Chapter 4

THE SEVEN-SYSTEM MANAGEMENT: INDIGENOUS KNOWLEDGE AND TRADITIONAL PRACTICES OF THE KOLLIHILLS

Introduction

Agriculture is the primary source of livelihood for a vast majority of the tribal population, though a large proportion of the area under agriculture has been, and is still to an extent, in shifting cultivation. These are the tribes some of whom are in the primitive stage of food gathering and hunting while others are, at the same time, in advanced farming. There are excellent farmers among them whose lives are being investigated in this analysis to understand the impact of transformation from shifting cultivation to plantation agriculture over their ways of living.

Tribal Economy and Change

The important development in the area of tribal research in the Indian context over the last century is the gathering of data regarding '*continuity and change*'. Extensive as well as intensive studies in tribal economies and their transformations have revealed that there are several tribal economies which are getting integrated with the national market economy.

Majumdar (1961), in his attempt to classify the various types of economies, lists the following categories:

1. A good number of Indian tribes are dependent upon the forests and they have similar types of economy.

2. There are tribes who have their economy midway between food gathering and primitive shifting agriculture.

3. There is the bulk of tribal groups depending on some forms of agriculture with forest produce as a secondary support.

4. The last category of the tribal economy is based on wage labour following the growth of industry in India.

The entire tribal India is now undergoing a transition due to induced changes or internal changes. The history of the tribal people shows that, during the past, they lived on bare subsistence and self-contained economies. The early changes in tribal life were due to their contacts with the Hindu civilisation. Roy (1925) reported that changes took place among the Chotanagpur tribes due to the demands of surrounding Hindu economy. Later, the tribals' contact with the outer world increased, which in turn facilitated more changes either by their visits to the outside world or by the penetration of aliens into their homeland.

More serious attempts to establish contacts with the tribes had started during the British period and the intention behind it was a part of their effort to consolidate their position in India. "British policy was, in short, a hotch-potch of segregation, often unnecessary and harmful, and lack of discrimination in administration, both of which hit the tribes hard." (Majumdar, 1950). The changes during the British period have changed the economic base and socio-political structure (Baily, 1979; Haimendorf, 1979; Pathy, 1984; Sharma and Prasad, 1982) because of the superimposed economic and political structures over the existing one. The British rulers during the pre-Independence period followed a policy of segregation and attempted to keep the tribals away from the rest of the population. After India's independence, it was realised that the tribal people would not have different fortunes than the rest of the population of the country. The result was the manifestation of the Government of India's Tribal Policy. Indian constitution itself in one of its provisions committed to improve the social and economic standards of these people. The constitutional safeguards provide a useful and very broad framework for tribal development.

A number of Commissions, Committees and study teams were formed from time to time to evaluate the socio-economic conditions of the tribal groups and also the different welfare measures attempted to develop the tribal communities. Reports of the Committees brought out both the positive and the negative impacts of the programmes implemented. Singh (1985) has made it very clear that many of the development programmes have not benefited tribal communities in the past. Sometimes, development has been at the cost of tribal interests (Sing, 1982). The failure or negative impact on the economic and social life of the tribals is mainly because of the ignorance of the tribal socio-cultural economic system (Chaudhury, 1992).

Insisting the same, Ratha (1982) says that planning and formulating any tribal policy requires clear *a priori* understanding of the social organisation and cultural values through sustained field investigation and collection of adequate information.

Agricultural Development of the Hill Areas

The tribal areas are generally characterised by undulated terrain, dense forests, lack of communication network and low population density. Each tribal group, with its own social customs and dialects, lives in a compact area. The geographical conditions and social and cultural background make the introduction of modern agriculture a difficult task in these tribal areas. Many tribal communities, who live in certain compact areas of the plains, have lost many of their original characteristics due to their contact with non-tribal people in the plains. The problems of agricultural development in the tribal areas of the plains are more akin to those of the other plains than to purely tribal areas in the hills. Almost all of the indigenous populations in the hilly areas still maintain their own identities.

Characteristics of Tribal Culture

Agriculture in the tribal areas of the Kollihills, for example, varies greatly with plough farming in the plains. Tribes in the hills once practised shifting cultivation. Social anthropologists believe that, after the hunting and gathering stage of human civilisation, the technique of raising crops was learnt and due however to nomadic character of the people at that time there was no fixed farm. Because of the geographical conditions of the hills, these tribes practised shifting cultivation. Unless compelled by the physical and economic circumstances, these people still prefer the traditional system of cultivation in place of permanent cultivation.

Because of the rapid loss of fertility, the land under shifting cultivation is invariably abandoned after one or two years and a new plot is selected for fresh cultivation. The period of occupancy is mainly dependent upon the density of population of a particular area and the availability of sustainable hill slopes. Apart from the loss of forests and consequent soil erosion on the hill slopes, such cultivation offers very little scope for economic uplift as it is subsistence in nature. This has resulted only in hand-to-mouth existence of the tribes, almost everywhere, making their lives anything but prosperous.

Land Ownership

Individual ownership of land is recognised in certain areas and such ownership is usually confined to homestead and settled farmland. In the villages of Alukurumbas of the Nilgiris, community owns the lands. Each village however operates in a particularly demarcated area and the power of distribution of land for cultivation to the farmers is vested with the village headman (*Mudali*) or Village Council. It is observed that due to non-fixity of the tenurial rights, the tribal farmers have little attachment to the land they operate. Therefore, these people evince no interest in the improvement of land for future use. The tendency for improvement of land is noticed in individually-owned areas.

Isolation from Forces of Market Economy

Long isolation has compelled the tribal people inhabiting the hills and interior areas to evolve a self-sufficient economy. In a subsistence economy, where population is sparse, there is little encouragement to induce people to produce for sale. It is observed that

production of cash crops such as coffee and tea, in the Kollihills, is very limited due to interior location and the situation obtaining there.

There are no roads and other means of transport to the interior villages. Even when there are some transactions, it is still mostly a barter system of exchange. Hence, there is little scope for monetisation of the transactions. Field experience shows however that most tribal people react immediately and favourably to the market forces. Even though their production methods are very primitive, they are bound to produce considerable quantity of agricultural produce when they are exposed to some market outlets.

The problems faced in agriculture development in the hills is linked to various other socio-economic considerations, namely, improvement of infrastructure, change in social habits and customs, creation of demand for goods and service facilities, the urge for self development and increased opportunity for investment.

Plantation Agriculture

Plantation agriculture is managed agriculture, where the basic landholding size is generally large. The plantation itself could be a large-scale operation, involving besides cultivation such activities as processing and marketing as part of the industrial process. However, the plantation agriculture here is of small holding plantation agriculture, managed by the tribal farmer himself but yet showing certain levels of returns from it that puts him at a comfortably better position than those who are engaged in other agriculture. The tribal plantations are in a sense subsistence activities and caters however to a market economy (Tharakan, 1996).

Tribes and Shifting Cultivation

Shifting cultivation is a traditional form of agriculture. It is one of a few modes of subsistence practised by the Kollihill tribes. It is also done in the tropics of Asia, Africa and Latin America.

Box 1: Shifting Agriculture

This form of agriculture is known in vernacular as the 'slash and burn agriculture' and 'swidden' or through local names such as `jhum' in India, `Chitememne' in Zambia, `Chinampa' in tropical America, 'Kaiginin' in the Philippines, 'Ladang' in Indonesia, 'Taungya' in Myanmar and 'Milpa' in Central America.

According to Dobby (1954), it is *"a special stage in the evolution from hunting and food gathering to sedentary farming*". While emphasising how the practice maintains the quality of the forests where it is being practised, Geertz (1963) says that "*the swidden plot is not a `**field**' at all in the proper sense, but a miniaturised tropical forest, composed mainly of food producing and other main cultivates*". Carnero (1964) has attempted to test the

generally held beliefs about the potentialities and limitations of slash and burn agriculture practised by the Kuikuru of the Amazon basin. In India, shifting cultivation is practised by several tribes; and it is also referred to as '*jhum or swidden or slash and burn* cultivation'. Tribes practising shifting cultivation have been found all over India and they are not confined to any one region but are spread all over the country. Shifting cultivation, though a rudimentary technique of land and forest resources utilisation, is an intricate relationship between ecology, economy, society and the cultural ethos of a region.

