CHAPTER VII
SUMMARY AND CONCLUSION
CHAPTER VII

SUMMARY AND CONCLUSION

7.1 Summary of the Study

The thesis has attempted to study the research problem systematically by linking issues relating to land degradation and the livelihoods of tribal communities, especially the livelihoods of Irula tribes in Attappady Tribal Development Block, located in the Palakkad district of Kerala. This Chapter is divided into four sections. Section 7.1 summarises the present study, Section 7.2 gives some suggestions of the present study, 7.3 gives avenues for future research and Section 7.4 concludes the research study.

Chapter I provided a brief introduction and/or an overview of the present study. In this Chapter, the researcher has tried to display that land degradation and the worsening livelihoods of tribal communities and its interplay are the major problems. Of course, there are so many reasons for the worsening of the tribal livelihood such as land alienation, leaving agriculture, poor planning and implementation of developmental and social security and welfare schemes and deforestation. The study focussed on the environmental factors of the worsening livelihoods of tribes in Attappady. Deforestation is a major reason of soil erosion in Attappady. Soil erosion is a cancer of land and it is a major form of land degradation. It is in this context, the thesis investigated into the problem of deforestation-cum-soil erosion induced land degradation and its impacts on the livelihood of tribal communities, especially Irula tribes in Attappady. Based on this, the thesis has developed a fundamental research question: what is the role of tribal societies in the process of land degradation in Attappady and what are its impacts on them? In order to seek the answer of the question, four objectives and three hypotheses were constructed. While the researcher proceeded with the study, some problems were found and recognised them as the limitations of the study. Accumulation based capitalist development led to anthropocentric development, which in turn, leading to environmental degradation and climatic changes, is called Human Exceptional Paradigm (HEP) in environmental anthropology and environmental sociology. Poor people, poorest of the poor and other vulnerable
sections e.g., women and children, belong to socially weaker sections are the worst victims of anthropocentric development across the regions. So social scientists from the disciplines such as environmental sociology and environmental anthropology question and reject HEP and is stand for an alternative paradigm, is called New Ecological Paradigm (NEP). Western culture has a very strong anthropocentric tradition, considering human beings as separate from and somehow above the rest of nature or fauna and flora (Ehrenfeld 1978). Almost all economic ideas of western culture like colonialism were based on a strong anthropocentric tradition in the past. The roots of anthropocentric tradition intruded into society and economy which led to the depletion and degradation of natural resources such as forest and marine fishery. The depletion of marine resources (fish resources) and degradation of marine ecosystem, land and forest are good examples of intrusion of western anthropocentric tradition. Huge deforestation for accumulative based modern non-subsistence capitalist agriculture led to land degradation in the study region. The settlers are the most important agents of intensive non-subsistence agriculture and thereby contributors of land degradation. Nowadays, tribal farmers are also emerged as an agent of intensive non-subsistence agriculture by the influence of settlers, and together contributing to land degradation in the study area.

Chapter II critically reviewed certain existing literature on land degradation at the global, regional, national and local level, including land degradation in Attappady. Literature Review provided two major insights: firstly, land degradation of tribal regions and its effects on the health, food supply, productivity and livelihoods which have not received due attention, and secondly, that land degradation leads to depeasantisation of tribes which have not been included in tribal related studies in India. Literature review also helped to identify research problem, objectives, hypotheses, theories, conceptual/analytical framework and methodology and data sources. As a result, methodology is presented as a separate Chapter. It is found that the percentage of degraded area of the world, Asia, India and Kerala were 70 percent, 71 percent, 53 percent, and 67 percent, respectively. It is quite shocking that 67 percent of geographical area of Kerala is degraded. It may be true because of the reason that Kerala witnessed changes in land use and cropping pattern and also agricultural extensification and intensification since 1970. Paddy
land area has decreased remarkably from 9 lakh hectares to about 2 lakh hectares in Kerala between 1975 and 2015. Additionally, Kerala has witnessed a heavy shift from food crops to cash crops, resulting in food insecurity in Kerala, the rice deficit in the state being 85 percent, for instance. Deforestation for agriculture land and intensification by using more chemical fertilizer and pesticides, HYVs, and tractor led to land degradation in Kerala. In Attappady, 57 percent of the total geographical area are under degradation by soil erosion-cum-topsoil removal. Soil erosion is a major form of land degradation in Attappady. Soil is one component of land and other components are water, vegetation and other biota, so that there is a big difference between soil and land. That is why the present study focussed on the soil rather than water, vegetation and other biota. Land alienation and landlessness of tribal people have received a considerable attention in academics of India. But it is understood that land degradation issues of tribal areas have not received sizeable attention in academics of the country. Land degradation causes food insecurity, poverty, nutrition problems and livelihood insecurity. Tribes of Attappady are suffering from all these problems. Therefore, it is quite interesting to analyse the role of tribal communities in land degradation and its impacts on socioeconomic marginalisation of tribes in Attappady. Land degradation affects not only tribal groups, but all of us. Later, one could extend this study further by research.

