Part 3

Participatory Forest Management: Implications for Policy and Human Resources' Development in the Tibetan Autonomous Region

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1 General Introduction to the Tibetan Autonomous Region

1.1 Location

The Tibet Autonomous Region (AR) lies in the southwest of China, between 26°50' and 36°53'N and 78°25' and 99°06' E. It has a total land area of 1.2284 million sq.km., approximately one eighth of the total land area of China. Most of Tibet lies at high altitudes and the topography is complex. The lowest point, in Maito County in the south-east, is only a few hundred metres above sea level. The highest point is on Mount Qomolangma (also known as Mt. Everest), the highest mountain in the world (8848.13 masl), which lies on the border between Tibet and Nepal. The average elevation of Tibet is slightly more than 4,000 masl.

Tibet is a part of the Qingzhang plateau, the so-called "Roof of the World" It is 2,000 km long from East to West, and 1,000 km wide from south to north. It has borders with Myanmar, India, Bhutan, Sikkim, Nepal, and Kashmir in the south-east and south; Xinjian Autonomous Region and Qinghai Province of China in the north; and the Sichuan and Yunnan Provinces of China in the east.

1.2 Geography and Vegetation

The Qingzhang plateau is the youngest plateau in the world. It is high in the north-west (with an average elevation of 5,000 masl) and low in the south-east (with an average elevation of 4,000 masl). There are many mountains, rivers, and lakes, together with remnant plateau. Most of the plateau is covered by west to east mountain ranges. The major mountain systems are the Hindu-Kush Himalayas, the Gandisi-Nianqingtanggula mountains, the Kelakuanlun-Tangula mountains, and the Kunlun mountains.

The Hindu-Kush Himalayas lie at the southern edge of the Qingzhang plateau and are 2,400 km long and 200-300 km wide with an average elevation of 6,000 masl. These huge mountains act as barriers against the flow of cold winds from the north and also stop the flow of the south-west monsoon from reaching the plateau. The mountains are natural boundaries for vegetation distribution. Rainfall on the southern aspects of the Himalayas is plentiful and supports the development of rich virgin forests. However, the northern slopes of the mountains lie in a rain-shadow area and here there is only shrub-meadow desert.

The Hengduan mountains lie in the south-eastern part of Tibet and are one of the few north-south running mountain ranges in China. They consist of parallel rows of mountains with deep valleys in between. The mountain peaks lie between 4,000 and 5,000 masl, but the valley bottoms lie below 1,500 masl. Rich forests grow on the southern aspect of the mountains as a result of the low elevation of the valleys and the influence of the Indian Ocean Temperature Flow. The climate in the middle range of the mountains is very dry, because of the influence of the *foehn* wind from the valley, and the vegetation consists of special shrubs adapted to the hot dry conditions. The precipitation and relative humidity increase gradually with increasing elevation.

Dark conifer trees like *Picea* and *Abies* start to grow above 3,000 masl.

The Tibetan plateau is a major watershed for tributaries of big rivers like the Yangtze, Langchan, and Yalu Tsangpo rivers as well as for many Indian rivers. The Yalu Tsangpo River is the biggest river in Tibet with wide valleys in the upper reaches, medium-sized valleys in the middle reaches, and mountainous country in the lower reaches. The inner rivers are located in the north of the Tibetan plateau with small watersheds draining into the basin.

The forests in Tibet are mainly distributed in the middle and lower reaches of the Yalu Tsangpo River and in the Niyangqu watershed. The main areas suitable for afforestation are the upper reaches of the Yalu Tsangpo, Nianchuhe, and Lashahe rivers.

As a result of the variable topography and climatic conditions, the Tibetan AR has a diversity of vegetation zones. The main vegetation types are, from south-east to north-west, subtropical forest, high-altitude hygropium, high-altitude steppe, and high-altitude desert. The southern areas contain tropical monsoon forests, evergreen broad-leaved forests, mixed forests, deciduous broad-leaved forests, dark conifer forests, semi high-altitude brush hygropium, high-altitude hygropium, and high-altitude scattered cushion vegetation occur.

1.3 Current Administrative Divisions and Social Status

Tibet contains one municipality (Lhasa), six prefectures (Rikaze, Shannan, Changdu, Linzhi, Naqu, and Ali), 74 counties (cities at county level, regions, and administrations), more than 950 townships (towns, administrations, and farmlands), and 7,410 villages (Tables 1 and 2).

