Mountain Farming Systems

ICIMOD

MFS Case Study
Series No. 00/3

Land Policies, Land Management and Land Degradation in the Hindu Kush-Himalayas

China Study Report

Cai Yunlong
Zhang Jian-ling
Zhu Xia

International Centre for Integrated
Mountain Development
Kathmandu, Nepal
2000

Land Policies, Land Management and Land Degradation in the Hindu Kush-Himalayas

China Study Report

Cai Yunlong
Zhang Jian-ling
Zhu Xia

International Centre for Integrated Mountain Development (ICIMOD)
Kathmandu, Nepal
2000

ISSN 1561 - 8676

Published by
International Centre for Integrated Mountain Development
G.P.O. Box 3226,
Kathmandu, Nepal

Editorial Team
Greta Mary Rana (Senior Editor)
A. Beatrice Murray (Editor)
Sushil Man Joshi (Technical Support and Design)

Typesetting at
ICIMOD Publications' Unit

Preface

The Mountain Farming Systems' Division of ICIMOD, with support from the Global Mountain Programme, initiated a comparative study on the effect of land policies on land management and degradation in six regional countries–Bangladesh, Bhutan, China, India, Nepal, and Pakistan–sharing the Hindu Kush-Himalayan mountain range. One study was commissioned in each country. The exception to this was India where two studies, one in the north-west and one in the north-east, were conducted to capture the diversity and size of the Indian Himalayas. Each of the country studies was carried out by a team of experts from biological as well as socioeconomic disciplines.

The study was based on a concept paper developed by Professor Piers Blaikie in association with ICIMOD staff. The Team Leaders of the country studies came to ICIMOD in May 1997 to discuss the concept paper and agree on the methodology and operational aspects of the project. Each of the studies was to investigate four sectoral policies, e.g., Agriculture, Forestry, Wildlife and National Parks, and Tenure and Property Rights. In addition, each study looked at the national and or provincial environmental policy and its implementation. The idea was to investigate thoroughly all the sectoral policies and their impact on land management. Each of the studies also chose one particular issue of interest for the country or area that had a significant impact on land management. The study period was between June and October 1997 and final reports were presented in a workshop at ICIMOD in early November. Subsequently, the reports were revised for publication.

We believe that, by publishing these studies, ICIMOD will facilitate an important contribution for a wider audience, in the Hindu Kush-Himalayan region and beyond, who will benefit from the detailed information and analysis of this very important topic.

ICIMOD would like to acknowledge the contribution of Professor Piers M. Blaikie, of the University of East Anglia, U.K., in the design and implementation of this study. From within the Centre, Professor Blaikie was assisted by Dr. Syed Zahir Sadeque, Social Scientist, ICIMOD, and Dr.Tej Partap, Head, Mountain Farming Systems and Coordinator of the Global Mountain Programme at ICIMOD. In addition, a multidisciplinary advisory team of ICIMOD professionals, namely, Dr M.Banskota, Dr N.S.Jodha, and Dr T.S.Papola, provided valuable inputs during the study.

Tej Partap

Syed Zahir Sadeque

Abstract

This report is a part result of the research project: Land Policies, Land Management and Land Degradation in the Hindu-Kush-Himalayas. The report is mainly concerned with the land degradation and its relation, through land use and land management, with land relevant policies; these include environmental policy, agricultural policy, land policy, forestry policy, natural reserve policy, and population policy; in the Chinese Himalayas. Luquan Yi and Miao Nationalities' Autonomous County, located in Western Yunnan is selected as a study case. Shangyan village in this county has been studied in particular by using an anthropological approach. As a background and context, the policy process and land degradation status at national and provincial levels are also investigated.

The process of land degradation can be regarded as the comprehensive result of mutual interaction between the physical process and human activities. In developing countries, land degradation and poverty are closely linked. Land degradation is not only an environmental issue, but also a social issue. The most urgent problem in regions in which there are areas of degraded land, is securing resources for basic living. Thus degraded land should be reconstructed (not just rehabilitated) so as to have a high and stable yield and ensure grain supplies and basic needs. Reconstruction is a man-made alteration that accelerated the development of the landscape to bring about balance. The process of reconstruction requires large-scale social investment to bring about rapid change in degraded lands. In order to escape the spiral of impoverishment-degradation, it is necessary for local people and leaders to be innovative and for government to transform institutions and policy.

Acronyms

CEPASC	Chinese Environment Protection Agency of the State Council
CRSLO	Contracted Responsibility System Linked to the Output System
DLSO	Detailed Land Survey Office
EIA	environmental impact assessment
EPCSC	Environmental Protection Committee of the State Council
FMO	forest management organisation
FMS	forest management staff
GDP	gross domestic product
HKH	Hindu Kush-Himalayan
ICIMOD	International Centre for Integrated Mountain Development
LAB	Land Administration Bureau
LABT	Land Administration Bureau of the Tibet Autonomous Region (TAR)
LABY	Land Administration Bureau of Yunnan Province
LEP	Law on Environmental Protection
LEPPRC	Law on Environmental Protection of the People's Republic of China
LLA	Law on Land Administration
LLAPRC	Law on Land Administration of the People's Republic of China
LMR	Law on Mineral Resources
LPCAP	Law on Prevention and Control of Air Pollution
LPCWP	Law on Prevention and Control of Water Pollution
NPC	National People's Congress
PPFF	Provision on Protection of Fundamental Farmland
PCFFYP	Provision on Conservation of Fundamental Farmland in Yunnan Province
PRC	The People's Republic of China
SACC	Socialist Agricultural Cooperative Community
SCNPC	Standing Committee of the National People's Congress
SCYPPC	Standing Committee of Yunnan Province People's Congress
SPC	State Planning Commission
SSTC	State Science and Technology Commission
TAR	Tibet Autonomous Region
VTE	village and township enterprises
YPG	Yunnan Provincial Government

Contents

Chapter 1
Introduction

1.1 Land Resources and Land Use

China has a land area of 9.6 million sq.km., the composition of which is shown in Table 1.1. Currently usable land accounts for 80.2 per cent of the total land area, i.e., 7.7 million sq.km. The population of China exceeds 1.2 billion, giving an average population density of 156 persons per sq.km.

Table 1.1: Composition of China's Land Resources

Type of land resource	Area ('000 km^2)	Percentage of total
Total	9600	100.0
Cropland*	1267	13.2
Economic forest land	34	0.3
General forest land	1214	12.6
Natural grassland	2856	29.8
Sparse wood and shrub land	447	4.7
Wasteland suitable for afforestation	779	8.1
Sand desert and Gobi (rock desert)	1160	12.1
Slightly rocky mountains	430	4.5
Tundra	150	1.6
Permanent snow alpine area	50	0.5
Marshland	110	1.1
Coastal beach	13	0.1
Inland waters	270	2.8
Urban, industrial and transportation land	670	7.0
Others	150	1.6

* About 67,000 sq.km. within the cropland area are unsuitable for cultivation and should be returned to forest or grassland.

Sources: Institute of Geography (1983); Wang Xianjin (1988)

The large population is in the process of urbanisation, and economic development is rapid. The amount of many land types is insufficient for needs. Conflicts between construction land, cropland, woodland, and pasture, and productive activities, environmental protection, and conservation of biological diversity are conspicuous.

Arable land accounts for 13.2 per cent of the total land area, i.e., 126.7 million ha, which is 0.105 ha per capita. In the period 1957–86, construction, desertification, and soil erosion reduced cropland by 40.7 million ha. In the same period, 25.1 million ha of wasteland were reclaimed. The net result was a decrease of 15.6 million ha of cropland, or an average of 538,000 ha per year. If this decline continues, croplands will decrease by 7.5 million ha to 119.2 million ha by 2000 when the population will reach 1.26 billion. Cropland will then average 0.094 ha per capita. In fact, the trend may be more pronounced because undeveloped arable land has been almost exhausted, and rarely is it possible to reduce growth of construction land and natural destruction of cropland.

There are not enough macro measures for adjustment and controlled land use. In particular, laws, regulations, and policies for land-use adjustment do not take into account needs brought about by economic reform and market development. In addition, land management at the micro-level is not faultless. Inevitably this leads to land degradation.

1.2 Land Degradation

In China, degraded lands are widespread. Economic loss caused by ecological deterioration and land degradation is great, directly influencing sustainable development of the society, economy and environment. Land degradation falls mainly into the following categories.

- Desertification

Desert and deserted land area amount to 153.3 million ha, 15.9 per cent of the total land area. The direct economic loss caused by wind erosion and desertification amounts to 4.5 billion *yuan*[1] per year. Deserted land has increased by more than 100,000 sq.km. since 1949. Cultivated land area influenced by desertification amounts to 10 million ha, accounting for 7.9 per cent of total cultivated land.

- Soil erosion

Soil erosion has either destroyed or seriously impaired about 1.63 million sq.km., 17 per cent of the total land area, compared with 1.16 million sq.km. at the beginning of the 1950s. Eroded cropland amounts to 44.5 million ha, 35.1 per cent of total cultivated land. In the Loess Plateau, the cradle of ancient Chinese civilisation, soil erosion affects 43 million ha, about 82 per cent of its total area. The flow of topsoil into the Yellow River has been vividly called a 'massive haemorrhage of the main artery of China'. The area of 'inferior land' and 'red desert' caused by serious soil erosion in mountain and hilly areas in southern China has increased by more than 38 per cent since the 1950s. 'Rock-desertification' owing to soil erosion in the karst mountainous and hilly areas of south-western China is especially shocking.

