

This article was downloaded by: [Hong Kong Polytechnic University], [Stephen Pratt]
On: 22 March 2013, At: 05:21
Publisher: Routledge
Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered
office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Journal of Sustainable Tourism

Publication details, including instructions for authors and
subscription information:

<http://www.tandfonline.com/loi/rsus20>

Minimising food miles: issues and outcomes in an ecotourism venture in Fiji

Stephen Pratt ^a

^a School of Hotel & Tourism Management, The Hong Kong
Polytechnic University, 17 Science Museum Road, Tsim Sha Tsui
East, Kowloon, Hong Kong

Version of record first published: 18 Mar 2013.

To cite this article: Stephen Pratt (2013): Minimising food miles: issues and outcomes in an
ecotourism venture in Fiji, *Journal of Sustainable Tourism*, DOI:10.1080/09669582.2013.776060

To link to this article: <http://dx.doi.org/10.1080/09669582.2013.776060>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any
substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing,
systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation
that the contents will be complete or accurate or up to date. The accuracy of any
instructions, formulae, and drug doses should be independently verified with primary
sources. The publisher shall not be liable for any loss, actions, claims, proceedings,
demand, or costs or damages whatsoever or howsoever caused arising directly or
indirectly in connection with or arising out of the use of this material.

Minimising food miles: issues and outcomes in an ecotourism venture in Fiji

Stephen Pratt*

School of Hotel & Tourism Management, The Hong Kong Polytechnic University, 17 Science Museum Road, Tsim Sha Tsui East, Kowloon, Hong Kong

(Received 24 January 2012; final version received 18 January 2013)

The tourism sector's demand for food, and the distance some food travels, has significant impacts on greenhouse gas emissions and implications for climate change, especially in long haul small island state destinations. This paper describes the development of the concept of food miles, and the many measurement issues involved. It analyses a small island ecotourism project in Fiji where the source, and transport mode, of all food consumed over 35 months was recorded in detail, during which time conscious efforts were made to minimise imported foods and increase island-grown food. In 2008, the share of imported "non-Fiji" food was 18%, by 2010 it was reduced to 5%. On-site production had risen from zero to 15%. Off-island, but Fijian, food accounted for the balance. Food miles were reduced by over 50%; carbon emissions from food transport fell by over 20%. Some problems were encountered by the largely young (average age 27 years), largely UK/US visitors who were unused to "low carbon" diets with reduced meat levels. Ideas are put forward to overcome that challenge, including new/fashionable cooking techniques, and interpreting local food and farming to visitors. Management issues involved in larger scale ventures are outlined.

Keywords: food miles; local food; sustainability; emissions; food production; transportation

Introduction

The nexus between food and tourism has grown in importance in recent years. For some destinations, food is seen as a pull factor, motivating tourists to visit the destination and sample its culinary wares (Boniface, 2003; Hall, Mitchell, & Sharples, 2003; McKercher, Okumus, & Okumus, 2008; Okumus, Okumus, & McKercher, 2007; Sims, 2009). Even for tourists not specifically motivated to travel for culinary reasons, food is still an important component of the travel experience. For local suppliers, agriculture's links with tourism can provide a major source of income and is one way to decrease leakages out of the local economy (Telfer & Wall, 1996, 2000; Torres, 2002). Food choices and their associated land use footprint are one of the factors that contribute to an ecological footprint calculation (Gössling, Hansson Borgstrom, Horstmeier, & Saggel, 2002; Wackernagel & Rees, 1996). Internationally, the tourism sector's demand for food and its associated food miles has a significant impact on greenhouse gas emissions and hence has implications for climate change (Gössling, Garrod, Aall, Hille, & Peeters, 2011). The food miles issue is especially important in this context for long haul small island destinations like Fiji, the site of this study.

*Email: stephen.pratt@polyu.edu.hk

Food miles measure the distance food travels from its production site, typically the farm, to the consumer. The concept originated in the UK in the mid-1990s as a result of the realisation that food production, distribution and consumption patterns had changed significantly over the previous 50 years (Sustain, 1999). For example, in the UK, the five largest retail chains now account for 80% of the market. As a consumer reaction, increasing dissatisfaction with food quality, safety, lack of choice and inequality in food distribution raised concerns about the transportation of food around the world. Sustain, the alliance for better food and farming, notes the effects of greater food miles (Sustain, 1999). These include:

- Increased transport pollution
 - Transport in all forms is a major consumer of energy.
- More packaging
 - Food that needs to travel further requires more packaging to retain its product quality.
- More processing
 - Food that travels further requires more processing than fresh produce to get to retailers.
- Biodiversity loss
 - Retailers seeking to maximise economies of scale are incentivised to limit the varieties they sell to aid packaging and distribution.
- Agro-chemical use
 - With increased processing comes increased chemical use to protect crops in transit and storage.
- Nutritional implications
 - The fresher the produce, the more nutritious it is.

Food miles are often linked explicitly with carbon accounting and climate change (DEFRA, 2005; Smith & Smith, 2000). They are often reported in terms of kilometres travelled but food transported is also calculated in terms of kilograms of carbon dioxide (CO₂) equivalents emitted due to the distance the food has travelled (Coley, Howard, & Winter, 2011). However, the relationship of food transport to overall sustainability is complex (DEFRA, 2005). In the analysis, data on factors such as the transportation mode, transportation efficiency, the type of energy used and differences in the food production systems need to be gathered or at least assumed.

The issue of food miles, their associated carbon footprint and the complexities behind it are discussed in Berners-Lee's book *How Bad are Bananas? The Carbon Footprint of Everything* (Berners-Lee, 2010). Berners-Lee goes into detail about the concept of carbon footprints and how difficult it is to calculate these. He does this for an extraordinary number of goods and services; from an email, to a pint of milk, through to having a child and a volcano (hence the title of his book). There is a need to consider not only the direct but also the indirect emissions associated with food production and food consumption. Firstly, low-carbon production techniques in farms in a more distant location, in addition to carbon produced through its food miles may still result in less carbon being produced than using higher-carbon production techniques more locally. Secondly, seasonality of fruit and vegetables can result in large differences in carbon footprints. Fruit and vegetables grown in-season tend to have a lower carbon footprint than fruit and vegetables grown out of season, which require different production techniques (such as the use of energy-intensive greenhouses) and transport modes (such as air-freight).

Some have argued, then, that the concept of food miles is too simplistic (DEFRA, 2005) and that the concept of life cycle analysis (LCA) is a better measurement of the impact of food production and consumption. LCA evaluates the resources and energy inputs and outputs at all stages of the life cycle: the acquisition of raw materials, food production, food processing, packaging and transportation, preparation and consumption, and end of life (resources and energy used in waste management and disposal) (de Backer, Aertsens, Vergucht, & Steurbaut, 2009; Heller & Keoleian, 2000). A full LCA is beyond the scope of this research. Food miles, and related carbon emissions, remain a useful indicator of the economic, environmental and social burdens associated with the transportation of food to a destination.

