

CHAPTER - 9

Summary, Conclusion and Suggestion

9.1 Summary of the research findings

In this research study, all socio-economic aspects of forest villagers' have been discussed critically, based on the information collected from the research field as the report is a critical assessment of the situation. However, the entire thesis is grouped into nine chapters to find out actual situation which prevailing among them. The systematic field observation, not only provided correct data about the background and the existing situation but also giving a evident idea about the forest villagers' residing different altitude in same forest environment. Further, by systematic investigations of all the field information both quantitative and qualitative, necessary analysis has also been prepared so that the description of major events of villagers' life may discuss in separate chapters. This may give an idea about socio-economic characteristics of forest villagers' in respect to the forest and forest resource utilization such as villagers' dependency on forest as well as collection of Non-Timber Forest Product (NTFP), role of JFM for the protection of forests and villagers development, and to show ecological adaptation and changes among forest villagers' in Alipurduar District. Besides, it has main thrust to examine the villagers' relation with forest and their perception of problems associated with forest. It has also been attempted to suggest the ways to relieve the problems of forest villagers.

In the introduction (chapter 1), the researcher describes the details of hypothesis, methodology and what to be researched from forest villagers' who live in forests of same environment. Details of methodology, sources of primary and secondary data, other schedules etc. have been put just to give clear picture which prevailed and attracted others. The analysis of first chapter has been done on the basis of primary as well as secondary level data. The published and unpublished data from government forest office and other sources have been used to present geographical personality, forest profile and location of forest villages of the study area. The primary data containing to economic and socio-cultural dimensions of local environment and its inhabitants, dependency on forests, collection and use of non-timber forests resource, adaptation and perception of villagers on forest etc were generated through scheduled source.

Chapter 2 contains of the details of geographical setting of the Alipurduar District. Here details of administrative setup, relief, water bodies, climatic characteristics, soil, natural

vegetation, details of demographic picture of the study area and economy etc. has been described. The area belongs to variety of climate, topography, soil and natural vegetation due to its wide altitudinal range from below 100 meters in south to over 800 meters in north. Geologically it is the foot hill zone of Greater Himalaya and mainly controlled by the altitude where climate of the region varies from tropical to sub-tropical type. The distribution of natural vegetation has also been influenced by altitude, climate and soil. The four vegetation zones have been identified which are (a) Riverine forests (b) Plains forests (c) Hill forests (d) Savannah forests. Besides close to the streams and moist pockets occurs a type of evergreen forests known as tropical evergreen forests. The area of the District has a preponderance of rural population where majority of the population, nearly 79.38 % (about 11.83 lakh) lives in rural area and 20.62 % (about 3.07 lakh) population live in the urban area (according to 2011 census).

Chapter 3 describes the details of forest profile as well as forest villagers' panorama. Here administrative setup of forest divisions, area coverage, forest resource product and utilisation, and important aspects of the forest villagers' life and culture has been depicted. As good number of tribal living, their mode of living, social customs and other religious festivals associated with agriculture, economy and forest have been described carefully. Manner and customs related to forest as well as many anthropogenic interactions (illegal cutting, man-animal conflict, forest fire, threatened and illegal trade of wildlife etc) have been depicted just to give a clear picture of the villagers' dependency and intervention on of forest in the locality under study.

Chapter 4 gives the details of field observations related information of demography as well as socio-economy of villagers of forests. Here demographic character such as age-sex composition, ethnic composition, dominant tribal group, family size and type, and migration; and social aspects such as language, educational status, religions and beliefs, and marital status etc. have been depicted diligently.

Chapter 5 is an elaborate analysis of various adaptation sides of sampled forest villagers. The site and location of forest villagers has a profound impact on the life style which they have to adapt according to their capacity. So the manner, customs and behaviour related to forest environment i.e. land use, food habit, fuel used, source of water facilities, house types and forest based economy i.e. income pattern, occupation, landholding capacity, livestock asset and agriculture as well as farming have been analysed to give the idea of livelihood adaptation power and economy of forest villagers in locality of the study area.

Chapter 6 describes the details of forest villagers' dependency on forests. Villagers are primarily depend on forests for number of forest resources like fodder, fuel, fruit, timber and minor forest products etc. Here the effort has been made to show the details of collection of forest resources such consumption of Non-Timber Forest Product (NTFPs), fodder, timber, fuel wood as well as time spent and distanced covered for collection of these resources.

Chapter 7 gives details of field observations related information of perception of villagers' as well as environment related views which also connected with villagers' socio-economic livelihood entities. Villagers' perception i.e. change in forest cover in the years, period of tree felled, perception about present and future forest stock, about forest values as well as environment related views such as perception about the effect of forest on ecological changes, reasons for shrinkage of forest area, destruction, its responsibilities and solutions etc. have been depicted carefully.