Salinisation and glaciation

The area of salinised cropland covers about 6.67 million ha in northern China. Salinisation, mainly scattered in arid and semi-arid regions, results from poor soil

1 There is 8.25 yuan to US $.

drainage and improper irrigation practices such as excessive irrigation, flood irrigation, and irrigation without drainage. In coastal areas of eastern China, it is mainly caused by seawater flowing backwards. In addition, soil glaciation is serious in southern China, affecting 20–40 per cent of paddy fields.

- Land pollution

The emission of waste water, waste gas and waste residue in urban and industrial zones, and the increasing application of chemical fertilisers and pesticides has seriously increased land pollution. Polluted cropland amounts to 10 million ha, of which 3.33 million ha is polluted by sewage irrigation, 5.33 million ha by atmospheric pollution such as acid rain and fluorine pollution, and 0.9 million ha by solid wastes and garbage. The annual loss of grain caused by cropland pollution amounts to approximately 12 million tonnes.

- Mined land

In the process of exploiting mineral resources, topsoil is destroyed by stripping, sinking, and piling up waste ores and slag. It is estimated that mined land covers 13.33 million ha. Coal mining has caused the most serious damage. About 13,000 ha of land is destroyed each year, and usually it is land in the plains with high capability.

- Declining land capability

Lack of manure application on cultivated land has caused a decline in organic content of soil. The components of chemical fertiliser have led to an imbalance in nitrogen, phosphorus, and potassium. Now, average organic content of soil is one to two per cent and less than 0.6 per cent in nine per cent of cultivated land. Fifty-nine per cent of cultivated land is deficient in phosphorus, 23 per cent is deficient in potassium, and 14 per cent is deficient in both phosphorus and potassium. Application of vast amounts of chemical fertiliser has resulted in soil that is hardened and impervious to water and has caused a reduction in land capability.

Among the above types of land degradation, land desertification and soil erosion are the most widespread and have the greatest influence. Both occur in impoverished regions. It is stated in *China's Agenda 21: The White Book on Population, Environment and Development of China in the 21st Century* (SPC and SSTC 1994) that there are two regions of extreme poverty. One is the 'Three Wests' (Hexi West, Dingxi West, and West Hai-gu) in the arid region of the Loess Plateau, and the other is the karst region of Yunnan, Guangxi, and Guizhou provinces. The former is seriously threatened by desertification, and the latter by rock-desertification.

1.3 Strategies for Sustainable Land Use

Huge population pressure and land-resource shortage and degradation present an enormous challenge to China. Sustainable development strategies for land-resource use have been established in *China's Agenda 21*(SPC and SSTC 1994) which represents the views and long-term policy of central government.

One approach is to improve the legal system of land administration and policy so as to protect arable land and promote sustainable use of land resources. It includes the following.

- A new law on land administration has been devised and was promulgated in 1998. It pays more attention than was formerly the case to land-use control and conservation of farmland.

- Reform of land-resource use is being accelerated. In order to ensure rational use and reasonable allocation of land resources, close attention will be paid to land-use planning.
- Conservation areas of fundamental farmland are being established to protect cropland from construction. More than 80 per cent of total farmland is classified as conservation areas of fundamental farmland.
- Information systems on land-resource management will be established and a detailed census of land resources will be carried out at certain intervals.

Another important approach is to rehabilitate degraded land and improve the quality of land resources. It includes the following.

- Improvement of soil fertility, expansion of the irrigated farmland area, and prevention of soil pollution, especially cropland pollution.
- Plantation of trees and conservation of forest resources.
- Promotion of monitoring, preventive measures and management of soil erosion, and major efforts at soil conservation.
- Further advancement of the prevention and management of desertification and degradation of land.
- Major efforts to develop eco-farming practices.
- Strengthening conservation of wetland.

1.4 Land Policy and Its Relevance to Land Degradation

China has undertaken profound reforms in recent decades. Policies have changed fundamentally and this kind of change has obvious impacts on the economy, society, and environment. In land use, management, and administration regimes, laws and policies were absent or inappropriate 20 years ago; they have been established gradually and have improved since 1978. There is a delay between policy-making and its implementation. Although some policies were made several years ago, the implementation processes are slow in some regions, especially in remote areas.

Many laws and policies about land, forest, agriculture, water resources, nature conservation, and environmental protection exist. There is often an overlap between policies, leading to a conflict of rights and responsibilities, as well as to the overstepping of authority between departments. The policy-making process needs to change from many separate forms into a comprehensive and unified one.

1.5 A Brief Historical Perspective of Land Administration

Land administration has taken two basic forms: separated administration and unified administration (Liu Xinhua 1998). Separated administration means various departments establish their own land administration agency and manage land use separately according to their own needs. Unified administration means the central government establishes a special administration agency to unify land policy throughout the country.

1.5.1 Review of the History of Land Administration

The land-administration system in the period of the Republic of China (1911–49) was the same as that in the feudal dynasties of the past. It depended on the private ownership of land and was implemented through a unified administration. Since the new China was

established in 1949, and as a result of progressive land reform, a new land-administration system based on socialist public landownership has been set up.

During the founding of new China, the land policy department in the Ministry of Internal Affairs of the Central People's Government was responsible for land policy within a unified administration. However, from the mid-1950s to the early 1980s, the land-administration system was separated. It was divided into urban, rural, and departmental administration. Urban land was managed by a real estate administration office that was under the command of a city's civil administration office. The Ministry of Agriculture was in charge of rural land. Various other departments were also responsible. For example, the Railroad Department was responsible for railway land-use management, the Ministry of Communications was in charge of land-use management of road and waterways, the Ministry of Forestry was responsible for forest land management and the Army was in charge of military land.

The separated administration system was used for more than 20 years. Although it made some achievements in land management, practice proved that it was unfavourable to effective conservation and management of land resources and prevention of land misuse, destruction, and casual occupancy of cropland.

1.5.2 The Current Land Administration System

In 1982, a State Land Administration system was formally established. Its establishment marked the unification of the land-administration system. Its main objectives are as follow.

- To manage land use for the whole country
- To co-ordinate and adjust land use by various departments
- To research, formulate, and implement land policies, laws and regulations, and master plans and annual plans
- To administer regional policies for land use

The central government identifies authorities in various departments who are responsible for land-use administration. The current land-administration system has been centralised and integrated. It uniformly administers national land policies for urban and rural land. This reform is clearly defined in the Land Administration Law (1986).

In 1998, the apparatus of central government was transformed and, in particular, land administration institutions were changed. The previous State Land Administration, Ministry of Mineral Resources, State Survey Bureau, and State Ocean Administration were combined into a new Ministry of National Land Resources. The Land Administration Law was revised and unification was further strengthened.

1.6 Goals and Methods of This Study

The main aims of this study are to reveal the relationship between land policy, land management, and land degradation. This kind of study is difficult in China because officials at all levels are sensitive to investigation of policy. In addition, there is little relevant literature. Thus, we focus on the following important aspects according to the definitions, scope, and concepts of ICIMOD and to China's actual conditions.

- Study of policies, laws, and stipulations that relate to land degradation and environmental deterioration, for exam-

ple, land policy, environmental policy, agriculture and forest policy, natural conservation policy, population policy, and poverty elimination policy (at all levels: national, provincial, and local)

- Identification of the part of these policies that has led to or will cause land degradation and environmental deterioration
- Study of the relationship between policies
- Analysis of the role of various administration systems on the process of land degradation
- Analysis of the whole process of policy: policy-making and legislative process, policy implementation, problems of policy enforcement, hidden policy agendas, and proposals for solving these problems
- Analysis of the impact of policies on stakeholders, land-use patterns, and people's livelihood
- Analysis of the response of stakeholders to policies, especially the response of local farmers[1] who are at the primary level of implementation of land, agriculture, and forest policies
- Analysis of the impact of land degradation and environmental deterioration on present policy and the corresponding activities or measures taken by government at all levels
- Comparison of men's rights with women's rights to land, and the impact on land use and management

The Luquan Yi and Miao Nationalities' Autonomous County of Yunnan Province was used for the case study.

In areas of degraded land, people find themselves struggling against the poverty-population-environment spiral. Land degradation in China, of which soil erosion is the most widespread, is particularly apparent in mountainous regions. Many poor people live in these areas. It is unrealistic under the pressure of population growth and increasing demand for natural resources to let degraded land recover naturally by itself. Degraded land needs ecological reconstruction through social investment—mainly from developed regions.

1 Farmer in this document refers to the rural subsistence farmer

Chapter 2
Chinese Himalayas and the Case Study Area

The Chinese Himalayas consist of Tibet, Western Sichuan, and Western Yunnan. With a high elevation and many mountains, this is one of the major areas of forest and grassland in China. It also has the most abundant diversity of natural resources. The huge potential of its water-energy resources is significant for economic development.

However, there are serious environmental problems, especially of soil erosion and land degradation. The critical cause of soil erosion lies in the shortage of arable land. More than 50 per cent of cultivated land is located on slopes of more than 25°. Other serious obstacles to economic development and resource utilisation and protection in this area are its inaccessible frontier location, undeveloped traffic infrastructure, low education, and high illiteracy rates.