This article examines an ecotourism project in the north of Fiji which tracked the source of all food consumed in the island destination over a 35-month period. In an effort to become increasingly sustainable, there has been a conscious effort to minimise imported foods and increase island-grown food. This has been a challenge, given limited water resources and seasonal natural disasters. The second section reviews a sample of the literature related to the globalisation of food, the impact of food supply chains on the environment and the link between agriculture and tourism with its potential to alleviate poverty in developing countries. The third section examines a case study in the north east of Fiji. The fourth section discusses the data and methodology used in this research while the fifth section provides the findings of this research examining the timelines of the different sources of food, assessing the satisfaction with food from the tourists' perspective and provides calculations of the food miles. The last section concludes that there has been a noteworthy decrease in food miles and hence carbon emissions as a result of more sustainable food sourcing, food production and food consumption. However, even in an ecotourism venture that targets adventure tourists, it proved important to provide nutritious and tasty meals that are acceptable to the tourist.

Literature review

Globalisation has brought into focus the issue of food, health and economics (Lang, 1998). Food has been traded for millennia and spices, fruit and rice, among other staples have been grown and transported thousands of miles for centuries in trade. But with ever increasing volumes, the issue of food miles and the supply chain is one element of the larger picture of greenhouse gas emissions and climate change. Food consumption comprises part of the ecological footprint calculations (Gössling et al., 2002). The emphasis on reducing food miles and promoting the connection between local initiatives and consumers is part of a wider agenda of promoting sustainable agriculture on a global scale. The local food movement is seen to be able to provide new economic opportunities for small to medium size enterprises, reducing environmental footprints and promoting healthier nutrition for consumers (Green & Dougherty, 2009). With the increasing recognition of more sustainable living, there has been heightened awareness of the problems associated with modernisation and mechanisation of food supply chains.

With increasing numbers of international tourists travelling worldwide, the potential for food-borne illnesses is growing but along with the mass movement of people, there is a rapid rise in the distance food travels (Lang, 1998; Stancu & Smith, 2006). In the United Kingdom, the distance food travels between consumer and producer has been estimated to have increased 30% in 15 years (Paxton, 1994). In developed countries, it has been recognised there has been an increasing disconnect between production and consumption of food. Large supermarkets tend to dominate (Ibery & Maye, 2005). There is a growing

literature on the size of food supply chains. Renting and Wiskerke (2010) highlight the emerging role for public institutions and community groups in the promotion of sustainable local agro-food systems. The authors succinctly communicate four food-related policy issues that need addressing. These are environmental pollution and ecological degradation; health problems; loss of food quality and diversity; and downward pressure on farm and regional incomes. Jackson et al. (Jackson, Ward, & Russell, 2006) recognise the explosion of interest in food across the social sciences; from politics to sociology to geography and economics. Focusing on the concept of “commodity chains”, Jackson et al. (2006) review how the concept has developed and evolved in different government agencies in the United Kingdom. They note that the concept of “food miles” has become a part of the vernacular. The concept gained prominence as a result of several reports (Hird, 1999; Paxton, 1994).

The argument about shortening food supply chains and encouraging local food is perceived to have the following beneficial impacts: opportunities for small to medium size enterprises (SMEs) to retain added value in the region, typically rural areas; to increase and sustain local employment; strengthen regional imagery and promote civil pride in the area; reduce food miles and provide energy savings, enhance biodiversity from farm to table; and assist in the promotion of local tourism (Green & Dougherty, 2009). There is an implicit assumption that local food supply chains are more sustainable. This notion is contested by Ibery and Maye (2005) who examine six case studies of specialist food producers in the Scottish/English borders. They find these specialist food producers are not particularly sustainable when assessed using sustainable food criteria developed by the United Kingdom’s Department of Environment, Food and Rural Affairs. Clearly, it is too simplistic to conclude that the reconnection between producer and consumer will be made solely through the development of niche and speciality food products alone (Ibery & Maye, 2005).

Other authors quite rightly note that there is nothing inherently more sustainable about local food production (Born & Purcell, 2006; Hinrichs, 2000; Winter, 2003). The “local trap” makes the assumption that local-scale food production is more desirable and hence preferred to food produced from larger-scale production systems. Born and Purcell (2006) note that the assumption that local is desirable does not always hold. They argue that advocates of “local” food see localisation as an end in itself, whereas the primary concerns of food production and consumption should be those of ecological sustainability; social and economic justice; and food quality and human health, regardless of scale.

Indeed, the definition of what is “local” is contentious and open to significant debate. Food sold in a local farmers’ market does not necessarily mean that the food is local. Complex food systems and supply chains means food often moves through various markets. Unless one can actually trace where the food was produced, then there will always be the chance that it may not be local. Even foods coming from other countries can enter the food distribution system in a destination and then be mistaken for local food. Morris & Buller (2003) note that “local” can mean one of two things: it can mean products are produced and sold from a geographically bounded region or it can represent terms of “speciality” or “locality” foods, which are perceived to prove a point of differentiation to the food or destination. Adopting a geographical definition of “local” is also complicated by the distinction between the origin of the ingredients and the place of manufacture. For example, if all the raw materials for the product are imported but the food is processed and/or packaged locally, is that perceived to be local food product? Sims (2010) concludes that the notion of “local” when it comes to food is very fluid. It is a relative term, dependent upon context. She found that the concept of “local” varies whether it is food producer, food supplier or food consumer.

Nevertheless, food designated as “local” has been used as a strategic tourism marketing element, especially in rural areas, where there is an emphasis on the conservation and maintenance of natural and cultural heritage (Hall et al., 2003). Food tourism or culinary tourism is seen as an opportunity for product development that adds to rural diversification (Sims, 2010). Everett and Aitchison (2008) examine the role of food tourism in sustaining regional identity in Cornwall, in the south-west of England. The authors note that food tourism offers retention and development of the regional identity, enhances an appreciation of the environment and sustainability, and provides social and cultural benefits such as a celebration of the local and challenges the homogenisation of global standardisation. It also conserves traditional heritage, skills and the ways of life. Food tourism is seen as a means of increasing tourist spending, as a way of extending the tourist season through the introduction of local food-related festivals and events, and can be used to market rural locations as a tourist destination (Everett & Aitchison, 2008). Sims (2010) also notes that the concept of “local” food encompasses cultural appreciation and place distinctiveness in addition to having a spatial component and being environmentally concerned.

“Local” food contributes to the sustainable tourism experience because it appeals to tourists’ desire for authenticity (Sims, 2009) and has also become synonymous with the growth of the slow food movement, as a reaction to the “McDonaldisation” of food (Dickinson, Lumsdon, & Robbins, 2011). Growing more food locally opposes the downward pressures on farm and regional incomes through the ongoing concentration and competition on food supply chains by seeking to maximise the dollars that are kept in the local economy and by trying to organically grow as much in the destination as possible, it is highlighting the cultural significance of preserving and regenerating gastronomic and quality food traditions, emphasising slow food (Renting & Wiskerke, 2010).