Tibet has a low population compared to other Chinese provinces. In 1952, the population was 1.15 million, and it has now risen to more than 2.4 million. The population is increasing at a rate of 17.8 per cent per year, five per cent more than in China as a whole. The major nationality in Tibet is Zhang. This group form 95 per cent of the total population and Han a further 3.5 per cent. Other nationalities include Hui, Luoba, Menba, Naxi, Xiaerba, and Den. The population is distributed unevenly. It is mainly concentrated along the Yalu Tsangpo, Lashahe; Nimong, and Niyangquhe rivers. A few groups live along the Nujiang and Langchanjiang rivers, and a very few live in the west and north of the region.

1.4 Socioeconomic Status

In Tibet, 86 per cent of the total population depends on farming and animal husbandry. Before 1952, the economy was based on ag-

Table 1: **Administrative Structure**

Prefecture (city)	No. of counties	No. of townships		No. of villages	Remarks
		Townships	Towns		
Lhasa city	8	86	5	762	Excluding 6 township administrative offices and 5 farm lands
Linzhi	7	59	2	603	Nature reserve and farm lands included into number of township
Changdu	11	159	9	1604	
Shannan	12	144	2	899	Excluding 6 farm lands
Rikaze	18	205	10	1715	Excluding 2 administrative offices, 2 farm lands, and 1 breeding station
Naqu	11	143	2	1487	3 farm lands included in number of township
Ali	7	105	1	340	
Total	74	901	31	7410	

Table 2: **Names of County Level Areas Managed by the Prefectures (City)**	
Prefecture (city)	**Names of counties**
Lashashan	Chengguan region, Mozhugongka, Dazi, Duilongdeqing, Qushui, Nimu, Dangxiong, Linzhou
Linzhi	Linzhi, Milin, Langxian, Gongbujiangda, Yalu Tsangpo River, Chayu, Motuo
Changdu	Zuogong, Mangkang, Luolong, Bianba, Changdu, Jiangda, Gongjue, Leiwuqi, Dingqing, Chaya, Bashu
Shannan	Naidong, Zhaguo, Gongga, Sangmu, Qiongjie, Luozha, Jiacha, Longzi, Qusong, Cuomei, Cuona, Langkazi
Rikaze	Rikaze city, Nanmulin, Xietongmen, Jiangzi, Dingri, Shajia, Lazi, Anren (Beilang, Renshi, Kangma, Dingjie, Shenba, Yadong, Jilong, Nielamu, Shaga, Gangba)
Naqu	Shenzha, Bange, Naqu, Nierong, Anduo, Jiali, Baqing, Biru and Suoxian counties, Wenbu and Shuanghu administrative offices
Ali	Pulan, Zhada, Heer, Rishang, Geji, Gaize, Cuole.

riculture, animal husbandry, and a few handicraft industries. After four decades of democratic reforms, Tibet has made remarkable achievements through the efforts of the local people, and the support of the central government and neighbouring provinces. The Tibetan economy now includes agriculture, animal husbandry, industry, transportation, and post and finance sectors. Because the gross national product (GNP) is increasing yearly, the living conditions of the local population have also improved. Even so, there are still 320,000 people in Tibet living below the poverty line.

2 Forest Resources and Development

2.1 Forest Resources

2.1.1 Overview

Tibet has a total forest area of 7,170,000 ha, making it the fifth largest province in terms of forest area area in China, and a standing stock volume of 2.084 billion cu. m., the largest in China. Forest coverage is only 9.84 per cent, however, ranking 22nd in China.

Virgin natural forests account for 99 per cent of the total forest. Timber forest represents 81.33 per cent of the standing tree area and 82.82 per cent of the standing stock volume.

Approximately 37 per cent of near mature, mature, and over-mature timber forest (43.76 per cent of stock volume) is accessible. The rich forest resources supply timber, fuelwood, bamboo, medicinal herbs, and other forest products needed for the establishment and development of Tibet and the subsistence of the local population. The forests also play an important role in the protection and improvement of the ecological environment of the plateau and surrounding areas.

Tibet has more than 6,000 species of higher plants, most of which are found in the forests. They include 5,800 species of seed plants, belonging to 1,258 genera in 208 families. There are 1,500 species of arboroid plants, belonging to 363 genera in 110 families; some 50 species of gymnosperms, belonging to 16 genera in eight families; about 15 species of pine that are generally only found in Tibet; more than 40 rare and valuable plants that have been listed as national protected species; and over 1,000 types of medicinal herbs.

