPULooCosExt == A7_9FU2HPULooCosExt

prtest A7_9BLHPULooCosExt == A7_9FU2HPULooCosExt

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A8_1BLH2OLoo == A8_1FU1H2OLoo

prtest A8_1FU1H2OLoo == A8_1FU2H2OLoo

prtest A8_1BLH2OLoo == A8_1FU2H2OLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A8_2BLNewH2OIncentLoo == A8_2FU1NewH2OIncentLoo

prtest A8_2FU1NewH2OIncentLoo == A8_2FU2NewH2OIncentLoo

prtest A8_2BLNewH2OIncentLoo == A8_2FU2NewH2OIncentLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest A9_2BLSeeFaecesDFS == A9_2FU1SeeFaecesDFS

prtest A9_2FU1SeeFaecesDFS == A9_2FU2SeeFaecesDFS

prtest A9_2BLSeeFaecesDFS == A9_2FU2SeeFaecesDFS

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P1_1BLOD == P1_1FU1OD

prtest P1_1FU1OD == P1_1FU2OD

prtest P1_1BLOD == P1_1FU2OD

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P1_2BLShareLoo == P1_2FU1ShareLoo

prtest P1_2FU1ShareLoo == P1_2FU2ShareLoo

prtest P1_2BLShareLoo == P1_2FU2ShareLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P1_3BLDefInLoo == P1_3FU1DefInLoo

prtest P1_3FU1DefInLoo == P1_3FU2DefInLoo

prtest P1_3BLDefInLoo == P1_3FU2DefInLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P2_1BLHaveFuncLoo == P2_1FU1HaveFuncLoo

prtest P2_1FU1HaveFuncLoo == P2_1FU2HaveFuncLoo

prtest P2_1BLHaveFuncLoo == P2_1FU2HaveFuncLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P2_2BLNoNeverHadLoo == P2_2FU1NoNeverHadLoo

prtest P2_2FU1NoNeverHadLoo == P2_2FU2NoNeverHadLoo

prtest P2_2BLNoNeverHadLoo == P2_2FU2NoNeverHadLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P2_3BLOnlyNonFuncLoo == P2_3FU1OnlyNonFuncLoo

prtest P2_3FU1OnlyNonFuncLoo == P2_3FU2OnlyNonFuncLoo

prtest P2_3BLOnlyNonFuncLoo == P2_3FU2OnlyNonFuncLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P2_4BL2FuncLoo == P2_4FU12FuncLoo

prtest P2_4FU12FuncLoo == P2_4FU22FuncLoo

prtest P2_4BL2FuncLoo == P2_4FU22FuncLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P2_5BLFuncPlusConstLoo == P2_5FU1FuncPlusConstLoo

prtest P2_5FU1FuncPlusConstLoo == P2_5FU2FuncPlusConstLoo

prtest P2_5BLFuncPlusConstLoo == P2_5FU2FuncPlusConstLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P2_6BLNoFuncLoo == P2_6FU1NoFuncLoo

prtest P2_6FU1NoFuncLoo == P2_6FU2NoFuncLoo

prtest P2_6BLNoFuncLoo == P2_6FU2NoFuncLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P2_7BLOnlyCnstrctLoo == P2_7FU1OnlyCnstrctLoo

prtest P2_7FU1OnlyCnstrctLoo == P2_7FU2OnlyCnstrctLoo

prtest P2_7BLOnlyCnstrctLoo == P2_7FU2OnlyCnstrctLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P2_8BL1Funct1NonFunctLoo == P2_8FU11Funct1NonFunctLoo

prtest P2_8FU11Funct1NonFunctLoo == P2_8FU21Funct1NonFunctLoo

prtest P2_8BL1Funct1NonFunctLoo == P2_8FU21Funct1NonFunctLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P3_1BLPlanBuildLoo == P3_1FU1PlanBuildLoo

prtest P3_1FU1PlanBuildLoo == P3_1FU2PlanBuildLoo

prtest P3_1BLPlanBuildLoo == P3_1FU2PlanBuildLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P3_2BLPlanHaveFunctLoo == P3_2FU1PlanHaveFunctLoo