The local purchasing of foods and links between tourism and agriculture and the benefits of producing more food locally, often measured through value chain analysis, has been identified as one component of pro-poor tourism (Mitchell & Ashley, 2009, 2010). Pro-poor tourism strategies are concerned specifically with impacts on poor people, though the non-poor may also benefit. Therefore, pro-poor tourism is a set of initiatives or principles rather than a particular type of tourism, whose goal is to alleviate poverty (Scheyvens, 2007). Ashley, Roe and Goodwin (2001) cite several examples in developing countries, some more successful than others, where the local community and businesses have supplied food to tourism businesses. Ashley et al.’s case studies (2001) highlight the increased economic benefits of local food supply, including employment, wages, commitment to local jobs, and training of local people in developing countries. Further, it is not only ecotourism or small-scale tourism that can contribute to poverty alleviation. Businesses at all levels and scales of operation can contribute to poverty alleviation (Scheyvens & Russell, 2012). Yet as Scheyvens notes (2009), there needs to be a strong commitment by the private sector as well as government in committing to improving the well-being of the poor, for pro-poor tourism to move beyond tokenism and provide tangible economic benefits.

Food imports represent a loss of income to the local economy as imports represent a leakage of currency out of the economy. In an early paper on this subject, Belisle (1984) identified six reasons why hotels use imported foods. They argue that the local food items are not available in sufficient quantity; items are more expensive; are of lower quality than imported items; are not able to be supplied as consistently as imported goods; imported items are more convenient to use; and lastly, do not meet the taste preferences of tourists. These results have been replicated in other destinations (Torres, 2002, 2003) and most recently by Rogerson (2012). Hence, the need to strengthen linkages between the agriculture-supplying industries and the tourist-orientated hotels and restaurants sectors (Valle & Yobesia, 2009).

There are still significant barriers to creating and strengthening linkages between hotels and restaurants and their supplying industries (Berno, 2006; Green & Dougherty, 2009). Some of these include the quality of produce and obtaining sufficient quantities to supply hotels, restaurants and resorts (Rogerson, 2012). In some countries, there is a lack of centralisation and sufficient organisation amongst producers so that hotels and restaurants need numerous individual contracts with agricultural suppliers to gain adequate quantities to service tourists (Veit, 2007). Additionally, hotels and restaurants need to be persuaded that sourcing ingredients locally, which can be more expensive, and providing a better quality product, will result in tourists paying a premium for this local produce (Green & Dougherty, 2009).

The increasing interest in sustainable food has seen the growing interest in organic food. Holt et al. (2002) compare markets for organic food in six EU states. They found that the land designated organically farmed in the UK increased eightfold in the six years between 1994 and 1999 while for Austria, Italy, Ireland and Portugal the increase was fivefold. This market for organic produce, which tends to promote regional development strategies, highlights the holistic approach that needs to be taken to sustainable food, such as on-farm and near-farm processing activities, easy and accurate food labelling and appropriate distribution channels. Elsewhere, Choo and Jamal (2009) conclude that there is potential for organic farms in South Korea to be viewed as a new form of ecotourism.

The above literature review examines a number of studies which are predominantly large-scale or sited in developed countries. While there has been some research to date on this issue in developing countries (see for example, Belisle, 1984; Telfer & Wall, 1996; Torres, 2003), this paper adds to the body of knowledge in this generally under-researched area.

Context

The sourcing of supplies, including food, to tourism developments on small islands has significant consequences. Generally, it is easier to notice the economic and environmental impacts of tourism on small islands. The potential for the negative impacts of tourism to affect small islands have been noted in earlier literature (Butler, 1991; de Hass, 2002; Hall, 1996; McElroy, 2003). Environmental sustainability on small islands involves the supply of marine and land resources and their ability to revive and sustain populations over a number of years. Two areas of concern where negative impacts have occurred include stress on limited resources and waste management (biodegradable and non-biodegradable) associated with the limited space and fragile ecosystems. The type of food offered and the sourcing of food are important factors in determining the sustainability of an ecotourism destination.

“Tribewanted” is an alternative tourism experience where tourists live like Fijian tribe members and with Fijian tribe members, whose visitors fall within the backpacker/volunteer/adventure tourism market. The project was founded by two UK nationals, Ben Keene and Mark Bowness in 2006 (see Keene, 2008 for a history of the tourism project). The project is managed by these expatriates, who employ local villagers as staff. Tribewanted claims to be a sustainable tourism development project, the aims of which are community-building, sustainable living and an adventurous experience (www.tribewanted.com). Tribewanted is located on the island of Vorovoro in the north-east of the Fiji Islands (<http://tinyurl.com/aprsx7z>). Vorovoro is a small island of roughly 200 acres, of which only two acres are “developed”. The area that was cleared contains eight *buves* (Fijian houses) of differing sizes, a kitchen, two picnic areas, a water tank, composting toilet, and a half an

acre farm. Vorovoro is located 45 minutes by boat from Labasa (Fiji's fourth-largest town with a population of c. 25,000) in Vanua Levu (Fiji's second-largest island). The island is marked by high ridges running along the island like a backbone. In the valleys though, the flat land is suitable for crop cultivation and buildings. This flat land has rich loamy soil suitable for fruit and vegetable growing.

Tribewanted aims to have as neutral an impact on the environment as possible. With respect to food supplies, this entails locally sourcing as much food as possible. The tourism operation is small-scale, with an average of 28 visitors a month visiting the island for an average of two weeks. Before this tourism project started, the island was uninhabited. Having an active population on an island creates an increased demand for water resources, food and space. A process of foregoing alternatives must be made when tourism is introduced to a small island. In this case study, discussions with the indigenous landowners revealed they decided to lease their land to an ecotourism operation, hence trading off potential environmental degradation for possible economic benefits and the ability to promote the indigenous culture to tourists. Natural habitats have to be cleared for human habitation; human beings are added to the island ecosystem and are placed at the winning end of the resource consumption chain (Hall, 1996). Increased demand for food can place strains on the ability of the island to yield sufficient supply both in land and marine resources. The greater the amount of imported products, the more waste will be generated, both organic/biodegradable and non-biodegradable. Interestingly, the ancient indigenous Fijian concept of *tiko sautu vaka taba yabaki* (bountiful multi-generational existence) depends on understanding the biological sensitivities of small island environments. Tribewanted is trying to revive and sustain this concept.

Data and methodology

The researcher visited the island as a tribe member on six occasions over the 19-month data collection period and held many informal discussions with project managers, tourists and employees. The researcher also participated in the production of locally grown food as well as in its preparation and consumption and observed how other food was transported to the island. The research was part of a larger project conducted on the island¹. Data on food originated primarily from the kitchen's logbook, supplemented by a post-visit online visitor survey about their satisfaction with the tourism experience. Several questions concerned food and its sustainability. Responses to the satisfaction questions were captured using a 4-point Likert scale. A copy of the online survey can be found as a supplementary file to the online version of this paper at www.tandfonline.com/JOST.

