Chapter 2
Changing Livelihood Strategies: The Experience of the *Valaiyars* of Karandhai Malai, Tamil Nadu

Kanmani Venkateswaran, Siddhartha Krishnan, Poosanavel Saravanan, M.C. Kiran, and S.C. Gladwin Joseph

2.1 Introduction

The National Rainfed Area Authority (NRAA) states in a draft paper 'Rainfed Livelihoods Progressive Paradigms' that 60 % of risky http://nraa.gov.in/pdf/RAINFEDLIVELIHOODSPROGRESSIVEPARADIGMS.pdf, unirrigated and underinvested areas of India support 40 % of the country's population and contribute 40 % of food grain, besides supporting a vast array of livelihoods. Climatic changes compound rainfed livelihood challenges, which require adaptation, coping and mitigation. Studies have stated that changes in rainfall and temperature patterns will adversely affect agricultural yields, especially in developing countries like India where there are insufficient funds for adaptation measures (Parry et al. 2001). Forest fringe communities are especially vulnerable to climate change due to their poverty, dependence on rainfed agriculture and their lack of access to modern

K. Venkateswaran
University of Colorado, Boulder, USA

Red Cross Climate Center, Lusaka, Zambia

S. Krishnan (✉)
Ashoka Trust for Research in Ecology and the Environment, Bangalore, India
e-mail: siddhartha.krishnan@atree.org

P. Saravanan
Community Conservation Centre, Ashoka Trust for Research in Ecology and the Environment, Natham, Tamil Nadu, India

M.C. Kiran
International Water Management Institute, Colombo, Sri Lanka

S.C.G. Joseph
Azim Premji University, Bangalore and Adjunct Faculty, Ashoka Trust for Research in Ecology and the Environment, Bangalore, India

S. Purushothaman and R. Abraham (eds.), *Livelihood Strategies in Southern India: Conservation and Poverty Reduction in Forest Fringes*,
DOI 10.1007/978-81-322-1626-1_2, © Springer India 2013

technology (Amisah et al. 2009). This study engages with one such geography and livelihood culture, namely, the forested Karandhai Malai mountain range that runs parallel to the semiarid Natham plains in South Tamil Nadu where Valaiyars engage in rainfed cultivation.

Our narrative of the Valaiyar case revolves around land use changes in two hill villages and farmers' exercise of plural livelihood options, with the intention of investigating the apparent motivations behind these changes and the long-term implications. Though the study began as an investigation of changes in farming patterns apparently motivated climate change, further investigation revealed a complex interplay of various other factors behind these changes, as the rest of this chapter describes.

2.2 Setting the Scene: The Karandhai Malai Foothills and the Valaiyars

The Valaiyar community, notified backward, inhabits and cultivates the Karandhai Malai (henceforth Karandhai) hills and foothills. The Karandhai mountain range runs parallel to the plains of Natham, a semiarid taluk of the Dindigul district of Tamil Nadu, and is spread over an area of 6,517 ha, 50 km north to Madurai (Fig. 2.2). This semiarid area experiences temperatures ranging from 19.7 °C to 37.5 °C in the plains and 7.7 °C to 20.6 °C in the hills. Heat becomes intense in April and May unless moderated by rains. About 46 % of the rainfall is contributed by the northeast monsoon. The full benefit of the southwest monsoon is not realised because of the Western Ghats forming a barrier. In Natham taluk, the mean annual rainfall is 859.8 mm.

The Valaiyars are said to have migrated to these hills around 300 years ago. Ongoing research indicates that the Valaiyar hill villages and surroundings are still rich in agro-biodiversity, despite noticeable change. The Valaiyars conserve and cultivate several traditional cultivars of millet and legumes through a traditional mixed cropping method. In the foothills, Valaiyars have substantially shifted from traditional crops to commercial crops such as gherkins, vegetables and flowers. Hill Valaiyars tend to practise rainfed agriculture, whereas foothill Valaiyars practise either canal-fed or irrigated agriculture or a combination of both. Nearly 60 % of the agricultural lands in the Karandhai constitute '*Manavari kadu*', or low lands with alluvial properties and medium to low water-holding capacity. Cash crops such as cashew (*Anacardium occidentale*) and tamarind *(Tamarindus indica)* are cultivated in '*Kothukadu*', or rocky terrain with gravely soil and with minimum water-holding capacity (Fig. 2.1).