Anthropologists differ in their views over the consequences of burning bush to prepare the soil for cultivation. One section believes that the slash and burn technique destroys the nutrients in the soil and thus compels the horticulturists to abandon their plots after two or three years. The other section maintains that the horticultural method is not seriously detrimental to the soil (Conklin, 1954). Roughly after four decades Ramakrishnan (1996) repeats the same by saying that the traditional shifting agriculture of the humid tropics is often dismissed as a primitive form of land use and is condemned as a mere waste of natural and human resources. However, in recent times, this agriculture along with many other traditional systems, are considered to be '*models of ecological deficiencies*'. The tribes who practice shifting cultivation have managed it for centuries with optimum yield on a long term basis, rather than trying to maximise production on a short term basis (Rathenberg, 1976; Toky and Ramakrishnan, 1982).

Husain (1992) concludes on the basis of his exposure to shifting cultivation, practised by many tribal groups in northeast India that "*since the cultural ethos of the Jumias is the outcome of shifting cultivation, closely influenced by its operation, it cannot be stopped within a short period of time. Therefore, there is an urgent need to the system more efficient and ecologically sustainable*". *Jhum* is the shifting cultivation of the northeastern region and is tied up intricately with the physical, socio-cultural and religious environments of the ***Abor***, a hill tribe of the northeast corner of Assam. As such, the need of the time is how to retain the traditional flavour and fervour in improving the tribal welfare, through new techniques and technologies towards improving the jhum (Gohain, 1994). In another study, shifting cultivation of the Baiga tribe of Madhya Pradesh has been considered impractical and undesirable in view of the fact that there is an ever increasing population and the difficulties in subsistence. Baiga cultivator has been the subject of another study by Bose (1987) who has focussed on the pattern of change, particularly on the land uses. This study has traced the process of change and the causal relationships, measuring the levels of change in the tribal community.

Nag (1994), analysing the problem, suggests that there should be some form of rehabilitation and reorganisation of the agricultural economy of the tribe. A similar conclusion has been drawn from a study of the shifting cultivation in Orissa but Mahapadra (1994) goes a step further and considers a holistic and an integrated approach to rehabilitation as very important to solve the problems in agriculture. There have indeed been some researches which carefully looked into the need to develop a coherent and an integrated framework for a National Policy to the marginalised shifting cultivators of the northeastern region. Das (1996) has indeed seen some very positive features in *jhum* cultivation while suggesting suitable changes in the traditional land use systems through

extension and not imposition. Others have emphasised that the shifting cultivation prevails elsewhere and it is not possible to stop it everywhere. Hence, more attention and care need to be given on introducing appropriate techniques of such cultivation.

Lack of reliable estimate of land under shifting cultivation and the number of shifting cultivators in the hills have added problems of loss of irreplaceable knowledge accumulated though centuries. The strength of it however lies in the communal character. Pathy (1984) argues that it is important to note that shifting cultivation has also been a scapegoat for the deleterious effect on forests and environment. But shifting cultivators, with the traditional ecological knowledge of the forest systems, should be considered as an integral part of the forest management.

With the march of modernisation in the hills, the informal community of the tribal areas has turned into individual orientated, formal agriculturists. But the tradition lingers on, using the forest as renewable sources for livelihood while at the same time turning it into a commercial market produce (Fernondus, 1993). On the other hand, Fuchs (1992) speaks of the forest dwellers as suffering much from the irreparable damage and injustice through much of the historical times, primarily deprived of, as a consequence, their traditional resources base. Menon (1995) however provides another contrast, taking the case of Kattunaickers of Malapuram district of Kerala. He points out the need for change in the conventional relationships of the change agent as the innovator of the tribal systems. In this study, it has been possible to showcase the fact that traditional wisdom leads to a stable survival of the people dependent on the forests. The stress is on minimising disturbance and maximising benefits.

The transition has been elaborated to show how the Irulas have been deprived of their basic food security in the process. The transition from hunter-gatherer economy to agricultural in the community of Nishis of Arunachal Pradesh (Sharma, 1993) has ushered in horticulture. Ritualistic agriculture often comes into conflict with modernisation of agriculture (Mahapatra, 1992). In fact, ritual and technology should create a new system of economic relationships in which ritual becomes flexible and liberal enough to absorb the demands of new technology, which in turn restructures the rituals.

Meghalaya presents a case of transformation from tribal, traditional economy to co-operative, collective economy taking Government as an active partner in the process. Mahalingam (1992) brings out the role of co-operatives in the tribal areas of the northeastern India, explaining the unique role of co-operation in strengthening the tribal economy through integrated credit, marketing and distribution facilities. There are further studies which turn to current topical interests such as sustainable development (for example, Ramakrishnan, 1993), taking traditional societies of the Himalayan ranges, which represent extremes of mountain ecosystems, physical and socio-cultural factors, towards analysing decentralisation. Institutional reforms and extension of credit by various government agencies to the tribes of Srikakulam have been analysed in a developmental context by Ramamani (1988). Involvement of extension agencies in agricultural development in the hilly region through the introduction of appropriate technologies suited to local conditions has been examined by Rai (1995).

In socio-economic development analysis, the tribal economies have been analysed threadbare as to the spatial and temporal patterns of distribution of development benefits. Sharma (1989) has studied the development of tribes of Baghelkhand of Madhya Pradesh, subjecting the data from a field survey to quantitative and cartographic analysis. He has concluded that the tribal economy needs to be integrated both in terms of spatial organisation and intra- and inter-regional relationships around a system of service centres. Mann (1993) has embellished the degree of transition and the subsequent state of integration in the socio-economic development of the Indian tribes. But the constraints to development, sustainable development at that, is the lack of infrastructures to the tribes more so than to the non-tribes.

Sachidananda (1964) has likened the infrastructures to the nerve centres of development. Tribal markets, among the infrastructures, are the most significant as they are network of socio-cultural ties among the people of the hinterland and have given them a common base for regional ethnology. Dube (1977) has cautioned that without infrastructural support development of the tribes could run into difficulties. Pradap (1975), Gopal and Kulandaisamy (1976) provide similar conclusions. So, it appears that infrastructures are a must if development was to be sustained. Kattakayam (1983) has presented the failure and success of various welfare programmes, making suggestions for making them effective and fruitful.

Traditional Subsistence Economy

Traditional Economy of the Alukurumbas is land based, the main shifting agriculture was supplemented with wild forest resources. In general, the Alukurumba settlements are on the hill slopes. Difficult mountain terrain, rocky and infertile soils, vagaries of climate, scarcity of water and harsh working conditions have made shifting cultivation a difficult task. Inadequacy of food has obviously forced them to search for supplementary means of subsistence in the surrounding forest territories. Rarely, whenever they get the opportunity, they go out to work as wage labourers in the neihgbouring farms.

Shifting Cultivation

In many parts of the tribal hill zone, there is technically a less advanced system of cultivation, known as the shifting cultivation. To do this a piece of land is selected, the trees and bushes are cut down and are allowed to dry and then set on fire. In the land which is thus cleaned, the soil is prepared by using hoes or digging sticks. Seeds are sown, in the little holes gouged in the ground. Or they are broadcast. Everything is done by human labour. Such field the fertility of which is not replenished by the application of manure, except for the ashes obtained from burning, gives a diminishing return and is practically exhausted in two or three years of time. Then, the farmer moves over to a new patch of jungle and allows natural vegetative growth to take over the abandoned field. In different places, the time allowed for recuperation varies considerably. When the abandoned fields are again covered by an adequate cover of secondary growth, the farmer may return to them for cropping again.

Economic and social impacts of shifting cultivation are viewed with difficulty by different people. Some hold the view that shifting cultivation invariably upsets the accumulated natural resources by removing more from it than that it can produce. Again, the type of cultivation has been held to constitute a major limitation for the spread of permanent tree crop. On the other hand, it has been pointed out by experts that shifting cultivation is not always harmful to the forest. Land, as it is believed to be, could be improved and its negative effects could be minimised by introducing leguminous creepers and nitrogen fixing plants. Besides fruit bearing trees may be grown on the exhausted shifting cultivation patches, while also avoiding cultivation on steep slopes (Government Report, 1960).

The system of land ownership for shifting cultivation differs from tribe to tribe. In most of the tribal areas, land is owned by the community as a whole. But, in contrast to this usual practice, the communal ownership of land under shifting cultivation is completely absent in some areas, for example in southern Orissa. The Bondas, Souras, Kondhas, Koyas and other tribes recognise private ownership of their respective hill clearings. Each household owns a number of sites which may be even outside the village boundary. The Bondas sell their clearings to one another and mortgage them when they are in need (Verrisor, 1950). However, there is no legal title to such lands. The ownership of land is accepted only by the common usage and practice. In the Nilgiris, by and large, the Alukurumbas practised shifting cultivation. The report of the Commission for SC and STs (1960-61) states that the Alukurumbas of the Nilgiris, Coimbatore, Attapadi and Karnataka were practising shifting cultivation in a large area (Table 3.1).