2.1 Tibet Autonomous Region

The Tibet Autonomous Region (TAR) is located on the south-western frontier of China. Its area is 1.2 million sq.km. and its population was 2.36 million at the end of 1994 (SPC 1996). It has a high elevation ranging from 4,000m on the plateau to over 8,000m at the peaks of the Himalayas. It has a typical plateau climate of low temperatures, little precipitation, and abundant sunshine. A small part is affected by the south western monsoon. Winter wheat, highland barley, and potatoes are grown there. Forest resources are concentrated in the Himalayan and Lianqing Tanggula ranges. There are 8.1 million ha of forest. Grassland accounts for 40 per cent of the total land. It is rich in lakes and water-energy resources. Natural-water energy is estimated to be 200 million kW (LABT 1994). Cultivation on slopes, especially on steep slopes in river valleys, has resulted in severe soil erosion, reduction of soil fertility, exposure of bedrock and loss of land capability.

2.2 Western Sichuan

Western Sichuan is located on the south-eastern fringe of the Tibet Plateau. It has an area of 236,190 sq.km. Its population

is 1.52 million. It is a mountainous region with a cold climate of long winters and short summers. Its average annual precipitation is 650 mm, 80–90 per cent of which falls from May to October. It has 12.2 million ha of grassland. The volume of forest is 780 million cubic metres. There are enough water energy resources to develop 31 million kW. Its main mineral resources are gold, copper, lead, zinc, and mica. There are 247,000 ha of cultivated land, 85 per cent of which is non-irrigated farmland with steep slopes, gravely soil, and low output; 50,000 ha of garden plots; 7.2 million ha of forest; 13.9 million ha of grassland; and 340,000 ha of natural conservation areas. Agricultural management is extensive and greater emphasis is placed on use than conservation, resulting in a lowering of land productivity. Forest resources have decreased rapidly. Forest cover has dropped from 25 per cent in the 1950s to 12 per cent today. Degraded grassland covers 1.6 million ha.

2.3 Western Yunnan

The area of Western Yunnan is 229,900 sq.km. Its population is 12.2 million (SBY 1994). Annual precipitation is about 1,600–1,700 mm, most of which falls in the summer. Its northern region lies above 2,500m, and the mountain peaks rise to 5,500m. This area is suitable for forestry and animal husbandry. The southern mountains lie in the subtropics, and are an important production area for cereal and economic crops. The forest resources of Western Yunnan are abundant. Forest cover is 29.5 per cent. Use of forest land is poor. Fuelwood accounts for 86 per cent of total energy in the countryside. Over 60 per cent of cultivated land is concentrated in the mountains and is mostly located on slopes greater than 30°. Its ability to retain water and soil is weak. Soil erosion affects 28.3 per cent of the total land. Grassland covers 36.3 per cent, but much is desertified and degraded. Water energy provides the potential to build large or medium-sized power stations and the installed capacity could reach 5.2 million kW. The area is rich in mineral resources and has various non-ferrous metal mines.

2.4 Luquan Yi and Miao Nationalities' Autonomous County in Western Yunnan

Luquan Yi and Miao Nationality Autonomous County was established in 1985 and is a suburb of Kunming City. It lies in the mid-north of Yunnan Province. The county government is located in Pingshan Township. The township lies at an altitude of 1,679m, and is 90 km from Kunming City.

The total area of Luquan County is 4,249 sq.km. It is mostly precipitous with many rivers, but there is a small region of plains in the south. Between the mountain ridges, there are table lands and alluvial plains. These plains are primary areas for growing cereals and economic crops.

Rivers in Luquan County are tributaries of the Jinsha River (the upper reaches of the Yangtze River). In some segments, water flow is rapid and water energy abundant; theoretical potential water power is 898 MW, of which 220 MW can be used. Until 1990, 10,829 kW had been exploited, only about 4.9 per cent of available reserves. However, many people in the region do not have sufficient water for drinking or irrigation. Zhangjiu River has been used to irrigate paddy fields; and the area has become Luquan County's main grain production base. Shuanhua Reservoir, built in 1958, regulates water flow and prevents floods. It is currently used for irrigation and electricity generation. Luquan County has a

northern subtropical monsoon climate. It is mild with moderate rainfall, has distinct wet and dry seasons, and a non-frost season averaging 234 days a year. The mountainous terrain results in obvious vertical climatic change.

Progress was made in agriculture and industry in Luquan County during the 1950s and 1960s. For instance, highways were constructed, and mines and factories were set up. Nevertheless, economic development was slow and erratic. In 1981, the household contract responsibility system was established. Reform of the rural economic system has resulted in greater progress in agriculture, forestry, animal husbandry, and fisheries. Farmers' incomes have increased and living standards have risen.

The economic system was once purely public and collective. Now, with rural reform, the proportion of individual economic enterprises has risen in agriculture, the handicraft industry, processing industry, transportation, commerce, and trade. The collective economy in Luquan now involves electric power, hardware and machine production, construction, chemical industry, and commercial corporations.

Agriculture is dominant. In the early 1950s, agricultural output made up 95 per cent of the total output value. In 1961, the structure of production was adjusted so that agriculture, light industry, and heavy industry were developed in proportion. Since 1980, with economic reform and rapid growth, great change has taken place in production. In total output value, agriculture has fallen from 89 per cent in 1965 to 59 per cent in 1997. Forestry has also declined to 6.3 per cent in 1997. Fisheries and animal husbandry are being developed. They were 26.7 per cent and 10.2 per cent in 1990 (Editorial Committee 1995). Industry, construction, transportation, postal services, telecommunication services, and commerce have been developed gradually.

After 1952, large-scale construction of water conservation works was undertaken. Improved varieties of crops and advanced farming machinery and methods were introduced. As a result, agricultural production developed rapidly. Average grain yield was raised from 1,650 kg per ha in 1949 to 2,865 kg per ha in 1990, an increase of 74 per cent. Total grain production was raised from 4,455 tonnes in 1949 to 102,943 tonnes in 1990. Agricultural has diversified into production of cash commodities. Of total agricultural output value, cash commodities account for 31 per cent.

The rural population makes up 97 per cent of the total in the county. People working in agriculture, forestry, animal husbandry, and fisheries make up 94.5 per cent of the total population. In 1990, the average cultivated land area was 0.064 ha per capita and 0.12 ha per rural worker. Grain production was 471 kg per capita and income was 417 *yuan* per capita. Grain crops include rice, corn, broad beans, soybeans, peas, other beans, potatoes, sweet potatoes, barley, oats, and buckwheat. Cash crops include rape, tobacco, flue-cured tobacco, sugarcane, peanuts, cotton, and hemp. Vegetables are mainly Chinese cabbage, green leaved vegetables, eggplant, melon, beans, and tuber crops.

Luquan County is one of the key units and basic timber forest areas in Yunnan Province. It is also a major part of the protection forest system in the upstream region of the Yangtze River. Its forestry has great potential, but although much forest management, protection, and plantation has been carried out since 1949, forest cover has been reduced by overfelling. Since the 1970s, av-

erage annual forest consumption in the county is between 450,000 sq.m. and 500,000 sq.m., much more than the 197,000 sq.m. of annual wood growth.

Widespread hill pastureland and plentiful crop straw provide good conditions for the development of animal husbandry. Varieties of livestock and poultry include buffaloes, cattle, horses, donkeys, mules, sheep, goats, pigs, rabbits, chickens, ducks, and geese. In 1990, the annual gross output value of animal husbandry reached 24.38 million *yuan*, accounting for 27 per cent of the total rural output value. In 1997, animal husbandry had a value of 126.47 million *yuan*, 34 per cent of the rural output. Annual fishery output value in the county in 1997 was 880,000 *yuan*, accounting for 0.2 per cent of total rural output.

The industrial base of Luquan County is not strong. Around 1949 there were some small workshops producing hand-woven cloth and local paper and some smithies. By 1997, industrial output value reached 220 million *yuan*, accounting for 24 per cent of the county's total output. Of the total industrial output value, light industry amounts to 62 per cent and heavy industry to 38 per cent; 18 per cent is publicly owned, 14 per cent is collective, and 68 per cent is private.

Except for power and building materials, industries produce low profits owing to shortage of capital, lack of qualified managers and technicians, inadequate transportation, and poor communication systems. In 1990, the annual average net income per capita was 225 *yuan*.

2.4.1 Overview of Land Utilisation and Land Degradation in Luquan County

In Luquan County, by the end of 1990, over 17,300 ha of slope land had been terraced, accounting for 25 per cent of total cultivated land. Output from terraces is greater than from slope land. Changing slope land into terrace is a useful measure for protecting cultivated land and raising output. Water conservation facilities have also been constructed and reinforced. Water loss and soil erosion take place readily because of steep slopes. Afforestation of mountains and development of forestry are important for sustainable management. Tree planting and forest protection have been emphasised.

Integrated development of agriculture has been stressed. Grain and tobacco production, forestry, fruit-growing and herding of animals are developed in an integrated way. The multiple cropping index and land productivity have been raised through inter-cropping, under-crop sowing, and rotation. Intensive utilisation of land has been brought about through investment and intensive farming. Land administration is being strengthened, and misuse and occupation of cultivated land are strictly forbidden.

Severe soil erosion has been brought about by overfelling of forests. This problem is especially evident when floods occur. In times of flooding, lots of stone and sand wash down the slopes, submerging fields, destroying villages, and causing damage and death. There are a few debris flows. Areas of waste mountain and bare ranges increased from 45,000 ha in 1949 to 100,000 ha in 1990. Forest cover decreased from 40 per cent to 27 per cent in the same period. Sand content in every river has increased.

