Understanding sustainable landscapes through the lens of apple growing— cases of Jumla, Nepal and Harcourt, Victoria

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ABSTRACT

Through the lens of apple growing and by employing a social-ecological systems approach this paper seeks to understand how identity and biodiversity both contribute to place formation. This paper compares two apple growing regions, Jumla in Nepal and Harcourt in Australia by analysing qualitative interviews and historical documents. The study finds that identity and place play an important role in the way growers interact with their local landscapes. This paper argues that sustainable landscapes can be realised through diverse production systems that adhere to physical place limitations and also adapt to long-term changes in social and physical conditions.

Key words: social-ecological systems, sustainable landscapes, identity, place

Introduction

This paper builds on extensive fieldwork and analysis carried out over three years in Jumla, Nepal and in Harcourt, Victoria, Australia. Using apple (*Malus domestica*) growing as a lens, this paper investigates how identity (the social) and biodiversity (the ecological) has contributed to the formation of place in these two different settings. The aim of the paper is to understand local people's interactions with social-ecological systems and the implications for how their activities implicate or define landscape sustainability.

Both case study sites are undergoing significant changes in terms of Apple production. Harcourt is facing market pressures contributing to economic hardship and a consequent mass exodus from the industry. Jumla is experiencing government incentives to grow the apple industry. This support is similar in terms of relative scale to the establishment of orchards in Harcourt in the nineteenth century. The contemporary Jumla narrative draws attention to the effects of modernisation, including potential biodiversity loss and increasing competition for land with staple food crops. The Harcourt narrative is also about modernisation, though scale and production chains are markedly different.

This paper uses ideas from the discourses of *place* and *identity* to explore how ecological as well as socio-cultural histories overlap and interconnect. The environmental history is important in drawing a wider understanding of the dynamic nature of places, which shape and are constantly shaped by the people who interact with them, and which are influenced by external markets and policies as well.

Places are recognizable at different scales; they can be defined by space and time, tangible and intangible characteristics, and they develop “meaning through personal, group, or cultural processes” (Low & Altman 1992, p. 5). Therefore, not only do places derive their significance from individuals attaching meaning to a certain area, but places are also constructed by groups, communities or cultures and ‘stored’ in cultural memories. Trentelman (2009) reflects on the tension between emphasizing the social aspects of place (i.e. Greider & Garkovich 1994; Tuan 1977) and the impact of physical elements associated with the construction of place (i.e. Stedman 2002). There is a reciprocal relationship between the social and the physical through which “local community culture influences place meanings” but at the same time, the physical environment also shapes community culture (Stedman, 2003, p.673). It is one’s interaction with not only other human beings and objects but also one’s interaction with the physical environment over time that plays an important role in forming a bond to a specific area (Hernández et al. 2007, p. 310). Marsden’s (2013, p. 216) suggestion that places are the “meeting point between ecological, economic and social/cultural community relationships” resonates, offering a point of mutuality from which to launch the case studies described here.

In the early twentieth century Harcourt experienced its peak in apple production; the gold rush in the area created a demand for fresh produce and there were people who took up the opportunity of apple growing. At the same time there was also government support and demand from domestic and overseas markets; and the physical conditions were deemed suitable. Water channels from the goldfields were diverted for irrigation and the climate was favourable for apple growing. The identity of Harcourt as an apple-growing place but also of its people as orchardists, is based on the triumph of an historical apple growing success that bred an apple culture within these local communities in the early twentieth century. However, today's difficult export market and challenges associated with keeping up with demand for year round perfect and plentiful apples is putting significant pressure on the remaining orchardists in the area, placing a question mark over the viability of apple growing in Harcourt. In this way this paper argues that sustainability in terms of landscape scale, production and markets has been tied to a particular time in Australian and global market history; and that the identity of local growers as orchardists and the future landscape sustainability of people and place would depend on these same criteria.

For the people of Jumla, apple growing only partly defines their identity. Different households have different reasons for engaging as orchardists. Jumli people seem to experience a new sense of togetherness and pride with the growth of apple cultivation and their cultural acceptance of the fruit suggests that this is not a barrier to production. More recently, the regional status attributed to their organic production of Apples has created a sense of pride in being an organic apple-producing region. Nonetheless, issues of landscape scale, the limits to production and the accessibility of markets are also determining factors in short and long term maintenance of these trees.