Cropping Pattern of the Alukurumbas 1965

The agro-climatic condition, prevalent during 1960s was most suitable for annual crops such as millets: ragi (Eleusine Coracana) and samai (Panicum sumatranse). Cultivation of coffee and tea was taken up only in a very few settlements. The crop and area under them is presented in Table 3.2.

The table shows that out of the total area of 215 ha (530.92 acres) in all the sample settlements, 53 per cent of the area was covered by forests and 47 per cent of the area under cultivation. Out of the land under cultivation, a maximum of 90 per cent of the area was used for shifting cultivation, on a rotational basis. In one shift in the year 1965, 32 ha (79.0 acres) was cultivated by millets such as ragi and samai. Only the remaining 10 per cent of the area was covered by coffee and tea.

The Alukurumbas' Shifting Cultivation

Shifting cultivation is a method of farming and an impermanent cultivation which has prevailed among the Alukurumbas for centuries. The chief characteristics of shifting cultivation are the ownership of land, selection of sites, use of fire for clearing the land, fallowing for a number of years for regeneration of forests, use of very crude and simple implements and performance of rites. It is seen from Table 3.3 that for seven villages out of ten, major portions of their land is on steep slopes. Only 4 villages are on gentle slopes.

Mixed Cropping

The mixed cropping pattern or the multi-tier cropping pattern has been practised by the Alukurumbas over time. Generally, they use different kinds of crops in the same field. This is the practice of inter-cropping, which is a production maximising strategy. For example, use of ragi, samai, greens and jowar/beans is very common. Two months after the sowing, they get plenty of greens and during the one/two week duration they harvest greens, they simultaneously do weeding in the main field. After 3-4 months, ragi is ready for harvest and, after 6/7 months from sowing, samai and jowar will also be ready. The tribe thus start reaping their crops from the end of the second month till the eighth or ninth month. It is seen from Table 3.4 that even though the area under annual crops has been substantially reduced, the tribes put major thrust on the multi-tier/mixed cropping pattern.

During 1965, out of about 32 ha (79 acres) under millet crops in the sample villages, 85 per cent of the area was under mixed cropping pattern and only 15 per cent under monocrop. In 1995, 100 per cent of the area (14 acres or 5.7 ha) was under mixed crop for their livelihood. The tribe depended completely on food crops and that too through the mixed crop or the inter-crops. Table 3.5 presents a list of crops cultivated by the Alukurumbas and their places of sowing and period in months, including information on harvests. As many as nine different crops are grown, five in the main field, two along the edges, one in the boundary and the other in the waste heap. The cropping period varies from 2 months to one full year. So, in a year of cropping, four harvests of different crops are made by the tribe.

Ownership of Land

Traditionally, the Alukurumbas of the Nilgiris have community ownership and land allotted by the **Mudali** or the village headman. The **Mannukara**, the village priest, with the consent of Mudali, allots the land to individual families. The ownership of land is thus only temporary and it could be converted into the community land again, if desired by the Village Council.

Selection of Sites

The selection of sites for shifting cultivation is made by the Alukurumbas on a number of considerations which include the fallow period, growth of wild plants to be slashed, nearness to the village, nature of slopes and supernatural deviations. The selection of sites and method of cultivation influence the extent of soil erosion and productivity.

Performance of Rites

The Alukurumbas are called the priests of the earth. They act as the priests of the neighbouring community, namely, the Badagas and Irulas during the time of two important agricultural operations, namely, sowing and harvesting ceremonies. Performance of rites at the time of selecting land for cultivation, before clearing, sowing and harvesting are the important features of the cultivation. The religious rites and cultivation of shifting land is inextricably intertwined with the socio-economic and cultural life of the Alukurumbas.

Major Operations in Shifting Cultivation

Various activities are associated with the nexus of culture, social relations and religious beliefs. The cycle of operations of the shifting cultivation is marked by such activities as the selection of sites, slashing and burning, sowing, weeding, harvesting and finally fallowing.

Identifying Locations for Cultivation

When a new site is to be selected, it is called Hosathu madodu (new cultivation). The Mudali, Mannukara and elders go to the place selected temporarily on a Tuesday and perform puja beneath a select and large tree in the field and, after a few days of stay in that place, they decide and inaugurate the land clearing operations. On clearing, the tribe cultivates the land for two or three years. If it finds that the land is becoming increasingly unsuitable, then they change to a new location on the basis of the assessment of growth and yield of the previous crop.

Such a new field used to be once virgin land but due to forest regulations since independence, they have to go in for such land which have been cultivated previously at least once. Such land, however, is regarded as hosa bhoomi (new field). Due to the restrictions imposed by the forest regulations, the Alukurumbas in the 1970s and before, could not live at a single site for a longer duration than they required. New sites had to be selected by them at least once in three years and shifting of settlements took place, accordingly.

Slashing and Burning

The land clearing operation is called Holabetto (clearing of the land), which is inaugurated by the Mannukara (village priest) observing necessary rites. A boundary for the entire cultivation area is made usually coinciding with natural boundaries like the streams and valleys. The internal boundaries for the fields are selected by each family and marked by the Mudali, Mannukara and village elders. No fencing need be done. With the boundary formation, the Alukurumbas construct the watch tower in a few appropriate places to clear the plot and later to watch the crops during the day time and night. With the boundary formation and construction of watch towers, the Alukurumbas begin their operation of clearing the land which begins in the month of February/March. All the under bushes, small trees and lopped branches of trees are brought and kept as a few heaps of waste (kuppe). The heaps are allowed to dry at least for a month and, in late April, they are burnt. Since the forest fires are common during these months, they make a safety clearing around the outer boundaries of their habitat and also around their watch towers to prevent fire. Axe and knife are the main tools used for cutting operations and weeding hoe and digging hoe are used for the field preparation.

Soil Preparation

The ash settled on the surface of the soil is thoroughly mixed with the soil. Reamains of burnt woods are removed. This entire practice is locally called as **Karikatte seeru**, an important ritual in the cultivation. The soil is now prepared for sowing and the seed is then sown.

Table 3.6 and Chart 3.1 show the number of agricultural implements used by the Alukurumbas in the sample villages. After rains, the Alukurumbas mix ash with soil. They classify land based on the smell emanating from the land as virgin or low fertile land. Further, they assess the yield of that season also. The clearing of land is usually done by men and as soon as the soil is prepared, the women take responsiblity of the major operations such as sowing and weeding; again, the men will join them during the harvest. However, during the entire cycle, the children help the adults in carrying out different operations.

Sowing

Immediately after the rains, an auspicous day is fixed by the village Mudali and Mannukara for sowing the seeds. After the ritual, the Mannukara will sow the first

ceremonial seed in one of the fields and it is followed by others in their respective fields. Before the sowing operations, and at the time of the ritual, a handful of seeds of different crops is brought by each family and the Mannukara will mix all the seeds brought by the villagers. After the ritual, the Mannukara will give a handful of mixed seeds to the each of the households and in turn they will mix the seeds along with the bulk of the seeds kept in the house. Then, they will start sowing in their own fields.

Sowing operation is carried out by means of a gouging stick to make small holes and jowar seeds are dibbled in at a distance of at least 60 to 90 cm (2-3 feet) centered by their steps in the edges. Pulses like togare and sonaiavare are similarly put in the main field/edges. Pumpkin, a favourite vegetable they use during the religious feasts, is grown in plenty. The cultivated creepers are planted on the ash heaps (Kuppe). The other seeds like ragi, samai and navane are broadcast in the entire main field.

Weeding

When the millets sprout, weeding is done with the help of the weeding hoe. Special rites are performed to safeguard the crop from pest and disease. Weeding in the field is considered to be a hard job and is done at least twice during the crop. In a new field, the first year of cultivation will have less weeds. But during the second year, the field will have weeds which they could tolerate; then, weeding is done twice or thrice. During the third year, the field is considered to be the **anigal bhoomi** (infertile land), which has very low soil fertility. When there is an exuberance of weeds, they put up with them fully knowing that their labour is wasted on this account. No serious effort is made to remove weeds and hence the yield would be very little and cosequently a new site is selected for the next sowing operation.

Harvesting

In July and August, ragi, the main crop becomes ripe for harvesting. Before harvesting, a ritual called 'hosa ragi habba' (ragi harvesting festival) is conducted. Women take care of cutting the ears of the millet and bringing them to the barn ('tene kottige'), which is built by men. Men prepare a threshing ground in the field. Before threshing is done, a certain amount of millet ears are beaten and the grain is collected for performing the new ragi festival. The 'hosa ragi habba' is celebrated to appease the family deities (mane devaru) by the people. The millet is then threshed with sticks, winnowed and the grains separated. A sufficient quantity of grain is preserved as seeds for the next season. Storage is in baskets or earthen pots.

