CHAPTER XI

11.1. ENVIRONMENT

Himalayan region is one of the youngest ranges of the world and is still geologically active, and is growing at the rate of 2 cm per year. The fragile ecosystems of the climax communities are delicate which cannot withstand any perturbations. Unlike secondary forests and grasslands which have developed resistance to fire, grazing and other biotic disturbances, climax species have not developed any resistance to such perturbations caused by anthropologic factors (Rao 1990). Darjeeling district offers the most remarkable example of population growth steaming mainly from immigration from outside. In the year 1835 when the British acquired the hill territory, it was almost entirely under the forest cover with a small population. It was estimated that in an area of 138 square miles, there was only 100 souls. Later Dr. Campbell, the first superintendent of Darjeeling in 1850 reported that the number of inhabitants in Darjeeling rose to 10,000 and in 1869 it was 22,000 (O'Malley 1907). The rapid growth in the population in the region can be understood from the following figure:

Table: 11.1 Population of Darjeeling district

Year	Population
1872	94712
1881	155179
1901	265780
1941	376369
1981	1024269
1991	1299919
2001	1605900

Source: Census of India (1961), Language Tables, Vol. I Part II-C (II), Pp-CL VII-CL IX.
Census of India (1981), District Census Handbook, Darjeeling district, West Bengal
Census of India (1991), District Census Handbook, Darjeeling district, West Bengal
Census of India (2001), Provisional Population Totals, Series-I.

In early years the major factors that encouraged the large scale immigration in the area contributing to the population growth were the tea and Cinchona industries. Another potent factor is general agriculture especially in Kalimpong sub division. Many people from the plains also migrated because of the hygienic and pleasant climatic condition of the region for permanent settlement or entered as the servants in government or in private enterprises and business. Besides, the immigration due to political reasons mainly from

Tibet, Bangladesh and Bhutan have played role in the growth of population in Darjeeling.

The effect of rapid population growth has been on the environment directly, causing the expansion of the area of cultivated fields and reducing the forest cover and regeneration. The loss of natural forest amounts to the loss of natural habitats for many native species threatening their existence are mostly involving the ground cover vegetations. It is revealed from the literatures that there was a rich and thick forest cover all over the Darjeeling and Sikkim Himalayas (Hooker 1855, Gamble 1875). At present there are 91 forest villages in three hill sub divisions of Darjeeling completely dependent on the forest resource and produces. The drastic reduction in the forest area is because of the human interferences. At present there is less than 35% of forest area in the hills. The guideline of the national forest policy act (1988) indicated that there should be a 60 % of forest area in the hilly regions for ecological security. The supreme court of India in the year 2000 made a verdict on the complete ban of tree felling. The later review of the act permits limited operation on disease infected and cyclone damaged trees. But the tree felling is not banned completely in the region and the act is still far away from being implemented.

The West Bengal Forest Development Corporation, an enterprise of state government has chosen the extraction of timber as a major source of revenue generation and is still operating in Kalimpong sub division. In 1977-78 clear felling was made in the pristine forest of Pankhasari range under Kalimpong sub division resulting in the denudation of an untouched forest. Many motorable link roads were constructed in the forest area to transport the logs and timbers.

Tourism is also considered as a major revenue generating enterprise in the region and is always encouraged. There are many tourist destinations located within the area of wildlife sanctuary and national parks which are the only reserved areas of the biodiversity hotspot. There is no restriction imposed on the number of tourist visits. The use of *Abies densa* (Pl-194) and *Rhododendron* branches and trunks as fuel wood is a common practice in the higher altitudes where the regeneration and growth of such plants are very slow. On the other hand the borders of the national parks and wildlife sanctuaries are porous and most of the tourists are unaware of mountain ecology. This leads to the destruction of regional biosphere resulting in the pollution and denudation. Used polythene bags and plastic wrappers thrown everywhere is a common painful scene around the tourist huts and tents.