Chapter III discussed the major approaches to land degradation (the Classical and Neo-liberal), theories of land degradation (Malthusian, Neo-Malthusian, Boserupian, The Tragedy of the Commons, and Land Ethic) and the conceptual and analytical framework of land degradation in order to have a broad understanding of land degradation, and methodology and data sources of the study. The main use of application of Malthusian theory is to link population growth and agricultural extensification. The result of the study is consistent with the Malthusian theory, for instance, population growth induced by immigration of setters led to the agricultural extensification in Attappady. Neo-Malthusian theory is an extension of Malthusian theory and is applied to link population growth and the environment in Attappady. The results of the study showed that population growth induced by immigration of settlers led to a heavy deforestation. Boserupian theory is used to link population growth and agricultural intensification. The results of the study are
consistent with Boserupian theory in Attappady, for instance, population growth induced by immigration of settlers led to intensification of agriculture using chemical fertilizers and pesticides, tractors, HYVs and other technology. The Tragedy of the Commons is used to explain the sharing of the common pool resources between natives and settlers and how the usage of CPRs of settlers lead to resource degradation. For instance, tribes were shared their common pool resources like land and forest with the settlers without objection from tribes, resulted in heavy land alienation and deforestation and its degradation in Attappady. Land Ethic is applied to highlight their past beliefs, customs and knowledge of tribal communities in conservation of the nature. For instance, tribes or natives saw the divinity of all natural resources like land, forest and river and therefore, tribal groups never abused or overused these natural resources in Attappady so that theoretical framework of the study is consistent with the result.

Based on the theoretical framework, the conceptual or analytical framework of the study was developed and was applied to show that the relationship between the growth of population, agricultural extensification and intensification, land degradation and livelihoods. The result of the study showed that population growth induced by settlers’ immigration led to a huge deforestation for land extensification and intensification and resulted in changes in structure of landholding, land cover and cropping pattern. The increased pressure on the land resource resulted in land degradation. The MMS or Mixed Methods Sampling (a combination of the probability and purposive sampling) was used to select 410 households from 43 hamlets from Attappady and to get the results that are consistent with the theory and approaches to land degradation and livelihood. Field observation, trend analysis, transect walk, household survey, expert opinion, soil testing, logistic regression, and Geographic Information System and remote sensing techniques were also used in the study. The inputs from a number of disciplines used in the study viz., Anthropology, Economics, Geography, History, Philosophy and Sociology helped to get a broad understanding of the research.

One of the objectives of the study was to analyse the causes of land degradation in Attappady. Chapter IV discussed the causes of land degradation in a systematic and comprehensive way. The causes of land degradation are broadly
divided into two categories namely, anthropogenic and natural causes. Hence the section, discussed both anthropogenic and natural causes of land degradation at the global, regional, national and farm (local) level with a special focus on the Attappady tribal block. It is found that land degradation is a resultant of anthropogenic rather than natural cause. Population growth, over-extensification, over-intensification, deforestation, unsustainable land use management and reduced fallow period are the major causes of land degradation in sample hamlets of Attappady. Soil erosion and low productivity are the main forms of land degradation in the study area. One of the hypotheses is that soil erosion and use of chemical fertilizer significantly contribute to land degradation in Attappady block. The application of chemical fertilizer is the anthropogenic cause and soil erosion is regarded as a natural cause and both are significant at 10 percent level (Table 4.24). It indicated that soil erosion and the use of fertilizer are the main causes of land degradation. The first objective and hypothesis of the study were clearly addressed using logistic regression. Deforestation-cum-soil erosion and soil erosion-cum-loss of top soils are the major causes of land degradation across the globe. Deforestation is an anthropogenic or anthropocentric activity. Land degradation is human induced or socially constructed rather than natural in Attappady. New Ecological Paradigm or eco-centric values/land ethic are more important tools in curbing environmental degradation in general and land degradation in particular. The result of the study gives two insights: i) human exceptionalism paradigm (HEP) played a significant role in increasing land degradation in Attappady and ii) new ecological paradigm based tradition needs to be revived from the past i.e., eco-centric culture of indigenous communities need to be revived. For example, in Kerala, people used to celebrate *Thiruvathira Njattuvela* from 20 June to 4 July every year. Farmers believe that this is the best time to plant or replant saplings or seedlings (e.g., paddy and pepper) and people believe this is the best time to plant or replant trees or saplings as the local societies have prior experiences in that cultivation and tree plantation during this period produces better output. This type of traditional eco-culture needs to be promoted which helps to reinforce human-environment relationship (HER) in turn eliminating the problem of environmental degradation and the depletion of natural resources significantly. In addition to this, accumulative and human
exceptionalism based western non-subsistence modern capitalist development and growth activities including unsustainable agricultural intensification need to be restricted. Mahatma Gandhi stated that “the earth provides enough to satisfy every man’s need, but not for every man’s greed.” Mahatma Gandhi’s words remind us that human beings cannot endlessly exploit nature or the earth to satisfy his or her unlimited wants. This is why Gandhian economy has been often referred to as ‘economy of environment.’