Fallowing

After raising crops for three years successively, it is believed that the field becomes unsuitable for cultivation. If they are cultivated, the yield goes on decreasing year by year due to the excessive growth of weeds and therefore such fields are to be vacated.

Table 3.7 shows the average year of holding for cultivation and the average fallow period. It is observed that the average period holding the land under cropping is 2.2 years and the fallow period is 2.4 years. The rainfall pattern, the elevation and slope percentage were also correlated to the cropping and fallow period. It is found that, wherever the slope percentage is less than 30 per cent, the cropping period was extended upto 3 years, for example, in Bhaviyoor and Banagudisholai villages.

In Pudukadu, even though the slope percentage is less than 30 per cent, the cropping period was only 2 years. This is mainly due to large areas available for shifting

cultivation. In general, the fallow period is between 2 and 3 years. It is also observed that both rainfall and the elevation have no significant relation with the fallow and cropping periods.

Rituals and Beliefs Related to Shifting Agriculture

The Alukurumbas attribute abundance of crops as well as crop failure to the moods of various gods and deities. The worship of `Bhooma Thai' (Mother Earth) is believed to ensure better crops. Her annoyance can cause damage. The human beings, believed to posses supernatural powers, also intervene in economic operation. For instance, the `Mannukara', the priest of the Alukurumbas decides on the auspicious day for sowing. Fowls / goats which they domesticate are offered, in sacrifice, to the deities. The two important agricultural rituals performed by the Alukurumbas are the sowing ceremony and the harvesting ceremony. Besides, they also have minor rituals during land clearing, pest and disease outbreak.

The `Mudali' and `Mannukara' are the two important leaders who organise, plan and implement agricultural activities of the village. More specifically, the Mannukara has a dominant role of performing various rituals in the presence of the Mudali, the Village Council and the villagers.

The important rituals are:

`Holabetto' - Land selection

`Kari katte seeru' - Land clearing and soil mixing

`Hola bitto' - sowing

`Hu archo' - ritual against pest and diseases

`Hosathu mado' - harvesting

Hola Betto (Land selection**)**

When a new site has to be selected, the elders go to the potential site, selected on an auspicious day, preferably on Tuesday, with a few household articles along with their family members and stay there for a couple of days. On the piece of land where they have to stay, a temporary hut (gudilu) is constructed. Dreams form the basis of final decisions. If any dead animal or fire or elephant is seen in the dream, it is a bad omen. Dreaming of water and honey is very auspicious. The dreams of elders living in the field are ultimately to decide whether or not the cultivation could be taken up in the selected site.

Kari Katte Seeru (Land Clearing and Soil Mixing)

When the field selection is over, the Mannukara will cut the first bush in the selected field, followed by the Mudali, elders, women and children. After cutting the bush and drying it, it is burnt. After a couple of days, when they get the first rains, they perform the ritual called `Kari katte seeru'. In this ritual, the Mannukara removes the unburnt/half burnt wood from the field, followed by the villagers. After the wood is removed from the field, they mix the ash with soil and wait for rains.

Hola Bitto (Sowing)

Before sowing, the people living in the tribal settlement observe a rite, for appeasing the earth goddess known as `Bhooma Thai'. The `Mannukara' performs a special puja in his house in the early morning and also offer the cooked millets to the gods. Then he, along with Mudali, Vandhari and Kuruthalai proceed to the field and by praying to the goddess of

earth, they sow the first seed, and broadcast the seeds in a small patch of few fields in the surrounding. After this, all members of the family start sowing/broadcast the seeds.

Hu Archo (Ritual to Arrest Pests and Diseases)

When the millets start sprouting in the field, weeding by the hoe is done. At this time, a special rite is performed by offering podded millet by the Mannukara, He sprinkles water all around the field in order to arrest the pest and attack of disease and this rite is known as 'Hu Archo'.

Hosathu Madodu (Harvest Ceremony)

The harvest ceremony is like the sowing ceremony where village Mannukara goes to the field in the early morning. After praying to God, he harvests a few strands of ragi from a few fields and brings them home. This is symbolic of bringing God to the house. At this time, it is important, that men, women and children should not come out of their houses. The `Mannukara' then prepares a dish out of ragi and offers it to the ancestors' spirit living around the fields by placing the cooked food over the roof of the house. Then the whole village goes for harvesting and a big festival called `hosa ragi habba' is celebrated by cooking new food, sharing it with others and dancing the whole day.

Reason for Shifting Cultivation

In the shifting cultivation system, the tribal families could produce their family requirements of food, cereals, vegetables, oilseeds and a few other crops. This system is in consonance with the concept of tribal self-sufficiency to which they have traditional preferences. Some of the major reasons for shifting cultivation are:

1. Alienation of land from the tribal to the non-tribals made the tribal people more insecure in the hill slopes as the exploiters cannot reach the inconvenient land plots on the difficult hill slopes.

2. Settled cultivation warrants high investment on fertilisers and labour. On the other hand, with the ashes of natural vegetation as manure and their own hard labour, they need to spend only a little for seeds in carrying on shifting cultivation.

3. Shifting cultivation provides work to all members of a tribal family. The children, women folk and old members of the family participate in the farming operations.
4. The tribals usually follow mixed cropping in the lands under shifting cultivation for meeting their different food requirements. This offers many advantages. Mixed cropping minimise the risk of complete crop failures due to vagaries of monsoon, insect and pest attack, which are common in the hill environment. The age old practice utilises the soil moisture in different layers of the soils which can be taken advantage of by divergent root systems of different crops and help in the recouping of soil fertility.

Extent of Coverage by Shifting Cultivation

Since the shifting land has to be left fallow for every 2 to 3 years, the land utilisation in the areas under shifting cultivation is studied and presented in table 3.8. Table 3.8 indicates that out of 90.69 ha (224 acres) of land available for shifting cultivation, 35 per cent of the land is utilised every year for cultivation. Out of the 10 sample villages, seven villages utilised one third of their cultivated area every year. In one village, Kinnakorai, cent per cent of the area was utilised every year. This is because of a very small area available in

that village. The crops grown under shifting cultivation is usually for home consumption and hence primary importance is given to the cultivation of food crops such as ragi and samai. However, a few respondents have earned some money out of the field crops.

Impacts of Shifting Cultivation

It has been observed that the land parcels selected for shifting cultivation do not contain valuable trees. Tribals generally select locations of forest growth whcih are less laborious to clean. If adequate care is taken to ensure cultivation with soil and water conservation measures, soil erosion can be reduced to a great extent. At present, the area under shifting cultivation in the Alukurumba sample households has considerably reduced from about 32 ha (79 acres) in 1965 to 5.67 ha (14 acres) in 1995. This is a drastic slide. This subsistence cropping is at its end. It is a crucial time to revive traditional subsistence cropping. Hence, any improvement in the methods of sedantary cultivation deserves more attention in the present level of tribal development, as food/subsistence security in the hills is increasingly being threatened. As shifting cultivation offers very little scope for economic upliftment, farming in the non-forested/cleared areas should be encouraged for subsistence in the villages where large tracts of land are available.

Measures for Scientific Cultivation

Most of the progressive tribal farmers are now fully aware that agricultural development in the hilly areas cannot be achieved without gradual shift from shifting to settled farming. It means that settled agriculture is not just introducing plantation and horticultural crops but also reviving the cultivation of millets and pulses for the tribal subsistence. The cultivable land of the sample settlements is mostly on steep slopes with the exception of a few villages where the land is on gentle and rolling slope areas and is suitable for crops such as the annual and plantation crops.

Soil and Water Conservation Measures

Appropriate soil and water conservation measures in the Nilgiris, especially on the steep slopes of the Alukurumba settlements, help in the preservation of the valuable top soils and reduce soil erosion. Various schemes by the Central/State Governments and NGOs could be implemented in these areas.

Watershed or Basin

Apart from general soil and water conservation measures in the cropped area, specific watersheds in the tribal hamlets should be identified. The programmes rationale in use in the watershed or basin should be developed in a suitable manner. It includes in its scope the following:

1. Provision of land to the people who are willing to give up cultivation on steep slopes. (For example, at Vellaricombai settlement, the state government has already initiated steps to allot alternate land for the tribal people of that village.

2. Planting of economic species useful to the tribal communities on steep slopes.

3. Establishing plantation crops, tea, coffee and species, in suitable areas with fruit as the inter-crop.

4. Utilisation of steep slopes, unfit for crop production or fruit farms, for timber production.

Role of Women in the Alukurumba Economy

Women play a crucial role in the Alukurumba economy. In the agricultural activities, women are engaged in seed preserving, sowing, weeding and harvesting operations. Besides, other subsidiary occupations of goat rearing and, in a few villages, broom making are carried on by women. They have to work hard for earning money to feed their families. Women save little money out of their hard work in their fields and by hiring their labour outside their homes and are responsible for providing food for the family.