The cultivated land is of poor quality and has low productivity. Ninety per cent of cultivated land belongs to low- or middle-yield categories. Flat land only accounts for 5.6 per cent of the total cultivated

land. Luquan County has 73,000 ha of grassland, accounting for 17.5 per cent of the county's total area. Most grassland is unimproved. Overgrazing results in degraded grassland and livestock that are thin and small.

Problems in land use and management also include low utilisation efficiency, poor use of water resources, misuse of cultivated land for building houses and mining, lack of long-term planning, and loose implementation of relevant laws.

Chapter 3
Land Policies in China: National, Provincial and Local Environmental Policies

3.1 Evolution of Environmental Policies

China's policies on the environment have gone through three stages (Zhang Kunming 1994).

The First National Conference on Environmental Protection was held in 1973 after the Stockholm Conference. The conference defined the so-called '32-Characters Policy' for environmental protection and adopted 'Some Stipulations on Protecting and Improving Environment' (Trial Draft).

The 32-Characters Policy emphasises 'overall planning, reasonable layout, comprehensive utilisation, turning harm into good, relying on the masses, everybody sets to work, protecting environment, and bringing benefit to the people'. At the same time, according to the actual situation of the country and learning from the experience of foreign countries, the government began to implement the system of 'three simultaneousnesses'. It meant that facilities for preventing and controlling pollution must be simultaneously designed, constructed, and commissioned with the main project. A system of levies on pollutant dischargers was also implemented. Most fees were used to subsidise enterprises for pollution prevention and control in the form of appropriation and loans. Some 20 per cent of the funds were used for the construction of an environmental protection system. Meanwhile, a system of environmental impact assessment (EIA) was implemented. This system requires a report on EIA to be examined and approved before all construction projects proceed.

In 1979, the 'Law on Environmental Protection' (in trial implementation) was promulgated, affirming the basic policies of environmental protection mentioned above. The policy that whoever causes pollution should be responsible for its elimination was also established. The government also stated that various organisations related to environmental protection would be established, and that adminis-

tration over environmental protection should be strengthened. Since then China's environmental protection work has been brought into the orbit of the legal system.

The Second National Conference on Environmental Protection was held at the end of 1983. It stated that environmental protection would be regarded as a basic national policy. It put forward the strategic policies: simultaneous economic, urban and rural, and environmental construction; simultaneous planning, implementation, and development; and unification in economic, social, and environmental benefits. This conference also defined that the strengthening of administration over the environment should be regarded as the central key for environmental protection. Since then, laws and stipulations such as the 'Law on Water Pollution Prevention and Control', the 'Law on Prevention and Control of Air Pollution', 'Stipulation for Technology to Prevent and Control Smoke Pollution', and 'Stipulation for Technology to Prevent and Control Water Pollution' have been issued.

Three principles for environmental protection gradually took shape. They are the principle of putting prevention first and combining prevention with control, the principle that whoever causes pollution must be responsible for its elimination, and the principle of reinforcing environmental administration. The state practised the 'Eight Systems and Measures for Environmental Management'. They include, beside the three old ones (three simultaneousnesses, levies on pollutant dischargers, and EIA), the following five new measures.

- The responsibility system for environmental protection targets. Governors, mayors, and county heads should be responsible for targets and tasks of environmental protection in their term of office in the form of a responsibility letter. The responsibility letter will be regarded as important to check on achievements in their official career.
- The quantitative examination of comprehensive renovation and control of the urban environment, including 20 indices of such aspects as air, water, noise, solid wastes, and afforestation. Moreover, the results of examination should be opened to the public.
- System of pollution discharge permits
- System for centralised pollution control
- System of setting deadlines for pollution sources to reach a control target

The Third National Conference on Environmental Protection was held in 1989. The conference stressed that the above eight systems should be continuously implemented and improved in the 1990s. They have been stipulated in the laws, rules, and regulations of the country. In August 1992, not long after the UN Conference on Environment and Development, the government approved the following ten counter measures for environment and development.

- To pursue the strategy of sustainable development
- To adopt effective measures to prevent and control industrial pollution
- To carry out comprehensive renovation and control of urban environment and to handle the Four Evils (air pollutants, water pollutants, earth-surface pollutants, and noise pollutants) in cities
- To raise the efficiency of energy use and improve the energy structure
- To popularise eco-farming, to plant trees and strengthen protection of biodiversity
- To promote scientific and technological progress for strengthening envi-

ronmental study and developing environment-related industries

- To protect the environment through economic measures
- To strengthen environmental education and to heighten the environmental awareness of the public
- To improve the legal system for the environment and reinforce environmental management
- To work out China's plan of action in line with guidelines from the UN Conference on Environment

3.1.1 Structure of Environmental Law

The Constitution of the People's Republic of China sets down a series of stipulations on environmental protection. These stipulations provide the most basic foundation for making laws, policies, stipulations, and regulations on environmental protection. They emphasise the conservation and reasonable use of natural resources and environmental protection so as to avoid environmental destruction by unreasonable exploitation and utilisation. The 26th clause states: "*The state aims to protect and improve the living environment and ecology, prevent pollution, and social effects of pollution*".

The ninth clause identifies: "*Such natural resources as minerals, rivers, forest, range land, wasteland, and so on, all belong to the state* (namely belong to the public of the whole country), *except for those which belong to the collective according to the law. The state guarantees the reasonable utilisation of natural resources, conservation of precious wildlife, and wild plants and prohibits any organisations and individuals from occupying and destroying natural resources with whatever means.*"

According to article 10 of section 2: "*All organisations and individuals who use the land must utilise it reasonably.*"

In December 1989, the State Council of the People's Republic of China enacted the 'Law on Environmental Protection'. This is the fundamental law on environmental protection. The law stipulates that the objects of environmental protection are "*all environmental elements, including air, water, ocean, land, mineral resources, forest, grasslands, wildlife, natural and historical relics, nature reserve, scenic spots, cities, and countryside which directly or indirectly influence human existence and development*".

The law also stipulates the practical system of environmental protection, including the following.

- Principle of harmony between economic development and environmental protection
- Putting prevention first and combining prevention with control
- System of environmental impact assessment (EIA)
- Three simultaneousnesses
- Levies on pollutant dischargers

This law also stipulates the basic demands for protecting the environment from pollution and for relevant obligation and prescribes the extent of authority and tasks of central and local environmental agencies on environmental supervision and management. It stipulates that every individual, group, organisation, and agency have the obligation to protect the environment and have a duty and power to supervise, report on, and accuse those who pollute and destroy it. The law also regulates the legal responsibilities, such as administrative responsibility, civil responsibility, and criminal responsibility, for breaking the Law on Environmental Protection.

Laws on land-use planning fall into the following categories.

- Law on territory renovation (although it has not been issued yet)

- Law on regional planning of agriculture—The Agricultural Ministry issued a 'Guideline for Helping Agricultural Producers' Cooperatives to Make Land Planning' (in 1957). The Agricultural Committee of the State Council compiled the 'Report of Unfolding Research on Natural Resources of Agriculture and on Agricultural Regional Planning'. The State Council approved this report (in 1979). The Agricultural Ministry issued a 'Guideline for Unfolding Further Land Use Planning' (in 1960). To date, a law on agricultural planning has not been made.
- Law on rural and township planning—The Construction Committee and Agriculture Committee of the State Council issued the 'Principles on Rural and Township Planning' in 1982. In the same year, the State Council promulgated the 'Provisions for Management over House-Building in Rural and Township Areas'.

A series of laws on pollution prevention and control has been made and implemented. For example, the Standing Committee of the National People's Congress (SCNPC) promulgated the 'Law on Ocean Environment Protection of the PRC' (in 1982), the 'Stipulation for Technology to Prevent and Control Smoke Pollution' (in 1984), and the 'Law on Prevention and Control of Air Pollution' (CPCAP) (in 1987). The EPCSC also ensured the 'Law on Prevention and Control of Solid Waste Pollution' (in 1996), rectified and passed through the new 'Law on Prevention and Control of Air Pollution' (LPCWP) and the 'Law on Prevention and Control of Noise Pollution' (in 1996). The State Council promulgated the 'Provision of General Administration for Preventing Sea Pollution' (in 1983), the 'Provision of General Administration for Offshore Oil Exploitation and Environmental Protection' (in 1983), and the 'Law on Prevention and Control of Water Pollution' (LPCWP) (in 1984). The State Council successively issued the 'Provision of General Administration for Dumping Waste and Pollutants into the Sea' (in 1985), 'Regulation on Prevention and Control of Noise Pollution' (in 1989), and enforcement regulations on 'Prevention and Control of Water Pollution' (in 1989). The State Council also issued enforcement regulations on the 'Prevention and Control of Air Pollution' (in 1991), approved the 'Provisional Regulations on Prevention and Control of Water Pollution in Huaihe River Basin' (in 1995), and issued a 'Provision of the General Administration on Pesticides' (in 1997). The Ministry of Agriculture, Animal Husbandry, and Fisheries (now the Agricultural Ministry), Forestry Ministry, Ministry of Chemical Industry, Ministry of Sanitation, and Ministry of Commerce together with the lead group of the State Council issued the 'Stipulation on Pesticide Registration' (in 1982).