prtest P3_2FU1PlanHaveFunctLoo == P3_2FU2PlanHaveFunctLoo

prtest P3_2BLPlanHaveFunctLoo == P3_2FU2PlanHaveFunctLoo

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P3_3BLPlanMatDurable == P3_3FU1PlanMatDurable

prtest P3_3FU1PlanMatDurable == P3_3FU2PlanMatDurable

prtest P3_3BLPlanMatDurable == P3_3FU2PlanMatDurable

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P5_1BLLoMatDurable == P5_1FU1LoMatDurable

prtest P5_1FU1LoMatDurable == P5_1FU2LoMatDurable

prtest P5_1BLLoMatDurable == P5_1FU2LoMatDurable

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P5_3BLLoExtraFeat == P5_3FU1LoExtraFeat

prtest P5_3FU1LoExtraFeat == P5_3FU2LoExtraFeat

prtest P5_3BLLoExtraFeat == P5_3FU2LoExtraFeat

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P5_4BLLoAccessOK == P5_4FU1LoAccessOK

prtest P5_4FU1LoAccessOK == P5_4FU2LoAccessOK

prtest P5_4BLLoAccessOK == P5_4FU2LoAccessOK

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P5_5BLLoNotBroken == P5_5FU1LoNotBroken

prtest P5_5FU1LoNotBroken == P5_5FU2LoNotBroken

prtest P5_5BLLoNotBroken == P5_5FU2LoNotBroken

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P6_1BLHHHHelpH2O == P6_1FU1HHHHelpH2O

prtest P6_1FU1HHHHelpH2O == P6_1FU2HHHHelpH2O

prtest P6_1BLHHHHelpH2O == P6_1FU2HHHHelpH2O

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P7_1BLLoWaterFac == P7_1FU1LoWaterFac

prtest P7_1FU1LoWaterFac == P7_1FU2LoWaterFac

prtest P7_1BLLoWaterFac == P7_1FU2LoWaterFac

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P7_2BLTipTap == P7_2FU1TipTap

prtest P7_2FU1TipTap == P7_2FU2TipTap

prtest P7_2BLTipTap == P7_2FU2TipTap

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P7_4BLSoap == P7_4FU1Soap

prtest P7_4FU1Soap == P7_4FU2Soap

prtest P7_4BLSoap == P7_4FU2Soap

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

prtest P7_5BLLoWaterFacH2O == P7_5FU1LoWaterFacH2O

prtest P7_5FU1LoWaterFacH2O == P7_5FU2LoWaterFacH2O

prtest P7_5BLLoWaterFacH2O == P7_5FU2LoWaterFacH2O

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

```
prtest P8_1BLSeeShit == P8_1FU1SeeShit
```

```
prtest P8_1FU1SeeShit == P8_1FU2SeeShit
```

```
prtest P8_1BLSeeShit == P8_1FU2SeeShit
```

* Compare proportion of participants who scored 1 for over three time periods: BL-FU1, FU1-FU2 and BL-FU2

```
prtest P9_1BLWASHIll == P9_1FU1WASHIll
```

```
prtest P9_1FU1WASHIll == P9_1FU2WASHIll
```

```
prtest P9_1BLWASHIll == P9_1FU2WASHIll
```

* Close data and log file to tidy up:

```
log close
```

```
clear
```

* If we want we can also close Stata, so this can run independently from a command line or Windows Explorer

```
exit, STATA clear
```

Appendix 7 – ‘Pre-sanitation ladder’