Barter Economy

Barter economy enables the tribe to fulfil the requirements of different tribal groups. The barter economy had great scope during the early days and it is practised within different groups of the tribal people. The Alukurumbas also had economic interaction with the neighbouring people like the Irula, Kota, Toda and Badaga. They take their forest produce such as honey, incenses, bamboo, medicinal produce to the groups above and barter with them with grains, potatoes and other vegetables (from Badagas), agricultural implements and pots (from Kotas), ghee (from Toda). The situation has changed now and the traditional mode of exchange is disappearing almost. Table 3.9 shows the distribution of secondary occupations of the Alukurumbas. Their occupations include the physical labour, food gathering and honey collection. Under gathering, collection of tubers and roots for their subssitence, collection and sale of medicinal plants, leaves, barks, seeds and roots of different plants and other minor forest produce are included.

The Alukurumba Forest Economy

The Alukurumbas are originally the forest tribes and food gathering was one of their main occupations. During the 1960s and before, they have depended on forest produce for their life.

But with the rigourous deforestation of the Nilgiris jungle, the life of the Alukurumba has become harder. Once their families lived well on what they gathered in the forests and cultivated on their small fields. Of late, they have to give up more and more of their ancestral living space. To find sufficient jungle produce in the small forest too has become increasingly difficult. Under the circumstances, they are forced to work as wage labour on the plantations. They thrive on whatever little available as produced in the remaining forest area.

Collection of Minor Forest Produce

Among the food which is still being gathered, the most important are the tubers (roots of wild yams), leafy vegetables, fruits and mushrooms. They collect edible yams mainly during the summer months when no other food items are available. Digging sticks or crowbars are used to dig up long, winding root. The Alukurumbas never dig out the entire yam; instead, they leave the top portion of the root for regrowth during the next season. The following roots of wild yams (Dioscoreaceae) are eaten:

Dioscorea bulbipara (Bekkilugasu)

D.opposit folkia L (Nadugasu) D.PlantaphylllaL. (Nuregasu)

Apart from this, the following greens are also regularly used by the Alukurumbas:

Maradai soppu

Bejjal soppu

Gakai soppu

Seekai soppu

The seasonal fruits play an important role in the Alukurumba economy, esepcially those of the jack fruit, orange and guava. Majority of the Alukurumbas have their own trees in the forests and during the season they sell their fruits. Table 3.10 and Chart 3.2 show the number of fruit trees owned by the Alukurumbas, in different settlements.

Another important part of the Alukurmba diet, obtained by gathering, are various edible mushrooms. The most important mushroom varieties are:

1. Akki kunu - a very small variety of edible mushroom
2. Kadukun - a ear-shaped variety of edible mushroom
3. Kunu - a favourite edible mushroom growing in the rainy season in large quantity - thin leg, small umbrella like shape
4. Kondakunu - the most popular edible mushroom of the Alukurumba, white in colour, large sized, umbrella shaped and grown on stems of old trees

The other produce collected by the tribe is tamarind (Tamar indica L), soapnut (Sapindes trifaliatus L) for the agents. Nowadays, gathering represents only a minor activity among the Alukurumbas. Most produce collected is used by the Alukurmbas to meet their own requirements and only a small quantity goes for the agents or sold in the market or bartered with the neighbouring groups. Besides gathering, the Alukurumbas also practice small gaming; they set traps and snares and catch birds, hares, wild boars, mouse-deer, and barking-deer.

DEVELOPMENT OF INDIGENOUS MEDICINAL PLANTS

The knowledge of the valuable drugs has gone unnoticed, without any record or documentation because this knowledge is being dissipated by the illiterate "Medicine Men" belonging to various tribes, who are quite often exploited by the middlemen and their value is not recognised. The worth of these drugs cannot be belittled by the allopathic physicians of the country, because it includes the new area of science and technology that have failed to help the mankind; and nature has always given a solution. With this newly evinced interest, there is a revival of the traditional systems of medicine in India. To avoid the repetition of our earlier negligence and ignorance, a systematic documentation on the minute study of these plants is being done by the scientists and researchers.

The Tribal Medicine Men

The indigenous tribal people of the district have wide knowledge on the medicinal value of the plants available in the various parts of the district. The Todas Kodas, Kurumbas and Irulas do practice their traditional knowledge of medicine with their patients. The researcher put some effort in this direction to meet "the medicine men" (Maddukara) belonging to the Alukurumba community. Maddukaras quite often are the senior citizens of the village leading their community people. These local doctors do a marvelous job in making medicine, usually the naturally occurring plant material being their source of medicine. The 'knowledge information' relating to these medicines and traditional therapeutics is passed on usually from father to son. The village physicians were initially hesitant to reveal their knowledge. However, the researcher could be able to establish good rapport with these experts and learned about the identification of various plants and their uses in the treatment procedure.

The Indian System of Medicine

Of the three indigenous system of medicine, Ayurveda, the traditional unit system of medicine is based on vedic scriptures, is the one that is practised in all parts of the country (India). Siddha is extensively practised in the southern State of Tamil Nadu and a few places in the neighbouring states. Unani also known as the Greek/Arab system of medicine was brought into India by Muslim conquerors and has been practised for several hundred years, predominantly in areas of Muslim culture. The major resource for the traditional medicines also comes from nature, from the plant kingdom. Now, there is a world wide interest in scientifically validating the therapeutic efficacy of traditional medicines. There are inherent problems in scientific validation of clinically acclaimed effectiveness of plant products which are further accentuated by the lack of availability of suitable experimental and clinical models; however, that should not deter the development quest for searching for new drugs from the alternative systems of medicine.

The Pharmaceutical Industry

In India today, there are about 20 well recognised manufacturers of herbal drugs, 140 medium scale manufacturers, in addition thousands of Vaidyas have their own miniature manufacturing facilities. About 1,200 small licensed manufacturers in India are on record. There are about 1,650 herbal formulations in the Indian market, containing 540 major plants in them. All these formulations make use of one of the traditional systems of medicine, the Ayurveda, Siddha and Unani as the basis of their formulations. Besides, an understanding has come between the practitioners of modern medicine and the traditional practitioners, that, each while respecting their traditions, is "better off by working in combination rather than competition" and have a symbiotic existence leading to the development of a new medical model, "integrated medicine".

Medicinal Plants of the Nilgiris and its Economic Importance

The Nilgiris hills form a nexus of the Western Ghats where they attain their greatest elevation of 2,633 metres at Doddabetta peak. These hills lie in the tropics but have a varied climate owing to their altitude. The lower hills are tropical, the middle hills are sub-tropical while the higher hills are temperate. Owing to this, the nature has exploited the climate as well as the soil and thus harbours a wide variety of indigenous exotic grasses quite often are of medicinal value. Over 2,700 species of flowering plants, 160 species of fern and fern allies, countless types of flowerless plants, mosses, fungi, algae and land lichens are found in the sholas which are the evergreen forest of this district. No other hill station is said to have fostered so many of the exotic species as are found in the Nilgiris.

In view of this, there has been a great scope for horticulture, sericulture, dairy farming, pisciculture, apiculture (beekeeping) and of course silviculture and agriculture, adding a new dimension to the already existing values of the flora of the Nilgiris. The medicinal value of these plants have not been discovered suddenly now. The Cinchona plantations of this district had world wide reputation for the supply of quinine in controlling malaria and fever in the pre and post world war era. Due to the development of synthetic drugs from chemicals, as well as better profit by resorting to agriculture in the vast forest lands of this region, medicinal plants have been pushed behind from the scene.

However, with the interest being revived in the use of plants for their medicinal value and the unpredictability of climatic conditions and rain fall, poor return from agriculture, the people of this district once again show attention to the probable value of the medicinal plants of this region. With a sudden interest on the medicinal plants, there has

been an unplanned attempt in harvesting the medicinal flora of this region and use them for their commercial value; This practice would, in the long run, result in the depletion of these medicinal plants in the wild. Hence, it has become important now to identify the plants of medicinal value in this region, and then try to preserve their existence in the wild. Subsequently, based on the commercial value of some of these medicinal plants, the farmers may be encouraged to take to the medicinal plants farming, so as to maintain a continuous supply of the medicinal plants, without the risk of their becoming extinct.