Cereals such as *thinai (Setaria italica)* and *perunchamai (Panicum sumetrans)* and fruiting species such as *seetha (Annona squamosa)* are also grown on such land. There are also the *Mettu kadu* uplands with medium to low water-holding capacity and where the soil is sandy loamy or red in character. Crops are terrace cultivated here. All of their crop varieties are traditionally suited for rainfed cultivation.

Fig. 2.1 Small farms adjoining hilly landscapes in Natham

Generally, the agricultural season starts with the onset of rainfall during southwest monsoon in June–July.

Cashew nut plantations are prevalent, having been introduced by schools established by an NGO, Sarva Seva. They supplied seedlings to the community for their livelihood promotion and farmers planted them in Kothukadu. The trees fruit between the Tamil months of *Chithirai* and *Aani* (mid-April to mid-July). The Valaiyars harvest the cashew nuts, dry them and send them to local markets.

2.3 Collecting the Evidence

The data for this study were generated from questionnaires administered in Valasu and Chinnamalaiyur, two out of three Valaiyar hill villages, the third one being Periyamalaiyur. A structured interview scheduled with closed and open-ended questions on land use, cropping patterns and local climate change observations was used. Twelve Valaiyar families in each of the two villages were selected for in-depth interviews. While a total of 24 households could appear unrepresentative of an average of 80 households in each of the two villages, it needs to be noted that this number is part of a larger survey of six Valaiyar villages, wherein 72 households in all were selected using a purposive non-probability sampling frame. The criteria for selection were occupation, income, sex and landholding.

GIS images were generated for land use changes in Chinnamalaiyur and Valasu for the period 1990–2007. The images were presented to Valaiyars from Valasu and Chinnamalaiyur during a participatory community workshop held at ATREE's Community Conservation Centre, in the Natham plains. Twenty-four Valaiyars gathered for the participatory consultation. Valaiyar participants were selected on the basis of age, gender, land possession extents and occupational profile, whether cultivators or NTFP collectors. Recruitment for participatory discussions along such criteria was to ensure that the participating cohort remain representative of hill Valaiyar economy and society. Graphical representations of our analysis of meteorological data were presented as visual aids in the form of bar graphs on rainfall trends and GIS data on land use changes.

2.4 Ground Realities Near Karandhai Malai

In this section, the changes visited upon the forest fringe subsistence economy of the Valaiyar will be narrated using information generated from questionnaire surveys and analysis of GIS images on land use changes in the hilltop villages of Chinnamalaiyur and Valasu. Firstly, we provide some quantitative estimates for changes in cropping patterns and area in each of the two villages based on the land use change maps. Briefly considering climatic factors that are to have influenced changes in cultivation, we discuss in depth the reasons for an apparent shift from subsistence cultivation of cereals and millet to the cash crop cultivation of cashew. We then draw some social and economic implications.

2.4.1 Chinnamalaiyur

Cultivation in this hill village is rainfed. Figure 2.3 reveals the extent to which land use has changed in Chinnamalaiyur between 1990 and 2007. Around 41.45 ha of land that was originally used for field crop cultivation is now cultivated with cashew. Cashew has also made marginal forays into forest and fallow. About 0.90 ha of forest lands and 0.37 ha of fallow land have been converted for cashew cultivation. These shifts, post-1990, add 42.72 ha of cashew crop to the 13.21 ha of cashew that existed prior to 1990. In 17 years, Chinnamalaiyur experienced a 324 % increase in cashew cultivation.