Darjeeling Himalayan region is considered as a place of strategically important. Military exercise and training takes place every year in the dense forests of Neora valley national park. During the course of training they make many tracts and trail which are used later by the cowherds, poachers, tourists and medicinal plant collectors and thus they become the permanent trek route. In the dense forest cover areas of high altitude (above 2800m) the

top soil layer formed by the humus is immediately followed beneath by the loose sandy soil which cannot withstand the undue pressure. In many places the trekking path of loose soil has been trodden and trembled down as deep as 3-5 meters below the ground level. In this way the rapid washing down of topsoil caused by the human interference is directly proving to be the most damaging act (Bhujel 1996).

Monsoon rainfall is higher in the eastern Himalaya than in the western Himalaya. Within the eastern Himalaya, it is particularly intense in Darjeeling and Sikkim Himalayas. There is no mountain to protect Teesta valley from the direct impact of monsoon winds which receive exceedingly high burst of rainfall resulting in a very high sediment yield by the river Teesta and is the highest of all the Himalayan rivers (Agarwal *et* Narain 1985). Intense rainfall in the region causes many land slides (190) resulting in the soil erosion and uprooting of many trees (191). In September 1899, June 1950, October 1968, September 1980, September 1997 and July 1998 intense rainfall triggered many land slides in the region where massive land slides occurred at Ambotey, Mangzing (193), Paglajhora, Likhubhir, Geshok-Gitdabling, Mamring-Toryok (189) and devastating floods occurred several times in Teesta and her tributaries (192). A narrow gauge railway line from Siliguri to GailKhola along the bank of river Teesta was swept away by the flood of June 1950 and the same remains closed since then. On the other hand the region has become more prone to land slides because of an extensive land use, developmental activities and deforestation which destroyed many natural sources of drinking water. The traditional system of terrace farming and the crops like rice and cardamom, require plenty of water for a good production. The annual heavy rainfall destroys the irrigation channels of such farms land and washes away the top soil thereby damaging the fertility and reducing the volume of soil and land. The frequent practices of ploughing and sowing of non productive crops before monsoon accelerates the soil erosion.

During the past few decades the vegetational wealth of Darjeeling Himalaya degraded very fast on account of various biotic influences. A number of factors such as economic exploitation of plants, rapid urbanization, widening of national highways, road, tourist resorts, dam and hydroelectric projects and quarrying are responsible for the deteriorating mountain ecosystem. Construction of a mega dam (above 15 meter height) on any major river will play the role of catalyst for the seismic activity. The region is highly vulnerable and falls under the seismic zone 5 while the Labha-Gitdabling area of Kalimpong sub division is said to be seismically active.

Introduction of exotic plants and practice of monoculture plantation has rendered another vegetational pressure. Many such exotics are now naturalized and have already dominated the native plants, in certain locations the factors like use of biocides in the tea gardens and open grazing practices are still in operation. The political violence and counter violence in the

movement of separate statehood in the three hill sub division along with a part of terai in the mid 1980s let many loopholes for the opportunists to destroy the forests and biodiversity of the region. The damage thus caused will ask for many years for recovery.

11.2. EDUCATION IN RELATION TO CONSERVATION

Most of the damages occurring in the Himalayan environment are due to the lack of education and increasing human necessity than anything else (Pradhan *et* Lachungpa 1990). Adequate knowledge and information on localities of important plant species is not easily available to the conservation planners. Whilst there are increasing numbers of publications (papers, reports, synopsis and books) dealing with lists of plants considered endemic, rare and endangered, very rarely do they contain specific proposal for conservational action. This information gap on 'where to protect endangered plant resources needs an immediate bridging because in practical terms, we conserve land and not the species. In the other hand conservation is mostly concerned with the animals. The conservation of plant wealth is of least importance except for a few places of the country. Considering the government sector the department of forests has a key role to play in looking after the forests and biodiversity with their following branches: (1) Divisional Forest Office and Silviculture (Hills) Division which includes the forestry research, supply of quality seeds and administration of Lloyd's Botanical garden, Darjeeling. (2) Working Plans (North) Division is involved in the management of forest and monitoring the implementation of the Silviculture Department. (3) Kalimpong and Kurseong Soil Conservation Divisions carry out the soil conservation works in the forest areas. (4) Forest Village Development Division (Jalpaiguri) monitors the welfare of forest villages in North Bengal (Including Darjeeling district) and (5) Minor Forest Division (Siliguri) conducts the inter cultivation of agro-forestry products in the forest plantation of North Bengal (including Darjeeling hills) and develops the marketing plans.