A survey of indigenous folklore use of medicinal plants at the Alukurumba sample villages was conducted from September 1992 to June 1996 in different seasons, selected local inhabitants and tribal medicine-men were interviewed together. First hand information on ethno-botanical uses of plants were noted. These tribal village heads were taken to the forests as guide-cum-informant for collection of various specimens for identification. The plants have been preserved as exsiccate in the herbarium of the survey of medicinal plants and collection unit, in Udhagamandalam.

Having collected 240 different medicinal plants from the field, enumeration of 162 plants alone has been presented because the full details regarding the local names, Tamil names, parts used, elevation of location and folk use are available only for that many. The details of 162 indigenous medicinal plants and its folk use is given in the Appendix 3.1. The Alukurumbas use various parts of the plants: roots, stems, barks, gums, leaves, fruits, seeds and flowers for medicinal purposes, It is also noticed that the same plant is used for a number of diseases in different ways. The traditional uses of various plants for various purposes have been recorded here.

The various plants are used for both common and chronic ailments like boils, blisters, ulcers, bone fractures, blood purifier, cough, cold, asthma, bronchitis, cuts, wounds, burns, deafness, cooling effect, epilepsy, malaria fever, body ache, tooth and gum ache, skin diseases, mother and child health care, impotency, anti-fertility, abortion, menstrual disorders, venereal diseases and snake bites. While some of the plants listed in the Appendix 3.1 either have already shown commercial and industrial possibilities or most of them have great scope for further work and expansion, no systematic study to document and validate the same is presently available.

CLIFF HONEY HUNTING AMONG THE ALUKURUMBAS

Throughout history and in all regions, honey hunting has been a specilised occupation of certain tribal communities or families, remaining an enigma to the rest of the population. This stands true even today. Modern bee keeping is based on a scientific knowledge of the structure, life history, habits and habitats of bees and it began with the invention of the artificial beehive in 1789. Traditional methods involve primitive honey hunting or making suitable nesting areas from local materials. Traditional honey hunters are highly skilled and their activity has evolved over a long period to suit local resources and local bees.

The Rock Bee (Apis dorsata fabricius)

It gets its name from its habit of nesting beneath overhanging rocks. It is also known as the Giant Bee and is a tropical species found throughout Southeast Asia and the Indian Subcontinent. Rock paintings from Singanpur, India, which are more than 2,400 years old, show hunters collecting honey from a nest of Apis dorsata. This bee is till today the source of a substantial part of the honey used in Southeast Asia. Apis dorsata is the largest, known social bee. It builds a single comb nest, from bees wax, attached to a high branch in trees, or

under a overhanging rock and sometimes under the ceilings of large buildings. Nesting place, built in the open but protected from rain and direct sun during summer and with abundant sources of nectar and pollen in the surroundings areas, are preferred. Aggregation of upto 10-50 colonies in one cliff are found in good areas.

The upper part of the beehive can store anywhere between 2 to 40 kg of honey. Pollen and brood are stored in the lower part. Worker bees cover the comb as a curtain for protection and to maintain optimum temperature. A strong colony can have 60,000 to 100,000 worker bees. Apis dorsata colonies are known to be vigorous, vicious and swift to attack intruders. Colonies migrate over large distances to areas with abudant nectar flows in different seasons. Attempt to domesticate Apis dorsata has failed. These bees are valuable pollinators with a foraging range of several kilometres.

Honey and Hunting: Legend and Perspectives

Since time immemorial, honey hunting is an activity that has been associated with the tribes of India. Folklore, superstitions and legends surround this activity and make this traditional activity a unique and, in some cases, a dangerous effort to harvest honey. Even though, thousands of years have passed since this activity was probably first invented and performed, till today, remnants of the strict traditions, reverence and associated rituals are followed in many parts of South India. Honey hunting is a means or a set of activities to raid the bee combs though (especially in the case of Apis dorsata) it may often result in the destruction of the colony. The activity is dangerous when it involves harvesting an Apis dorsata colony. Ropes, forest vines, ladders and pegs are used to reach inaccessible areas, usually under rock cliffs or in tall trees to harvest combs of honey. It is much simpler and safer to harvest combs of other bees. The Apis dorsata colonies are a major source of honey and bee wax. The honey hunters smoke the bees, cut the combs, squeeze the honey and melt the combs for bees wax.

Importance of Honey Hunting

Honey as a natural product and, as an income generating option, has been associated closely with tribal honey hunting with their traditional bee songs and ascetic practices prior to the hunting day is an eye opener. The activity is intrinsic to their life style. The income earned, production levels and better technology is a secondary matter for most of them. Honey hunting is a lucrative activity due to the large quantities of honey available at one time. On an average, a full grown Apis dorsata colony yield 10-15 kg of honey in these areas. The honey hunters who are unorganised face a variety of hazards in their work and yet get low returns. Though the price of honey in the urban market ranges from Rs. 75 kg to Rs. 120 kg the price paid to the honey hunters varies from Rs. 15/kg to Rs. 50/kg only. In some areas, where there is a demand for honey from tourists or private people, the honey hunters have a chance to get higher returns.

Tribal Honey Hunting Practices of the Alukurumbas

A range of different techniques, traditions, beliefs and supersititions exist among tribals in the hills. Some communities are engaged in this activity as part of their norms and customs, while others look upon it as an economic activity. However, to the tribes honey hunting is an essential part of life. It is made ineresting by its sheer thrill and risks (Figure 3.1). It is one which is valid for most of the tribals in the state. The difference in technique and skill will be reflected in the analysis to follow. The analysis largely deals with Alukurumbas honey hunting. This analysis holistically attempts to discuss the issues facing the honey hunters today.

Cliff honey collections have been associated with tribal cultures from time immemorial and even today this assumes particular importance among the Alukurumbas of the Nilgiri hills are still adopting the indigenous practices. The Alukurumbas hunt for honey in the season from mid-April onwards to mid July, when the family (both husband and wife) goes to look for hives. Once located, they put a mark as an indication to the other hunters that it is reserved by them. Nobody takes honey from such and already indentified/marked hives, which are identified through the chanting of mantras.

A date is set for harvesting the honey. Twelve days prior to the set date, the honey hunter goes on fast - praying and bathing regularly. He contacts his brother-in-law and another trusted person and goes for hunting the comb. The wife or any other woman should not be seen while going for honey hunting. On the day of harvesting, the hunter does not eat anything, least of all, anything non-vegetarian. He does not talk but is all the time chanting mantras and invoking God to keep him safe. While he climbs the ladder, he sings the bee songs in praise of the bees.

The brother-in-law (The brother-in-law occupies a vital position as the maximum trust is placed in him to guard the ladder of the honey hunter. This is based on the belief that if any harm befalls the hunter, his sister will become a widow. This practice is very common and important among the many tribal practices.) of the honey hunter holds the rope from the top of the cliff when the man swings/climbs down on the rope ladder, made of vines, that is, of creepers from the forest. This ladder is prepared during the day time and the honey is harvested in the evening (dusk). The main equipments used are a forest vine rope ladder, knife, smoking by leaves and bamboo baskets and sticks to collect the comb. They cut the brood part first and it falls off. Only the brood with the young comb is eaten. The rest of the comb is collected in tins and the honey is squeezed out by hand but only once the hunters get back to the village. It is sometimes filtered through cloth. The first honey is tasted by the priest of the village. The rest is shared between all villagers and partly sold to knwon people. The rock bee colony builds a single comb measuring about 0.5 m to 1.0 m from side to side and 0.3 m to 0.6 m from top to bottom.

The comb is suspended from huge rocks. Honey comb consists of hexagonal cells. These bees collect large quantities of honey and the ripe honey is sealed in the combs. The bees begin work early in the mornings and stops late in the evenings. They store surplus honey in the comb which is harvested once or twice during the season by tribal honey gatherers. The rock bees have a ferocious temperament and attacks people who troubles them. The bees have strings at the top of the abdomen. When we disturb, the bees drive their victim over long distance. But they are, however, sensitive to smoke and only through this way the bees can be successfully managed and driven away.

Only professional honey gatherers are able to handle the bees without danger. The men are suspendend hundreds of metres from the top of the clif. The ladder is made of wild jungle climbers which are immensely strong and are very light weight. Some branches of trees are used to smoke away the bees. Then pungent smell of the smoke has a kind of paralysing effect on the bees and prevents them from stinging. The Alukurumbas are experts in rock honey collection. It is the custom that the honey collectors have to undergo some important rituals before they go for collection as already disscussed, the men who harvest

honey should prepare themselves by abstaining from certain routines for 7 days. After reaching the rock they have to complete the preparatory work at the bottom of the rock. These important accessories are made for the honey collection.