Pre-sanitation ladder- steps

1	Unsure of status regarding owning and planning to acquire a toilet
2	Has no toilet and never did and says they are not planning to acquire a toilet
3	Had one or two toilets in the past but neither of these are functioning and says they are not planning to build a toilet
4	Has no toilet and never did and says they are planning to acquire a toilet but have taken no action
5	Had one or two toilets in the past but neither of these are functioning and says they are planning to acquire a toilet but have taken no action
6	Has no toilet and never did and has begun procurement for acquiring a toilet
7	Had one or two toilets in the past but neither of these are functioning and has begun procurement for acquiring a toilet
8	Has at least one toilet under construction and does not plan to build an additional toilet
9	Had one or two toilets in the past but neither of these are functioning and currently has at least one toilet under construction and does not plan to build an additional toilet
10	Has at least one toilet under construction and plans to build an additional toilet but has taken no action
11	Had one or two toilets in the past but neither of these are functioning and currently has at least one toilet under construction and plans to build an additional toilet but has taken no action
12	Has at least one toilet under construction and has begun procurement for acquiring a toilet
13	Had one or two toilets in the past but neither of these are functioning and currently has at least one toilet under construction and has begun procurement for acquiring an additional toilet
14	Has two toilets under construction and does not plan to build an additional toilet
15	Has two toilets under construction and plans to build an additional toilet but has taken no action
16	Has two toilets under construction and has begun procurement for acquiring an additional toilet
17	Has a toilet that is functioning (regardless of whether it is under construction still) and is not planning to acquire an additional toilet
18	Has one toilet that is no longer functioning and one toilet that is functioning (regardless of whether it is under construction still) and is not planning to acquire an additional toilet
19	Has a toilet that is functioning (regardless of whether it is under construction still) and plans to build an additional toilet but has taken no action
20	Has one toilet that is no longer functioning and one toilet that is functioning (regardless of whether it is under construction still) and plans to build an additional toilet but has taken no action
21	Has one toilet that is no longer functioning and one toilet that is functioning (regardless of whether it is under construction still) and plans to build an additional toilet but has taken no action

22	Has one toilet that is no longer functioning and one toilet that is functioning (regardless of whether it is under construction still) and has begun procurement for acquiring an additional toilet
23	Has one toilet that is functioning and one that is not functioning (regardless of whether they are under construction) and does not plan to acquire an additional toilet
24	Has one toilet that is functioning and one that is not functioning (regardless of whether they are under construction) and plans to acquire an additional toilet but has not yet taken action
25	Has one toilet that is functioning and one that is not functioning (regardless of whether they are under construction) and has begun procurement for acquiring a toilet
26	Has two functioning toilets (regardless of whether they are under construction) and is not planning to acquire an additional toilet
27	Has two functioning toilets (regardless of whether they are under construction) and plans to acquire an additional toilet but has not yet taken action
28	Has two functioning toilets (regardless of whether they are under construction) and has begun procurement for acquiring an additional toilet

Appendix 8 – Study 3 Question Guide

Study 3: Barriers and enablers to the success of a WASH program in Manufahi, East Timor

Questions for WaterAid, partner and W4W staff:

1) History and sequence of program implementation in the village

Intro: I'd like to start with some general questions about what was done by WaterAid and WASH for Worms in this village. Don't worry if you can't remember things – it was a long time ago.

- a) Can you tell me what happened first? How did you get permission to do the program in this village?
- b) When did that happen?
- c) Who was there? Who did what? E.g. who attended the activity? Who led the activity? Which staff were there?

Repeat these questions for consequent events e.g. 'And then what happened?' etc.

Prompt with any events (related to water, sanitation, hygiene and gender) which I know about already e.g. 'I heard there was a meeting with the xefi before the first CAP meeting, something about feasibility. Is that correct? Do you know what happened there?' or 'I heard your team sometimes visits the village after the CAP meeting. Did your team do that here? How often? What did you do?'

Activities I know about:

• Feasibility study	• Toilet construction
• Meeting with xefi suco/aldeia	• Tippy tap construction
• CAP meeting	• Hygiene education
• CLTS	• Working with GMF
• GMF election	• Follow up visits
• Gender training	• Inauguration/declaration
• Water supply construction	• Evaluation

2) Perceptions of level of success of the program and explanations of level of success of the program