The Eastern Forest Ranger's College at St Mary's hill (Kurseong) imparts the forestry training to the forest range managers and the West Bengal Forest School, Dowhill (Kurseong) imparts the forestry training to the deputy foresters and range managers. The Wild life Division manages and administers the National parks and Wildlife sanctuaries. The Zoological Survey of India and the Botanical Survey of India are involved in faunal and floral studies. Padmaja Naidu Himalayan Zoological Park (Darjeeling) undertakes activities related to conservation and breeding of endangered Himalayan fauna and creating of awareness among the public for conservation of nature. Darjeeling Natural History Museum administers deer parks, animal rescue centers and interpretation centers. Soil conservation division has a nature interpretation center at Kalimpong where the wildlife

division has one at Labha under Kalimpong sub division. The Regional Research Station (Sukuna) conducts the research studies sponsored by the government of India on environment and ecology.

There are many Non Government Agencies which are involved in the conservation of biodiversity and natural resources. "Federation of Societies for Environment Protection" was established in 1991 to carry out awareness programme on the conservation of biodiversity and local environment. Some of its activities include awareness programme in collaboration with the forest department, aforestation programmes, watershed management and short term Joint Forest Management programme. Besides, the society also conducts the AIDS awareness programmes and works for the development of minority communities.

"Environment Protection Society" a voluntary association of scientists, social activists, lecturers, students and people in villages at the grass root level was established in 1986. Some of the activities of this organization are creating of awareness among the rural people through audio-visual, eco-development programs and public hearings. It is also involved in the Joint Forest Management (JFM) schemes and other income generating activities using natural resources. A journal of this society with the name of "Himalayan Paryavaran" started in 1993 which highlights the environmental and developmental issues of the Himalayan region.

'Regional Community Development Committee' (RCDC) was established in 1993 by the Darjeeling Jesuits of North Bengal. It has a mandate to evolve and implement sustainable human development models for Darjeeling and its adjoining hills. It has grass root activities and provides support services to other organizations.

'Save the Environment and Regenerate Vital Employment' (SERVE) was established in 1993 by Professor Gnter Faltin, who is known for starting the marketing of Darjeeling tea in Germany. In 1996, the project was handed over to WWF-India, Eastern Regional Office. The main activities that are carried out are development of nurseries, tree planting in degraded areas, bee keeping, mushroom cultivation, Himalayan Salamander habitat preservation and awareness programmes on conservation.

'Ashoka Trust for Research in Environment and Ecology' (ATREE) was established in 1996. The trust combines public concerns over the deteriorating economic and physical environment with vigorous scientific approaches to solve environmental problems. It also promotes the scientific and educational activities at school and colleges on biodiversity conservation, sustainable development, protection of environment and rural development. Its major areas of interest are inventory monitoring and conservation planning, sustainable management of biodiversity, strengthening law and policy frame work, community and environmental health and education.

"Earth Group" was established in 1998 under the West Bengal Society Act. The main objectives of the group are to protect the environment and carry out sustainable development. One of the major objectives of the society is to promote the community involvement in the protection of the resource bases through the Joint Forest Management system.