Forest products are used as raw materials for the production of a number of products such as perfumes and oils. They also provide many subsistence products like fodder, and edible and medicinal mushrooms like *Hydmum erinaceus*. The forests are rich in wildlife resources. Tibet is home to 488 species of birds (42% of the species found in China), 142 species of mammals (32% of the total in China), 55 species of reptiles, 45 species of amphibia, 48 species of fresh water fish, and more than 2,300 species of insects. There are some rare and valuable animals including *Presbytis* spp., *Hemitragus jemlahicus*, *Moschus himalayan*, and *Naemorhedus cranbrooki*. A total of 125 species of animals are listed as protected species.

2.1.2 Characteristics

As a result of the variation in altitude, edaphic characteristics, and climatic conditions, Tibet has many different types of forests.

Six zones can be distinguished from the lower to the higher altitudes: the tropical zone, upland subtropical zone, upland temperate zone, upland moist zone, semi high-altitude boreal zone, and the high-altitude cold zone. The forests found in these zones are tropical rain forest, monsoon rain forest, subtropical evergreen broad-leaved forest, deciduous broad-leaved forest, temperate *Pinus spp.* forest, *Cupressus spp.* and *Quercus spp.* for-

est, evergreen deciduous and broad-leaved mixed forest, temperate deciduous and broad-leaved forest, *Pinus* spp forest, *Cupressus* spp forest, *Quercus* spp and *Larix* forest, semi high-altitude dark conifer forest, and *Sabina* forest.

The precise forest community varies. For example, *Abies* spp forest includes *Abies georgei*, *Abies yunnanensis*, *Abies spectabilis*, *Abies delavayi*, *Abies densa*, *Abies delavayi*, *Abies ernestii*, and *Abies squamata; Picea* spp forest includes *Picea likiangensis var. linzhienisis*, *Picea likiangensis var. balfourianna*, *Picea spinulasa* and *Picea smithiana;* and *Pinus* spp forest includes *Pinus densata*, *Pinus armandi*, *Pinus griffithii*, *Pinus roxburghii*, and *Pinus yunnanensis*. There are many different types of *Larix*, *Cupressus*, *Sabina*, *Quercus*, *Populus*, and *Betula* forests as well.

As a result of the variation in climate and temperature, the forests are distributed unevenly. Most forests are found in the eastern part of the Himalayan, Nianqingtanggula, and Huanduan mountain ranges. Small areas of forest are also found in the southern part of the region, the south-western part of the Himalayas towards the valley of the Yalu Tsangpo River, and in some western and northern areas. Most plantations are located in the middle of the Yalu Tsangpo River Valley and the Lashahe and Nianchuhe watersheds. The steppe and deserts are found in the western and north-western areas of Tibet.

Forests are found in all the prefectures (and the city) with the exception of Ali, which only has areas of rangeland and shrub. The most highly forested prefectures are Linzhi and Changdu. Thirty of the 74 counties have significant forest resources (Table 3)

2.2 Role of Forests and Forestry in Tibet

Forestry plays a key role in the regional economic development of the Autonomous Region. Forestry was first established formally when the Autonomous Region was founded about 30 years ago. Since then, an independent and modern system of forestry management and related industries has developed, including the introduction of modern methods of silviculture, protection, management, and rational exploitation.

2.2.1 The Forest Administration

The Forestry Department is responsible for implementation of forest policy, silviculture, forest maintenance, surveys of resources, and design of macro-management plans for rational exploitation of the forest resources. Forestry Bureau with various sections have been set up in all prefectures or cities, with the exception of Ali. Forestry Bureau and forest stations have been set up in forested and other appropriate counties

The Forest Department has a large number of forest staff which includes 110 technicians and 580 forest rangers. More than 30 wood monitoring stations have been established with more than 100 staff.

2.2.2 Forest Management

In the past, Tibetan forests were managed by different Departments, and this led to illegal logging and severe forest degradation from the 1960s to the beginning of the 1970s. After the mid 1970s, the Forestry Department was given sole authority for forest management. At present, there is a system of good organization and efficient policy and management with par-

Table 3: **Forest Resources in Tibet's Counties**

Prefecture	Tibet	Linzhi	Changdu	Shannan	Rikaze	Naqu	Ali
No. of counties	74	7	11	12	19	11	7
Counties with forest	30	7	11	4	5	3	0
Percentage of counties with forest	40	100	100	34	26	27	0

ticipation by the local population. This has been effective in protecting forest resources and ensuring reasonable utilisation. The benefits from forestry have also been shared among the local people.