- a) What do you feel are the biggest successes of the program in this village? (prompt for examples)
Why do you think this was a success/why did this work so well? Were there any other successes?
- b) Alternative to a): What are the goals/objectives of the program? (Prompt with water, sanitation, hygiene and gender goals that I'm aware of.) Which goals were achieved? Which goals went well? Why do you think this went well? (Prompt with any that I'm already aware of.) Were these goals easy to achieve? Why were these easy/hard to achieve?
- c) No program is ever perfect and sometimes things don't get completed or achieved. Are there some things that you feel didn't go so well? Were any goals not achieved?/Are there any goals that still need to be achieved/reached/finished? Which ones? Why did this not go well? Why didn't it work? (Prompt with any that I'm already aware of)
- d) Alternative to c): Were there any problems with the implementation of the program? What were they? Why do you think this happened? How, if at all, were these problems resolved? (Prompt with any that I'm already aware of)
- e) I know that the success of the program always depends on both the hard work/effort/cooperation of both the NGO/facilitation staff as well as the community. The NGO needs the community to cooperate and the community needs clear information and support. What do you think about the implementation of the project? If you did this again in the future, would you do anything differently? Did WaterAid have any difficulty doing their work?

3) Community responses to the program

- a) Did the community participate in meetings/tasks/activities? What was their attitude to the program?/Were they enthusiastic about participating or not interested? Were they happy or not happy to work for the water construction and toilets? Were they friendly/welcoming/happy to see you? Why do you think they were... etc? Can you give me an example? (Prompt with any that I'm already aware of)

(Prompt: 'There are many NGOs in Timor which provide assistance to communities and they often bring something to the community. WaterAid doesn't provide toilets though – what did the community think about this?')

- b) Sometimes it's difficult to make the community understand the importance of water, sanitation, hygiene and gender - was it difficult to explain to this community? Do you think most people in the community understand the goals of the programs? Did anyone not understand? Why do you think they did/did not understand?

Repeat these questions in reference to the xefi and other leaders.

4) Household responses to the program

- a) One of the goals of the program was for each household to build a toilet. How many households built their own toilet?
- b) Sometimes households have difficulty becoming ODF or building a toilet. Were there any examples of that in this village? Can you tell me about them? Why do you think they had difficulties with this? What could help them to build a toilet?
- c) Can you think of any households in the village which are female-only/female-headed/have people with a disability/elderly/are very poor? How did they respond the program? What did they do? Did they build toilets? Do you think it was easier or more difficult for them than other households? Why was it more/less difficult for them? What could help them to build a toilet?
- d) Some households easily become ODF and build a toilet. Were there any examples of that in this village? Can you tell me about them? Why do you think they found this easier?

Repeat these questions for other household activities: helping with water construction, constructing tippy taps, using toilet, washing hands, gender awareness.

Questions for participants from the village (xefi, GMF and household representatives):

1) History and sequence of program implementation in the village

The purpose of this question is to get the participant thinking about the events which have happened in their village related to the WASH program so a great deal of detail or accuracy is not necessary.

Intro: There have been people from an NGO (prompt with WaterAid, LBF and HN) coming to your village to work on a water and sanitation program. Do you know about this program? I would like to ask you some questions about that. Don't worry if you can't remember things – it was a long time ago.

- Do you know why the people from the NGO come here? What is their purpose?
- Can you tell me what the people from the NGO have done here? What activities? What happened during the activities?
- When did this happen?/How often does this happen?

Repeat b) and c) for each activity. Have a list of activities and dates that I know about already and prompt with these if necessary: 'There was a meeting last year, in August I think. Do you remember it?'

Activities I know about:

• Feasibility study	• Toilet construction
• Meeting with xefi suco/aldeia	• Tippy tap construction
• CAP meeting	• Hygiene education
• CLTS	• Working with GMF
• GMF election	• Follow up visits
• Gender training	• Inauguration/declaration
• Water supply construction	• Evaluation

2) Perceptions of the overall program in the village

Try asking the following questions both generally about the program but also about any relevant individual activities mentioned in question 1) above. Prompt the participant's perceptions of attendance and reactions to specific events/interventions and lead in a negative direction.