'Society for Environment Education and Development' (SEED) was established in 2000 with the objective of conservation of biodiversity and eco-development. Currently the conservation of indigenous aquatic animals and indigenous varieties of food grains are in the progress. It is also concerned with the management of non bio-degradable wastes. Its campaign on the ban on polythene bags in the hills was effective since 15thSeptember 2001.

Recently the University Grant Commission, India introduced the 'Environmental Studies' as a compulsory subject of study in colleges, at degree level.

11.3. SOCIO-ECONOMY AND ETHNOBOTANY

Environmental condition plays an important role in conditioning the livelihood and economy of the people. The establishment of heavy and medium scale industry of any type would be problematic because of its topography. The district is not included in the industrial map of the country. The climatic variation, soil condition and topography have all influenced the human occupation. Majority of the people are dependent on the subsistence agriculture, livestock, forestry, tea and Cinchona plantation, and allied activities. The gradual receding of forest areas affected the daily collection of fodder and fuel for the villagers and is becoming more difficult year by year. This has reduced the number of livestock per household over the period of time. This in turn, has a direct impact on agricultural productivity because most of the farmers in the hills use the bio-organic manure. The limited yield in the terrace type of agriculture resulted into a low capital output ratio and the district remains deficient in food grains. The scope for extending the area under cultivation is limited and the improved technical approach for agriculture to increase the yield is not in the scene. Following the traditional practices of agriculture in the *khasmal* areas the crops like ginger, maize, millet, orange, paddy, potato, and large cardamom are grown as major crops. The economic out put generated by a small section of farmers from floriculture, horticultural and vegetable crops is unable to recover the ailing economy of district.

The chief trade centers in the district are Darjeeling, Kalimpong, Kurseong, Mirik and Siliguri. In the remote areas especially in high altitudes the carriage is done by means of pack pony and *joe* (hybrid yak). Kalimpong was an important centre for Tibetan trade till 1962. But this has been closed permanently after the Indo-Chinese conflict.

In the interior part of the district mostly the *khasmal* (settlement areas other than the tea and Cinchona plantation) there are weekly markets known as 'haat' which are held in the central place of large villages. Many weekly markets are observed in the district and its adjoining areas for the convenience of the rural people. The following list gives a picture of the major 'haats' in the district:-

Darjeeling sub division

Days	'haat' centers
Monday	Sombarey (S.W Sikkim)
Tuesday	Rimbick
Wednesday	Lodhoma
Thursday	Kainjaley
Friday	Bijanbari, Maneybhangyang, Sukiapokhari
Sunday	Pokhriabung

Kalimpong sub division

Monday	Gorubathan (Sombarey), Kumai
Tuesday	Labha, Nimbong
Wednesday	Gitdabling, Jholung(Jaldhaka), Kalimpong town
Thursday	Charkholey, Bindu
Friday	Kafer (Sailung), Pedong
Saturday	Bagrakot, Kalimpong town
Sunday	Algarah, Odalbari

Kurseong sub division

Saturday	Saureni
Sunday	Mirik, Dudhey, Panighatta, Garidhura, Khaprel

Siliguri sub division

Monday	Salugara
Tuesday	Matigara
Wednesday	Salbari

Terai and plains in the eastern part of district

Sunday	Mateli, Malbazar
Tuesday	Chalsa

There are only a few 'haat' places in Kurseong sub division because most of the areas in this sub division are under tea plantation. In such 'haat' the trade of domestic products and vegetable crops including the medicinal plant parts takes places. Many indigenously made art and craft items are brought for the sale. The transaction of single day trade is considered to run a one week of expenses. Such markets in the villages have a higher trade and attendance during the festive seasons and remain lean and dull otherwise.