In the chapter 8, the researcher describes the details about key issues and supporting activities of Joint Forest Management project in Alipurduar District. Activities of FPCs and EDCs members in JFM, ecological, economic and social activity of JFM project, villagers' Response on Joint Forest Management activity, villagers' participation and expectation in forest management, women's involvement in JFM etc. have been put forward just to give clear picture about the real status of implementation of JFM pilot project for the development of forest villagers in this area.

Here, chapter 9, which is conclusion, all these have been critically assessed and what to be done for betterment of forest villagers has been suggested. All these given suggestions might be helpful to the social workers, project planners, social scientists and others who involved directly or indirectly for causes of the sustainable development of the forest villagers.

Various data, tables and charts have been documented to have a very clear idea of the situation of socio-economic characteristics of these forest villagers. For that purpose the study is made to analysis socio-economic characteristics of forest villagers' in respect to the forest and forest resource utilization as well as villagers' relation with forest and their perception of problems associated with forests also analyzed. It has also been attempted to suggest the ways to recover the associated problems of forest villagers.

The analysis has been done based on of primary as well as secondary level data. The data from government forest office and other sources have been used to present geographical information such as administrative set up, forest, soil, river, climate, forest villages, and

demographic features of the study area. The primary data containing to socio-economic and socio-cultural dimensions of forest villagers were generated through questionnaire source. The area belongs to variety of climate, topography, soil and natural vegetation due to its wide variation natural activities and difference of altitudinal range from south to north. Geologically it is the foot hill zone of Greater Himalaya and mainly controlled by the altitude where climate of the area varies from tropical to sub-tropical type.

The distribution of natural vegetation has also been influenced by altitude, climate and soil. The four vegetation zones have been identified which are (a) Riverine forests-The Riverine forests are of mixed type, main trees are Khair (*Acacia catechu*), Sissoo (*Dalbergia Sissoo*), *Premna* species, *Salmalia malabarica*, *Albizzia* species, and *Gmelina arborea* etc. (b) Plains forests- the Plains forests are Semal, Khair, Asathwa (*Ficus religios*), Neem (*Melia azadirachta*), Amlaki (*phyllanthus emblica*), Radha chura (*Poinciana regia*), Debdaru (*Polyalthia longifolia*), Guava (*Psideim guyava*), Arjuna (*Terminalia arjuna*), Hartaki (*Terminalia arjuna*) etc. (c) Hill forests-The hill forests of this District include some important species of *Toona ciliate*, *Castanopsis specia*, *Acrocarpus fraxinifolius*, *Durabanga Sonneratioides*, *Ailanthus grandis* and *Mours Laevigata*. (d) Savannah forests-Savannah forests covered small area in the District. Common savannah forests species of grasses that are found include the *Saccharum* species, *Erianthus* species, *Imperata cylindrical*, *Phragmites karka*, *Arundo donax* and *Neyraudia reynaudiana*. Besides close to the streams and moist pockets occurs a type of evergreen forests known as tropical evergreen forests, tropical trees of which are *Aesculus assamica*, *Eugenia Formosa*, *Dillenia indica*, *Castanopsis* species, *Talauma hodgsoni*, *Pinanga gracilis*, and *Myristica* species.

The area of the District has a preponderance of rural population where majority of the population, nearly 79.38 % (about 11.83 lakh) lives in rural area and 20.62 % (about 3.07 lakh) population live in the urban area (according to 2011 census). The agriculture, by far, occupies the dominant sector of the economy as 93.51 % of sampled workers are engaged in primary sector such as agriculture, farming, livestock rearing, while only 2.05 per cent is engaged in the secondary and 4.44 % in tertiary sector (table 5.17). There is a referable feature in women section that is the higher female participation especially in agriculture as the cultivators, non-timber forest resource collection labour. The dependence on agriculture especially in horticulture farming practice increasing in higher altitudes village area where interior areas of low altitude food crop practicing is more visible.

The 17 sample forest villages were selected from different altitude and location area for detailed study of demography and social condition, adaptation to forest environment and economic characteristics of the inhabitants, their dependency, perception and participation in Joint Forest Management. In order to understand villagers' impact on the nature of relationship between villagers and forests, the socio-economic characteristics of the villages have been studied by selecting low and high altitude village. The majority of the respondents could respond about the unemployment, less number of higher education institution, lacking of metal roads and electric connection in the forest cover. About 49.20 % households have family size of between 4 to 6 persons and the proportion of large families with more than 10 persons occupied only 0.57 % household (table 4.11). The economic characteristics of the households reveal that there is higher female participation in all forest villages because of migration of able males from this area. Since the returns from the agriculture are low, quite a few members of the household of high altitude have to adopt other occupations e.g. labour, NTFPs collector, daily wage labour in nursery, seedling and plantation. The field survey shows that about 1.73 per cent of the working household members has some auxiliary other activity besides agriculture.