- Was the program/activity 'x' interesting? In your opinion, was it an important thing to do or a waste of time? Do you feel like the program took up a lot of your time?
- Did the community here support the program? Why? Sometimes, in other communities I've visited, some people do not support the program. Did anyone here not support it? Why not?
- Some people have said that the NGO staff are only here because they get paid. Do you think anyone here felt that way?
- Some people say that the meetings and activities are sometimes difficult to understand. Were the activities and meetings easy to understand or difficult?
- Do you think it was easy or difficult for people who are old to participate in the program activities, for example the meetings? What about people with a disability? Or widows or households with only women? How could they have participated more easily?
- Sometimes, people in other communities don't like to work voluntarily for the program. In your opinion, do you think the community was asked to work too much for the program?
- If the program happened again in your village, what would you like to be done differently? In your opinion, is there anything else the program should have done in your village?

If household has a person(s) with a disability/elderly person/widow/FHH:

- Your household has a person with a disability/elderly person/widow/FHH – is that correct? Was it easy or difficult to participate in the program? What would have made it easier to participate?

3) Household sanitation activity relating to the program

- a) Where do the people in your household defecate? Why do they defecate here? Do you sometimes defecate somewhere else? Why?
- b) Does your household have a toilet? (If they said they used a toilet, ask if it is their household toilet or someone else's?)

If household has a toilet, or is building one, go to c)

If household does not have a toilet, go to n)

Household has toilet:

- c) What kind of toilet do you have? Why did you make this type? Some people have different types of toilets. Would you prefer a different type or are you happy with this one? Why/why not? Is the toilet finished? If not, what do you still need to do?
- d) Do you use the toilet? If not, why not? Is the toilet easy or difficult to use? Is it difficult for anyone in your household to use?
- e) Who made it? Who provided the materials? Was it easy or difficult to make the toilet? Was it easy or difficult to get the materials? Did you need any help? Who helped you?
- f) When did you make it? (Prompt with 'before or after the water connection was made?') Why did you make it then? Did you have a toilet already before the program started?
- g) What are the good things about having this toilet? Does everyone in the household agree with this or do some people have different opinions?
- h) What are the bad things about the toilet? Does everyone in the household agree with this or do some people have different opinions? Is it possible to improve this? How could this be improved?
- i) Overall, are things better or worse in your household because of the toilet?
- j) What happened in other households in your village? Does everyone have a toilet? Was it difficult for anyone to make their toilet? Why do you think that was? How could it be easier for them to make a toilet? Was it easy for anyone to make a toilet? Why do you think that was?
- k) Do you think it would be easy or difficult for an old person to make a toilet? What about a person with a disability, for example, blind or difficulty walking? What about a household with no men, only women? Why? How could they build a toilet? What would make it easier for them to build a toilet? (Prompt: Would they need help with money, materials or labour? Who do you think would help them?)
- l) Is it difficult for anyone in this village to use their toilet? Do you think the toilets in this village would be easy or difficult for a person with a disability to use? What about an old person? What about a very pregnant woman? Do you think the toilet would need to have special features?

If household has a person(s) with a disability/elderly person/widow/FHH:

- m) Your household has a person with a disability/elderly person/widow/FHH – is that correct? Do you think this made it easier or harder to make a toilet? Why were you still able to make a toilet? Does this make it easier or harder to use your toilet? Have you had to put special features in your toilet so you can use it?

Household does not have toilet:

- n) In the villages that I visit there are always some households who haven't made a toilet. Can you tell me why you don't have a toilet? (Prompt: Is that because it was too expensive to make one? Too much work/didn't have materials/no time/physically unable/did not want to/don't know how to make/no one to help build it?) What is the main reason? If you had enough money/time/knowledge etc, would you have been able to build a toilet?
- o) Have you ever had a toilet previously? If so, why don't you have one now?
- p) Would you prefer to have a toilet/your own toilet (if using another household's)? Why/why not? If so, what type? Do you have plans to make your own toilet? What will you make? Where will you get the materials? Who will build it? Will it be easy or difficult to make it? How will you overcome these difficulties?
- q) What happened in other households in your village? Does everyone have a toilet? Was it difficult for anyone to make their toilet? Why do you think that was? How could it be easier for them to make a toilet? Was it easy for anyone to make a toilet? Why do you think that was?
- r) Do you think it would be difficult for an old person to make a toilet? What about a person with a disability, for example, blind or difficulty walking? What about a household with no men, only women? Why? How could they build a toilet? What would make it easier for them to build a toilet? (Prompt: Would they need help with money, materials or labour? Who do you think would help them?)
- s) Is it difficult for anyone in this village to use their toilet? Do you think the toilets in this village would be easy or difficult for a person with a disability to use? What about an old person? What about a very pregnant women? Do you think the toilet would need to have special features?