In both the cases, orcharding has occurred at the local level, even as these places (and farmers) have gained a regional identity as apple growers from a now known apple growing area. But, the success of orcharding is heavily influenced by global market economies, external to the water and soils, wind and rain, and phenology of the local trees. In Harcourt, apple growing has always focused on the export of fresh Apples to domestic and overseas markets and now that this is becoming increasingly difficult, growers who are persisting with their businesses fall back on their individual as well as regional apple growing identity to market a diversified product range at a more domestic level. For Harcourt growers, regional identity sustains their apple businesses even as the ecological values of that region and place

are overridden by the need for increasing technological adaptation. For Jumli producers, the new identity of Jumla as an apple growing place has helped them to sell their Apples and motivated them to scale-up orcharding. But the Harcourt pathway of commodity agriculture Jumla is following may pose a threat to the long-term sustainability of their livelihoods. Many smallholder farmers have less control in a global market than if farming for subsistence. As well, apple growing in Jumla is slowly threatening other biodiversity (forests and staple crops), while Harcourt has already experienced just that.

Methodology

Since the aim of the paper is to understand local people's interactions with social-ecological systems and the implications for landscape sustainability, a social-ecological systems approach was used as the framework to structure data collection and analysis in these two separately researched studies.

Both case studies used semi-structured open-ended interviews with individual growers conducted in two separate research projects in 2012 and 2013. These in-depth conversations were audio recorded, transcribed and analysed with the qualitative social research software NVivo via coding and thematic analysis. In Harcourt, the participants were asked about their family's history in apple growing, the changes in orcharding, in terms of **cultivar** selection, orchard management and marketing; as well as the challenges they face today. **The purpose was to create an account of the region's environmental history as well as get an understanding of contemporary growing practices.** In Jumla respondents were asked **to describe their views, practices and experiences of apple growing. They were also asked about their experiences and views on overall changes in the landscape.** Questions were coded and grouped under themes relating to biodiversity, change, history, place, challenges and physical influences.

In addition, historical research was also undertaken. Document analysis formed the main part of the historical research and in the case of Harcourt this consisted of diaries, letters and other manuscripts from libraries and historical societies dating back 1830. In Jumla, apart from researching limited government documents, participants were asked to recall history, cultural and management practices and experiences in relation to the introduction and cultivation of Apples over the last 40 years.

Contextualizing the cases

This section briefly outlines the physical conditions in each case study site and then reflects on their divergent environmental histories.

(Fig 2)

Harcourt

Harcourt is a township in central Victoria. **The climate is temperate, and extreme weather events such as droughts and hail are not uncommon (ABS 1999).** Victoria has the second highest number of agricultural businesses involved in horticulture (ABS 2011) and is the biggest apple producing state of Australia (ABS 2012; Department of Primary Industries 2012). The township of Harcourt is located in the Harcourt Valley, at the foot of Mount Alexander. It has a population of 872 people and comprises 28.5 sq km (ABS 2011).

Jumla

Jumla is located in a rugged high altitude mountainous landscape in the poorest region of mid-western Nepal comprising of 2531 square kilometres. Out of a total area of 254,365 ha, only 26,896 ha of land is under cultivation and 106,430 ha is forested land in Jumla (DADO 2012). Reliable rainfall and snowfall is critical for Jumla, as people's livelihood is largely based on rainfed agriculture and the collection of non-timber forest products.

Unlike Harcourt, agriculture in Jumla is overwhelmingly subsistence family farms. In recent years apple cultivation has been gaining momentum. Apples from Jumla, which is an organic district where chemical fertilizers and pesticides are banned, fetch higher prices in Kathmandu and other regional market centres than most imported Apples.

The physical landscape of these sites affects social and economic outcomes for producers. The remoteness and rugged geography of Jumla focuses markets internally within the district and nation, and weather variability demands diversification of practices that both build an apple culture and limit orchard expansion. The location of Harcourt offers an easier physical access to national and international markets and current weather conditions are well suited to apple growing. However, increases in extreme weather events, market demands for standardised products, prices set externally, pests and a growing price of water for irrigation pose significant challenges in the future (Beilin et al. 2012; IPCC 2014).