The agricultural land is considered as the major productive resource of inhabitants which is limited in this region especially in high altitude it is too less due to hilly terrain. The analysis showed that the average land holding capacity per household is 0.62 acres where the average land holding size is 1.0 acres in the lower altitude area and less than 0.50 acres in high altitude area. Only 3.18 per cent of total households possess more than 1.1-2 acres of land whereas 50.46 % possess less than 1 acres (table 5.18). The analysis of livestock population and assets shows that on an average one household has 1.89 cattle units. It is also noticed that the average number of cattle units increase with decrease in altitude.

The collection and pattern of forest resource utilization, inhabitants' access of forest resource has been studied at the ground level with the help of household survey. The forests have shared an important resource base in this region. Villagers depend on forest for a number of forest resources like fodder, fuel, fruit, timber and minor forest products etc. The effort has been made to evaluate demand and needs of these resources. The quantity of green fodder is available for an average of 9 months from forests and dry fodder is sufficient for an average of 3 months only from agricultural field. In this study, it is concluded that in addition of usual grazing, average green fodder of grass and leaves collection is 4.50 ± 0.53 kg and 3.81 ± 0.59 kg per day of a member of household from the forest whereas it is only 0.84 ± 0.36 kg and 0.86 ± 0.24 kg

per day from the agricultural field. In case of dry fodder, average grass and leaves collection is about 2.89 ± 0.41 kg from the agricultural field but it is nil from forest (table 6.3 of chapter 6). However the green fodder demanded to sustain the livestock supply is obtained from the forests by spending average 2.33 ± 0.34 hr a day one member of the household for 294.93 ± 3.43 days in a year. But it is only 0.67 ± 0.32 hrs a day and 86.24 ± 3.62 days in a year from field collection. For dry fodder, average grass and leaves collection time is about 1.15 ± 0.45 hrs a day and 61.25 ± 5.70 days in a year (table 6.5). There are some variations in the distance covered for regional and altitudinal height difference, proximity to forest for trip of fodder collection. The villagers inside the forest and near proximity have to walk minimum distance (0.59 ± 0.13 km/ day), and have to make maximum 2.09 ± 0.42 km/ day of the fringe villagers of low altitude to obtain the green fodder of forest (table 6.6).

Another great contribution of resource from the forest is in the form of fuel wood. It is the only one source of domestic fuel energy for forest villagers. According to the data collected from field survey, average consumption of fuel wood is about 119.74 ± 20.34 kg and 98.64 ± 20.32 kg per household per month in winter and in summer season respectively (table 6.7 of chapter 6). It is responsible for more fuel wood consumption for cooking as well as for water and room heating at high altitude and hill villagers due to comparatively low temperature whole of the year. The women and children were performed as fuel wood collector for their family. The fuels collecting from the forest in the forms of twigs, branches, and dead dry wood, fallen wood and log wood. Most of the household used dry leaves, branches and twigs as fuel. The study has shown that a lot of time has been spent by women and children in collecting the fuel wood although restrictions are ruled by Forest Department.

The timber is another forests' contribution used by villagers' as a major component material in house construction. As many as 770 (87.70 %) of total households are used wood and tin for making roofs, walls and floors of houses (table 6.10). The quantity of timber used is more in high altitudes areas (400-800m) where household make wood-floor, wood wall, wood stairs and wood-roof. The non-availability of alternative building material and the prohibitive transport cost of bricks, tin and cement, leave the forest inhabitants with no alternative but to use timber easily.

The analysis has shown that timbers are only prime material used in construction of a house with other materials. The presences of forest helps the villagers to obtain the timber easily whether free of cost or as free grant or at concessional price from Forest Department. Although

this are not sufficient to meet timber needs of the households because the timber quantity provided by Forest Department is fixed on the basis of agreement holder of households existing in villages. Since other members who are out of agreement have to purchase extra timber according to their needs. The analysis shows that 87.81 % of the households used free grant timber, 7.63 % used as concessional based priced timber, 2.51 % used on auction purchase basis, 2.05 % household collected timber through un-authorize way (table 6.11). In addition to this the villagers required huge amount of fuel wood for family programmes and social ceremonies such as birth day, wedding, poles for vegetable creepers and stocking of dry fodder; fencing of fields, wood for agricultural implements etc. So wood and bunches for varieties of purposes is also collected from the surrounding forest area. From the above evaluation it is clear that forest contribution is unlimited to inhabitants in consideration of fodder, fuel and timber. The household obtained more and more timber and non-timber forest product according to their daily day needs. Except above facilities the study reveals that forest do not provide appropriate employment opportunities to local inhabitants. There are only few agreement household members who got some employment facility in forestry activities. Other few non agreement members were also getting job but it is very much irregular. The contribution of forest to the income level of households need is also not meaningful except for fodder, fuel and timber.