The online survey was conducted among tourists who had recently departed the island. An email thanked them for visiting the island and sought feedback on their experience on Vorovoro: what they enjoyed and what needed to improve. At the end of May 2010, 205 visitors had responded to the online survey, a response rate of 19.8% of the island's 1034 tourists. UK residents comprised the majority of respondents, with 61% travelling to Tribewanted; a further 13% came from the USA. Average visitor age was 27 years. The main way that visitors found out about the project was through television, newspapers and magazines (38%) while over a quarter (28%) of tourists found out through word-of-mouth from family or friends.

Three times a week, a boat makes the 20-kilometre round trip journey from Vorovoro to the mainland to pick up and drop off new tourists and re-stock food supplies. All food purchased by the Tribewanted tourism project is weighed and entered into a logbook. Each entry denotes the item, its weight and its source (the local market [Labasa]; elsewhere in

Fiji; or overseas). Food grown on the island, fish caught in the area and eggs produced by the on-island chickens were weighed and recorded in the same logbook. Data tracking was undertaken from January 2008 until November 2010.

The definition of “local” is complex and open to debate (as noted earlier). Food either caught or grown on VoroVoro Island is relatively easy to categorise as it comes straight from the fishing boats or gardens. The food obtained from the local Labasa market was assumed to be sourced from the surrounding waters and farmland of Labasa; it is not packaged and discussions revealed that the sellers at the market had grown the products themselves. Hence, to the best of the author’s research, the food categorised from Labasa comes from the surrounding area. The food categorised as coming from elsewhere in Fiji and/or imported was primarily sourced from the shops and supermarket in Labasa town. The author reviewed the packaging of these food stuffs and verified that the categorisation in the logbook accurately reflected the geographical location of the food source.

The data was entered into SPSS for analysis. The number of items entered into the logbook each month was approximately 250. The number of unique items entered into the logbook was approximately 160. This included 26 different types of food grown on VoroVoro. The most frequently used island ingredients were coconuts and papaya. The most frequently purchased items from the town were potatoes, bananas, carrots, onions and flour. In an average month, the total amount of food consumed was 878.7 kg.

Findings

Source of food

As the island was previously uninhabited when the project began in September 2006, all food needed to be transported onto the island. To be as self-sufficient as possible, one of the environmental initiatives of the project was to produce as much food as possible on the island. The project has measured and monitored the source and quantity of all food consumed and produced on the island since January 2008.

Across the period January 2008 to November 2010, on average 14.6% of food consumed on VoroVoro was produced on the island; 35.7% came from the mainland gateway town of Labasa; 40% was sourced from the rest of Fiji with only 9.8% imported from overseas (Figure 1).

There has been a conscious effort to source food locally. If it could not be grown on the island then the local market was perceived to be the next best source. The 9.8% of food by weight spent on imported goods compares favourably to Belisle’s (1984) results for Jamaica, which stood at 54.2%.

As can be seen in Figure 2, there was a conscious decision to dramatically reduce the amount of imported food consumed on the island. A decision was made in May 2008 to bring no more tinned or canned items onto the island. In 2008, the share of imported food was 18% of the total while in 2009 and 2010 the average stood at 6% and 5%, respectively. Backpacking staples such as Milo (powdered chocolate drink), baked beans and tinned tuna are no longer purchased as well as Argentinean tinned tomatoes, tomato puree, sweet corn, peanuts or corned beef. Imported fresh fruit such as New Zealand apples, Australian grapes, imported capsicum and celery no longer make it onto the island. In addition, certain food stuffs packaged in glass jars are no longer purchased, such as mayonnaise, sweet chilli sauce from Indonesia and strawberry jam from Australia. Some refrigerated items like yoghurt and imported packaged luxuries such as food colouring and Philadelphia cream cheese have also been eliminated from the shopping list.

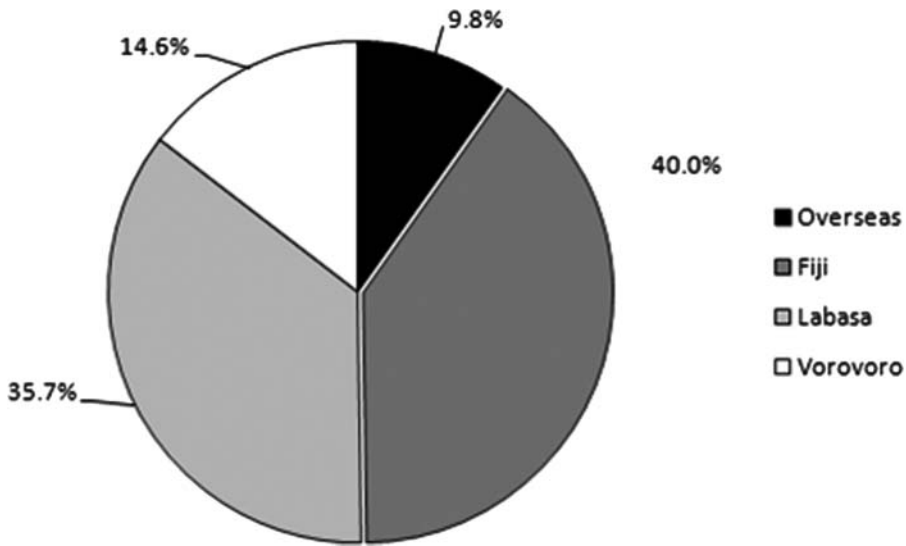


Figure 1. Source of food consumed – January 2008 to November 2010.

On the supply side, the decision was made to grow fruit and vegetables such as papaya, coconut and other various garden vegetables. In September 2009, free-range chickens were brought in to produce eggs and naturally, all the fish was caught in nearby waters.

Over the 35-month period from January 2008 to November 2010, the project produced an average of 14.6% of its own food requirements. From May 2008, there has been a significant increase in the amount of food sourced from the island (Figure 2). Initiatives

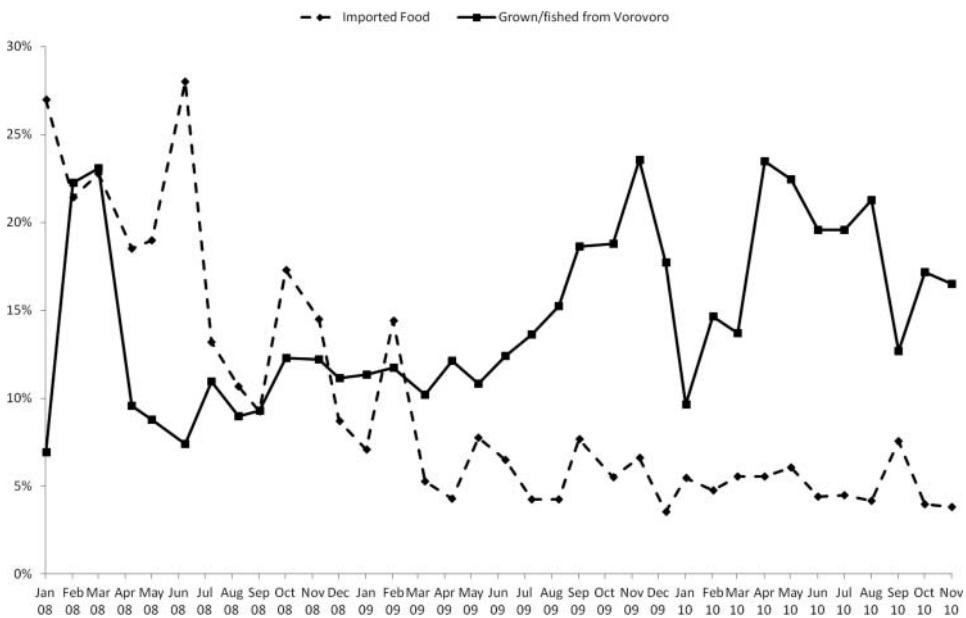


Figure 2. Percentage of imported and island-grown food by month.