In order to strengthen the management of forest resources in Tibet, the state and autonomous region have carried out inventories of forest resources, vegetation, land, and wildlife many times since 1951. The major inventories and surveys are listed below.

- Forest survey of parts of eastern and southern Tibet
- Forest investigation of south-eastern Tibet
- Integrated science survey of the Yalu Tsangpo river watershed
- Integrated survey of the Mount Qomolangma region of Tibet
- Forest resources and forest production survey of south-east Tibet
- Forest inventory of the whole of Tibet AR
- Continuous forest inventories, by setting up an inventory system for Tibet
- Forest management inventory of a part of the Tibetan forest
- Forest cutting blank renewal inventory of the entire Tibet AR
- Forest division of the whole Tibet AR
- Site condition survey of suitable land for forest
- Forest development planning for the Yalu Tsangpo River, Nianchuhe and Lashahe watershed areas
- Desertification control treatment planning for the Yalu Tsangpo River, Nianchuhe and Lashahe watershed areas
- Cutting area survey and design
- Afforestation design

Tibet has a distinct dry season during which the dryness and strong winds facilitate the spread of forest fires. These forest fires are very difficult to extinguish because of the lack of manpower and the difficult terrain. Forest fire control has been given more attention by the government and by various levels of the forestry department, and some success in fire control has been achieved through the participation of local people.

Thirteen nature reserves have been established in Tibet in order to protect the natural scenery, vegetation types, biodiversity, and rare and valuable wildlife and plants. Of these, two have been upgraded to national protection areas. The total protected area is 325,330 sq.km., about 26.5 per cent of Tibet's land area.

2.2.3 Greening of the City by Plantation

Before the democratic reforms in Tibet, there were only a few horticultural and green areas. Since the 1960s, greening of the city has been promoted extensively. Tibetan cities have become greener and more beautiful through planting activities undertaken by local institutions, communities, the army, and local people. Tibet City has a total green area of about 670 ha with a greening rate of 17.1 per cent, the public greening area is 159 ha. This effort has been awarded many times by the appropriate national institutes.

Afforestation activities in forest areas were started in the early 1950s. There have been three main phases, each with varying degrees of local participation.

- The period from 1959 to 1968. In this starting phase, small afforestation activities were implemented, with cuttings used as the major plantation method. The focal areas for plantation were the front of farmhouses and some city areas. The major species used included *Populus spinulasa, Populus alba*, and willow.
- The first phase for preliminary development (1969 to 1986). Afforestation was carried out with exotic high-yielding and fast growing species on river banks and bare lands The dominant species used were Beijing poplar and other poplar species.
- The second phase for rapid development (1987 to 1998). Large-scale afforestation was carried out based on appropriate planning, adapting imported exotic species and planting them in combination with indigenous species, and using shrubs and grasses in different forest categories. Planting activities have continued in the spring,

autumn, and rainy seasons using both seedlings and seeds.

Large-scale afforestation on suitable land has been important for the improvement of the ecological environment. Plantations have acted as wind shelters, controlled floods, and improved agricultural yields, as well as supplying local populations with fuelwood and fodder.

2.2.4 Forest Industry

Forest industry in Tibet AR started in the 1960s. At present there are 30 state enterprises employing more than 3,000 people. Forest-based industries, such as log and fuelwood production, wood processing industries, resin production, and medicinal herb exploitation, contribute about 10 per cent of the gross output volume of agriculture and industry and about eight per cent of the GNP in the whole region. Rich forests are valuable resources for local populations to overcome poverty and to obtain prosperity.

In the mid 1980s, parts of the state-owned forest were allocated to communities or villages for management, with the ownership retained by the state. Collective forest farms were established in some counties. At present, there are more than 20 such collective enterprises and thus many farmers benefitting from the scheme.

The development of forest industry not only contributes a great deal to the regional economy, it has also contributed to the development of qualified local people.

2.2.5 Economic Forests

Economic forest is the name given to plantations of fruit trees, oil-bearing trees, and tea bushes. Apple trees were introduced to Lhasa in 1956. The success of apples in Lhasa was instrumental in promoting the development of horticulture in Tibet. Nowadays, there are more than 400 fruit orchards in the region (including apples, peaches, pears, and oranges), producing six million kg of fruit annually.