RESULTS

From the larger two case studies, the results presented here are of the document analysis and interviews concerning three main topic areas: environmental history, identity and biodiversity. We argue these are core to place formation in both Harcourt and Jumla. It explains the history in each case study site, and then lays out the meaning of identity and biodiversity to the local people in relation to Apples. Following the results, the discussion explains how these factors contribute to the overall sustainability of the landscapes and the formation of place.

Environmental history of Apples

The way in which history is told and remembered reveals much about the purpose and underlying political intentions at different times in the past. Jumla has existed for centuries without Apples; whereas Harcourt's founding (180 years ago) was based on the orcharding industry.

The Harcourt story

The history of apple growing in Harcourt is the story of the modernisation and intensification following a growth model of agricultural extension that has contributed to the layout of orchards and the 'look' of the place. For years the productivist model has been followed which utilises an "approach to land use based on intensive forms of agricultural production" (Burton, 2004 p.198). Producing Apples for global export has been the main driver for the apple industry and the characteristics of good orchard practices are based on this ideal. However, once this productivist model hit a major obstacle in the early 1970s when the UK export market collapsed, the industry started exhibiting signs of vulnerability to market shocks. More recently this has been exacerbated under climate change and with more rapidly changing market conditions.

A rapidly expanding population in Victoria during the gold rush led to the commercialisation of apple growing in the Harcourt Valley. In the early 1850s many growers flocked to the gold fields of central Victoria where demand for fresh produce was high and apple growing benefited from technologies such as transport and irrigation available there (Garden 1984; Holman 1993). The first vegetables and fruit trees were planted in Harcourt in 1853 and when it was evident that the physical conditions could be combined with irrigation, more and more apple orchards appeared. Early orchardists supported themselves with employment on the

goldfields until their trees reached a productive state (Milford 2004). Intensification of apple orcharding resulted from increased demand due to a rising population and growing export market, as well as improved technologies after World War Two. Orchard in Harcourt was very much a response to first the gold rush, and then it became a fast-paced opportunistic development. This has been possible because of the close alignment between technological advances and market demands. The intensive production required by both national retailers and global supply changes worked initially to the benefit of the growers; but more recently, growers who cannot achieve both scale and production demands within these market parameters are turning back to the landscape and the meaning of Harcourt as an apple place, to seek diversification opportunities. Arthur, a cider maker, describes the reasons for making cider rather than growing commercial apples for market:

“[...] we quickly learned that the size we were you were not going to make much money out of it [commercial apple growing]. Mainly because of the dominance of the supermarkets and the requirements for the size and the colour and everything has to be perfect and we saw 50%.... sometimes 60% of our fruit wandering off somewhere to be made into juice.”

Today there are less than ten apple orchards left in Harcourt. Interviews with these growers emphasise the difficulties inherent in coping with rising costs of water, labour and other inputs; extreme weather conditions such as droughts and flood events; and increasing pressures from pests and diseases. While this is nothing new, the scale of production and requirement for perfect looking apples makes it more difficult to work with these pressures. They also must adhere to stringent supermarket guidelines for quality and quantity. Growers have been leaving the industry and in many cases even this is not an easy step. Not only are they often leaving behind a longstanding (in the Australian context) family history and identity in the orchard industry but they are also facing obstacles when trying to sell their land due to lack of market demand for agricultural land. In addition, strict regulatory policies require the trees to be removed (at great cost) because of their alleged biosecurity threat to the region. John, a 5th generation orchardist describes the emotional cost of exiting the industry:

“So we are the generation that made that decision after 5 generations, which is a very hard decision to make. At that time my father was alive and he loved his orchard and he knew some of the apple trees in the orchard almost personally.”