such as increased fishing trips, increasing the number of laying chickens as well as more experience in knowing the better productive crops on the island has led to this increase. Further, there is always an abundant supply of papaya and coconuts on the island so modifying the weekly menu to maximise these ingredients has led to an increase in island-produced food. One major threat to the continued sustainability of growing and consuming island-grown food is the occurrence of natural disasters, particularly cyclones. For example, Cyclone Mick passed over the island in December 2009, practically wiping out all crops. There was a noticeable decrease in the proportion of island-grown food in the months following the cyclone.

For food unable to be produced on the island, there has been a conscious decision to reduce the purchase and consumption of processed foods and substitute this food with fresh produce from the Labasa market or directly from Labasa farmers. For example, the project has ceased purchasing some types of frozen goods such as mixed vegetables and sausages as well as some packaged food such as noodles, white bread and cheesy bread. Tribewanted now bakes all its own wholemeal bread in addition to making such condiments as papaya jam.

The local Labasa market was the predominant source of food in 2008 but this has dropped slightly to an average of 34% in 2009 and 31% in 2010. Other food from Fiji has climbed from an average of 29% in 2008 to 45% in 2009 and 47% in 2010. It is food from this source that has increased its share at the expense of the imported food items.

Many of the examples noted above were discussed amongst the visitors and deliberate decisions were made for the benefit of the local economy and the desire to live more sustainably, often forsaking immediate “self-gratification” for the social good. Awareness of the economic, environmental and health impacts of food production and supply is raised when the visitors are directly confronted with the consequences of their actions. This cognition function is often followed by a change in behaviour (Wilson & Ateljevic, 2008).

Satisfaction with the menu

While the project has attempted to grow as much food as possible on the island or alternatively source food from the local market, in general, there has been a positive response about the menu from the tourists. Over half (53%) of those completing the online survey rated the food as “excellent” on a four-point Likert scale. Verbatim comments made in the online survey noted the change in the menu.

“Food MUCH healthier than when I last visited. . .Loving the use of more fresh, raw vegetables.”
(UK visitor)

However, about one in seven visitors are, at a minimum, only just satisfied with the food. In sourcing food locally and remaining economically sustainable, the project still needs to be creative in its menu. The food has to be “sustainable” but also has to be palatable to the (predominantly Anglo) tourists’ taste. There are issues around the repetitiveness and lack of variety of the menu as well as the issue of enough protein in the diet. With respect to the lack of variety, the following comments were indicative.

“As a family we did struggle at times with the food, even I went off it for a few days in the middle, we’re just used to far more variety, not quite so much rice!! More fish would’ve been fab!” (UK visitor)

“Sometimes the food was pretty insipid. On a few occasions it was absolutely delicious! Too much flour and sugar for my liking.” (NZ visitor)

“Needs to be more variety of fresh fruit if possible. I suppose when I went some fruit were out of season, but good vegetarian food was provided and cooking it with the Fijians was so much fun!” (Australian visitor)

It is important that the food offered sustains and energises the visitors. Despite the significant quantities of legumes in the diet, there is a perception of a lack of protein available. Tourists from developed countries are accustomed to more meat even if it is not necessarily good for their health. This perception of a lack of protein led a number of tourists to believe it was detrimental to participating in some of the adventure activities on offer.

“Food I rated as satisfactory: because it was a low-protein diet which meant I was tired all the time. When you talked to the islanders, they’d all had fish for breakfast and I was trying to keep up with them on porridge - which is great for fibre but not really full of protein. Eggs would be great or even nuts chopped into the porridge. Also there wasn’t an understanding of a balanced meal for vegetarians - if you take meat out, you have to replace it with protein.” (NZ visitor)

“The food on the island needs to be improved so that you get more vegetables and mixed diet while on the island to give the islanders [tourists on island] enough energy and good health to be able to enjoy their time in the island.” (UK visitor)

“Need more protein in the diet and less bread, I was very upset with the food considering what the locals eat and the variety of fruits etc. available.” (USA visitor)

An example of the food plan for a typical week is shown in Table 1. The focus on fruit and vegetables is noticeable. However, the protein provided is derived largely from legumes sourced from Fiji as opposed to the more expensive and probably imported meat.

Tourists were also asked to rate their cooking experience they were involved in whilst on the island. A large majority of the tourists had a positive experience cooking in the kitchen: 36% rated their cooking experience as “excellent” and a further 44% rated their experience as “good” on a 4-point Likert scale.

Table 1. Example of weekly menu.

Breakfast	Afternoon tea
Porridge	Cakes
Grated coconut	Date slice
Fruit	Tea/coffee
Bread	Dinner (one of the following plus side dishes)
Pancakes (occasionally)	Dhal pie
Tea/coffee	Lentil burgers
Morning tea	Chicken chop suey
Coconut	Pad Thai
Papaya	Pizza
Other fruit	Ginger chicken
Lunch (one of the following plus side dishes)	Fish
Fried rice	Chick pea soup
Dhal soup	<i>Side Dishes</i>
Curry patties	Crunchy salad
Roti and eggplant	Spicy chutney
<i>Side Dishes</i>	Green papaya salad
Salad	
Boiled potatoes	
Eggs	

Food miles

Food miles are simply the distance food travels from the farm or factory to the consumer. While the distance travelled is a useful metric to convey to the consumer some of the environmental impacts of their purchase, it fails to inform about the true environmental burden of the underlying food system, such as energy use and contribution to climate change, dependence on fossil fuels, traffic congestion as well as social and economic impacts on rural communities and developing countries (Stancu & Smith, 2006). With the tracking of food consumed on Vorovoro, it is possible to calculate food miles. For food consumed on Vorovoro, the land-based food miles are zero, while the fishing trips equate to 4.8 kilometres per trip one way, a number estimated by the boat captain based on fuel use. For the food sourced from the local Labasa market, the distance travelled one way by boat is 10.24 kilometres.