Policies and stipulations on natural conservation have been established. The State Council issued the 'Provision on Water and Soil Conservations' (in 1982) and the 'Announcement on Protecting Strictly Precious Wildlife' (in 1983). In 1987, the State Council enacted three stipulations that matched with the Law on Mineral Resources. They are the 'Interim Procedures on Prospecting and Registration Management of Mineral Resources', the 'Interim Procedures on Mining and Registration', and the 'Interim Procedures on Supervision and Management of Mineral Resources'. The SCNPC issued the 'Forest Law' (in 1984), passed and issued the 'Law on Mineral Resources' (in 1986), and passed and enacted the 'Law on Water' (in 1988) and approved the 'Law on Conservation of Water and Soil' (in 1991). The President of China promulgated the 'Grassland Law' (in 1985) and issued the 'Law on Protection of Wildlife'

(in 1988). The Agricultural Ministry issued the 'Provision on Breeding and Protection of Aquatic Resources' (in 1981) and the relevant enforcement regulations (in 1993).

Laws and stipulations on environmental management have also been enacted. The State Council issued 'Interim Procedures for Imposition of a Discharge Pollutant Fee' (in 1982), the 'Stipulation for Strengthening the Environmental Management of Townships, Enterprises and Streets' (in 1984) and the 'Determination on Further Strengthening the Work of Environmental Protection' (in 1990). The Ministry of Urban-Rural Construction and Environmental Protection issued the 'Provision for General Administration on Environmental Supervision of the Country' (in 1983). The State Committee of Economy issued the 'Interim Provision on Several Problems about the Comprehensive Utilisation of Resources' (in 1985). The State Committee of Economy together with the State Committee of Environment promulgated 'Enforcement Procedures for the Check-up System of Environmental Protection of Industrious Enterprise' (in 1985). These two committees together with the Planning Committee of the State promulgated 'Procedures of the General Administration on Environmental Protection for Construction Project' (in 1986). After the UN Conference on Environment and Development, the National People's Congress and State Council approved 'China's Ten Countermeasures for Environment and Development' (in 1992) and issued *China's Agenda 21: The White Book of Population, Environment and Development of China in the 21st Century.*

The State Council issued 'Trial Standards on Three Wastes (waste gas, waste water and solid waste) of Industry' (in 1973). The Environmental Protection Group of the State Council issued 'Standards on Quality of Air Environment' (in 1982), 'Standards on Quality of Seawater' (in 1982), and 'Standards on Noise in the Urban Region' (in 1982). The Ministry of Urban-Rural Construction and Environmental Protection issued the 'Standards on Environmental Quality of Groundwater' (in 1983). The Ministry of Agriculture and Forestry issued the 'Standards on Safe Use of Pesticides' (in 1984). The Environmental Protection Group of the State Council, the Infrastructure Construction Committee, and the State Committee of Economy and Agricultural Ministry reissued together the 'Standards, on Quality of Irrigation Water for Farmland' (in 1985). The Infrastructure Construction Committee of the State and Ministry of Sanitation revised the 'Sanitary Standards on Drinking Water' (in 1985). The Ministry of the Metal Melting Industry issued 'Discharge Standards on Pollutants for the of Steel Industry' (in 1985).

Article 98 of the General Roles of the Civil Law stipulates: "*Citizens have a right to enjoy life and health. Behaviour harming the citizens' health by polluting the environment belongs to tortuous activities.*" The Criminal Law stipulates: "*breaking the forest law, such as illegal cutting of trees; breaking the fishery law, such as fishing during the forbidden fishery season or in a forbidden zone, or catching the aquatic product with forbidden tools and means; and breaking the hunting law, e.g., damaging precious birds, beasts, or other wildlife resources all compose a crime.*" It also stipulates a relevant fine if the circumstances are serious. In addition, the Economic Law and the Security Administration Act also stipulates corresponding clauses on environmental protection.

3.1.2 Environmental Policies in Yunnan Province

The Yunnan Provincial Government (YPG) has transferred many national

laws and stipulations or re-made some new detailed rules and regulations according to the special conditions of the province. The government sent these laws and stipulations to every city, county, and relevant department for implementation. Subsequently, the local government also made more detailed enforcement regulations according to their special situation. Recently, YNG have made and issued a series of policies and stipulations that have brought about significant progress in the field on managing the natural resources and protecting environment by laws.

The YPG issued the 'Procedures of the General Administration on Environmental Protection of Collective and Private Enterprises in Urban and Rural Areas' (in 1991) and the 'Procedures of the General Administration for Imposition of a Pollution Discharge Fee in Yunnan Province' (in 1993). YPG also successively issued the 'Administrative Procedures for the Imposition of the Compensation of Mineral Resources' (in 1994), the 'Enforcement Procedures on Rewards and Penalties for Environmental Protection' (in 1995), and the 'Provision on Agricultural Environmental Protection' (in 1997).

The Standing Committee of Yunnan Province People's Congress (SCYPPC) passed the 'Provision on Environmental Protection in Yunnan Province' (in 1992), and passed and issued 'Some Stipulations for Non-gratuitous Exploitation of Barren Hills in Yunnan Province' (in 1994). SCYPPC issued the 12th decree: 'Implementation Procedures of the Law on Prevention and Control of Water Pollution and passed through the Provision on Management of Mining of Collective and Private Enterprises and Individuals in Yunnan Province' (in 1994).

According to the national 'Law on Environmental Protection and the Yunnan Province's Provision on Environmental Protection', YPG issued the 'Enforcement Provisions on Target-Responsibility System of Environmental Protection in Yunnan Province' (in 1994). The provision stipulated the examined content and concrete check-up index. For example, the examined content includes: whether the investments of environmental protection were put into pool; whether institutes, staff, facilities and fees of environmental protection are matched with the work of environmental protection in the region; and the managing circumstance of various natural conserves. The check-up criteria include the treatment rate and time limit of main industrial pollution sources, the quantitative examination of environmental elements, the implementation rate of the Three Simultaneousnesses, areas of afforestation and survival rates, and the treatment rate of polluting accidents. The results of assessment are open to the public. The implementation of this provision not only prompts environmental protection, but also lets the public participate in the implementation process.

3.1.3 Environmental Policies in Luquan County

The government of Luquan County has implemented some policies on environmental protection. The Standing Committee of Luquan People's Congress enacted the 'Interim Provisions on Environmental Protection of Zhangjiu River Basin in Luquan County' (in 1995). It is the only regulation about environmental protection made by Luquan County itself. The Environmental Protection Station of the Urban Construction Bureau of Luquan County is responsible for detailed planning and enforcement. However, the station does not make detailed regulations about environmental protection except for implementing national and provincial policies and stipulations.

3.2 Land Policies

3.2.1 Institutional Evolution of Land-use Rights in Rural China

In the 1950s, the state owned all land in China. The institution of gratuitous use of land was implemented and transferring of rural public land was forbidden. The state gratuitously allocated rural public land to farmers, collectives, or enterprises for utilisation and stipulated that the user could not transfer land by way of renting, selling, or any other form. In 1950, the Government Administration Council (GAC predecessor of the State Council) promulgated the 'Indication about Resolving the Problems of Rural Land in Old Liberated Areas'. It stipulated: *"All users of rural public land for cultivation are exempt from land rent, but pay agricultural tax."* Also in 1950, the Law on Land Reform stipulated: *"Public land managed by privateers can not be rented, sold or cast aside."*

This system was detrimental to effective utilisation and rational allocation of land. Also it did not put any responsibility for land conservation on the user. Every user wanted to occupy more and better land. The prohibiting of land transfer and rent discouraged people from investing in the land.

During the period of the People's Commune (1958–78), collective ownership of land was implemented. Land was owned and managed by collectives, and farmers worked on collective-owned land for their income and grain. Farmers also had small plots of land (called self-remained land) on which to grow vegetables or cash crops.

Since 1979, the rural economic system has been gradually reformed and the contract responsibility system has been developed. This means that collectively owned land and other production materials are contracted to each household for independent use and management. Individual users are responsible for both their profit and loss. The contract responsibility system makes land-use rights separate from land ownership to some extent. This land policy cancelled egalitarianism and embodied the principle of distribution according to work.

Implementation of the land contract responsibility system greatly modified the enthusiasm of farmers, prompted agricultural development, and improved living standards. Nevertheless, the contract responsibility system also led to some serious problems. Firstly, each household had less land, and the land allocated to individuals was difficult to cultivate with modern machines. Secondly, some households, who had not enough farmland, became unemployed. Thirdly, some households lacked labour to cultivate extensively. Fourthly, it was difficult to form a useful scale of land management. Finally, farmers felt this system was not stable because land-use rights were not explicitly guaranteed by law; therefore, farmers were unwilling to invest capital in their farmland.

SCNPC passed the 'Law on Land Administration of the PRC' in 1986. The NPC revised and implemented this law in 1988. The Law on Land Administration is a milestone in land use and management. The government made a series of policies in order to prompt reform of the land-use system and popularise the non-gratuitous land-use system.

In 1982, the State Council distributed the 'Report about Resolving the Problems of Abusively Occupying Farmland for Building Houses' to various levels of government. This report pointed out: *"The State will impose land-use tax on both private-house construction and construction by*

various organisations according to the area and quality of the land." In 1986, the State Council issued the 'Announcement on Reinforcing Land Administration for Controlling Illegal Occupation of Farmland'. It pointed out that the state should control non-agricultural use by means of economic measures and impose land tax and land-use fees according to the use and quality of the land.