The present study has aimed to analyse the perception of local villagers about necessity of forest, related problems and solutions. A questionnaire was prepared to capture these valuable comments of inhabitants. The heads of household replied the questions about deforestation; local forest based needs, changes in the environment, awareness about their rights and concessions, attitude of officials', regarding unemployment, policy issues of Joint Forest Management and activities, reasons of frequent wild animal conflicts and solution ways of forest destruction.

The analysis shows that the perception of the individual is independent reflection of his or her dependence on forest and the intensity of the forest resource needs. The villagers were asked to recognize their perception regarding forest coverage, density and composition of trees in the surrounding forest areas, the respondents were given about perception of such changes. All respondents gave their reply based on perception and knowledge regarding past and present day forest situation. There were 82.23 % households who opined that forest cover situation is worse today than before and there has been deterioration and degradation in the forest cover but there were 17.77 % respondents, who still felt that, no development or change has been observed in the forest coverage in last two decades (table 7.2).

The study also shows that the forest and fringe inhabitant don't have any role in the process of deforestation and degradation of forests but they are directly affected and faced many problem by this deforestation. The inhabitants felt the impact of deforestation when there were large numbers of man-animal conflict occurred in their surrounding areas. Through this study, an attempt has been made to get the villagers' response about the causes of tree felling, type of trees felled, process of deforestation, period of tree felling, and the agency responsible for tree felling. Besides this as a supplementary question, villagers were also asked about the background of contractors, local market for woods, labourers engaged for felling and the actual destination of the wood. To recognize the reasons of tree felling, villagers were asked to reply the reasons of tree felling, as they perceived to report. Out of total respondents, 65.03 % respondents disclose their perception about reasons of tree felling, and thought that trees were felled for use of outside of the region. They have opined that the native and local residents have no share in felled trees and they have seen all the timber and wood being taken out of the region. However most of the older respondents expressed that large scale of trees were felled in the British period for their own needs, tea plantation and agricultural land for labours, later after independence huge amount of sal trees were felled for railway sleeper need. Among them 9.79 % opined that at present illegal cutting of trees, illegal removal of fire wood and NTFPs, illegal grazing and encroachment are the prime causes of tree felled. It is quite significant to note that 8.88 % respondents felt that road construction and extension of width of NH 34, railway line of NJP to Alipurduar Junction of North Frontier Railway Division within the dense forest, dam construction along river bank or extension of area under tea and agriculture are the reasons of large scale tree felling. However it has been noticed that only 5.01 % respondents were supported and engaged to cut the trees through illegal way, but they could not specify the actual demand or numbers. On the other hand 94.99 % respondents opted that they were not supported and engaged to cut the trees by illegal way even they remarked illegal felling are mainly the cause of outside of the forest people who are not emotionally connected with forest (table 7.4).

Villagers gave their perception on forest values according to the importance and after taking opinion it is noted that most of the economic values such as food, fodder, bamboo, fruit, cane medicinal products etc. were get much more importance than ecological values (such as protection of water resources or restoration of soil fertility, soil erosion, landslides, climate change). Although, they gave high ranked opinion on climate change and clean air value by giving more importance. So it proves that villagers now very much concern about forest

environment. There are 81.44 % respondents who gave much more importance in economic value of forests, where 16.17 % opined in favour of ecological value and only 2.39 % (table 7.7 of chapter 6) gave importance of forests on social and cultural value. From above observation it is clear that directly or indirectly villagers are very much dependent on forest for economic support and due to lack of other alternatives economic activity, forests have been facing tremendous pressure of economic related work although few respondents of them were very much serious about deterioration of forest cover and environment which provide them all sort of needs.

The villagers were asked about their perception and feeling of forest role on environment change. About 0.91% was not very specifying their comment, there were 7.74 % of the respondents who feel that presently trees do not affect on environmental change at all. And about 91.35 % of the respondents were consented about the influence of forest on the environment by referring increasing normal temperature and decreasing amount of normal rainfall in this area (table 7.9). It also reveals that 3.76 % respondents commented on no change in rainfall over the past 10 years and it is opined only by the villagers who were resided in high altitude and dense forests. About 71.87 % of the respondents announced that rainfall has decreased over the past 10 years, whereas 24.37 % noticed it is now uncertainty and irregularity at the time of rainy season (table 7.10). According to the villagers' opinion, it is noticed that the rainfall behaviour has become uncertain for the past decade.