There has also been a reduction in field crop cultivation between 2005 and 2011. In 2005, the farmers managed to cultivate a triple crop. However, farmers in each consecutive year after 2005 have only managed a double crop. The farmers initially attributed this reduction in cropping cycles and the shift to cashew cultivation to decreased rainfall, delayed and more erratic rainfall. We attempted to map their claims onto existing local meteorological data. Although we could not find a pattern showing a consistent decrease in amount of rainfall or more erratic rainfall since 1975,

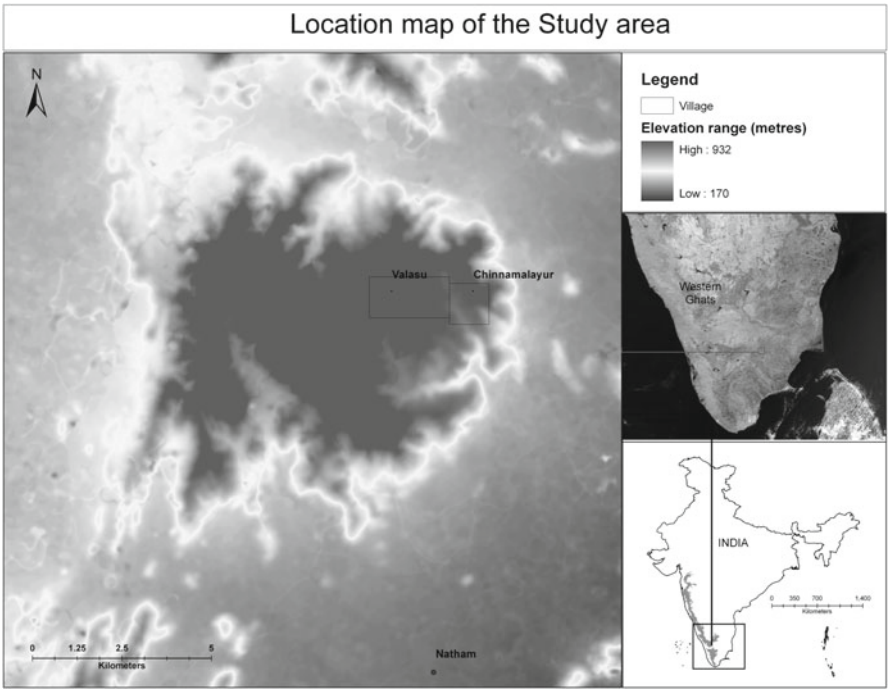

Fig. 2.2 Study area: Valasu and Chinnamalaiyur are villages located in the Karandhai Malai mountain range. Farmers in these two villages practise hilltop-rainfed agriculture

we did find that years from 2006 to 2011 were particularly bad for cropping during the June to August monsoonal season. The shift away from field crop cultivation has allowed the farmers to seek secondary employment. In Chinnamalaiyur, out of the 12 farmers who were interviewed, 11 were employed as coolies and one as a shopkeeper. The farmers earn an annual average of Rs. 20,400 ± 10,843 in their secondary jobs as opposed to Rs. 16,917 ± 11,943 by farming.

2.4.2 Valasu

Valasu, like Chinnamalaiyur, is a Valaiyar village located in close proximity to it (Fig. 2.2). It has the same physical, social and economic factors acting on it. This has resulted in similar changes to what was discussed in the Chinnamalaiyur section.

Figure 2.3 shows widespread shifts to cashew cultivation. In 1990, around 59.80 ha of land was cultivated with cashew. By 2007, it had risen to 181.11 ha, indicating a 202.86 % increase in cashew cultivation. Of this, approximately 117 ha of