In 1992, the State Land Administration issued the Emergence Notification on Strict Examination and Approvals about Land by Law. It emphasised that: "*to reinforce the administration of land prices, the State Land Administration should define as quickly as possible the standard land price in their own region according to the theory of differential land rent and the current situation of the land market.*"

In 1988, the State Council issued the 'Provision on Land Rehabilitation'. It stipulated that land users must follow policies of comprehensive exploration, assessment, and utilisation while exploiting mineral resources. Illegal exploitation should be strictly forbidden so as to prevent and control resource destruction and deterioration of the natural environment. It also stipulates that: "*while exploiting mineral resources, land users must conserve land and take some rehabilitation measures if farmlands, grasslands, or forest lands are destroyed by mining.*" In addition, policies state that whoever causes land destruction must be responsible for its rehabilitation; and reclamation of destroyed land should be according to rehabilitation planning.

The State Council issued the 'Provisions on Enforcement of the Law on Land Administration' in 1991. The Emergency Notification on 'Strict Prohibition of Illegal Land Occupation', issued in 1992, aims: "*to insist on paying attention to the management of land resources and property; to normalise the land market; to integrate planning, requisition, exploitation and rent of land with land administration.*"

The 'Provision on the Protection of Basic Farmland' was issued in 1994. In 1998, the 'Law on Land Administration' was revised and reissued by SCNPC. The most important changes include a new chapter on farmland conservation and a clause on lengthening the land contract term by another 30 years.

In addition, every province, autonomous region and municipal makes a series of relevant policies and stipulations of land administration to carry out national policies. These play an important role in deepening the system of non-gratuitous land use. These policies also contribute to farmland conservation and improve the efficiency of land use.

3.2.2 Land Policies in Yunnan Province

Yunnan Province has made a series of important policies on land administration in recent years. The SCYPPC approved and issued the 'Implementation Provisions on Land Management in Yunnan Province' (in 1994), 'Some Stipulations on Non-gratuitous Exploitation of the Barren Mountains in Yunnan Province' (in 1994), and the 'Provisions on Conservation of the Fundamental Farmlands' (in 1995).

YPG issued the 'Implementation Provisions on Rent and Transfer of Land-use Rights of Public Land in Yunnan Province' (in 1993). The YPG and its relevant departments also issued a series of notifications on the imposition of fees for non-agricultural land use.

In 1996, the 'Land Bureau of Yunnan Province' promulgated the Supplement

Notification on the 25th [1995] Document issued by State Land Administration. It pointed out that the: *"Provincial Land Bureau can only keep 10 per cent of the total land management fee imposed by itself and, of the rest, 20 per cent must be returned to the local land authority and 70 per cent sent to the State Land Administration. The local land authority can keep 30 per cent of the management fee imposed by itself and return 70 per cent to the State Land Administration."*

3.2.3 Land Policies in Luquan County

In 1992, the Government of Luquan County issued the relevant 'Provision on Implementation of the Law on Land Administration in Luquan Yi and Miao Nationalities Autonomous County'. In the provision, there are detailed regulations about land-management fees.

3.3 Agricultural Policies

The Agricultural Policy aims to solve a particular problem or realise a plan in an agricultural or rural area. In practice, agricultural policy has some effect on land-use patterns, land quality, and quantity.

3.3.1 Agricultural Policies in China

The 'Contract Responsibility System Linked to Output' (CRSLO) is a management style for community agricultural organisations. Its prerequisite is to take such production material as land to be public property that cannot be changed in the long term. The responsibilities, rights, and benefits of the agricultural community and individual farmer were ascertained. The CRSLO has played an important role in agricultural development. It is characterised by the combination of unified and scattered production. Redistribution of public materials to farmers allows them greater independent rights and initiatives to engage in agriculture. It has linked remuneration directly to output.

The main method of CRSLO is a contract responsibility system based on the household with remuneration linked to output (contracted responsibility with family and special individuals). Other methods include payment linked to output, and contracted responsibility with farmers' groups. The preferred method for farmers is contracted responsibility with family. It means that agricultural organisations within the community do not unify production procedures and distribution. The procedure is based on a family's decision. Agricultural products must first satisfy country collection and community reservation. Then the farmer can freely sell excess agricultural products in the market.

In 1995 the document on 'Opinions on Stabilising and Improving the Contract Responsibility System of Land', proposed by the Agricultural Ministry, was approved by the State Council. The document indicated the following.

- Contracts that have ended will continue. The contracted time will be extended by another 30 years.
- The principles of not increasing land area with an increase in family members and not reducing land area with a decrease in family members should be advocated. For regions where population increase is fast, a trial solution is 'to change the account instead of the land'. This means to take financial measures to solve unequal land accessibility caused by population growth or reduction, instead of reallocating the land within several years or adjusting it in the short term by stabilising it in the long term. If approved by most farmers in community organisations, land redistribution can be made. The pe-

riod for short-term adjustment cannot be less than five years.

- A transfer system for contracted-use ownership should be established. It allows farmers to transfer their land-use rights to others through exchanging or buying a share. However, farmers have no right to change agricultural land to non-agricultural uses.
- A farmer's burden cannot be allowed to increase as a result of land readjustment.

Chinese agriculture aims to achieve optimum economic, ecological, and social benefits. It emphasises low input, high output, high quality, and environmentally friendly methods; but it does not exclude the use of chemical materials absolutely. It tries to fit in with the carrying capacity of the natural resources. It is compatible with the concepts of sustainable development. The government has drawn up a series of policies to develop ecological and sustainable agriculture.

In 1984, the State Council advocated the development of ecological agriculture in the Second Conference of National Environmental Protection. The document of the State Council drawn up at this conference indicated that environmental agencies at all levels should cooperate with other government agencies to spread ecological agricultural technology and prevent environmental destruction. The Chinese Environmental Protection Agency of the State Council drew up 'Opinions on Developing Ecological Agriculture and Strengthening Agricultural Environmental Protection'. From the perspective of law and policy, it indicated clearly that China should use ecological agriculture.

In 1991, the Tenth Plan of National Economic and Social Development and the outline of the Eighth Five-Year Plan were passed. They indicated that the government should continue to conduct demonstrations of environmental harnessing and ecological agriculture.

In 1992, the central government indicated that agricultural development should be low input, high efficiency; have low energy costs; and conserve nature. The State Council put forward the idea of *"spreading ecological agriculture and afforestation as policies to solve environmental and development problems."*

In 1995, the Ninth Five-Year Plan and a long-term plan for 2010 were drawn up. These documents also emphasised developing ecological agriculture and protecting agricultural environments. In China's Agenda 21, ecological agriculture and sustainable agricultural development on a countrywide scale were put forward as one of the goals for the government to establish and improve an integrated management system of sustainable development by the end of 2000. It was stipulated that present agricultural laws and regulations should be revised according to the principles of ecological and sustainable agriculture. Plans to improve and strengthen laws and regulations were proposed, especially the law and policy systems on agricultural environmental protection and natural resource conservation–such as regulation of agricultural environmental protection, regulation of cropland protection, regulation of renewable plant and animal species. It was suggested that previous laws and regulations related to agricultural plans and policies should be studied again and re-evaluated, so that farmers and government could co-ordinate their actions in developing sustainable agriculture. The Agenda 21 required carrying out agricultural experiments on sustainable development, including doubling experimental sites.

The 'Agricultural Law of the People's Republic of China', promulgated in 1993, is

about agricultural technology and education. It stipulated the following.

- Government at all levels should gradually increase funds to invest in agricultural technology and education.
- The government should develop complulsory education and occupational education in the countryside to improve labour quality.
- The government should support the rapid extension of advanced agricultural technology to farmers. Extension units should co-ordinate with research and education units to spread advanced agricultural technology.
- Government policies, such as those on taxes and loans, should be preferential to the extension of advanced agricultural technology.
- Government at all levels should adopt operational measures to ensure the extension of advanced agricultural technology and increase extension staff.
- The government should encourage farmers to accept advanced technology, and support farmers in setting up technological organisations.

Laws on extension of advanced agricultural technology were promulgated in 1993. They indicated that the government should depend on technology and educational developments to create agriculture of high quality and high yield; extension of technology should be proved to be advanced and suitable to local conditions; farmers should apply agricultural technology willingly; and government agencies should serve farmers without charge (except for royalties) for technology transfer and contracted services.

Although agricultural investment increases year by year, government investment in agriculture is low compared to other industries. Agricultural investment concentrates on such infrastructure and key projects as water conservation, flood prevention and irrigation systems, key infrastructure for agricultural production and trade, and construction of a commercial grain base, lumber-forest base, and shelter forest. Community and individuals mainly invest in agricultural production and field-conservation systems.

The Agricultural Law stipulates that "*any improper activities such as burning mountains for cultivation, reclamation of lakes and cultivation on steep slopes are forbidden*"; that it is "*forbidden for anyone to denude forest. Forest should be protected, and forest coverage should be increased*"; and that "*special measures should be taken for basic cropland conservation*".