The perception of respondents about changes in normal temperature due to changes in forest cover had been tried to observe by asking questions. The field investigation has revealed that out of the total respondents, 8.08 % opined that no change in temperature has been felt, 70.96 % felt increase in normal temperature while 20.96 % are of the notice that the normal temperature has fluctuated in different seasons over the last 10 years (table 7.11).

Due to forest felling and thinning of the forest cover in this area, the river bank erosion and landslides in the high altitude area generally increased. Therefore respondents were asked to give opinions on this subject. About 30.52 % respondents did not give any reply since they have no idea about landslide and erosion; and 7.18 % were of opinion in no change in landslides or erosion intensity. While 62.30 % were of the opinion that landslides have increased in recent past. None of single respondents feel decrease in landslides (table 7.12).

An important aspect of the study was to understand the villagers' response regarding reasons of forest destruction, responsibility of this destruction and likely solutions. The field

investigation reveals that a variety of causes have been perceived by respondents as its reasons. According to their opinion large scale tree felling is mentioned as the most important single reason for forest destruction and shrinkage by 41.91 % out of 878 respondents. About 25.97 % respondents opined that illegal felling by outsiders and poachers are main culprit for forest destruction, whereas 14.24 % villagers viewed day by day increase in village population as the major reason for forest destruction. About 4.67 % respondents viewed natural calamities (fire, landslide) as the reason for forest destructions; whereas 13.21% respondents considered rail way and road construction as main damaging factors (table 7.14). The villagers in lower altitude were so much concerned about forest destruction and opined that large scale felling, rail way and road construction and illegal felling are major responsible factors which has been occurred in their neighbourhoods, while villagers of high altitude viewed that increase in village population and natural calamities (fire, landslide) also involved and considered as responsible factor to the forest destruction in high altitudes area.

With the perception of forest related problems and by considering the critical situations of the surrounding forests, the respondents gave some separate suggestions about proper care of the forests. Among total respondents, 24.83 % respondents opined that more and more afforestation is one and only good way of solution of forests problems in the area. About 38.95 % respondents were of the opinion that serious awareness of the Forest Department should have been taken for proper care of the forests by implementing Government projects accordingly. While 17.99 % respondents suggested to control strictly of illegal felling by implementing hard and fast laws, and also proposed heavy fine on the offenders must be imposed. It was thought by 12.64 % respondents that ban and restriction on large scale felling can save the forest area and should have taken step about it strictly, whereas 5.59 % respondents suggested to awareness of villagers own self and they felt that alternatives sources of fuel and fodder should be made available to protect the forests (table 7.16).

The major finding of this research is 'sustainable livelihood of forest villagers' in which different favourable steps, obstacles and interventions were observed which was done by JFM, NGO's, local panchayet or others. The sustainable livelihood steps are the allotment of open and fairly open forest land for agriculture, collection and uses of non-timber forest products, permission livestock rearing, forestry activities, infra-structure development and nursery etc. For agricultural development and to reduce pressure on forest and fringe area, ownership of 1.5 to 2.5 acre of forest land has been distributed to the forest villagers by giving "patta" on forest land.

The employment generation were done through infra-structure development like ecotourism, tourist guide, electricity connection, establishment of primary school as well as school building for children of each forest village, construction of metalled, earthen road which are connected with local market and main roads so on. In plantation activities different types of species were planted and wage labouring provided to the villagers. Many concrete walls and check dams had been constructed to protect river bank erosion, soil erosion, land slide and water conservation.

The study also tried to understand coherent relation between socio-economic conditions of forest villagers and their participation in different programmes of the Joint Forest Management (JFM) through sustainable view point. The JFM programme has been implemented over two decades in this state as well as in this study area. This JFM project opened up many avenues for forests as well as villagers development but a number of issues have been identified to sustain the programme from social, economic, political and technical point of view. From the social point of view, though the women are important stake holder but their participation was not good and satisfactory level. Number of women participation is decreasing day by day since lack of attempts and approaches had been made to empower the women. Similarly the forest departments' dominance and influence is found more than the villagers/ beneficiaries in case of the process and progress of different project related work. Lack of belongingness is observed among the forest villagers towards forest department. The EDCs, FPCs and other communities' leadership and activities is not observed so much active. The JFM members are getting fewer interests as there is no regular source of income and employment opportunity in this programme. Moreover forest officials didn't co-operate properly about villagers' compensation and other project installation issues. Almost in all forest villages, villagers engaged with SHGs, NGOs and Missionary activities since villagers getting ideas, funds, skilled opportunities etc. comparatively than Forest Department. There are many economic activities have been generated through different project of JFM, such as assistance of intensive agriculture farm, horticulture, NTFPs processing, value-addition and marketing, nursery of small plants and medical plants, cleaning of forest, sal and teak plantation of felling area, seed handling. But members are not properly appointed to work in these working circles and less number of villagers/ members sometimes has been engaged in these schemes due to which villagers are indifferent regarding JFM projects.