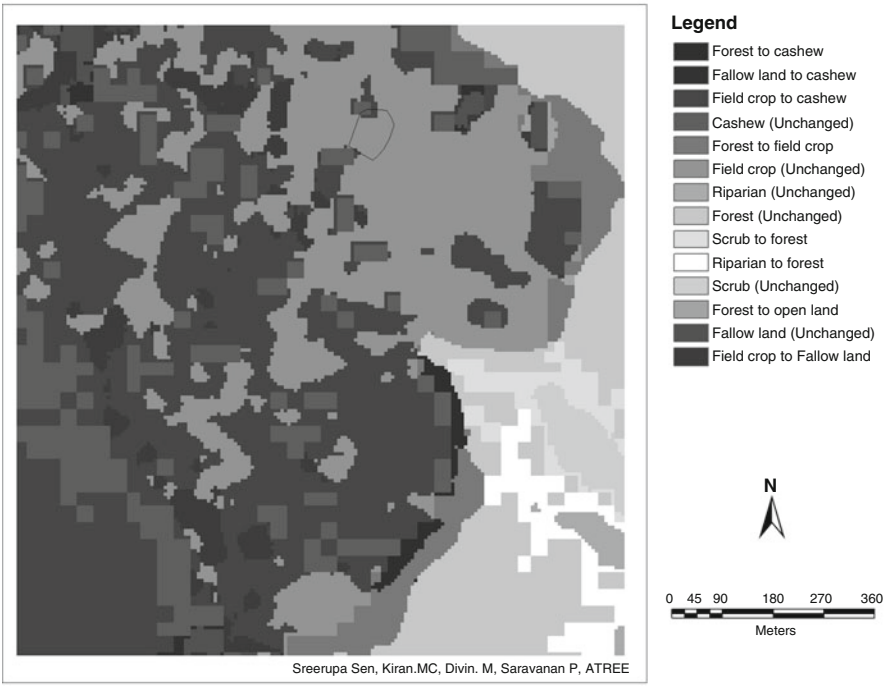

Fig. 2.3 Land use change in Chinnamalaiyur between 1990 and 2007

land was once cultivated with field crop but now bears cashew trees. The 18.97 % decrease in forest lands indicates cashew forays at the fringes. As in Chinnamalaiyur, the farmers in Valasu have only managed to produce a double crop since 2006. They too attributed their poor agricultural output to reduced, delayed and erratic rains. The poor field crop yields due to erratic climatic factors and the desire for a higher income have ostensibly encouraged farmers from Valasu to seek secondary employment, as was the case in Chinnamalaiyur. All of the farmers interviewed in Valasu work as coolies. They earn an average income of Rs. 15,917 (±10,149) annually from farming and Rs. 28,117 (±21,676) annually as coolies.

2.5 Reconciling Reality and Expectations

2.5.1 Moving Away from Traditional Agriculture

Land use change from field crop to tree crop between 1990 and 2007 is striking. There have been significant shifts from subsistence crops to cash crop cultivation of cashew cultivation in both Valasu (Fig. 2.4) and Chinnamalaiyur (Fig. 2.3).

Fig. 2.4 Land use change in Valasu between 1990 and 2007

Cashew is used to be cultivated on wastelands (sloped rocky and weedy areas) and forest/revenue lands, but is now cultivated on main agricultural lands replacing millet and pulses. In foothill villages that are also rainfed, traditional agricultural crops have largely been replaced by mango cultivation.

Figures 2.3 and 2.4 show a 202 % and 323 % change in land use to cashew cultivation in Valasu and Chinnamalaiyur, respectively. From the figures it is noticeable that cashew is being cultivated not only on lands that were used for cultivation of traditional crops such as millet and pulses but also on forest lands at the fringes. At this point in our narrative, a deeper discussion on choice of cashew is warranted.

2.5.1.1 Why Cashew?

But why cashew? Cashew, *Anacardium occidentale* L., is a part of the *Anacardiaceae* family. It is grown in semiarid and subtropical regions, which means that Natham taluk's climatic conditions are well suited to cashew cultivation (Harilal et al. 2006). Cashew is an especially popular tree crop amongst communities practising hilltop-rainfed agriculture. It is a drought-resistant, hardy and perennial tree crop which suggests that its productivity will not be affected by annual climate variability

(Ghana Export Promotion Council 2005; Harilal et al. 2006). The foothill Valaiyar villages, however, have largely shifted to mango cultivation, also a drought-resistant tree crop. The reasons for hill Valaiyars not growing mango were forthcoming from workshop discussions with them. They revealed that there were no roads from their villages to the foothills. This makes transportation of mango, a perishable fruit, to the markets particularly difficult. Tamarind, although a cash crop, has not been planted extensively due to the fact that it takes 15 years to yield fruit.