In Australia today, the trend shows that many smaller orcharding businesses are either exiting the market or consolidating into larger operations (Buxton 2007). While in the past, growers collaborated via centralised cool storage and packing facilities, today's industry is more fragmented, compared to other exporting countries such as New Zealand, Chile or South Africa (ibid). Now, most Australian growers have their own facilities resulting in an increasing 'culture of non-collaboration within the industry' (Buxton 2007, p. 9). There is also diversity among growers, ranging from descendants of the very early orchardists, to the ones who have entered the local industry more recently. This contributes to the lack of coherence between growers, but it also presents opportunities for new prospects of innovation into the region.

To keep up with the neoliberal production-orientated economy, promoting efficiency and growth as progressive ways to improve businesses, growers must continuously invest in new technology, the latest apple cultivars and innovative marketing strategies. Further, additional ecological pressures such as droughts, floods, hail and pests are adding to the burden. And while the soil and climate are generally suitable for apple growing, water availability is becoming more and more of an issue as a new irrigation network in the Harcourt area will secure water supply to the growers but at a higher financial cost, and this will increase in the future as the pumping systems are fossil fuel dependent.

The Harcourt case study emphasises that high input costs such as labour, investments for more intensive plantings and their required sprays, and climatic variability are major challenges for even those remaining in the industry.

The Jumla story

Unlike Harcourt, Jumla has a relatively short history of apple growing but it exhibits a similar relative trajectory to Harcourt. The first domesticated apple nursery stocks were introduced in Jumla in 1968 by individual farmers when they brought such **stocks** from neighbouring Indian states for their home gardens.

It was in the 'Year of Agriculture', 1972/73, that the Government distributed subsidised apple **nursery stocks** imported from Himanchal state of India and from some European countries. Despite suitable agro-climatic conditions at the time, and the Government's continuous encouragement through extension services, expansion of apple cultivation was very slow

until 2001. Again in 2001, the government distributed some 73,500 subsidized **nursery stocks** imported from India (DADO 2012). The government later also encouraged and supported local farmers to establish apple nurseries so that future demand for **nursery stock** could be met locally.

The Government originally promoted apple cultivation in Jumla as a cash crop to help raise local income among these subsistence farmers, and as an alternative to their traditional salt trade with Tibet. Inter-regional trade and pasturing movement between Nepal and Tibet was severely restricted after Tibet was annexed to China in 1959 (Adhikari 2008; Bishop 1990). But a recent opening of the Karnali Highway in 2007, connecting Jumla to the rest of the country, provided access to markets and gave the farmers impetus to respond to Government's encouragement to produce for the nation. As of 2011, 2472 ha of land is covered by apple trees—a huge jump from that of 397 ha in 2004 and 548 ha in 2008. Currently, 92 percent of Apples are imported: with 65% coming from China, 22% from India and 5% from other countries including New Zealand and Australia (Bhandari et al. 2010). Therefore, local growers see the possibilities for them within the national marketplace.

In a recent effort to expand apple cultivation in Jumla, the Government has launched 'one household, one apple orchard' program. The Government intends that at least 80% of the total households establish an apple orchard of at least 25 trees. The Government is providing technical and financial help to farmers for an initial four years. Highly subsidized **nursery stocks**, farm tools and apple growing training are being provided to the farmers. The Government also subsidizes packaging materials and shares the cost of transporting Apples from Jumla to the nearest regional market centre.

Apples and bio-diversity

Apples have shaped place in both the case study areas and contributed to the formation of place identity in different ways resulting in different perceptions of the local people as to what a sustainable landscape constitutes. This section discusses how apples are interacting with local biodiversity in both the case study areas and how place and identity underpin the construction of sustainable landscape.

Harcourt

After the gold rush of the 1850s, the Australian apple industry's focus has been on global competitiveness. This has meant that the choice of cultivars depended on international demands, and in turn diversity of apples has been declining. While in the 1900s there were over 800 different apple cultivars grown in Victoria, today there are less than 20 commercial cultivars required by these markets. These are dominated by Royal Gala, Jonathon, Golden Delicious, Red Delicious, Fuji, Granny Smith, Pink Lady, Sundowner and Lady Williams (APAL 2004). Some growers go overseas to investigate new cultivars and grow them on trial plots to assess their suitability for Harcourt's physical conditions. Therefore, as diversity of older cultivars is decreasing, there are constantly new cultivars introduced.