The low but stable economic income in the district is generated by the tea and Cinchona plantation. It was in the year 1840 when Dr. Campbell introduced tea plantation in Darjeeling hills which developed in an extensive scale as a commercial enterprise from 1856. At present most of the areas of Darjeeling and Kurseong subdivision are covered by the tea plantation. Darjeeling tea is famous for its peculiarity in its flavour. Similarly the region was found suitable for the cultivation of Cinchona which produces quinine, a febrifuge used for the treatment of malarial fever. It was in 1861-62 when Dr. Thomas Anderson established the Cinchona nursery in the summit of Senchel. Later it was shifted to Lebong spur temporarily and finally a permanent cultivation was started at Ranjuvalley. From the year 1874 manufacture of Cinchona febrifuge began at Mungpoo. At that time only two species of Cinchona (one with red stem bark and poor quinine content and the other with yellow stem barks and rich quinine content) were brought to plantation. Later, Dr. King (Superintendent of Botanic Garden, Calcutta) suggested the inter plantation of two species allowing natural hybridization which yielded positive results. The topography and climatic condition of the region even today is considered suitable for the cultivation of tea, Cinchona and other plants of horticultural and floricultural importance which can sustain the economy of the hills.

The tea and Cinchona industries have been suffering from management and administrative problems since the past decade. The government and private enterprises have centralized their trade activities and head offices far away from Darjeeling, such as in Calcutta and other metro cities. Except for the payment of labour wages and salaries the other beneficial transactions are carried out in these distant head quarters. Moreover, agricultural progress is normally a pre requisite for the industrial development which enhances the employment generation in the industrial ground and raises the rural purchasing power. Thus only the increase in agricultural activity and productivity can contribute to the economic development of the district.

The economic well being of the district cannot be just be assessed by the external appearances of the four municipal township and roadside structures. The deep rooted poverty, illiteracy and ignorance are the common companion of the actual residents in the rural areas. In the under developed infrastructure the rural people are living hardship rather than a life (Bhujel 1996). Himalayan planning and development is neglected even from the

educated communities. Most of the planners and technocrats have their offices at cities and are apathetic to the hills. On the other hand, the laws and policies of forests in the true sense are a little extension of British policies of more than fifty years ago. Numerous forest based industries were introduced in the past which increased the people's involvement and encouraged them to consume more forest and natural resources. This ultimately added an additional pressure on the life carrying capacity of forest ecosystem. Himalayan region needs to be treated exclusively for their sustainable management and development. It is important for the planners and technocrats to have a sound knowledge of the Himalayan ecology and environment before they venture into any policy matters. Knowingly or unknowingly whatever is lost in the past has a very feeble chance of restoration again in its original state. Yet, the following suggestion measures could be applied to control the further degradation and seek the economic upliftment of the people in general:

- Restoration of forest areas and its resources should be done with the help of regeneration technology. The mass aforestation programme including shrubs and non timber trees should be done involving the local people. The creation of a continuous and uninterrupted forest belt in all geographical zones will help to check the soil erosion. Restriction should be imposed on free cattle grazing inside the forest areas.

- Strict measures should be taken to check immigration in the Himalayan region. Planning should be proper for the stabilization of population growth.

- Proper rules and regulations should be framed to stop the illegal trades on herbal and other forest produces including animal parts falling in the list of endangered species.

- The government should declare the creation of more bio reserve areas in the region to regain the forest areas as prescribed in the national forest policy for the environmental security.

- All the developmental planning should be with careful and critical estimate with the group of experts involving the local people. Any further heavy construction work in biodiversity rich areas should be checked.

- Recognition and expansion of local people's participation in developing and maintaining the regional environment should be encouraged and rewarded. Giving subsidies on the purchase of such goods should encourage the use of alternative energy sources in rural areas.

- The dissemination of all the knowledge on the utilization of natural resources should be publicized to generate further awareness for the conservation of the deteriorating environment.
- Proper scientific approach should be made for the propagation of native crops including their proper storage and post harvest management.
- Cultivation of high value medicinal and other economically important plants according to their availability and distribution should be encouraged for the economic pursuit and steady source of income. Encouragement should be given to use traditional system of medicine along with the modern system.
- Farmers or genuine cultivators of private holdings should be trained and provided with adequate technical information from the research based works for sustaining economy and maintaining environment. Training cum demonstration centers should be established in all major places of the district with visiting experts from time to time. Establishment of traditional home garden and an ethno-museum in the district should be established which will help to motivate the people for conservation. This will also attract and interest the researchers and tourists from different parts of the world.