India has been one of the largest cashew-exporting nations since the 1920s, exporting a major quantity of its crop. But there is a substantial internal demand. Therefore, India has also been one of the largest importers of raw cashew nuts. In the 1960s, a Directorate of Cashewnut and Cocoa Development was established as a subgroup within the Ministry of Agriculture and its role was to help develop the Indian cashew nut economy and reduce India's dependence on imports. Although cashew nut imports into India reduced during the mid-1980s to 22,000 t as compared to 169,000 t in the early 1970s, they have significantly increased from the 1990s onwards – it was reported that 3,55,000 t were imported between 2001 and 2002 alone (Harilal et al. 2006). We can infer that this occurred due to the relatively high grade of Indian cashew as compared to globally produced cashew. The selling price for Indian cashew was between $1,012 and $1,188 per metric tonne FOB as compared to $330 and $315 per metric tonne FOB for Mozambique cashew and $700 per metric tonne FOB for Guinea Bissau Cashew, which suggests that India stood to profit more by exporting most of its cashew and importing cheaper cashew to satiate internal demands (Ghana Export Promotion Council 2005). The high selling price for Indian cashew coincides with the time during which hilltop-rainfed agricultural Valaiyar communities in Natham taluk began to cultivate cashew on their lands and when India increased its export of raw cashew kernel in the late 1980s and early 1990s (Harilal et al. 2006). In 1990, for example, Valasu and Chinnamalaiyur already had 59.80 and 13.21 ha of cashew planted, respectively. As revealed by Harilal et al. (2006), the price of cashew varied on a year-to-year basis. This brings into question the act of increasing cashew cultivation with the intention of enhancing livelihood security.

When questioned about the economic risks associated with cultivating and depending upon a single cash species, Valaiyar farmers from Valasu and Chinnamalaiyur stated that they would continue to prefer cashew cultivation even if the market prices fell. This maybe because processing the raw nut to produce the edible cashew kernel is a less labour-intensive process than processing millet, which only has subsistence value and no market demand. Although processing cashew requires seven to eight steps, grading, packaging and flavouring are performed by commercial outlets and not by farmers and their families (Harilal et al. 2006). Millet, however, is cultivated for subsistence rather than commercial purposes, and therefore, the process of dehusking millet grains – at least seven times – is done entirely by farmers and their families. Cashew is also relatively less labour intensive because there is no need to sow cashew on a yearly basis – the cashew tree starts bearing fruit after 3–4 years of being planted and remains productive for 30–40 years (Ghana Export Promotion Council 2005). The time that the farmers would

spend on sowing seeds every year can be spent on external employment opportunities, including those provided by the government such as through the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) scheme.

2.5.2 *Economic Aspirations and Dietary Cultures*

The MGNREGA guarantees 100 days of wage labour per year for members of rural communities and pays Rs. 100 per day (at the time this chapter was written). It has provided farmers with jobs in projects such as rainwater harvesting and infrastructural improvement like fixing village roads. Others in Valasu and Chinnamalaiyur have sought employment outside of MGNREGA as labourers and shopkeepers. The farmers in these villages seem to be making more money from their secondary employment than they do by cultivating traditional crops. From our workshop with villagers from the foothill and canal-fed villages, we gathered that some also find seasonal employment in banana, coffee and cardamom estates. This migration typically takes place from February to April, but not during the sowing and harvesting seasons which extend from April to November. The farmers work for 10–15 days and return to their villages once they have earned around Rs. 2,000.

Finnis' (2007, p. 349) study conducted in Kolli Hills, Tamil Nadu, found a similar shift from millet cultivation to cassava cultivation. She attributed the shift to changing 'household economic aspirations'. Finnis argues that families want to be able to spend on commodities such as jewellery and electronics and want to send their children to private English or Tamil schools. Eating good food does not seem to be a priority any longer.

Millet and pulses were a major part of the traditional diet. This is not the case anymore given that rice is being sold at subsidised prices to families through the public distribution system (PDS). The dietary shift is to such an extent that families consume approximately 50 kg of rice per month. Unfortunately, the PDS only provides 16 kg of rice for a family of two and 20 kg for a family of four, requiring families to purchase the difference from markets in Natham at a rate of Rs.15–16 per kg. Therefore, the dietary shift to rice is also perpetuating a household need to grow cash crops in monocultures.

If rice is a significant cost for the families, why do they continue to buy it and forgo subsisting on millet and pulses? In Natham, villagers cited social pressures as a reason for the dietary shift. Consuming millet is looked down upon because it suggests poverty and backwardness, given that wealth is largely measured by the ability to buy market goods. In addition, growing and processing millet is labour intensive because agriculture in Valasu and Chinnamalaiyur is completely manual and because seven layers of the millet grain need to be manually dehusked before they can be cooked and consumed. Once the millet has been dehusked, the final yield is significantly smaller. As a result, both adults and children are not interested in consuming millet, thereby increasing the demand for rice in these communities (Fig. 2.5).