The density of tree plantings and the number of cultivars grown is changing dramatically; growers recall that less than one generation ago trees were planted up to 6 meters apart, whereas today the spacing is can be less than 1.5 meters. Growers also state that in order to keep up with demand from retailers, they need to grow perfect fruit conforming to certain specifications. Kenneth, a fifth generation apple grower describes this pressure:

“You have to be achieving not just high yields but you've got to achieve really high pack-outs to be going with it. [...] And the only way to achieve those really high pack-outs is to have the best quality strains of fruit you can have. Because somebody is always setting a benchmark of high colour, so you've got to match it. And the sooner you match it the more money you make and the better off you are.”

Limiting the number of cultivars they grow is a standard response among small scale family growers to achieve higher yields. This decrease in cultivar diversity is associated by growers with a loss of in-field diversity of insects and other plants. Growers are aware of the potential for serious issues such as pest and disease outbreaks as well as an erosion of the gene pool

that is likely with this trend in orcharding. Nonetheless, the short-term economic gain overrides this rational thinking.

Jumla

Despite the fact that all the orchards in Jumla are family owned and ‘small’ in size (average size is less than 1 ha) enhancing productivity has been the ultimate intention of both the Government and growers. The same progress model in relation to transfer of technology that Harcourt experienced throughout the twentieth century, before the extensive privatisation of Victorian extension services, is being pursued in Jumla. This model focuses on rewarding early adopters as progressive farmers (Stephenson 2003). The government intends to commercialise apple growing in Jumla (APP 1995; DADO 2012). This move from subsistence farming to commercial cropping, or here, orcharding is a direct threat to biodiversity (Chappell & LaValle 2011). In Jumla, expansion of apple cultivation is already affecting local biodiversity in three major ways: i) diversity of apple cultivars ii) competition with traditional food crops for land, and iii) deforestation.

Interview participants said that the introduction of apples as a crop in the Jumla landscape is a welcome addition to the local agricultural biodiversity. There are 15 different apple cultivars grown but the most important ones in terms of area covered and market demand are Red and Royal Delicious, Golden Delicious, Jonathan and Macintosh because of their perceived better taste and market demand.

Since the introduction of Apples in Jumla, the number, area coverage and cultivars of traditional crops are in the decline in the orchard areas. The introduction of new crops, cultural change among farmers and/or economic changes are frequently cited as responsible for declines in agricultural biodiversity (for example see Steinberg 2001). In Jumla, apples compete with traditional and important, locally consumed food crops for land—mainly upland crops such as, buckwheat, millet, *chino* and *kaguno*.

Similarly, promotion of Apples by the Government may be contributing to the already high rate of deforestation in Jumla threatening the wild biodiversity of the region. Given the low level of law enforcement in a remote place like Jumla and the limited availability of arable land, farmers are encroaching forest areas. This is in response to the increased demand for food supply to feed the family and more recently to respond to the government’s incentives to

establish apple orchards. Participants admit that irrespective of their legal land holding size, many farmers are clearing forest areas to establish apple orchards. **Highlighting the magnitude of forest clearance for apple orcharding, Krishna who is a farmer and also works part-time as a legal counsel at the local court said:**

“In my village almost all households have established apple orchard [but] I can say with confidence that most of such orchards are established on forest land; ‘one household, one apple orchard’ program has accelerated encroaching forestland in our village for apple orcharding.”

Again, apple cultivation is a fairly recent phenomenon and it therefore places pressures on other existing land uses where arable land is limited. This modernisation of the hillsides of Jumla potentially redefines place identity, which has been culture centric rather than product oriented for such a long time.

Biodiversity in Jumla depends on centuries of cultivation and attenuation of the crops to the local conditions. Wild harvesting of non-timber forest products (NTFPs) are still a key aspect of life here. Clearing for apple orchards in this *ad hoc* manner has implications for longer term ecological outcomes. By contrast, biodiversity in Harcourt has focused on diversification within the Apple crop. Even so, after 180 years, a particular ecosystem has evolved in response to management. Interestingly now, it is the threat of climate change and biodiversity from elsewhere in the form of pests and disease that is destabilising orchards and orchardists.