Chapter V analysed the impacts of land degradation on the tribal livelihoods in Attappady. It is understood that Attappady has a long history of human inhabitation. Many megalithic monuments such as Dolmens and Menhirs were found during the survey and served as the best examples of historic importance of the study area. Kurumba are the first inhabitants of Attappady among the living social communities, followed by Muduga and Irula. It is found that socio-economic conditions of tribal people are miserable. It is noticed that 50.77 percent of the sample population are women. KILA (2008) had already found that 50.6 percent of the tribal population are women in Attappady. The percentage of the tribal population belonging to the age group of 18 –59 years is 62.64 percent. When the widows in sample population are taken into account, the number of widows among tribal women are increasing because of increasing mortality rate and decreasing life expectancy of tribal males. Literacy level of tribes is increasing slowly. The study shows 63.4 percent of tribes are literates, as compared to Kerala’s figure 94 percent (Census of 2011). 21.58 percent of households are headed by women. About 83 percent of sample households are not having good toilets and 50 percent of sample households are depending on public tap and rivers for drinking water. A substantial number of tribes in the sample population are wage labourers and a few are full-time farmers. Tribal communities have a special relationship with forest, land and number of other natural resources and their life depend on all these natural resources. That is why tribal society is often referred to as society of environment. Therefore, the depletion or degradation of natural resources could certainly affect their societies, lives and culture. But in the past, until the 1900s, many tribal societies were practising shifting cultivation on a subsistence and eco-centric basis, resulting in sustainable environment. This situation has changed since the intrusion of
colonialism and settlers into tribal regions. Modern non-subsistence capitalist agriculture based on anthropocentric tradition penetrated into tribal communities and resulted in massive clearing of forests, land alienation of tribes and replacement of traditional subsistence agriculture based on eco-centrism, land ethic, and indigenous technology. Permanent or settled cultivation for a long period in tribal areas destroyed fertility and quality of soils, causing land degradation. Tribal farmers are no used to changing crop land because of the reason that shifting cultivation was banned during the colonial and post colonial period. So they have been forced to use either infertile or poor quality land or put it as fallow land. Agriculture is not viable to tribal farmers. Historically, tribal life encompassed and accustomed in hunting, gathering and shifting cultivation. Since all these sources of livelihoods could not be possible and lands degraded or infertile at present condition, tribal communities lost food supply, nutrition, income and livelihood. As a result, the incidence and intensity of poverty and malnutrition and related health problems got increased among the tribes. Women and children are the worst victims of processes and impacts of land degradation. That is why Attappady is ‘famous’ not in terms of its history, but women/child mortality rates.