For food sourced elsewhere in Fiji, an estimate was taken for road transport to a port, followed by sea transport to Labasa and onto Vorovoro Island. The average kilometres travelled was estimated to be 322.0 kilometres one way, using Google Maps (www.maps.google.com) for the road transport component and the longitude and latitude coordinates of the ports/airports of origin country to the Vanualevu port to estimate the air and water transport distance. For example, the flour consumed on Vorovoro Island was sourced from Flour Mills of Fiji, whose operation is in Suva, Fiji. A cargo ship transports this flour to the town of Savusavu on Vanualevu, where the flour is then transported to Labasa via road transport. Suva Port to Savusavu port is 182.0 kilometres and the distance from Savusavu to Labasa is 84.1 kilometres, according to Google Maps. Hence, flour produced in Fiji was estimated to have a food mile estimate of 266.1 kilometres. An analogous method was used to calculate the distance that the imported food travels. Imported food was estimated to travel 5523.3 kilometres one way. Because not all the food origins were recorded to the nearest town, a weighted average was used to calculate the food miles for imported food. The distances were weighted by the weight of the food consumed on the island and by the location of source of food. This is a modified version of the weighted average source distances methodology outlined by Carlsson-Kanyama (1997).

The transportation of food by different methods of transport modes has different environmental impacts. Hence, it is necessary to make assumptions regarding the different modes of transport used: these are shown in Table 2. They were based on discussions with shipping agents and food distributors in Fiji. For food sourced from elsewhere in Fiji, 70% of the distance is estimated to be covered by boat and 30% by road. For the imported food, 4% is estimated to occur by boat, 39% by road and 57% by air transport.

As mentioned earlier, the proportion of food consumed on Vorovoro differed from 2008 to 2009 because of the decision to import less food and grow more food on the island (Table 3). In 2008, 18% of the food consumed came from overseas, with 43% being sourced from the local market and 11% being grown or caught on the island. In 2009, the proportion

Table 2. Estimated percentage of food miles by transport mode.

Transport mode	Imported	Fiji	Labasa	Vorovoro
Air	57%	0%	0%	0%
Boat	4%	70%	100%	100%
Road	39%	30%	0%	0%
Total	100%	100%	100%	100%
Estimated distance (kilometres)	5523.3	322.0	10.24	4.8

Table 3. Percentage of food consumed by source.

	Imported	Fiji	Labasa	Vorovora	Total
2008	18%	29%	43%	11%	100%
2009	6%	45%	34%	14%	100%

of imported food decreased to 6.3% while the amount of food grown or caught on the island increased to 14.1%, and 45.3% was sourced from elsewhere in Fiji.

The initiative to consume more local food has impacted the distance the food has travelled. The standard food miles calculation is in tonne-kilometres of goods transported; the weight of the food in tonnage multiplied by the distance the food travelled in kilometres (OECD, 1997; Sustain, 1999). However, as the amount of food changed from year to year depending on the number of visitors to the tourism project (11,715 tonnes of food was consumed in 2008 and 7869 tonnes of food was consumed in 2009 reflecting lower occupancy), the measures were standardised by estimating food kilometres per kilogram of food. In 2008, the food kilometres per kilogram was 1065.4 kilometres while for 2009, a kilogram of food travelled 496.9 kilometres, a reduction of over 50%.

It is also possible to estimate the emissions as a result of the food kilometres travelled. This involves making some assumptions about the amount of greenhouse gases emitted per tonne-kilometre travelled. The emissions will differ based on assumptions about the utilisation of vehicle capacity and fuel efficiency of the modes of transport used. The OECD (1997) describes the issues involved. Nevertheless, some estimates are provided by Whitelegg (1993) for Europe and cited in Sustain (1999) and Paxton (1994). These are shown below in Table 4.

Applying the emissions of different forms of transport to a standard distance travelled for 2008 and 2009, Table 5 shows the greenhouse gas emissions for one tonne (1000 kilograms) of food consumed on Vorovoro across the two years. In 2008, the transportation of one average tonne of food to the island produced 706.5 kilograms of carbon dioxide; in 2009 this figure was reduced to 562.4 kilograms, a 20.4% decrease. Table 5 shows

Table 4. Emissions of different forms of transport.

Grams per tonne-kilometre	Carbon dioxide	Hydrocarbons	Nitrogen oxide	Carbon monoxide
Air	1206	2	5.5	1.4
Boat	30	0.04	0.4	0.12
Road	207	0.3	3.6	2.4

Source: Sustain, OECD, Whitelegg, 1993.

Table 5. Greenhouse gases emissions on Vorovoro per 1000 kilograms of food consumed.

Greenhouse gas emissions (kilograms)	2009	2008	Difference
Carbon dioxide	562.4	706.5	-144.1
Hydrocarbons	0.91	1.15	-0.2
Nitrogen oxide	3.6	4.3	-0.7
Carbon monoxide	1.4	1.6	-0.2

that carbon dioxide is the main emission with hydrocarbons, nitrogen oxides and carbon monoxide being significantly less.

Expressed in another way: how many trees might it take to offset these carbon dioxide emissions? Not all trees are the same at reducing global warming (Nowak, 1993). Because pine trees are grown in Fiji, this type of tree will be used in this example. Further, old trees consume much more CO₂ than younger trees. A 25-year-old pine tree absorbs around 6.82 kilograms of carbon dioxide per year, or 170.5 kilograms of carbon dioxide in its lifetime (Nowak, 1993). Therefore, the amount of CO₂ emitted in 2008 would take the equivalent of 102.5 pine tree years to sequestrate (capture and store) while the sequestration for 2009 would be 82.5 pine tree years, a saving of 21 pine tree years.

The savings in carbon dioxide emissions can also be expressed in savings made to the local environment. A return trip from the island to the mainland is 20.48 kilometres and an estimate of the number of grams per tonne/kilometre of carbon dioxide emitted for boat transportation is 30 (Table 4). Therefore each return boat trip emitted an estimated 0.6144 kilograms of carbon dioxide. With a saving of 144.1 kilograms of carbon dioxide from 2008 to 2009, the estimated number of return boat trips saved is 235.

Conclusions

Through tracking food miles and associated sources, this ecotourism operation has identified and improved its sustainability and ecological footprint by minimising greenhouse gas emissions. Revised purchasing decisions and a commitment to producing more food on the island, the Tribewanted project has halved the distance the food travelled on a per kilogram basis.

Reducing the length of the supply chains and hence reducing “food miles” is a desirable outcome in itself. Growing more food locally also opposes the downward pressures on farm and regional incomes through the ongoing concentration and competition on food supply chains by seeking to maximise the dollars that are kept in the local economy and by trying to organically grow as much on the island as possible, it is highlighting the cultural significance of preserving and regenerating gastronomic and quality food traditions, emphasising slow food (Renting & Wiskerke, 2010). More locally grown food provides increased employment, wages, a commitment to local jobs and training of local people in developing countries by strengthening inter-sectoral linkages and minimises leakages out of the local economy (Mitchell & Ashley, 2009).

Challenges to further promote and use local food include perceived higher prices and challenging logistics (Green & Dougherty, 2009). Further, the definition of the term “local” is contentious (Sims, 2010). Different groups, residents, tourists, wholesalers, retailers and producers all associate “local” with various values related to social, environmental and “quality” criteria. It is too simplistic and naive to equate “local” with “good” and “global” with “bad” (Sims, 2010). Further research needs to acknowledge that there is nothing inherently more sustainable about “local” (Born & Purcell, 2006).