* A huge ladder 800-1000 m made up of wild climbers
* A jungle plant locally called 'Suttai Kodi; which can produce much smoke, the smell of which make the rock bee temporarily unconscious.
* Parai Koodai - a basket ismade out of this climber, which is used to collect honey from the comb.

A section of the people will move towards the top of the rock with the ladder. From the top of the hill, a ladder is sent down, the top end of the ladder is tried to a big tree. Two of them from the top, come near to the rock bees through the ladder. The first harvested honey is kept under the tree and a special puja is performed to the tree God. Smoke is sent from the bottom of the rock towards the bee colonies. The honey is harvested and sent to the bottom through a basket (Parai Koodai) where honey is filled. The collected honey is taken to the village and a portion of the honey is shared by the villagers. The balance of honey is distributed among the honey collectors which is then sold commercially. Thus, honey is the most important substance in the life of the Alukurumbas who live in the forest areas of the Nilgiris hills. More than 5,000 kg of honey is being collected by them from more than 60 sources in the rocky areas which are called 'bare' and each bare is allotted to a particular village. Honey is the principal means of the rituals and social communications and exchange. Each man has a close association with the bee colonies, who says that the bees recognise the body smell of the tribe and will not sting him when he comes for the honey. They also follow the bees in seasonal migration as they swarm from one part of the forest to another. The Alukurumbas have a unique honey culture where it is the most valued item as milk is to the pastrolists.

Bee Colonies (Bare is a dialectical word meaning 'rock').There are more then 60 rock cliffs where the quality honey is harvested and sold in the areas given below (Table 3.11).

Summary

This chapter has dealt mainly with the stages of economy of the Alukurumbas, in different periods of development. They have had a shift in their economic organisation, from traditional economy to wage economy (1965-75) to

age economy (1975-85) and to the present plantation economy (1985-95). Their traditional economy has included shifting cultivation, livestock rearing, hunting and gathering, especially gathering of non-timber products from the forests. Their wage economy has centred around the agricultural labour which is cash earners as wages. The third phase of plantation agriculture has developed due to settled agriculture of the tribes and the new interventionist approaches of the government and private agencies of development. In this face, new crops such as tea and coffee have been introduced to the small holder tribal farmers in the region.

The chapter has extensively dealt with different techniques of Alukurumbas, in their shifting cultivation, from the steps of selection of land site for cultivation, land preparation by slashing and burning, sowing, weeding, harvesting and fallowing besides different rituals and beliefs related to shifting cultivation. The other economic activity of collection of tubers, roots and wild yams, leafy vegetables and fruits and mushrooms has been given thorough treatment in this study with illustrative photographs. The significant 'tribal medicine' used as the 'indigenous medicine' in terms of medicinal and herbal plants has been discussed threadbare with details of folk use. The list of plants has included as many as 162 indigenous plants by the Alukurumbas. It has been seen as a rare treasure of great utility of the tribal culture and tribal economy.The hunting for honey among the cliffs by the tribe has been given a special focus because the activity represents a certain cultural value and tribal practice, unifying the community, or at least those involved in the activity, in the execution of it.

Indigenous farming systems, practices and knowledge: some examples

Already in early colonial times, perceptive observers commended the intricate and careful cultivation methods of 'native' inhabitants (see Box 3.2). Classic studies of Asian and African agriculture were made in the 1940s and 1950s, e.g. de Schlippe (1956), Conklin (1957), Allan (1965). A growing number of publications are now appearing about indigenous knowledge systems and the farming systems based upon them (e.g. Brokensha et al. 1980, Biggs & Clay 1981, Rhoades 1984, Richards 1985, Marten 1986, Wilken 1987, Warren et al. 1989, Dupre 1990), which reveal their complexity and sophistication in dealing with environmental hazards.

The following examples of indigenous practices illustrate how well farmers in the tropics learned to manipulate and derive advantage from local resources and natural processes, applying the principles of agroecology without knowing that this term exists. The principles of agroecology as discerned by scientists will be presented in Part II of this book, but first let us take a look at some of the practical applications evolved by farmers through a process of informal research and development.

Examples of indigenous land-use systems

Forest gardens. In many parts of the humid tropics, indigenous systems of forest gardening (silvihorticulture) have been developed. For example, village agroforests have existed in Java since at least the 10th century and comprise today 15-50% of the total cultivated village land. They represent permanent types of land use which provide a wide range of products with a high food value (e.g. fruits, vegetables, meat, eggs) and other products, such as firewood, timber and medicines. In their small plots, often less than 0.1 ha, Javanese peasants mix a large number of different plant species. Within one village, up to 250

different species of diverse biological types may be grown: annual herbs, perennial herbaceous plants, climbing vines, creeping plants, shrubs and trees ranging from 10 to 35 m in height.

Livestock form an important component of this agroforestry system - particularly poultry, but also sheep freely grazing or fenced in sheds and fed with forage gathered from the vegetation. The animals have an important role in nutrient recycling. Also fish ponds are common and the fish are fed with animal and human wastes.

Natural processes of cycling water and organic matter are maintained; dead leaves and twigs are left to decompose, keeping a continual litter layer and humus through which nutrients are recycled. Compost, fishpond mud and green manures are commonly used on cropland. These forms of recycling are sufficient to maintain soil fertility without the use of chemical fertilisers. Villagers regulate or modify the functioning and dynamics of each plant and animal within the system (Michon et al. 1983).

Shifting cultivation. All over the world, shifting cultivation, also called swidden agriculture, has been and still is practised to manage soil fertility. Shifting cultivation involves an alternation between crops and long-term forest fallow. In a typical sequence, forest is cut and burnt to clear the land and provide ash as 'fertiliser' or 'lime' for the soil. Crop yields are typically high for the first few years but then fall on account of declining soil fertility or invasion of weeds or pests. The fields are then abandoned and the farmer clears another piece of forest. The abandoned field is left to fallow for several years or decades and thus has a chance to rebuild fertility before the farmer returns to it to start the process again.

Shifting cultivation is often characterised by a season-to-season progression of different crops which differ in soil nutrient requirements and susceptibility to weeds and pests. For example, the Hanunoo in the Philippines plant rice and maize the first year after clearing, then root crops such as sweet potatoes, yams and cassava, and finally bananas, abaca (*Musa textilis*), bamboo and fruits (Conklin 1957).

Shifting cultivation practices throughout the world vary immensely, but there are basically two types of systems:

- **Partial systems**, which evolve out of predominantly economic interests of the producers, e.g. in some kind of cash crop, resettlement and squatter agriculture.
- **Integral systems**, which stem from a more traditional, year-round, community-wide and largely self-contained way of life.

Provided that the population pressure does not exceed the carrying capacity of the area at that level of technology, integral systems of shifting cultivation present a good equilibrium between humans and their environment.

Transhumant pastoralism. Where livestock are kept in regions with large seasonal differences in precipitation and temperature, a rational low-external-input management form is to move the livestock with the season. American ranchers use winter and summer pastures; shepherds in European mountain areas use alpine and valley pastures; African pastoralists use wet-season and dry-season pastures. Traditionally, pastoral peoples, such as the Fulani in West Africa, keep their livestock in more arid areas during the wet season, where forage quality is relatively high (Breman & de Wit 1983). In the dry season, when water becomes scarce in the north, they move their animals further south to more humid areas, where the livestock can graze the crop residues in harvested fields and the still-green grass in low-lying areas along streams and rivers. These herds are important sources of manure for arable farming. However, this system of resource use was disturbed by the drawing of national boundaries, the setting up of wildlife reserves and commercial ranches

(usually in the best grazing areas), and the expansion of cash cropping as well as subsistence cropping to support rapidly growing populations. Especially, the cultivation of low-lying areas with crops, such as rice, is depriving transhumant pastoralists of vital dry-season grazing areas for their herds.

Integrated agriculture - aquaculture. Particularly in Asia, the productive use of land and water resources has been integrated in traditional farming systems. Farmers have transformed wetlands into ponds separated by cultivable ridges. An outstanding example is the dike-pond system which has existed for centuries in South China. To produce or maintain the ponds, soil is dug out and used to build or repair the dikes around it. Before being filled with river water and rainwater, the pond is prepared for fish rearing by clearing, sanitising and fertilising with local inputs of quicklime, tea-seed cake and organic manure. The fish stocked in the pond include various types of carp, which are harvested for home consumption and sale. Mulberry is planted on the dikes, fertilised with pond mud and irrigated by hand with nutrient-rich pond water. Mulberry leaves are fed to silkworms; the branches are used as stakes to support climbing vegetables and as fuelwood. In sheds, silkworms are reared for yarn production. Their excrements, mixed with the remains of mulberry leaves, are used as fish feed. Sugarcane plants on the dikes provide sugar, young leaves are used to feed to fish and pigs, and old leaves to shade crops, for roofing thatch and for fuel; the roots are also used as fuel. Grass and vegetables are also grown on the dikes to provide food for the fish and the family. Pigs are raised mainly to provide manure but also for meat. They are fed sugarcane tops, byproducts from sugar refining, aquatic plants and other vegetable wastes. Their faeces and urine, as well as human excrement and household wastes, form the principle organic inputs into the fish pond (Ruddle & Zhong 1988).