Chapter VI discussed perceptions of tribal farmers’ on land degradation and two case studies of land degradation and its effects on tribal people in Narasimukku and Aanagaddha hamlets. The main purpose of this Chapter is to substantiate arguments of the thesis. Two case studies from Narasimukku and Aanagaddha showed that land degradation is relatively high in Narasimukku because of the reason that low rainfall, high deforestation, changes in land cover and cropping pattern and intensive cultivation. Soil nutrient loss is high in Narasimukku than that of Aanagaddha. Tribal farmers are aware about poor germination of plants, low yields, low productivity and soil erosion-cum-topsoil removal and topsoil loss-cum-soil infertility. Soil erosion is a major form of land degradation not only in Attappady, but the whole of India. Topsoil loss induced by soil erosion by water and wind lead to soil degradation, which is perceived as cancer of land. Due to the pressure of market development and the influence of settlers’ modern non-subsistence capitalist agriculture, tribal farmers are doing intensive cultivation based on anthropocentric tradition of western culture. It can be referred to as economy of
anti-environment as a few tribal farmers depart from traditional agriculture (i.e., economy of environment) to modern agriculture (i.e., economy of anti-environment) which cause land degradation in Attappady, Narasimukku and Aanagaddha. However, a vast majority of tribal farmers still practise traditional farming. This is why the thesis argued that the role of tribal communities in land degradation is relatively low than that of settlers.

Chapter VII summarised and concluded the study with the way forward and avenues for future research. Land degradation is a serious potential challenge to the livelihoods of tribal societies in Attappady. It has emerged as a main environmental problem in Attappady since the 1960s. Land users should have a sense of love and reverence to land and all its inhabitants as our ancestors nurtured it with love and respect. As observed by George Sessions (1996: 140) “the cultures of most primal (hunting and gathering) societies throughout the world were permeated with nature oriented religions that expressed the eco-centric perspective. These cosmologies, involving a sacred sense of the earth and all its inhabitants helped order their lives and values”. Loss of such eco-centric perspective, including land ethic among the settlers (outsiders) forced them to follow inappropriate use or mismanagement of land, such as land extensification and land intensification that has resulted in a large scale alienation of the tribal land and land degradation in Attappady. Nowadays, tribal farmers have also lost eco-centric values and land ethic by the influence of settlers, and together contributing to land degradation in the study area. It is found that settlers and tribal farmers are not able to respect nature and are not able to see the divinity in all natural beings such as trees, rivers, forest, mountain and land. Therefore, they tried to abuse and misuse it and also they tried to privatise and accumulate these natural resources. Theoretically speaking, loss of land ethic among human beings inhabited in the study area is a major cause of land degradation because people are seeing land as a commodity or monetary asset belonging to them i.e., people are not seeing divinity in land but seeing monetary benefits. Land ethic has been replaced by monetary benefits. This is consistent with theory of land ethic by Aldo Leopold.
7.2 Suggestions of the Study

Despite some challenges in assessing, understanding and mitigating land degradation, there are ways to move forward. Soil and water conservation are important measures of mitigating land degradation (Hudson 1988). In order to arrest land degradation and its injurious consequences, the following suggestions can help tribal farmers and government.

A. Policy Level

1. Distribution of degraded land to the poor people should be discouraged, as Government of India has distributed 5.79 million hectares of degraded land to the poor (Government of India 2002: 247).

B. Poverty Alleviation Schemes

2. Poverty alleviation schemes like MGNREGS should follow a positive approach to land conservation activities; for example, wage employment schemes like MGNREGS should promote land conservation or irrigation works in crop land of tribal farmers in Attappady.

C. Agriculture

3. Agricultural extensification through forest clearing should not be promoted. In-migration (rural–rural) which leads to agricultural extensification through forest clearing is to be discouraged. Land friendly high yield variety seeds need to be promoted. Also the introduction of incentive mechanism to farmers, who maintain fertility and quality of crop land by soil and water conservation techniques can be done. Misuse of chemical pesticides and fertilizers (over-intensification) is to be discouraged.

D. Participatory Approach

4. Here is a need of promotion of participatory eco-restoration and livelihood enhancement schemes. Community and location specific land uses need to be promoted. For instance, customary rights of tribal councils for self-governance and self-management of forests, land and other natural resources in tribal areas are to be promoted.
E. Indigenous Knowledge

5. There can be promotion of the indigenous knowledge of land conservation and cultivation techniques (For example, in Kerala, people used to celebrate *Thiruvathira Njattuvela* from 20 June to 4 July every year. Farmers believe that this is the best time to plant or replant saplings or seedlings like paddy, trees, and spices) as the community has prior experience in that cultivation during this period produces better output. It is in this context, there is a need of preparation of a handbook of indigenous knowledge on the land and other resources conservation techniques.

F. Awareness Promotion

6. Land degradation awareness campaign among farmers, politicians, bureaucrats, local people and students should be promoted.

G. Database

7. Systematic and authentic recording and database of land degradation at the global, national, regional and local level should be made available. Monitoring mechanism of land degradation is a necessity from the global to local level.