Tea was successfully cultivated in Tibet in 1956. Since the 1970s, 2,100 *mu* of land has been brought under tea cultivation. The annual output of tea exceeds 120,000 kg per annum and includes 20 types of green, flower, and brick-shipped tea (brick-shipped tea is slighly fermented tea).

The local species of oil-bearing trees are walnut and Chinese pepper. Walnut is the most important tree in terms of economic benefits, and plantations of exotic and native species of walnut have been increased. More than 80,000 walnut trees have been planted and the annual output of walnuts is now one million kg. Moreover, 180,000 Chinese pepper and 120,000 *Aleuriles fordii* have also been planted.

2.2.6 Forestry Education and Research

Before 1974, forest professional staff were mainly trained and supplied by other provincial institutions. A forestry faculty was established in the Tibet Agriculture and Animal Husbandry Institute in 1977 to train high-level forestry professional technicians. In the three decades since its establishment, more than 600 professional staff have been trained by the Institute and more than 400 persons have attended training courses in various fields related to forestry. The Agriculture and Animal Husbandry School, established in 1974, introduced courses in forestry for middle level forest technicians in 1983.

In the last three decades, forestry research in Tibet has seen remarkable achievements. As a result, the Tibetan Autonomous Regional and Linzhi Prefecture Forest Institutes were established with more than 100 research scientists.

3 Forest Policy

Tibetan forests are an important part of the forests in China. The Chinese national decrees and rules related to forests are thus applicable to the Tibet AR. Some further local regulations have also been formulated appropriate to the local conditions.

3.1 China's Policy, Decrees, and Regulations Relating to Forest Management

China's national policies, decrees, and regulations are formulated by the National People's Congress (NPC), the State Council, and the Ministry under the State Council involved with policy formulation. The local People's Congress is responsible, together with the local government and forestry department, for the formulation of regional or local policies, decrees, and regulations.

3.1.1 National Policies, Decrees and Regulations

The decrees and regulations currently enforced in Tibet include major laws and regulations for criminal violations and public security such as the Criminal Laws and the Public Security Management and Punishment Provisions of the People's Republic of China. Forest policies and decrees include various laws such as the Forest Laws and the Forest Protection Provisions. The Administrative Procedural Laws of the People's Republic of China cover comprehensive policies and decrees. The major national laws and regulations relating to forest management are described in the Beijing report.

3.1.2 Local Policies, Decrees and Regulations

The formulation of Tibetan policies and regulations is based on the practical requirements for the rational exploitation and protection of forests, wild animals, and plant resources. The Tibetan Autonomous Region Forest Protection Provisions and Eight Provisions for Forest Protection and Fire Control are the major local decrees and regulations relating to forest management.

3.2 Current Local Forest Policies

The development of Tibetan forest policies can be separated into three phases: the forest start-up phase, the forest rehabilitation and development phase, and the rapid forest development phase. The forest policies formulated during these different phases were based on the social and economic conditions during these periods.

3.2.1 Forest Policies during the Forest Start-up Phase 1960-1976

Policies relevant to forest protection, harvesting, afforestation, and greening were formulated by the local government in 1961 after the democratic reforms in Tibet, and in accordance with national forest development. These policies stressed that state-owned forest should first be protected, and then rational cutting and exploitation implemented. Regeneration and afforestation, combined with tending, were promoted at the same time. If a farmer planted a

tree on his own land, the tree and forest products belonged to the farmer.

Forestry suffered serious ravages under the Cultural Revolution after 1966. Unreasonable resource management, illegal cutting, and several forest fires were the major causes for the destruction of forests at this time.

Measures like planned cutting, supply, and allocation and only cutting in certain places were then adopted. The state was given sole control over all such activities, in particular the state-owned forest farms and local government cutting yards. Forest fire control activities were also promoted.

3.2.2 Forest Policies during the Forest Rehabilitation and Development Phase: 1977 to 1984

In 1977, the Chinese economy started to improve, especially following the opening up and reform of the economic system in 1979. At the same time, the condition of the forests also started to improve. Forest policies continued to stress suitable measures for forest protection, planned cutting, and supply. Further refinements were introduced in the Eight Provisions for Forest Protection and Fire Control.