There is no available irrigation system, micro-credit schemes which are arranged in favour of villagers for cultivation, poultry farming and live-stock rearing. The skill building programmes were arranged but villagers as well as beneficiaries were not interested to

implement the skill due to its lack of income opportunity. The application of micro enterprise of different sections is not properly organised for achieving sustainable livelihood of villagers. Financial assistance is an important side for mobilizing the remote inhabitants. But there is no micro-financial aid/ projects which is essential and have to be started immediately without hard and fast rules.

In the very recent days due to implementation of NREGS, hundred days scheme infra-structural development had been taken place. But the income generating point of view infra-structural development is not satisfactory level and it has to be enhanced in different sectors related with forestry so that sustainable livelihood can promote in this area.

The villagers are in huge troubles due to attack of wild animals specially elephants and leopards regularly which is now burning issue and there is no alternative ways or plans except compensation of damage materials provided by the Forest Department. The man-animals conflict has been increasing rapidly which is now a big environmental problem of imbalance of biodiversity in this study area and challenge of environmentalists. So there have a deep thinking of planners to find out the way of sustainability of living for both forest villagers and wild animals for better future.

9.2 Suggestions

In the study area NTFPs collection provides substantial employment as well as income opportunities for forest villagers. So forest villagers, who are residing for more than 100 years, are collecting NTFPs from forest to sustain daily needs of the households. Hence number of species as well as quantity of NTFPs collection for both consumption and sale is increased appreciably over the years, reflecting dependence on forest by villagers to sustain family needs due to less employment opportunity. However forest resource decline is also reported due to commercial extraction, logging, fire hazards and excessive extraction of timber and Non-timber forests products. These are prime causes of imbalanced between forests and NTFPs based resources with extraction and income. In order to avoid the sudden bad consequences, there should be a strong step for scientific management and strict monitoring between timber and NTFPs yields with extraction rates of forest resources to maintain stabilization. Besides, villagers and fringe people should also be informed about the ill effects of excessive extraction of forest resource, man-made fire in the forest, and illegal cutting and collection of NTFPs, fire protection should be proactively followed by the Forest Department involving core and fringe inhabitants.

Scientific studies have to be carried out to evaluate the short and long run impact of NTFPs extractions on forests and ecosystem. Based on serious future impact, villagers should have to be educated on sustainable ways of harvesting NTFPs.

Research is also required on different harvesting mechanisms as such knowledge will ensure sustainable harvesting of resources, which in turn can contribute to the economic well-being of the villagers and involve them in the conservation of forest ecosystem and biodiversity. However, NTFPs activities should be based on participatory planning and management, where socio-cultural issues play an important role in the sustainability of the NTFPs resource base. Besides Research is also necessary on the environmental aspects of NTFPs such as distribution, regeneration pattern, growth rates, yield in different forest types of the area and silvicultural mechanisms for managing multiple products. The extraction and utilization rates over time and different seasons need to be explored over a period to identify trends or patterns in yield and use of NTFPs and other forest resource.

Villagers who are primary collectors are highly dependent on vendor/ agents for NTFPs sale. As a result, they are not getting proper remunerative price for collection, since local vendor have the monopoly and control over the NTFPs trade. The vendor/ agents reportedly followed inappropriate weighting of the products, providing them less purchase amount and retained higher margins through sales. Therefore concerned local authorities of vendors should be appointed by the local Govt. to ensure fair practices and appropriate price in the trade of NTFPs as well as explore the possibilities of increasing price benefit to the villagers.

At present villagers used forest woods, branches, green and dry leaves etc. to fulfill the fuel need, house construction and demands of other agricultural materials. To reduce the pressure and sustain the forest non vulnerable, state and central government should provide alternative of fuel such as LPG, concrete pillar, tins, bricks for house construction and other metal agricultural materials in free basis for certain period.