H. Eco-centric Values

8. Eco-centric values such as environment and land ethic need to be promoted. For instance, a better land-human relationship is to be maintained.

I. Environmental

9. In order to assure sustainability of land resource, specific agricultural intensification and extensification livelihood strategies are to be framed based on scientific and indigenous knowledge. Reforestation and afforestation works are to be carried out in degraded lands. Land users must have soil health cards\(^1\) and it should be renewed every year based on soil testing by government. In order to ensure health of soil, basic minimum biodiversity should be maintained by land users and landowners. The problem soil such as saline and

---

\(^1\) Soil health card represents the status of the soil nutrients such as organic carbon (OC), nitrogen (N), phosphorus (P) and potassium (K). The researcher has suggested that every land user must have soil health card issued by the agricultural department.
alkaline soil should be managed by leaching of excess salt. Soil Development Index (SDI) needs to be applied for showing economic and biological productivity capacity of soil. Likewise, Land Development Index is to be developed. Soil management practices such as reduced tillage, manuring and organic farming should be encouraged. In the Kerala Land Development Act 1964, there was a provision of reclamation of wasteland in the state. It should be reinforced effectively in Attappady.

J. Soil Erosion Control Measures

10. Contour bunds should be constructed effectively in steep slope areas. Intercropping or mixed cropping needs to be promoted.

7.3 Avenues for Future Research

In this study, the researcher has provided some details of relationship between land degradation and the deteriorating livelihoods of the tribes. There are volumes of studies on land alienation and poverty among the tribal communities. However, in this study, the researcher has focussed on the deterioration of land quality possessed by the tribes and its impacts on their livelihoods. This is a major departure from the existing literature on the land and livelihoods of the tribal people. The very limitations of the present study would widen the scope for future research or studies. Social dimensions of this study can be extended, for instance, an assessment of the impact of land degradation on the livelihoods of non-tribal communities in Attappady is a step forward in learning the extent of land degradation. The scope of the study could be extended not only to soils, but also to water, vegetation cover, micro-climatic conditions and other biotic organisms. Such studies can go on to assess the relationship between land degradation and welfare of the households, whose members live in degraded lands.

7.4 Conclusion

Land degradation is one of the biggest environmental challenges of the day, and too many poor people rely on degraded land for income and nutrition. Hence land degradation is not merely an environmental problem, but also sociocultural and economic problem. Attappady is the best example of this scenario. Thus, the
researcher has attempted to the study land degradation (a complex biochemical and socioeconomic process) at length in Attappady with special reference to the livelihood of the tribal groups (Irula, Muduga and Kurumba). It is noticed that massive agricultural extensification (Malthusian and neo-Malthusian) and agricultural intensification (Boserupian), the tragedy of commons (forest and land) and poor property rights carried out by the settlers during the last 50 years are the major causes of land degradation in Attappady. It is to be noted that a few tribal farmers are addicted to application of pesticides and fertilizers (Boserupian) in some sample hamlets leading to land degradation. The sharing of the commons such as forests and grazing land led to degradation of such resources. The results of the study confirmed that land degradation in Attappady must be seen as a result of human activities of the settlers, including the British, Tamils and Malayalis. Tribal communities are the victims of land degradation, but not the agents of land degradation. In fact, a substantial portion of tribal farmers gave up their farm activities and became farm and non-farm wage labourers. The tribal people have adequate knowledge and perceptions on land degradation in sample hamlets, but they do not have money to invest in soil and water conservation works. Recognizing the fact that tribal communities are the victims, but not the agents of land degradation in all sample hamlets, the state government must take mitigation measures for development of degraded land in Attappady based on their needs and with the active participation of tribal communities. Land degradation is due to a number of biochemical (physical) and socioeconomic factors. Hence it is difficult to control land degradation and to restore severely degraded land. It is better to prevent (further) rather than curing land degradation.

The lack of simple and standardised tools for assessing and reversing the extent and severity of land degradation is a major challenge. Development of an early land degradation warning device is very important. In addition to this, the use of natural resources with concern, respect, and love will greatly contribute to sustainability of the land resource. The misuse/abuse of land resources by land users which cause land degradation should be avoided.
The permanent solution to the problem of land degradation can be provided by research and development (science and technology) and the extension of environment ethic, relationship and respect. Land degradation, in reality, is induced by human greed and anthropocentric tradition of development. This had fact underscores the solution of land degradation. This study proved clearly that the tribal communities are, unquestionably, victims, but not the agents of land degradation in Attappady.