Apples and identity

Harcourt

The family farming that has underpinned the wellbeing of the Harcourt families might previously have been expected to mean that orchardists stay with their land, no matter what. But twentieth century impetus to detach lifestyle from farming as a business makes it clearer now that their business (and not the land, *per se*) has to sustain their livelihoods. If not, they will exit the industry. The practice of intergenerational succession among orcharding families is no longer taken for granted. Most growers said that they do not want their children to enter the industry.

Adding to the frustration associated with surviving in the industry is the fact that the local meaning of apples is lost in the contemporary production chain. No longer can the consumer choose to eat a Pink Lady from one specific area and a Gala from another, as most retailers do not mark the apples' origin, and apples are packed into unnamed boxes. The loss of branding and direct connection to the consumer also undermines local identity—the opposite to the situation developing in Jumla and Nepal.

Harcourt is still regarded as a good apple growing region and some growers are resisting the trend to scale up, to create a niche enterprise based on their trees. They are reviving the apple growing brand of Harcourt for their marketing. Some businesses are capitalising on the region's identity and their families' histories to recapture a smaller scale production and lifestyle response to some demands for local produce among consumers. The annual apple festival that takes place in Harcourt promotes this reputation for quality local produce as part of a regional identity that is used to benefit the growers. Not only does it bring people from the region together to celebrate, but it also presents opportunities for Harcourt to continue to be seen as an apple-growing centre. The event is held at the local historical society, the home of the Harcourt museum which features a large collection of orchard related artefacts. The festival draws people into Harcourt and therefore the town's history is made visible to others and this helps to validate the work and identity of the growers who live in this place.

Jumla

The Jumla case confirms that even in such a short time span, apples are becoming synonymous with the identity of Jumla as a place. Apples have become an important part of religious and cultural ceremonies. Apples are used to make garlands to offer to gods and to welcome guests to the community. **Ram—a small farmer from a remote Jumla village, reflected on changes in Jumli identity in recent time:**

“Before Jumla was known for its hand-made carpets/blankets and for the medicinal herbs we used to sell, to the rest of the country. [But] nowadays, it's all about Apples. When I visit Surkhet, Nepalgunj [regional townships] everyone I meet talks about our Apples. Apples have become almost synonymous to Jumla.”

Service providers working at the policy level interviewed for this research echoed this perception. Apart from this, apples contribute to the nutrition of most of the people of Jumla as apples are the most popular mid-day snack during apple season.

In both the cases apples are contributing to the construction of both place and individual identity. The differences lie in the scale of production, the integration with markets that in the Harcourt case, have dictated the physical look of the land, and in the Jumla case may also have this effect in time, even at a smaller scale. In Jumla, apples are still part of a range of other crops; but in Harcourt, where the predominant land uses consists of apple growing, diversification is in the post-harvest use of the product or selection of cultivars to better produce niche products like cider. The following section discusses how these constructions define and limit sustainability within these landscapes.

Discussion

Examination of apple histories suggests the pathway the Harcourt apple industry has been following has failed to deliver sustainability—defined as being able to support the family and maintain the relationship to their places for these small farmers; as a result farmers increasingly are leaving the industry. And even with the short involvement of apple growing, Jumla respondents are already experiencing how this economic progress model, coupled with the effects of climate change, may not be helpful for small holders and marginalized sections of the community over time.

Climate change is a threat to apple growing in the Jumla region. Both empirical and anecdotal evidence suggest that rises in surface temperature affects agriculture (Furuya & Kobayashi 2009). This has emerged as a threat to the viability of Jumli apple orchards as all cultivars being cultivated require long cold winter periods to initiate flowering. Local people already comment on changes in the timing of blossom initiation over recent years. Another critical factor is the availability of water. Almost all of the research participants perceive that they are getting less and erratic rainfall. Since rainfall is the only source of irrigation for almost all apple orchards in Jumla (DADO 2012), less rainfall will affect the production of apples. Even and despite intensive technology associated with water management in the Harcourt area, the latest drought in Harcourt, which lasted around ten years and which ended officially in 2009, followed by extreme flood events in 2010, meant that there was little or no water in the irrigation system. The flood, across severely dried out landscapes undermined the health of many of the trees and impacted orchard watering systems. But in the international marketplace, other apple growing places were able to benefit from the lack of production in Australia; and this was a further blow to the Harcourt locals.