Fig. 2.5 Farmholdings in the foothills of Karandhai Malai forests

Farmers also suggested that the physical factors such as soil fertility were affecting their crop yields. Continuous sowing and harvesting are likely to have degraded the soil. We, however, do not have data pertaining to soil quality in the communities' agricultural fields. The farmers used to ensure soil fertility by spreading livestock manure over the fields. But livestock populations have decreased over the past 20 years as there is no fodder to feed the livestock. The fodder fed to livestock used to be crop residue. However, due to the shift to cashew cultivation, the amount of crop residue has drastically decreased. In addition, there is little social prestige attached to grazing which has created widespread disinterest in rearing and grazing livestock.

2.6 Livelihood Changes and Risk

During the participatory workshops conducted with the Valaiyar villages, all of the community members stated that the monsoon rains had reduced in quantity and become more erratic and that the overall seasons were getting delayed. They initially attributed their shift to cashew agriculture to supposed increased climate

variability and claimed that the shift ensured some degree of livelihood security. To some degree, the shift has allowed them to explore external employment opportunities and increase their annual incomes – a higher annual income, for instance, implies that they can enrol their children in better schools and thereby ensure the younger generations some amount of livelihood security (Finnis 2007; Dame and Nüsser 2011).

Nevertheless, the agricultural shift cannot be entirely attributed to climate change. In their review of adaptation, adaptive capacity and vulnerability, Smit and Wandel (2006) suggest that farmers should be able to survive in normal climatic conditions and cope in conditions that moderately deviate from the norm. Our analysis of the meteorological data from the area suggests that there have been no extreme shifts in Natham's climate. The Valaiyar farmers of Valasu and Chinnamalaiyur have not necessarily been trying to maintain their traditional agricultural practices. Instead, they have shifted to cultivation cash crop monocultures since the early 1990 in the process reducing their overall dependency on agriculture. This suggests that they are not attempting to 'cope' with slight to moderate shifts in climate, but have focused their livelihood strategies on non-climatic factors.

But current land use preferences pose some risks. The economic benefits of growing cashew seem to outweigh that of growing traditional subsistence crops, which suggests that the Valaiyars practising hilltop-rainfed agriculture in Natham taluk are in the process of converting all of their agricultural lands into monocultural cash cropping. The shift from traditional agriculture to cashew cultivation has several implications, environmental, social and health-wise.

A risk of monoculture cropping is the increased likelihood of crop failure from pests and disease. All households interviewed in Valasu and Chinnamalaiyur complained of increased disease occurrence. Therefore, to some degree, Valaiyar livelihood security is at greater risk now than it was when they had more diversified cropping systems. In Valasu and Chinnamalaiyur, all interviewed farmers have been spraying their cashew crop with the chemical fertiliser endosulfan to prevent pest-induced crop failure. They apply 4 l of endosulfan per acre once or twice a year, and the labour, application and technology cost approximately Rs. 2,000 per acre. endosulfan, once sprayed, persists in soil and water for many years as it easily adsorbs onto clay particles. Farmers from Natham taluk have noticed that endosulfan causes irritation on their hands, but have not yet seemed to have experienced its long-term health effects. They have also noticed that cashew trees sprayed with the pesticide have, on average, a 10-year shorter lifespan than an unsprayed cashew tree. It is likely that prolonged endosulfan use will cause health problems within the Valaiyar villages and surrounding faunal and floral communities. The increase in rice consumption and decrease in consumption of their traditional crops such as millet and pulses is also likely to adversely affect the health of the members of the Valaiyar communities in Natham. Millet and pulses are more mineral and fibre rich than polished white rice that is being distributed via the PDS. Moreover, the amount of rice given to the families is not sufficient suggesting food insecurity.

The farmers reported during the workshop that cashew trees also depleted supplies of groundwater and soil nutrients required by the other crops. The only other crop that is able to grow alongside cashew, according to them, is silk cotton, which is a non-native tree species. It is likely that the combination of long-term cashew cultivation and the threat of drought will drain out groundwater reserves, thereby altering the hydrological qualities of the land. Moreover, the farmers mentioned that they do not rear a significant amount of livestock due to both disinterest and a lack of fodder. As a result, there is no manure for the fields which indicates that soil nutrients are not being regenerated at necessary amounts. Overall, the lack of groundwater and soil nutrients may result in environmental degradation.