There is continuous threat of loss of agricultural products (food crops) due to depredation of elephant, wild boar and monkey. This crop raid by wild animals over agricultural farm is a major issue which is confining and controlling agricultural activities of the villagers. So immediately Government should ensure proper compensation for the loss and take up effective preventive measure against crop raids, although forest authority must take steps to enrich trees as well as fodders of animal food inside the forest by plantation, to reduce crop raid of animals. Besides other some preventive measures may be taken to reduce conflicts, such as by creating

maximum no. of elephant proof trenches as physical barrier in vulnerable area, erection solar energy fencing, forming advisory committee to forest village, fringe village as well as to tea gardens for effective management of leopard straying outside, training of EDC and FPC members forming village wise small squads to provide immediate response etc.

The preventive measures to reduce incidence of elephant, bison and other animals killing by train may be implemented in the following way, such as restriction of trains speed within 20 to 25 km/ hr. Local villagers as well as EDC and FPC members of forest villages may be trained and employed permanently or daily basis to track the movement of animals and immediately its information should be informed to concern railway authority for necessary action. Meeting should be arranged regularly to exchange information among Forest Department, Railway Board and movement trackers. Under pass may be constructed in animal corridor and vulnerable area across the railway track. Advanced technologies may be installed to alert the loco pilots regarding the presence of animals near the track. Besides clearing of bushes and vegetation up to 30 meter all along track side must be maintained by Forest Department.

Hand loom small-scale industry of cane furniture, bamboo furniture and small showcase wood materials on cooperative basis could set up in this area so that maximum profits would go directly to primary producer as NTFPs extraction increased considerably in recent years. Furthermore, women Self Help Groups (SHG) can be engaged as selling agents for hand loom and NTFPs for more profits at ground level. Also village tourism through home stay basis may be initiated in potential forest village areas with full cooperation of Forest Department as well as JFM projects.

At present the forest laws prevent extraction and gave some restriction on NTFPs in the National Parks and Wildlife sanctuaries. In such a situation, forest inhabitants should be given suitable alternative sources of livelihood opportunities outside the forest area and also government should explore the possibility for voluntary rehabilitation or relocations outside the forest by giving attractive compensation and alternative job of reliable income source.

The concerned government authorities should ensure that the benefits of the development policies and programs targeted by the central and state government only at the forest villagers should successfully reach to the actual needy forest inhabitants. Besides health consciousness, knowledge of education about environment and forest, and transport and other infrastructures facilities should be ensured to villagers within the available provisions of forest area.

The funds provided for projects and working period of projects is too less, which have to be increased immediately with proper planning and guide based on local issues. Now the planning is prepared by the outside Govt. employee or officers or by thinkers or planner who don't have ideas about local demand, attitude, opportunity and environment. So the micro plans for inhabitants should have to be prepared and implemented on the basis of local demand, attitude, opportunity and environment along with villagers' maximum co-operation for sustainability issues. Otherwise in preparation of awareness building, skill development, infra-structure development and other development related interventions would be unsuccessful, which is very much apparent at present in case of earlier project plan and implementation in this study area.

9.3 Limitations of the research findings

There are some limitations in this research finding. The reasons behind these limitations were geographical as well as anthropogenic. As the research has been conducted on the socio-economically backward forests villagers' as well as geo-physically foot hill remote areas of the Bhutan of north eastern India, the availability of data and information was not at all very easy. Attempts have been made to manage data and information as much possible from the range office reports, District forest and state forest reports. However, it cannot be said that the data and information whatever collected, have been related and referred to in the research work. There are very limited sources of information on the forestry and forest-people relationships of these tropical deciduous forests. For administrative boundary, area, JFM activities and other documents of beat, range, and division have been collected from several government reports, Forest Department reports, District Statistical Handbook reports, and reports on project work by NGOs and research organisations, journal publications, books and newspaper articles. However, there is very limited work has been undertaken and evaluated the importance of NTFPs in forests socio-economic life and how these products can take a constructive role in tropical deciduous forest villagers' development and management. Therefore, there are limitations in terms of literature and background information available.

For this research, almost three months pilot study and five months full fieldwork have been conducted. Due to the limitations of poor accessibility within the interior and dense forest area, it is felt that the periods of fieldwork were insufficient. The problem of transportation in the field area posed a tremendous problem in terms of completing the research within the scheduled time. During the arrangement for interviews, household surveys and group discussions, a special effort

had to put to encourage female and child members of forest tribes who were felt uneasy and avoid participating with outsiders. Although some of female and child members have shared their experiences, but still there is a space to improve it. As the study area is in dense and fairly dense forest cover and the accessibility is too poor so the wild animal attacks were quite noticeable in the research area. In fact, during the progress of field work, suddenly an elephant attack took place on the way of survey near Bhutia basti forest village. Therefore, the Forest Department was not allowing me to access to interior forest villages without proper protection, prior notice and guide in the core area. The researcher is thankful to the Forest Department for help hand in this regard. A flash flood also happened in Pana River when researcher has gone to survey in Bhutri forest basti. There is no any kind of transport line except rugged foot track to go Adma and Chunabati forest village of Buxa hill forest. So it was tough to manage for field survey as 2.30 hours to 3.00 hours trekking and walking taken to reach there from transport line. However, the situation adversely affected day-to-day social life of forest villagers and simultaneously this also influenced on the research work, which was conducted about these communities.