The other factor that is not in favour of small apple growers in Jumla is the remoteness and lack of transportation facilities. Jumla is a hilly landscape and road networks are just in the making. The only means of transportation are on human or animal backs and because apples are a perishable commodity, farmers have to endure a higher transportation loss (post-harvest loss).

While subsistence farming was the norm in 19thC Harcourt (and lasted until the mid-twentieth century), growers today almost exclusively grow apples. In Jumla on the other

hand, apples compete with other staple food crops for land, threatening the long-term food security prospect. Similarly, taking care of apple trees requires a lot of investment of time and money without having any immediate return, as most apple cultivars grown in the region require 6-8 years to mature which is longer than in Australia where dwarfing rootstocks allow full production after just 2-3 years. **Given the prevalence of higher levels of absolute poverty in Jumla (CBS 2013), many interviewees indicated that they cannot** afford such investment. Moreover, because apples are a relatively new crop for most growers there, less educated farmers lack traditional knowledge on apple cultivation. Additionally, as an imported crop, farmers are facing new kinds of insects and pests that came with the imported **nursery stock**. **Explaining these insect and pest infestations as a new phenomenon in Jumla, Laxman—a young farmer from a remote Jumla village said:**

‘I don’t remember my father [a farmer] talking about these kind of bugs before. This is a totally new bug...if I am not wrong we saw this bug for the first time in our village just 9/10 years ago. We have had damage by some other threats...but this is a different thing ... what we are seeing these days, is something totally new.’

Similar to Jumla, Harcourt is experiencing increasingly extreme weather events and a rise in pests that put pressure on the remaining orchards. In addition, the loss of apple businesses is changing the social and cultural fabric of the region. And while Jumla is still accumulating local knowledge and expertise in apple growing, this knowledge is already slowly being lost in Harcourt.

Further the Harcourt community at its height of population and profitability was based on the orchard industry. Therefore, identity as growers and as people from the region grew together. Whereas in Jumla, communities have existed for hundreds of years before the introduction of apples. The foundations of Harcourt as a place, are rooted in the success of the orchard industry. Today’s difficulties reflect the perception that there are no obvious alternatives for the people whose history **and identity** is so tied to apple growing. That history however, was very much focused on the economic benefits of orcharding. It is the economy that is dictating the terms of social change now. The remoteness, the long-standing culture of diversification may have helped Jumla withstand the relentless push of market penetration in these early years. But if Jumla growers were to specialise in apple orchards, it would require a huge social change to the way production is understood and fields and landscapes maintained. The reality of fragmented parcels of these small scale land holdings suggests monocultures like in

Harcourt's landscape are not possible. However the impetus to be more and more responsive to market forces can still distort decision-making in Jumla. For example, traders in Kathmandu are already demanding growers to improve colour of their Apples and have wax coating on them.

In Harcourt, apple cultivars came with the settlers and were 'from home'. This was replaced by government extension and private nursery production and promotion during the growth phase of the industry. Now the growers largely respond to market demand. This differs from Nepal, where the government has influenced cultivar selection from the start. Growers in Jumla are responding to what is given to them, rather than doing market research as to what cultivars are and will be popular. They select from about 15 cultivars provided to them by the government and that are well accepted by the market. And in the Harcourt case, the ability to source their own stock and experiment with new cultivars has brought some growers short-term gain, but little long-term security because the big retailers still require the same 3-4 cultivars. The Jumla extension approach has not been able to respond to the local growers' experience of changing climate conditions; and consequently, no new cultivars are being offered to respond to the rising pest predation or the delayed blossom set and diminishing yield.

But economic sustainability at the household level, at this time, as noted by many of the interview participants in Jumla indicated that apple orchards are helping them raise their income. For them, apples are a cash crop helping them to access more income than from cereal crops that they otherwise would have cultivated in their field. With gradually improving road access to markets and the perceived better taste of Jumli apples compared to imported ones in the market, its exports to Kathmandu have notably increased in the last few years (DADO 2012).