2.7 Conclusion

This case study of the Valaiyar alerts us to the fact that changes in livelihood strategies are due to a combination of physical, economic and social factors. Climate change is not, as is widely perceived today, a chief driver of agricultural shifts in this geography. As Fischer et al. (2005) and Gregory et al. (2005) state, climate change does not solely influence agricultural shifts; rather it is the interplay of social, economic and climate factors that influence such shifts. The latter (Gregory et al. 2005) also mention that since there are a multitude of factors that affect food systems, 'the capacity to adapt food systems to reduce their vulnerability to climate change is not uniform'. Adaptive capacity varies across countries, districts, communities, time and so on (Smit and Wandel 2006). Valaiyars are adapting to both socio-economic and climate change by making dietary and cropping switches. The gradual switch to cashew has meant that less time needs to be spent in agricultural activities and more time available to participate in the labour market, whether in paddy fields in the plains, tea estates in mountain ranges nearby or in construction labour. Rice, sold in subsidised rates, in PDS outlets, ensures food security. Cashew is also a hardy crop and can withstand climatic variability. More such case studies of how farmers in rainfed regions are coping every day and adapting long term to economic changes are as important as studies of farmers coping and adapting to climate change. In fact insights will be richer if climate change is located in a repertoire of changes visiting rural India, rather than being isolated, albeit in both reductionist and deterministic senses, as a sole independent variable.

Investigating adaptive strategies and their stated and actual motivations, this chapter provided an insight into how challenges of peripheral communities are often misunderstood and misinterpreted. In a similar vein, the following chapter provides looks at the changing livelihoods of a peripheral community that is also grappling with the onslaught of urbanisation. What may largely be perceived as an opportunity for these communities is in many cases a threat to certain groups within the communities, as the next chapter reveals, again highlighting the need for context-specific caution in strategising livelihood interventions.

Acknowledgements This chapter is based on a study of climate change and agriculture in Natham under an Indo-Norwegian research and education project, Conservation of Biodiversity and Sustainable Use of Natural Resources: Capacity Building for Interdisciplinary Research and Applications. The authors would like to thank the donors, The Royal Norwegian Embassy, New Delhi.

References

Amisah, S., Gyampoh, A. B., Sarfo-Mensah, P., et al. (2009). Livelihood trends in response to climate change in forest fringe communities of the Offin Basin in Ghana. *Journal of Applied Sciences and Environmental Management, 13*(2), 5–15.

Dame, J., & Nüsser, M. (2011). Food security in high mountain regions: Agricultural production and the impact of food subsidies in Ladakh, Northern India. *Food Security, 3*(2), 179–194.

Finnis, E. (2007). The political ecology of dietary transitions: Changing production and consumption patterns in the Kolli Hills, India. *Agriculture and Human Values, 24*, 343–353.

Fischer, G., Shah, M., Tubiello, F. N., et al. (2005). Socio-economic and climate change impacts on agriculture: An integrated assessment, 1990–2080. *Philosophical Transactions of the Royal Society: Biological Sciences, 360*(1463), 2067–2083.

Ghana Export Promotion Council. (2005). *Market brief: The market for cashew nuts in India*. http://www.gepcghana.com/assets/file/Market%20Brief-Cashews.pdf

Gregory, P. J., Ingram, J. S. I., & Brklacich, M. (2005). Climate change and food security. *Philosophical Transactions of the Royal Society: Biological Sciences, 360*, 2139–2148.

Harilal, K. N., Kanji, N., Jeyaranjan, J., et al. (2006). *Power in global value chains: Implications for employment and livelihoods in the cashew nut industry in India*. London: International Institute for Environment and Development.

Parry, M., Arnell, N., McMichael, T., et al. (2001). Millions at risk: Defining critical climate threats and targets. *Global Environmental Change, 11*(3), 181–183.

Smit, B., & Wandel, J. (2006). Adaptation, adaptive capacity and vulnerability. *Global Environmental Change, 16*, 282–292.