The Grassland Law stipulates that the "*grassland plant community must be protected strictly. Any activities to reclaim or destroy grassland must be forbidden. For grasslands that have been cultivated, the county government must enclose and restore the plant community within a certain period*"; any activities such as "*cutting shrubs and sand-fixing plants or digging of medical herbs in the desert, semi-desert, and desertified grasslands must be forbidden*"; and people should "*utilise grassland properly, and prevent overgrazing.*"

3.3.2 Agricultural Policies in Yunnan Province

In addition to carrying out national agricultural policies, YPG made a series of relevant laws and stipulations (LGPL 1997).

In 1990, the YPG issued 'Procedures on Approving Officially the Crop Strains in Yunnan Province'. In 1991, SCYPPC approved and issued the 'Implementation Provision on the Fishery Law of PRC in

Yunnan Province'. In 1993, YPG issued 'Implementation Procedures on Management of Crop Seeds in Yunnan Province'. In 1995, YPG issued the 'Procedures of the General Administration about Farmers' Bearing Fee and Labour Service in Yunnan Province'.

In 1995, SCYPPC approved and issued 'Provisions on Conservation of Fundamental Farmlands in Yunnan Province' (PCFFYP) according to the 'Law on Agriculture of the PRC', the 'Law on Land Administration of the PRC' and the 'Provision on Conservation of Fundamental Farmlands' issued by the State Council. It stipulates punishments for breaking relevant laws and regulations.

In 1996, the SCYPPC issued the 'Provision on Agricultural Contracts in Yunnan Province'. It stipulates that: "*contractors cannot destructively operate and manage contracted farmlands, forest lands, barren mountains, and grass hills, etc. They cannot build houses, move earth, and make bricks on these lands.*" However, it lacks relevant articles about monitoring contracted land after expiry of the contract. This weakens the policies' ability to control land degradation. In 1997, SCYPPC issued the 'Provision on Protection of Agricultural Environment in Yunnan Province'. This provision details penalties.

3.3.3 Agricultural Policies in Luquan County

The Agricultural Bureau of Luquan County also has made regulations in order to guarantee farmers' livelihood and to eliminate poverty. For instance, a policy called 'Three Guarantees for Farmland' has been issued. This guarantees water supply, fertiliser supply, and control of soil erosion through a subsidy to farmers of 100 *yuan* per 0.067 ha from local government's poverty-aid fund. It also requires farmers to terrace steep slopes and prevents farmers from opening up wasteland. This kind of policy has played an important role in controlling land degradation.

Mountain land has changed from being state-owned to farmers' tenure. Investment for this land has been changed also from state investment only to farmers' investment combined with partial state investment. This manner of management demands the close cooperation of local farmers, and will impact land use, land management, and land degradation/improvement.

3.4 Forestry Policies

The need for farmland has damaged forestry resources seriously. Since 1949, the government has enacted many policies to protect forestry resources and to plant trees. The forestry coverage rate has increased to about 13.4 per cent of the total territory. Results from the Third National Forestry Survey (1984–88) indicated that the forest coverage rate increased a little compared with the results from the Second National Forestry Survey (1977–81). Nevertheless, forest quality decreased and wood storage was reduced by about one third. The wood-consumption rate is higher than the wood-growth rate. Forestry policy has played a role in creating this situation.

3.4.1 Evolution of Forestry Policy

There were forest protection rules in the ancient Xia (2100–1600 years BC), Shang (1600–1100 years BC), and Zhou (1100–800 years BC) dynasties. Throughout the slave and feudal society, there were many regulations for forestry conservation; modern forestry legislation started after the Chinese Democratic Revolution in 1911. Forest laws were written in 1914 and 1932.

In 1979, the 'Interim Law on Forest Conservation of the People's Republic of China' was passed at the NPC. After five years' experimental application and revision, the law was formally passed in 1984. In 1986, the Ministry of Forestry drew up the 'Detailed Implementation Rules of Law on Forestry of the People's Republic of China'. In 1987, the Ministry of Forestry formulated the 'Management Regulations for Forestry Cutting and Renewal'. The State Council drew up the 'Regulations for Prevention of Forest Fire' in 1988, and the 'Regulation for the Protection of Forests from Diseases and Insects' in 1989. In order to satisfy the needs of forestry management under a system of market economics, a new revision was passed in 1998.

After the establishment of new China, forest ownership was reformed with land reform. The general policy of forest ownership can be outlined as the following: large areas of forest belonged to the state; small areas of woodland belonged to the town, village, or individual according to the convenience of management and production. Woodland previously belonging to individuals or farmers still belonged to them. Supported by the government, farmers strengthened forestry production and accelerated forestry development.

From 1956 to 1979, the government guided forest farmers in a socialist way. The first step was to establish a socialist agricultural cooperative community (SACC). The second step was to incorporate a forest cooperation community into the SACC. The third step was to convert the private forest farmer. At first development was fast. Then all cooperative communities were transformed into the People's Commune. During the years of the People's Commune, forest ownership was destroyed. Forestry production collapsed.

After 1978, forestry production was normalised. The State Council drew up 'Twenty-five Rules of Forestry'. The whole country acted on the principle of 'Three Fixations' which means fixing of forest and mountain ownership, fixing the boundaries of private mountains, and fixing the forestry contract responsibility system. The forestry production system was based mainly on state ownership while other (e.g., private and collective) ownership acted as subsidiaries.

3.4.2 Forestry Administration

Administration of forest resource conservation and forest-industry development is the responsibility of the government. According to the Forest Law, the special forestry administration agency of the State Council is responsible for forest management in the whole country. Special forestry administration agencies of the prefecture and county government are responsible for regional forest resource management. Town governments set up full-time or part-time positions for forestry administration. In the main forest areas, some forest stations are set up to strengthen local forest-resource management. Local governments at various levels organise related departments to set up forest management organisations (FMO) and appoint forest management staff (FMS). The main tasks of FMOs are forest conservation, preparation of contract agreements with units owning woodlands, and delimiting the boundaries of forest conservation areas.

The main tasks of FMS are monitoring woodlands, stopping behaviour that destroys the forest, and asking special government agencies to punish people who destroy the forest. Their tasks involve forest resource surveys and forest classification, timber-storage measurement and establishment of forest archives. They also undertake long-term planning for forest resource management and trade; prevention of forest fires; prevention of disease

and infestation; management of felling and renewal; management of timber transportation and trade; and management of tree planting.

2.4.3 Afforestation Policy

In 1981, a 'Decision on an Obligatory Tree-Planting System' was passed in the NPC and 12 March every year has been appointed as a tree-planting festival. According to 'Enforcement Procedures on the Forest Law of the PRC', the goal of afforestation is to reach 30 per cent forest cover.

In 1976, YPG made a policy to establish two kinds of forest base: a timber-forest base and an economic-forest base. For Luquan County, the coverage rate should reach 70 per cent in mountain areas, 40 per cent in hill areas and 10 per cent in the plains.

3.5 Policies on Natural Reserves

3.5.1 National Policies on Natural Reserves

In 1956, the Ministry of Forestry drew up a 'Demarcation Draft on Felling in Forbidden Zones of Natural Forest' (natural reserves). In 1962, the State Council issued the 'Instruction on Active Conservation and Reasonable Utilisation of Wildlife Resources'. In 1963, a 'Provision on Forest Conservation' was promulgated by the state. In 1979, the state issued the 'Law on Forest' (trial) and the 'Law on Environmental Protection' (trial). In 1980, the Ministry of Forestry and the Chinese Academy of Sciences together with six other ministries and commissions jointly issued the 'Notification on Reinforcing Administration and Scientific Investigation of Natural Reserves'. Subsequently, the NPC and the State Council continued to issue a series of laws and stipulations on natural reserves. In 1981, the State Council ratified the 'Procedures on Management of Shotguns'. This aims to control the hunting of wildlife. In 1984, the NPC issued the 'Forest Law of the PRC'. In 1986, the 'Enforcement Regulations on the Forest Law of the PRC' were ratified by the State Council and issued by the Ministry of Forestry. In 1985, the 'Procedures of Administration of Wildlife Types and Natural Reserves' was ratified by the State Council and issued by the Ministry of Forestry.

In 1987, the State Council issued the 'Outline of Natural Reserves in China'. In 1988, the Ministry of Forestry addressed the 'Notification on Reinforcing Management of Forestland Ownership'. In 1988, the NPC approved the 'Law on Protection of Wildlife of the PRC'. In 1992, the 'Enforcing Regulation on Protection of Terrestrial Wildlife' was ratified by the State Council and issued by the Ministry of Forestry. In 1990, the Ministry of Forestry, Agricultural Ministry, Ministry of Economics and Trade, the State Customs' General Administration, and the Bureau of Commodity Inspection and Testing jointly issued the 'Notification on Reinforcing Management of Exportation of Precious Wild Birds, Game, and Ornamental Wildlife'.

In 1990, the People's Supreme Court and Procuratorate, together with the Ministry of Forestry issued a 'Notification of Strict Prohibition of Illegal Hunting, Purchasing, Scalping, and Smuggling of Wildlife'. These laws and stipulations laid a firm foundation for natural reserves in China. Moreover, the State Administration of Land and the National Environmental Protection Agency jointly issued the 'Procedures of General Administration on Lands of Natural Reserves'.

3.5.2 Policy and Stipulation of Natural Reserves in Yunnan Province

There is a special diversity of environment and biology in Yunnan Province. There-

fore, the establishment of natural reserves in Yunnan not only helps to prevent land degradation, but also conserves biodiversity.