If household has a person(s) with a disability/elderly person/widow/FHH:

- t) Your household has a person with a disability/elderly person/widow/FHH – is that correct? Do you think this made it hard to make a toilet? What would make it easier for you to make and use a toilet?

Household does not have toilet:

- n) In the villages that I visit there are always some households who haven't made a toilet. Can you tell me why you don't have a toilet? (Prompt: Is that because it was too expensive to make one? Too much work/didn't have materials/no time/physically unable/did not want to/don't know how to make/no one to help build it?) What is the main reason? If you had enough money/time/knowledge etc, would you have been able to build a toilet?
- o) Have you ever had a toilet previously? If so, why don't you have one now?
- p) Would you prefer to have a toilet/your own toilet (if using another household's)? Why/why not? If so, what type? Do you have plans to make your own toilet? What will you make? Where will you get the materials? Who will build it? Will it be easy or difficult to make it? How will you overcome these difficulties?
- q) What happened in other households in your village? Does everyone have a toilet? Was it difficult for anyone to make their toilet? Why do you think that was? How could it be easier for them to make a toilet? Was it easy for anyone to make a toilet? Why do you think that was?
- r) Do you think it would be difficult for an old person to make a toilet? What about a person with a disability, for example, blind or difficulty walking? What about a household with no men, only women? Why? How could they build a toilet? What would make it easier for them to build a toilet? (Prompt: Would they need help with money, materials or labour? Who do you think would help them?)
- s) Is it difficult for anyone in this village to use their toilet? Do you think the toilets in this village would be easy or difficult for a person with a disability to use? What about an old person? What about a very pregnant women? Do you think the toilet would need to have special features?

If household has a person(s) with a disability/elderly person/widow/FHH:

- t) Your household has a person with a disability/elderly person/widow/FHH – is that correct? Do you think this made it hard to make a toilet? What would make it easier for you to make and use a toilet?

- 5) Household hygiene activity relating to the program
- a) When do you think you should wash your hands? (Prompt with times if necessary.) Why do you wash your hands?
 - b) How do you usually wash your hands? Where do you wash your hands? What do you usually use to wash your hands? (Prompt: soap, ash, just water?)
 - c) Are there times when it's difficult to wash your hands when you want to? Why is it difficult? What would make it easier to wash your hands?
 - d) What about other households in your village? Do some people have difficulty washing their hands? Why?
 - e) Do you think a person who is old, sick or has a disability, for example is blind or can't walk, would find it difficult or easy to wash their hands? Why? How could they wash their hands more easily? What would make it easier for them to wash their hands?
 - f) (If they have a tippy tap) Who made this? Was it easy or difficult to make?
 - g) Is this easy or difficult to use? Do you prefer it to washing your hands elsewhere, for example in a bucket? What are some of the good things about the tippy tap? Why do you like using it? What are some of the bad things about it? Does it ever break?
 - h) Do other people in the village have these? Did anyone have difficulty making a tippy tap? Why was it difficult for them?
 - i) Do you think it would be difficult or easy for someone who is old or has a disability, for example is blind or can't walk, to use a tippy tap? Why? What would make it easier for them?
- If household has a person(s) with a disability/elderly person:
- j) Your household has a person(s) with a disability/elderly person – is that correct? Is it easy or difficult for them to wash their hands/use the tippy tap? What would make it easier for them?
- 6) Can I see your toilet/tippy tap?