All institutions involved in forest product harvesting that were not managed by the Forest Department were closed in 1979. All state-owned forest resources (including forest enterprises) in the Tibetan region were brought under the management of the Forest Department. Log and sawn timber were supplied by the Forest Department, and producers were not allowed to market the products themselves. In 1977, the forest policy was changed so that afforestation was to be organized mainly by the collectives with support from the state and individuals.

3.2.3 Rapid Forestry Development Phase: 1985 to the Present

The formulation and implementation of the Forest Law of the People's Republic of China in 1984/5 marked a new period of development. Starting in 1985, the policies for forest resource management encouraged the involvement of local communities and individual households. Measures were introduced so that parts of state-owned forests could be allocated to a community or a village for management, though the ownership still belonged to the state.

The Tentative Regulation for Forest Policy, which changed restrictions on protection responsibility areas and management responsibility areas for communities and individual households, was formulated by the Autonomous Regional People's Government in 1985. Local people living in protection responsibility areas were given permission to market fuelwood, charcoal, thinning wood, raw wood materials, and bamboo products; to hunt (non-protected animals); to collect and weave products; and to produce sawn timber according to the national plan. The regulation also stressed that poorer communities and households should be paid more attention by the local government and forestry department.

Later, forest policies were further changed to motivate voluntary cooperation by local communities in planting trees or grass on bare lands and wetlands. People were allowed to own the trees they planted and their children had the right to inherit the use of the land. State-owned forest land could be contracted to individual households or managed by an association of households. All income generated could be taken by the contractors. In 1994, the forest policies in Tibet were changed to further encourage and support local people to utilise barren lands. Anyone who managed such lands was allowed to retain the products or other benefits obtained from the land, and the land use right could be inherited or transferred.

In order to meet the demands of the market economy, wood allocation and price setting were removed in 1993 and management rights were given to enterprises. Enterprises were allowed to produce in accordance with market needs and the prices of products were allowed to fluctuate in line with market conditions. In order to avoid illegal cutting and forest damage, production of wood was still managed on

the basis of an indicative plan. Two certificates, a Cutting Certificate and a Transportation Certificate, had to be verified.

A policy was also formulated to attract foreign investment, technology, and qualified personnel for mutual benefit and to achieve rational exploitation of forest resources and comprehensive use of wood, to organize scientific surveys and design, to develop private nurseries and fruit orchards, and to coordinate with projects supported by foreign organizations. In 1994, in order to protect the environment and to increase the income of the local population, provisions for the utilisation of forest products, such as wild edible mushrooms and herbal medicine, were included in the policy.

3.3 Efficiency of Forest Policy

Implementation of the above-mentioned national and local policies, decrees, and regulations has played a positive role in the protection and utilisation of the Tibetan forest, wild animal, and plant resources; has brought about improvements in the environment; and has helped in the development of society. Specifically, they have helped in the management of forest and other resources, strengthened forest security, and helped in the punishment of all illegal activities causing damage to forest resources.

Forest fire control has been strengthened by the implementation of elaborated rules for fire control at various levels. Two hundred and seventy fire control organizations and joint groups between local people and the army have been established. These organizations now have about 1,000 professional and part-time staff. Public awareness of the need for fire control has increased. Statistics show that the annual incidence of forest fires, and the area damaged were reduced by 57 per cent and 88.3 per cent respectively in the period of the Seventh Five Year Plan (1986-90) compared to that of the Sixth Five Year Plan (1981-85).

Use of artificial reforestation to promote natural regeneration and mountain closure activities have been carried out in a total area of more than two million *mu*.

The forest products available from forests have diversified from straightforward wood products to include fuelwood, bamboo products, logs, herbal medicines, edible mushrooms, and weaving products. Increased production of forest products has substantially increased the total income of the local population through the rational exploitation of resources. Tentative estimates show that the local people living near forest areas have increased their annual income by over 40 million *yuan*, more than 100 *yuan* per capita, through commercial timber production. They also generated over 20 million *yuan* through the collection and marketing of herbal medicines and wild edible mushrooms. These gains have increased the enthusiasm of the local people for forest resource protection.

The enthusiasm of the local people for reforestation has also increased. Plantations have benefitted the ecology and economy and have supplied timber and firewood to the local population, thereby reducing damage to the natural forests. For example, 440,000 plants, or 2,200 plants per person, have been planted in villages in Rikaze county. The plantations now supply sufficient fuelwood for the people of this county. A forest zone 75 m wide and 1,500 m long has been planted to control strong winds.