To what extent can more mainstream tourism operations implement some of the sustainability initiatives undertaken on the island of VoroVoro? A small ecotourism project can undertake this type of sustainability programme but it may be more difficult for a four or five star resort to minimise its food miles and produce its own food supplies. Even for this small-scale tourism project, there would be significant challenges if tourist numbers increased. For this to happen on a larger scale, the local community, in addition to other key stakeholders such as farmers in Labasa, would need to coordinate and communicate needs and expectations about both the quality and quantity of food produce to meet tourists’ expectations (Scheyvens, 2009). Further, if there was a shift to growing more food at this

island resort, this might introduce non-native plants into the environment, bringing another set of issues and potential problems.

From a management perspective, it is imperative, even for this ecotourism venture, that staff clearly explains food choices and the rationale behind the menu when tourists first arrive on the island. Management needs to emphasise the fact they are trying to use the island's produce and support the local economy as much as possible. The qualitative interviews revealed problems with "imposed" diets. Getting tourists involved in the production of local food helps meet tourists' desire for an experiential holiday. On-farm or at-destination activities could include visits to farms to learn how to prepare specialities that are indigenous to the region. While there was a high level of satisfaction with the food on offer for some tourists, others complained about the lack of variety and blandness of the food. This can occur when predominantly western tastes are served staples from developing countries. More effort could be placed on designing and producing "fusion" food which takes the local ingredients and adapts them to tourists' tastebuds. A recent award-winning cookbook has shown how to do that. *Me'a Kai: The Food and Flavours of the South Pacific* (Oliver, Berno, & Ram, 2010) showcases the cuisines of the South Pacific. It was named the Best Cookbook in the World for 2010 at the Gourmand World Cookbook Awards. The book promotes the "farm to the table" concept, and introduces over 90 easy-to-make, yet delicious recipes, increasing demand for locally grown foods. This example could be replicated in other destinations, particularly in developing countries.

In December 2010 the management of Tribewanted Vorovoro was handed back to the local community. After five years of building a new community on Vorovoro the instigators of the project were happy to see Tui Mali, the Mataqali (landowners) and the wider community of Mali take more ownership of the project. The community should reopen in 2013.

Note

1. As Tribewanted claimed to be a unique travel experience, the researcher undertook a programme of research on Vorovoro to examine issues relating to indigenous tourism, cultural authenticity and sustainability. The findings of this research can be found in Gibson, Pratt, and Movono (2012) and Pratt, Gibson, and Movono (2012).

Notes on contributor

Dr Stephen Pratt is currently assistant professor at the School of Hotel & Tourism Management at The Hong Kong Polytechnic University. He has been there since January 2013. Previously, he served at the University of the South Pacific, based in Suva, Fiji from January 2009. He completed his PhD at the University of Nottingham, United Kingdom, under the supervision of Professors Thea Sinclair and Adam Blake. Prior to undertaking his PhD, he was a research director for several marketing consultancies both in Hawaii and Australia. He obtained a bachelor of economics and a master of economics degrees from the University of Sydney. His research interests include the economic, socio-cultural and environmental impacts of tourism; destination marketing; cruise tourism and film tourism.

References

- Ashley, C., Roe, D., & Goodwin, H. (2001). *Pro-poor tourism strategies: Making tourism work for the poor - A review of experience*. Retrieved on 10 January 2011 from http://www.propoortourism.org.uk/ppt_report.pdf
- Belisle, F. (1984). Tourism and food imports: The case of Jamaica. *Economic Development and Cultural Change*, 32(4), 819–842.

- Berners-Lee, M. (2010). *How bad are bananas? The carbon footprint of everything*. London: Profile Books.
- Berno, T. (2006). Bridging sustainable agriculture and sustainable tourism to enhance sustainability. In G. Mudacumura, D. Mebratu, & M. Haque (Eds.), *Sustainable development: Policy and administration*. London: Taylor and Francis.
- Boniface, P. (2003). *Tasting tourism: Traveling for food and drink*. Burlington, VT: Ashgate.
- Born, B., & Purcell, M. (2006). Avoiding the local trap: Scale and food systems in planning research. *Journal of Planning Education and Research*, 26(2), 195–207.
- Butler, R. W. (1991). Tourism, environment and sustainable development. *Environmental Conservation*, 18, 201–209.
- Carlsson-Kanyama, A. (1997). Weighted average source points and distances for consumption origin-tools for environmental impact analysis? *Ecological Economics*, 23(1), 15–23.
- Choo, H., & Jamal, T. (2009). Tourism on organic farms in South Korea: A new form of ecotourism. *Journal of Sustainable Tourism*, 17(4), 431–454.
- Coley, D., Howard, M., & Winter, M. (2011). Food miles: Time for a re-think? *British Food Journal*, 113(7), 919–934.
- de Backer, E., Aertsens, J., Vergucht, S., & Steurbaut, W. (2009). Assessing the ecological soundness of organic and conventional agriculture by means of life cycle assessment (LCA): A case study of leek production. *British Food Journal*, 111(10), 1028–1061.
- de Hass, H. C. (2002). Sustainability of small-scale ecotourism: The case of Niue, South Pacific. *Current Issues in Tourism*, 5, 319–337.
- DEFRA. (2005). *The validity of food miles as an indicator of sustainable development*. London: Author.
- Dickinson, J. E., Lumsdon, L. M., & Robbins, D. (2011). Slow travel: Issues for tourism and climate change. *Journal of Sustainable Tourism*, 19(3), 281–300.
- Everett, S., & Aitchison, C. (2008). The role of food tourism in sustaining regional identity: A case study of Cornwall, South West England. *Journal of Sustainable Tourism*, 16(2), 150–167.
- Gibson, D., Pratt, S., & Movono, A. (2012). Tribe tourism: A case study of the Tribewanted project on Vorovoro, Fiji. In S. Fullagar, K. Markwell, & E. Wilson (Eds.), *Slow tourism: Experiences and mobilities* (pp. 185–200). Bristol: Channel View Publications.
- Gössling, S., Garrod, B., Aall, C., Hille, J., & Peeters, P. (2011). Food management in tourism: Reducing tourism's carbon "footprint". *Tourism Management*, 32(3), 534–543.
- Gössling, S., Hansson Borgstrom, C., Horstmeier, O., & Saggel, S. (2002). Ecological footprint analysis as a tool to assess tourism sustainability. *Ecological Economics*, 43(2–3), 199–211.
- Green, G. P., & Dougherty, M. L. (2009). Localizing linkages for food and tourism: Culinary tourism as a community development strategy. *Community Development: Journal of Community Development Society*, 39(3), 148–158.
- Hall, C. M. (1996). Environmental impact of tourism in the Pacific. In C. M. Hall, & S. J. Page (Eds.), *Tourism in the Pacific: Issues and cases* (pp. 65–80). London: International Thomson Business Press.
- Hall, C. M., Mitchell, R., & Sharples, L. (2003). Consuming places: The role of food, wine and tourism in regional development. In C. M. Hall, L. Sharples, R. Mitchell, N. Macionis, & B. Cambourne (Eds.), *Food tourism around the world: Development, management and markets* (pp. 25–59). Oxford: Butterworth-Heinemann.
- Heller, M. C., & Keoleian, G. A. (2000). Life cycle-based sustainability indicators for assessment of the U.S. food system. *The center for sustainable systems*. Retrieved from http://css.snre.umich.edu/css_doc/CSS00-04.pdf
- Hinrichs, C. (2000). Embeddedness and local food systems: Notes on two types of direct agricultural market. *Journal of Rural Studies*, 16(3), 295–303.
- Hird, J. (1999). *Food miles: Still on the road to ruin?* London: Sustain.
- Holt, G. C., Tranter, R. B., Miele, M., Neri, C., Vestergaard, J., Nielsen, R., . . . Sottomayor, M. (2002). *Comparison of markets for organic food in six EU states*. Paper presented at the UK Organic Research 2002 Conference, Aberystwyth, Wales.
- Ibery, B., & Maye, D. (2005). Food supply chains and sustainability: Evidence from specialist food producers in the Scottish/English borders. *Land Use Policy*, 22(4), 331–344.
- Jackson, P., Ward, N., & Russell, P. (2006). Mobilising the commodity chain concept in the politics of food and farming. *Journal of Rural Studies*, 22(2), 129–141.
- Keene, B. (2008). *Tribe wanted: My adventure on paradise or bust*. London: Ebury Press.