The region has tremendous potentialities for cottage industry based on handicrafts of bamboo and wood carving and many local individuals have skills in craftsmanship. Recently, floriculture has proved to be a boon to the economy of the hilly areas in several states in the country and in the world as well. The following important floricultural plants are under the cultivation and production in the Darjeeling hills.

Gladioli (American and Dutch variety)	- Sword lily
Eucharis grandiflora	- Amazon lily
Caladium sp. X *Hortolanum sp.* or *C. bicolour*	- Angel's lily
Haementhus multiflorus	- Football lily
Zephyranthes candida	- Zephyr lily
Gloriosa superba	- Climbing lily
Gloriosa lutea	
Gloriosa rothschildiana	
Lycoris aurea	- Golden lily of Japan
Ornithogalum thyrsoides	- Chinchirinchee
Amaryllis-Hippeastrum (Dutch variety)	
Anthurium andreanum	
Anthurium scherzarianum	
Begonia semperflorens	

Begonia socotrans
Glaxonia speciosa
Cyclamen persicum

Souce: Preliminary Report (1997) of Kalimpong Horticulture Society.

There are many ornamental plants like roses, orchids, cacti and succulents, palms and cycads and many seasonal plants like *Azelia sp., Chrysanthemum sp., Kalanchoe sp., Hedera sp., Freezia sp., Iris sp., Carnations sp.* etc are successfully grown in many private nurseries in Kalimpong, Mirik, Pokhriabong and Takdah. The terai region of the district (at an altitude of 150-300m) is found to be suitable for the cultivation of *Vanilla planifolia* one of the important plants of commerce. It can help in the economic pursuit of the people. The un-cleared jungle lands are ideal for establishing *vanilla* plantation. It would be necessary to retain the natural shade provided by leafy trees and to leave the soil or the rich humus layer on top undisturbed. Vanilla is cultivated in various types of soils from sandy loam to laterites (Vanilla: status report 2000).

11.4. FURTHER RESEARCH SCOPE

Since the inception of the term 'ethnobotany' in 1895 by John W. Harshberger to the study of plants used by the primitive aboriginal people, the concept and scope of the subject have regularly expanded. The ethnobotanical study of any region with a taxonomic approach has the great advantage to prepare the basic data of native plant wealth, which further helps for scientific evaluation. It is found that the origin of traditional medicine systems have their root in the ethnobotanical folklores. The proven evaluation and application of ethnobotany necessitate the understanding of human physiology, principles of indigenous system of medicine and phytochemistry along with the addition of new dimension and approaches. The utility of ethno-medico botanical research is tremendous in the healthcare programme and in locating life support species of wild relation at the time of emergency. The pharmaceutical approach to investigate the active principles of all the known medicinal and other important plants including clinical taste in case of medicinal plants is an important field for further research. Investigation of inter disciplines like anthropology, indigenous art and crafts, and the scientific investigation on megico-religious beliefs about plants are the interesting area of further study. The region is also interesting for the study of agricultural botany, pest control, food value of wild edible plants, variations of herbal drug preparation among the ethnic people and their ecology and conservation. Several branches of ethnobotany like archaeo-ethnobotany, ethno-pharmacology, ethno-ecology, ethno-

taxonomy, paleo-ethnobotany, ethno-gynaecology and the ethnobotany of lower group of plants like algae, fungi, bryophytes, bacteria and yeasts are still to be taken up. The cross cultural ethnobotany among heterogenous groups and their economic botany for product commercialization need to be studied in organized form.