In the past there was no forest in Bianxiong township in Rikaze county, and the area was very windy. The output of grain per *mu* per harvest was about 100 kg. An 11 km protection forest system was established, which decreased wind speeds over an area of 509 *mu*. A 22,000 m band of forest has protected a reservoir and conserved 85,000 *mu* of paddy fields. The output of grain has increased by more than 400 kg per *mu*. A local farmer who has been planting trees for the last 10 years now obtains an annual income of over 3,000 *yuan* from timber from his 40 *mu* plantation.

In recent years the utilisation of Tibetan forest resources has been characterised by increasing investment, adoption of new technologies,

and involvement of qualified people from inside and outside the region. Various wood processing enterprises, including a floorboard factory, pulp mill, furniture factory, and sawn timber factory, have been started. Utilisation of other forest vegetation and edible mushroom resources has also started and the economic benefits gained from them have increased.

4 Social Forestry

The situation of social forestry and development of human resources are gradually improving in Tibet. However, as a result of the heterogeneous distribution of forest resources, local people have different levels of awareness about, and interest in, forests. These necessitate different approaches to the promotion of social forestry and human resource development.

4.1 Government Participation in Forest Resource Management

Before the democratic reforms, most forest resources in Tibet suffered from serious neglect, forest fires, and illegal cutting. There were no plantation activities and only a few monasteries and courtyards of upper-class nobles were planted with scattered trees by their slaves under *corvee* labour. Since the democratic reforms were introduced, the central and regional governments have paid more attention to the forest resources.

A forest management bureau was set up under the Tibetan Agriculture and Animal Husbandry Department in September 1965 in order to develop the forest resources as a basis for industry and local economic development and to overcome local poverty. This was the first forest management organization in Tibet. The organization was responsible for forest resource development and management. Later, after much restructuring, the Tibet Forestry Department was established and its functions defined more clearly. Forest management systems have also been set up at the prefecture, county, and township levels.

The forest resources of Tibet belong to the state, thus the government plays a key role in forest resource management. In the last three decades, the forest resources have been developed through government management. At the same time the government has contributed much to improving the local economy and the living standards of the local people, in order to enhance protection of forest resources. The major activities and changes are listed below.

- Local forest policies, decrees, and regulations have been formulated and elaborated to implement the policies, decrees, and regulations of the central government, taking into account the social and economic conditions in Tibet and the demands of the local population.
- The status of Tibetan forest resources has been improved with the assistance of the central government and relevant local institutions.
- Investment in activities like forest fire control, wildlife protection, and forest management has increased.
- People from all walks of life have been involved in the reforestation of barren lands and in establishing a forest conservation system.
- Policies and concepts for forest resources' exploitation have been formulated according to the rules of a planning economy and management carried out based on the market economy.
- A large investment has been made in forestry education to enhance the training of

forest professional staff in forestry and research.

4.2 Social Forestry for Forest Resource Management

Forest resource management should depend on support from all sides of society, not only from the government. This point has been given due attention by the Tibetan government from the very beginning.

4.2.1 The Formulation of Forest Policies, Decrees, and Regulations for Social Forestry

National and local forest policies and regulations are formulated by the NPC and at various levels of government. The representatives in the PC represent all sides of society including workers, farmers, intellectuals, researchers, technicians, and businesspersons.. Many women and minorities are involved. All proposals, suggestions, and demands on forestry are collected by the PC representatives and various levels of government and presented to the autonomous Standing Committee of the National People's Congress (SCNPC) and the autonomous people's government for reference and scrutiny. Emphasis is placed on a high level of participation by all sides of society in policy-making for forestry development.

4.2.2 Social Forestry in the Utilisation of Forest Resources

Under the previous planned economy system, exploitation of forest resources was strictly controlled by the state. Local people living adjacent to forest areas could use products like fuelwood, wild edible mushrooms, and fruits for subsistence, but they had few, if any, forest products for marketing. Thus, they were not interested in managing the forest resources.

After the introduction of a market economy in China in the mid-1980s, local communities in Tibet have been involved in the management of the state-owned forest resources and given permission to market forest products. In this way local people have started to benefit directly from the exploitation of forest resources. In 1993, the total income of the local population from forestry reached 43 million *yuan*, or 100 *yuan* per capita.