9.4 Implementation of the research findings in different forest areas

Keeping in mind all the limitations of this research, it can be said that, this research is going to be the first piece of research which enclose all the aspects of forest villagers such as demography and social status, adaptation in forest environment and economy, dependency, perception, forest livelihoods with fuel wood and NTFPs, and forest management of the tropical deciduous forest of North Bengal. Although, it is true that with the variations in forest character and availability of forest resources, nature and characteristics, and livelihood of villagers varies from place to place. Even, the results of this work can be referred to for the similar type of forest villagers' research for other regions. There are some basic aspects of forestry and dependency, forest cultures and in forest management strategy. Therefore, the findings of this research may be used for similar forest areas with a little modification according to the respective native forest villagers' characteristics. To save the forest ecosystem and biodiversity, this research has been discussed in details with special reference to Joint Forest Managements' system and which are available in the tropical deciduous forest of North Bengal. Appropriate harvesting of NTFPs can reduce the dependence on timber, fuel wood and other products. Excess large scale tree felling, illegal timber cutting always creates problems in the inhabitants of forests, where thousands of different

forest community villagers live within or at the fringe of the forests. It is because of the poor economic conditions, these forest villagers cannot manage any other alternative source of fuel. So, selling firewood is only a good business for the marginal forest villagers as the demand of firewood is also higher outside and fringe forest area. For earning, they go to the forest to collect firewood as they are sure that they will be able to sell it. Therefore, the protection of forest cover it is necessary to control timber and non-timber product collection. But it is not very easy to control timber and NTFPs collection without offering an alternative source of income to forest villagers. In this situation, scientific harvesting of NTFPs and sustainable uses of it can do an important role in protecting the forests cover, providing an alternative source of income for forest villagers.

The research has interpreted the collection strategies of forest resources, way of storage facilities and how marketing channels of NTFPs connected from the ground level to the ultimate purchasers. The idea, themes, findings and suggestions can be useful for the improvement of socio-economically backward forest inhabitants of other countries. The economic development of forest villagers could help to protect the forests of North Bengal. The introductions of government policies are not enough to improve financial situation in this regard. It has to be ensured that forest policies are working intensively for the fiscal growth of forest villagers and other beneficiaries. A sense of ownership over forest resources including fuel wood, timber, NTFPs and others could inspire forest villagers to protect the forest cover of North Bengal. Proper education regarding the importance of forests and forest products directed through Gram Panchayat (Block and village level government body) institutions could help to increase the consciousness among villagers. It is, however, also true that as the forest inhabitant have been living in these forest areas for the long periods. So they know better than outsiders about how they should collect fuel wood, timber, NTFPs and other resources, which products should collect and how much they should collect.

9.5 Further research

The present research mainly focuses on socio-economic characteristics of forest villagers, where social status, adaptation in the forests, dependency and perception has been analysed. In future, however, consumption of resources and sustainable harvesting of forest products, socio-economic impact of deforestation on forest inhabitants can arrange in a parallel way for the development of forest inhabitants. Research can also be conducted on other social aspects such

as women's participation in JFM programme and their development, and other JFM policies applied on forest communities' development such as ecological and socio-economic impact assessment of villagers' Eco-Development Committee (EDC) and Forest Protection Committee (FPC). No doubt, the forest has played an important role in the life of forest villagers, but the action is not always same way for all. The activities of forest villagers' also differ on the forest environment and forest character. Besides, there are many several type socio-economic practices among different forest communities which can be included in the research separately. Moreover, forests and particularly those people live in the forest should not be studied only from the aspect of forestry and environment, but at the same time, other forest communities such as backward tribe communities should receive equal advantage in research. For the overall improvement of socio economic circumstance of marginal forest villagers and forest resource management, a research is needed that connects historical view, development, economics and environmental related local policy making perspectives. The discovery of the historical views of man-environment interactions, the study of contemporary socio-economic issues of forest inhabitants related to forest and forest products harvesting can be considered as an important features in terms of future relevant policy making. This research will intend to present an overall idea about natural resource harvesting and marginal livelihoods of villagers in terms of forest resources which are available in the tropical-deciduous forest of North Bengal.

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