11.5. CONCLUSION

Ethnobotany is a science with adventures. This is especially so, for this part of the eastern Himalaya not only for its status of the biodiversity hot spot zone, but also for its physiographical and topographical peculiarities with the silver line of Mt. Kanchandzonga at its top. The present record of 415 plant species with various ethnobotanical uses, 320 of them being for the medicinal purposes, itself speaks of the respectable status of ethnobotanical resources and the people's involvement in the transformation of traditional knowledge. This knowledge has remained confined to the individuals or communities of the small geographical area. Except for a few plants, they have neither been exploited for the benefit of the larger human section, nor so attempted. As a result, this does not contribute anything to the economy of people of the region otherwise known for their backward rural background and ever struggling state of upliftment. But at the same time, it was surprisingly revealed that the legal or illegal trade on medicinal plants is being regularly carried on in the region. Such activities have threatened the habitat of more than 24 plants and about 9 species are almost wiped out. There are already two national parks and three wildlife sanctuaries in the district for the conservation of nature. In this circumstance, protective and conservative measures need a serious enhancement. There are plants which are the important constituents of the flora. The place is blessed by the climate and topography for cultivation of plants of horticultural, floricultural and medicinal value. Therefore, the propagation and multiplication of the medicinal plants of commerce involving the farmers will also fetch a respectable income for them. In fact this will in turn, surely be one of the major steps towards conservation of natural habitat.

The importance of the studies in ethnobotany is unquestionable. The information and estimation of plant resources, particularly the ethnomedicinal plants and the traditional ways of their exploitation have become the base for further studies, evaluation, analysis and application in the interest of greater human need. Situated in the lap of snow capped mountain Darjeeling is much more known for its natural beauty and vegetation. The ethnobotany of the region is as rich and diverse as its flora.

165. *Pandanus nepalensis* St.John

166. *Calamus erectus* Roxb.

167. *Eleusine coracana* (L.) Gaertn.

168. Meal plates-*Thahar, Tapara* which are used in cultural and religious ceremonies.

169. Locally made stool and rain cover (Ghum) on display.

170. Wooden vessels made from the mature stem of *Boehmeria rugulosa* Weddell and bamboo tray made from *Bambusa nutans* Wall.

171. Baskets made from bamboos (*Dendrocalamus hamiltonii* Nees & Arn. ex Munro and *Bambusa nutans* Wall.).

172. Close up view of wooden vessels made from the mature stem of *Boehmeria rugulosa* Weddell

173. Varnished wooden vessels on display.

174. Wooden vessels (*Theka and Harpey*) made from the mature stem of *Boehmeria rugulosa* Weddell.

175. *Guizotia abyssinica* (L.f.) Cass.

176. Grinding tools to extract oil from the seeds of *Guizotia abyssinica* (L.f.) Cass.

177. Crushing of the seeds to extract oil.

178. Filling of the oil in bottle.

179. Young shoot of bamboo (*Dendrocalamus hamiltonii*) Nees & Arn. Ex Munro

180. *Tama* on sale in local markets (Kalimpong).

181. *Dhup* (incense) making to size before packing.

182. *Dhup* (Incense) packing for market.


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183. Flowers of *Daphne bholua* D.Don

184. Debarking the stem bark of *Daphne bholua* D.Don

185. Drying of stem bark of *Daphne bholua* D.Don for trade.

186. *Pahare kagaj* (traditional Nepalese hand made paper) being manufactured at Kalimpong from the stem bark of *Daphne sp.* and *Edgeworthia gardneri* (Wall.) Meisner

187. Drying of paper before sizing.

188. Products prepared from *pahare kagaj* for sale.

189. Land slide of Toryok-Mamring (July 1998).

190. Land slide at Kafer (1996).

191. Soil erosion at Singalila national park (1997).

192. Land slide at Gish river bank (1996).

193. Land slide at Mangzing (1996).

194. Tree felling inside the Singalila national park (1997).

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