Poor villages and individual households in forest areas have been given more support by the local government. For example, Mr. Buqiong's household (three men and four women) in Cayu County in Linzhi Prefecture was a relatively poor household with an annual income in 1994 of 400 *yuan*. After being helped by the local government, they earned a net income of more than 2,000 *yuan* from cutting and marketing of 15 cu.m. of timber, and more than 2,500 *yuan* from collection of other forest products by the four women in their forest responsibility areas. As Mr. Buqiong said: "With the development of economic reform, our life is getting better and better, based on the good policies formulated by the government. Now we are getting more and more benefit from the forest. We very much appreciate the fact that we are supported a lot by the government at various levels. I planted Chinese pepper on over 10 *mu* of land by myself this year, and I trust that our living standard will improve even further."

Awareness of the proper utilisation of forest resources has improved as a result of the changes in forest policies, and the local people have benefitted. It is becoming increasingly important to attract surplus labour in forest areas, especially to encourage women's participation in the collection and marketing of forest resources such as wild edible mushrooms and herbs for herbal medicines.

With further adjustments in forest policies, the thrust has now moved towards the processing of forest resources. Many enterprises have been set up, by both collectives and individual households, that include extensive processing such as Zhang style furniture and bamboo weaving. At the same time investment from inside and outside Tibet is contributing to the increasing exploitation of forest resources and the development of the economy in forest areas.

4.2.3 *Social Forestry in Forest Resource Management and Protection*

Forest resource management and protection is an activity that involves all strata of society. With the development of multiple management activities in forest areas, the likelihood of forest resources being damaged has also increased. Policies and regulations, such as the Forest Laws, Forest Fire Control Provisions, Forest Protection Provisions, and Wildlife Protection Laws, have been disseminated in order to raise public awareness about the importance of forest protection and forest fire control.

In order to ensure the security of forest resources, the forest ranger group (a special group of farmers) has been restructured and strengthened in key forested counties. The terms of reference of the forest rangers have been defined clearly and responsibilities assigned to collective forest farms and individuals to raise public awareness of forest protection.

4.2.4 *Social Forestry for Afforestation*

Massive reafforestation campaigns have been undertaken in the three decades since the introduction of democratic reforms. In 1997, afforestation was implemented by collectives, together with the state and individuals, on the principle that whoever plants a tree, owns it.

Afforestation activities are being planned on barren lands and wetlands in the agricultural area along the Yalu Tsangpo River and the Nianchuhe and Lashahe watersheds, using government investment. Local residents will be involved in the afforestation activities. In smaller areas and scattered open lands and wetlands, afforestation activities will be carried out on the basis of the voluntary cooperation of local residents through the association of administrative natural villages, the association of households, and contracted afforestation and management by individual households. A "Forest and Wood Ownership Certificate" will be granted to the owners of the forest.

There is a scarcity of forest products like firewood in the agricultural areas of the Yalu Tsangpo River, and Nianchuhe and Lashahe watersheds because these areas have no forests. The local population are now very interested in the afforestation programme because of the new policies. The residents of Zhongzi Township, situated in the north of the Nianchuhe watershed, have planted trees on 4,000 *mu* of land (1.6 *mu* per capita). Over 300,000 plants (127 plants per capita) have been planted here since 1979. Grass has also been planted on a further 4,700 *mu* of land (2 *mu* per capita). Since the trees grew, the residents have been harvesting 25 tonnes of fuelwood annually. Furthermore, the plantations have protected the agricultural land, supplied fodder for livestock, promoted the development of animal husbandry, and improved the environment.

Afforestation actions involving various members of society, such as the "Cadre Plantation", "Youth Plantation", " Women Plantation" and "Joint Effort Plantation of the Army and the People", have become very popular in Tibet. Large areas of open lands and wetlands have been planted in this way.

4.3 Contributions from Outside Tibet

Over the past three decades, several hundred forestry technicians have been trained for Tibet by different forestry colleges. A number of interdisciplinary researchers involved in research and the Tibetan forest resources' survey have contributed much to forest development in Tibet. Members of the Ministry of Forestry, Chinese Science Academy, Chinese Science and Forest Academy, Southwest Forestry College, Beijing Forestry College, Central South Forestry College, and Central South Forest Reconnaissance Institute have been involved in forestry development in Tibet for a long time. Many enterprises from different provinces in China have also been involved in the utilisation of forest resources in Tibet and are contributing to the economic development of Tibet and its forests.