- Lang, T. (1998). The new globalisation, food and health: Is public health receiving its due emphasis? *Journal of Epidemiology and Community Health*, 52(9), 538–539.
- McElroy, J. L. (2003). Tourism development in small islands across the world. *Geografiska Annaler*, 85(B), 231–242.
- McKercher, B., Okumus, F., & Okumus, B. (2008). Food tourism as a viable market segment: It's all how you cook the numbers. *Journal of Travel & Tourism Marketing*, 25(2), 137–148.
- Mitchell, J., & Ashley, C. (2009). *Value chain analysis and poverty reduction at scale* (ODI Briefing Paper 49). Retrieved from <http://www.odi.org.uk/resources/docs/3528.pdf>
- Mitchell, J., & Ashley, C. (2010). *Tourism and poverty reduction: Pathways to prosperity*. London: Earthscan.
- Morris, C., & Buller, H. (2003). The local food sector: A preliminary assessment of its form and impact in Gloucestershire. *British Food Journal*, 105(8), 559–566.
- Nowak, D. J. (1993). Atmospheric carbon reduction by urban trees. *Journal of Environmental Management*, 37(3), 207–217.
- OECD. (1997). *The environmental effects of freight*. Retrieved on 26 January 2010, from <http://www.oecd.org/dataoecd/14/3/2386636.pdf>
- Okumus, B., Okumus, F., & McKercher, B. (2007). Incorporating local and international cuisines in marketing tourism destinations: The cases of Hong Kong and Turkey. *Tourism Management*, 20(1), 253–261.
- Oliver, R., Berno, T., & Ram, S. (2010). *Me'a Kai: The food and flavours of the South Pacific*. New Zealand: Random House.
- Paxton, A. (1994). *The food miles report*. London: Sustainable Agriculture, Food and Environmental Alliance.
- Pratt, S., Gibson, D., & Movono, A. (2012). Tribal tourism in Fiji: An application and extension of Smith's 4Hs of indigenous tourism. *Asia Pacific Journal of Tourism Research*. doi:10.1080/10941665.2012.717957.
- Renting, H., & Wiskerke, H. (2010). *New emerging roles for public institutions and civil society in the promotion of sustainable local agro-food systems*. Paper presented at the 9th European IFSA Symposium: Building sustainable rural futures - The added value of systems approaches in times of change and uncertainty, Vienna, Austria.
- Rogerson, C. M. (2012). Tourism–agriculture linkages in rural South Africa: Evidence from the accommodation sector. *Journal of Sustainable Tourism*, 20(3), 477–495.
- Scheyvens, R. (2007). Exploring the tourism–poverty nexus. *Current Issues in Tourism*, 10(2/3), 231–254.
- Scheyvens, R. (2009). Pro-poor tourism: Is there value beyond the rhetoric? *Tourism Recreation Research*, 34(2), 191–196.
- Scheyvens, R., & Russell, M. (2012). Tourism and poverty alleviation in Fiji: Comparing the impacts of small- and large-scale tourism enterprises. *Journal of Sustainable Tourism*, 20(3), 417–436.
- Sims, R. (2009). Food, place and authenticity: Local food and the sustainable tourism experience. *Journal of Sustainable Tourism*, 17(3), 321–336.
- Sims, R. (2010). Putting place on the menu: The negotiation of locality in UK food tourism, from production to consumption. *Journal of Rural Studies*, 26(2), 105–115.
- Smith, P., & Smith, T. J. F. (2000). Transport costs do not negate the benefits of agricultural carbon mitigation options. *Ecology Letters*, 3(5), 379–381.
- Stancu, C., & Smith, A. (2006). Food miles - the international debate and implications for New Zealand exporters. *Landcare Research Business & Sustainability Series*. Retrieved on 13 December 2010, from http://www.landcareresearch.co.nz/research/sustainablesoc/business/trade/documents/food_miles.pdf
- Sustain. (1999). *Food miles – still on the road to ruin?* London: Sustain: The Alliance for Better Food and Farming.
- Telfer, D. J., & Wall, G. (1996). Linkages between tourism and food production. *Annals of Tourism Research*, 23(3), 635–653.
- Telfer, D. J., & Wall, G. (2000). Strengthening backward economic linkages: Local food purchasing by three Indonesian hotels. *Tourism Geographies*, 2(4), 421–447.
- Torres, R. (2002). Toward a better understanding of tourism and agriculture linkages in the Yucatan: Tourist food consumption and preferences. *Tourism Geographies*, 4(3), 282–306.
- Torres, R. (2003). Linkages between tourism and agriculture in Mexico. *Annals of Tourism Research*, 30(3), 546–566.

- Valle, E., & Yobesia, M. N. (2009). Economic contribution of tourism in Kenya. *Tourism Analysis*, 14(3), 401–414.
- Veit, R. (2007). *Tourism, food imports, and the potential of import-substitution policies in Fiji*. Suva, Fiji: Ministry of Agriculture, Fisheries & Forests.
- Wackernagel, M., & Rees, W. E. (1996). *Our ecological footprint: Reducing human impact on the Earth*. Gabriola Island: New Society Publishers.
- Whitelegg, J. (1993). *Transport for a sustainable future: The case for Europe*. London: Belhaven.
- Wilson, E., & Ateljevic, I. (2008). Challenging the “tourist–other” dualism: Gender, backpackers and the embodiment of tourism research. In K. Hannam & I. Ateljevic (Eds.), *Backpacker tourism concepts and profiles* (pp. 95–110). Clevedon: Channel View Publications.
- Winter, M. (2003). Embeddedness, the new food, economy and defensive localism. *Journal of Rural Studies*, 19(1), 23–32.