Soil fertility management practices

Indigenous farmers have developed various techniques to improve or maintain soil fertility. For example, farmers in Southern Sudan and Zaire noticed that the sites of termite mounds are particularly good for growing sorghum and cowpea (de Schlippe 1956). Farmers in Zaachilla, Mexico, use ant refuse to fertilise high-value crops such as tomatoes, chili and onions (Wilken 1987).

In Senegal, the indigenous agrosilvopastoral system takes advantage of the multiple benefits provided by *Faidherbia* (formerly *Acacia*) *albida*. The tree sheds its leaves at the onset of the wet season, permitting enough light to penetrate for the growth of sorghum and millet, yet still providing enough shade to reduce the effects of intense heat. In the dry season, the tree's long tap roots draw nutrients from beyond the reach of other plants; the nutrients are stored in the fruits and leaves. The tree also fixes nitrogen from the air, thus enriching the soil and improving crop yields (see Table 3.1). In the wet season, the fallen leaves provide mulch that enriches the topsoil, as well as highly nutritious forage. The soil is also enriched by the dung of livestock which feed on the F. *albida* leaves and the residues of the cereal crops. These benefits are extremely important in places where few alternatives exist for improving soil fertility, crop yields and animal nutrition (OTA 1988).

Pest management practices

Traditional practices of biological pest control have recently been the subject of increasing scientific interest, and some interesting examples have been documented. For example, a century-old practice among citrus growers in China is to place nests of the predacious ant (*Oecophylla smaragdini* F.) in orange trees to reduce insect damage. The citrus growers even install interconnecting bamboo rods as bridges for the ants to move from tree to tree

(Doutt 1964). Ducks, fish, frogs and snakes are traditionally used to control insects in paddy rice cultivation. Traditional crop selection, planting times and cultivation practices often reflect efforts to minimise insect damage (Altieri 1987, Thurston 1990).
In innumerable traditional systems, living and hiding places for natural enemies of crop pests are maintained by conserving part of the natural environment. In Sri Lanka, large trees and wooded upland were traditionally left standing around the paddy tract and threshing floors to provide nesting and resting places for birds, which the farmers regard as the main agents of insect control. When pests appeared, certain rituals were performed. For example, when caterpillars invaded the paddy, an offering of food and light was placed at sunset on an unstable plantain disk fitted to a stake. The light attracted birds. When the birds attempted to perch, the food fell. When the birds went after the fallen food, they saw the caterpillars and ate them (Upawansa 1989).

Weed management practices

Farmers in the Usambara Mountains in Tanzania developed a multistorey farming system in which they practised fallowing, intercropping and selective weeding. Young crops do not provide ground cover. The farmers understood that, if weeds are left to grow, they cover the soil, prevent it from heating up or drying out excessively, induce a positive competition which stimulates crop growth, and reduce erosion during rainfall. Later in the season, when the farmers regarded weed competition as negative for crop growth, they did superficial hoeing. They left the weeds on the soil surface as protective mulch, to recycle nutrients and to allow nitrogen assimilation through the bacteria decomposing the plants. The crops could then develop fully. A second generation of weeds was allowed to cover the field completely and produce seed, so as to ensure their reproduction in future seasons. When the dry season started, the field was covered with high weeds. The soil remained moist, soft and rich in humus and was thus in good condition for the next growing season. However, the introduction of the principle of weedfree fields led to the collapse of this system of weed-tolerant cropping, so that fertiliser became necessary to replace the green-manuring effect of selective weeding (Egger 1987).

Genetic resource management

Traditional agriculture is characterised by its great diversity of genetic resources. Many LEIA farmers are highly skilled in managing this diversity so as to ensure sustainable farming systems. For example, farmers in East Java, Indonesia, deliberately make use of different soybean varieties to ensure a supply of fresh seed.
About 70% of soybean production in East Java comes from dry-season cropping on wetland after rice, while the remaining 30% is produced on dryland during the wet season (Soegito & Siemonsma 1985). Most farmers use local soybean varieties which they generally call 'local 29', referring to variety No. 29, which was introduced from Taiwan to Indonesia in 1924. This variety was maintained at Indonesian research institutes but was not multiplied and distributed after its initial introduction at farm level. The farmers' local varieties have small, green-yellow seeds and mature in about 90-100 days, like No. 29. However, the variation found among farmers' varieties in terms of time to reach maturity and yield levels indicates that 60 years of intensive cultivation has led to the development of many distinct local varieties.

The farmers have difficulties in storing soybean seed so as to maintain its viability for more than about 6 weeks. To obtain good germination and establishment of soybean after wet-

season rice, they need access to fresh seed. To achieve this they developed a system called JABAL (Jalinan Arus Benih Antar Lapang), which literally means 'seed flow between fields' (Figure 3.1). Certain villages have specialised in soybean growing on dryland during the wet season. Yields are lower than those of dry-season soybean, but farmers can get a 50% higher price for their wet-season crop.

Not only the local crop varieties but also the numerous local breeds of livestock testify to the skills of traditional livestock-keepers to manage genetic resources. Local breeds are partially a result of natural selection, but they are also a result of deliberate selection for specific traits, above all, for the type of animal that can survive and produce under LEIA conditions. The supposedly 'irrational' marketing behaviour of many livestock-keepers reflects their selection strategies. Animals that are diseased, are weak or have poor mothering qualities are sold; those with proven disease and drought resistance are retained. The animals are also selected to fit into the farming system. For example, in pastoral systems, animals not amenable to herding are culled. Transhumant pastoralists select for animals that can walk long distances. An older animal that knows the route well and keeps the herd going steadily on its way will be kept. Generations of natural and deliberate selection have resulted in local breeds with a high degree of disease resistance or tolerance and capable of subsisting on seasonally scarce and lowquality feed resources (Bayer 1989).

Microclimate management practices

Local climate plays a dominant role in the lives and fortunes of farmers everywhere. Farmers in the tropics have developed several ways of influencing microclimate so as to improve the conditions under which crops and animals can grow. The effects of frost (in tropical highlands), hail, strong wind, extremely dry air and daily peak temperatures on plants and animals can be very great, and buffering these may make the difference between a yield and a complete loss.

Farmers influence microclimate by retaining and planting trees, which reduce temperature, wind velocity, evaporation and direct exposure to sunlight, and intercept hail and rain. They apply mulches of groundcovering plants or straw to reduce radiation and heat levels on newly planted surfaces, inhibit moisture losses and absorb the kinetic energy of falling rain and hail (see Box 3.3). When night frost is expected, some farmers burn straw or other waste materials to generate heat and produce smog, which traps outgoing radiation. The raised planting beds, mounds and ridges often found in traditional systems serve to control soil temperatures and to reduce waterlogging by improving drainage. Also natural dew is manipulated and exploited (Wilken 1987, Stigter 1987a). An ingenious system of microclimate manipulation by Indian horticulturists is described in Box 3.4.

Local classifications of soil and land use

Most indigenous farmers can quickly identify major soil types and properties according to characteristics such as colour and texture. Farmers' assessment of soil properties often goes beyond the inherent fertility to include an assessment of workability and response to amendments. Also economic and geological factors, e.g. distance to the village, slope, water-holding capacity, presence of rocks and irrigation water, may be taken into account. Examples of such sophisticated classification systems in Mexico and Guatemala are given by Wilken (1987).

Eger (1989) describes a system of land-use classification in Burkina Faso based on local farmers' knowledge. He compared the effectiveness of land-use classification on the basis of aerial surveys and laboratory analysis of soil samples with a classification on the basis of local knowledge, and concluded that farmers' knowledge is far superior to the outsiders' assessment of soil qualities for certain crops.

Farmers often know the soil properties in the wider area, and may deliberately use these differences in soil properties to make optimal use of the available resources and to spread risks (see Box 3.5).

Many other examples of effective indigenous farming practices have been described, e.g. related to risk minimisation strategies (Eldin & Milleville 1989), slope management (Wilken 1987, Mountjoy & Gliessman 1988, Rhoades 1988), water management (Pacey & Cullis 1986, Reij 1990, Ubels 1990) and pastoral resource management and animal health care (Mathias-Mundy & McCorkle 1989, Niamir 1990).