Conclusion

This paper has explored the importance of place in two very different apple-producing areas and concludes apple growing in both regions contributes to the formation of place and identity. While Harcourt is struggling to maintain its apple identity, Jumla has just found a new identity in Apples. This highlights the temporal vagaries associated with building a regional reputation on a particular production system, something that is associated with successful economic modernisation in the west. In these landscapes, identity can be and has

been used for the benefit of individuals and regions. Increasing dependency on one crop (even if of mixed cultivars) however, can lead to increased vulnerability for individuals and regions.

During the early 20thC and up until the 1950s, the scale of apple production in Harcourt allowed for more mixed cropping and was very lucrative in social and economic terms. Today's realities are such that growers are struggling to maintain their businesses at the increased scale and intensity of monoculturing required by global economies. In the visible future the model focusing on intensification, global competitiveness and productivity will not be maintained, not only because of economic reasons but the actual physical apple growing is jeopardised by ecological realities and market pressures - and these play out by undermining the local orcharding community. It is not as simple as saying that Harcourt has been unsuccessful, but rather recognizing that it was success at a particular scale and in a particular time.

In the case of Jumla, apples have quickly found a place in Jumli socio-economic and cultural landscapes. Apple trees originate from Central Asia in Kazakhstan, and have completed a whole loop by travelling to Europe before re-emerging in the east and Nepal. In just 40 years, apples have re-defined aspects of Jumla's identity as a place. While Jumli growers are in the midst of connecting to international markets, growers in Harcourt who choose to disconnect, would appear to be more sustainable in economic, social and ecological terms, for the foreseeable future. The Nepalese Government is encouraging Jumla farmers to pursue the same trajectory as Harcourt, if at a different scale, and that may lead to economic marginalization and a distortion of local cultural and ecological outcomes, at least in the short term.

In both cases, the environmental history indicates that the aim is for an intensive and export orientated apple industry, and the question of landscape sustainability is important in both locations. Communities in both places are dependent on the maintenance of soil health and water supply, as well as markets. Building on place identity as a marketing tool can support the local economy but only as long as the physical conditions are also in favour of apple growing.

The Harcourt experience has shown that a sole reliance on the orchard industry is based on spatial and temporal scale dependency; and that spatial and temporal scales may be misaligned and that neither is static. Arguably, Jumla can avoid such dependency if enough attention is given to maintaining other sources of income and the maintenance of staple crops. The Harcourt example indicates that an identity dominated by a sole commodity and linked so tightly to the meaning of that place, i.e. apple growing, can limit the ability to imagine other forms of sustainable landscapes. There are other land uses that sit on the periphery of the current physical and social affirmation of apple identity that could be considered if the public discourse around re-imagining Harcourt, or re-visiting traditional cropping in Jumla was given some support and stronger linking with regional change. The Jumla case also illustrates the importance of accepting the limitations of place, rather than overriding them as has been the fashion in Harcourt for the last 150 years.

In these narratives we see the importance of place in shaping what is possible to grow, the continuing trajectory of agricultural modernisation in shaping what is grown, and the consequences of these two on the social and cultural identity of both the place and the people who live and work within them. Sustainable landscapes are shaped both by the internal drivers for sustenance and the external drivers that determine the interaction of place with the wider region and world. This paper, therefore, concludes that while we might define Harcourt or Jumla as a place where sustainable landscapes exist or have existed, and where what is grown has shaped the physical and social identity of place and people, the apple narratives show how dependent the definitions are on both spatial and temporal scale.

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Figure 1: Conceptual framework used in this study (using an ‘apple lens’ to investigate the contribution of identity and biodiversity in the formation of place within a social-ecological system)

Figure 2 World Map showing location of Jumla and Harcourt.

(source: Chandra Jayasuriya, University of Melbourne)

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Title:

Understanding sustainable landscapes through the lens of apple growing: cases of Jumla, Nepal and Harcourt, Victoria

Date:

2015-04-01

Citation:

Christensen, J. & Gaire, K. (2015). Understanding sustainable landscapes through the lens of apple growing: cases of Jumla, Nepal and Harcourt, Victoria. SUSTAINABILITY SCIENCE, 10 (2), pp.275-284. <https://doi.org/10.1007/s11625-014-0273-5>.

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