In 1981, YPG issued a 'Notification on Establishment of Natural Reserves' and approved a report on establishing 35 natural reserves drafted by the Agricultural Office of Yunnan Province. YPG issued 'Provisions on Enforcement of the Forest Law and Regulations for Its Implementation in Yunnan' and the 'Detailed Regulations of the General Administration for the Forest and Wildlife of Natural Reserves in Yunnan' (in 1987). In 1989, the YPG issued a list of precious protected wildlife in Yunnan, according to the 'Key Wildlife List in China', and a list of key protected wild plants in Yunnan. In 1991, the YPG issued a 'Notification on Practicable Reinforcement of Wildlife Protection and Prohibition of Illegal Activities', and addressed the 'Bulletin on Wildlife Resources' in Yunnan. Kunming transmitted the 'Quarantine Committee for Animals and Plants Notification on Reinforcing the Management of Exportation of Precious Birds, Game, and Ornamental Wildlife'.

In 1995, the YPG issued the 'Provisions on Protection of Precious Plant Species in Yunnan'. From 1981 to 1983, YPG organised overall planning and investigation for 30 natural reserves. From 1983 to 1985, the YPG formally approved and established 30 natural reserves. Up to now, the total areas of natural reserves amount to 1.34 million ha–including Dianchi Lake, Stone Forest, Chang Mount, and the Er Sea. These natural reserves comprise 3.4 per cent of the total land area of Yunnan.

3.5.3 Policy on Natural Reserves in Luquan County

In 1986, technicians from the Forest Bureau of Luquan County and the Southwest Forestry Institute carried out a comprehensive investigation of Jiaozi Mountain (part of Wumong Mountains) in the county. They concluded that the mountain was typically diversified in environment and biology and suitable for the establishment of a natural reserve. They submitted the 'Proposal on Establishing Wumong Mountains' Natural Reserve in Central Yunnan' to the relevant agency. In 1989, the government of Luquan County ratified the Jiaozi Mountain as a natural reserve and scenic spot. In 1992, the government of Kunming City brought it into the planning of tourism exploitation in Kunming. In 1993, the YPG listed the Jiaozi Mountain as a Scenic Spot at the provincial level.

There exist about 30 species of mammals and 100 species of birds in Jiaozi Mountain. Of them, 11 species belong to the national protected animal list. There are also some rare plant species and more than 1,000 species of Chinese herbal medicine, of which 200 are frequently used.

3.6 Population Control and Poverty Elimination Policies

3.6.1 Population Control and Family Planning Policies

The main focus of population control policies in China is family planning. The policy aims to achieve the following goals.

- Improving population quality. This kind of policy aims to improve the moral quality, physique, and quality of education and science-technology of the whole nation.
- Adjusting population structure and distribution. It is inevitable that population structure will change from young to old because of family planning. The state will adjust the policy of family planning and actively establish a pension system. The adjustment of

population structure will gradually change the population from more rural to more urban.

- Population migration. The state encourages migration from densely populated areas to sparsely populated areas.

In 1980, the government made a stipulation that couples in governmental, entrepreneurial, institutional, and collective units must not have more than one child. Couples with one of the following conditions are allowed to have another child: the first child is disabled and cannot work normally in the future; the remarried couple have only one child in total; and having adopted a child, the couple have the ability to give birth later. For rural women, one birth is best and two is the most.

Both the birth rate and natural growth rate are high in Yunnan Province. There are 26 nationalities and their population amounts to 30 per cent of the total of Yunnan. Population density has gradually increased, but it has not unbalanced the province. There are more and a greater density of people in the east than in the west.

According to national policies, the government of Luquan County encourages one birth, controls two births, and curbs three and more births.

3.6.2 Policies of poverty elimination

Today, poverty is a universal socioeconomic problem. As Blaikie (1987) indicated, land degradation may be a symptom of a deeper set of socioeconomic problems. Land degradation is closely related to poverty in China.

Since 1978, the central government has drawn up 16 policy documents successively concerned with poverty elimination. The State Council issued the 'Notification on Supporting Poor Areas to Change the Conditions of Poverty' (in 1984), the 'Notification on Strengthening the Economic Development of Poor Areas' (in 1987), and the 'National Programme on Specialising in Poverty Elimination' (in 1994). In 1996, the Central Committee of the Party and State Council made a decision to solve the problem of poverty in rural areas as quickly as possible.

The basic policies of poverty elimination and development in poor areas can be summarised as follow.

- Identifying poor counties and investing national capital for poverty elimination, including a financial fund for development and a credit fund for poverty elimination.
- Making preferential policies of resource development for poor areas and allocating large construction projects in the main poor areas in order to improve the infrastructure and promote the development of a regional economy.
- Cutting or waiving agricultural tax in some poor areas, waiving the duty of grain payment for people living below the poverty line, and waiving income tax for all enterprises in a poor areas for three years.
- Broadening and developing cooperation with other international organisations.
- Setting up protective and indemnified policies for fundamental farmland and its fertility, and offering policies safeguarding culture, education, health, science, and technology for poor areas.
- Taking poverty elimination as the central task of economic development in poor areas and supporting counties that have eliminated poverty to consolidate the achievement.

For implementing national policies of poverty elimination, YPG has worked out specific and practical policies according to the provincial conditions.

YPG issued some 'Stipulations about Tax Exemption in Poor Areas of Yunnan' (in 1984) and some 'Practical Measures to Strengthen Work in Poor Areas Towards the Rapid Eradication of Poverty' (in 1986). They include specific policies and regulations on such issues as developing resources, initiating non-public businesses, ensuring unblocked circulation of commodities, developing science and education, and reducing the burden on farmers in poor areas. In 1987, YPG transmitted the 'Provision on Finance Administration in Poverty Elimination', which was issued by the State Council. In 1988, YPG transmitted the 'Interim Provision on Measures of Economic Development in Poor Areas in Collaboration with the Developed Areas', which are being promoted by the Agricultural Development Bank of Yunnan Province. In 1989, the Tax Bureau of Yunnan Province promulgated a 'Stipulation on Tax Exemption in Poor Rural Areas'.

In 1994, a programme of poverty elimination in Yunnan Province was worked out. Its objective was to help seven million poor people in the province to overcome poverty within seven years. Specific measures included development of township enterprises and auction of use rights of barren mountains and uncultivated land, water, and beach. In 1995, YPG promulgated the 'Decision on Winning the War against Poverty during the Ninth Five-Year Plan'. It made a provision that the government would supply a special fund of 0.3 billion *yuan* to support the poor every year from 1996. In 1996, the 'Provision of the General Administration on Special Capital for Poverty Elimination' and the 'Provision for Collecting Poverty Elimination Funds from Construction of Electricity Structures' were put forward.

In 1986, Luquan County was classified as a poor county that should be supported by the province and the country. The local government has been working to help the poor since 1987. The aim of activities has changed from being to help the poor to providing education, and from finance-importing to capacity-building.

The national government and the local governments of Yunnan Province and Kunming City have provided large development funds for poverty elimination in Luquan County. During the period from 1980 to 1990, funds totalled 15.37 million *yuan*, of which 7.14 million *yuan* were used for agricultural development, 1.62 million *yuan* for industry, 2.63 million *yuan* for science, education, culture and health, and 3.95 million *yuan* for other uses. In addition, aid amounted to 6.18 million *yuan*. By the end of 1990, 193,200 people had shaken off poverty. However, there were 57,900 people still classified as poor.

The World Bank is supporting projects for poverty elimination in southwestern China. It attempts to solve the problem of the impoverishment-degradation spiral in the poor mountain areas of Guangxi, Guizhou, and Yunnan provinces through non- or low-interest loans for the construction of infrastructure and environment. Several projects were initiated in 1995 with a total credit of US $ 620 million.

Chapter 4
Policy Processes

4.1 Legislative Procedure

When a proposal for drafting a law is put forward at the national level, the preparatory stage starts. This stage includes the following steps.

- Setting up a specific organisation to draft the law—The organisation consists of the relevant state departments, non-government organisations (NGO), research institutes, specialists, and scholars
- Detailed investigation and analysis of the problems, seeking of opinions and experiences from all concerned
- Collecting and studying relevant documents from home and abroad
- Drawing up the first draft, soliciting opinions on it from the relevant people and organisations, amending it, and forming a working draft

The draft is then submitted to the NPC for legislation. This stage includes the following four steps.

- Raising a formal proposal for legislation and submitting the draft law
- Discussing the draft law—Firstly, it is submitted to a committee of NPC for examination and approval, and this includes modifying and amending the proposal. Secondly, it is considered by the plenary session of the legislative organisation.
- Adopting the law proposal—The law proposal should be passed by more than a half of the members of the SCNPC.
- Promulgating the law—The legislative organisation or the President publishes the law.

In the Constitution, it is clearly stated that provincial governments also have the right to set local laws and regulations. The formulation process of local legislation always includes investigation, planning, drafting, examination, voting, and publication, and revision, approval, or abolishment.

In the drafting of local legislation, the first task is to make clear the purpose; the sec-

ond is to identify the main problem and to find a solution through investigation; and the third is to examine related laws and regulations. The following steps are undertaken.

- Advancement of local legislation motions–Units having the right to raise motions include the praesidium and the Standing Committee of the People's Congress, various special committees, and the government at the same level. Parties, offices, organisations, and individuals do not have this right, but they can make suggestions. Local legislation motions and policies are submitted to the local People's Congress or its Standing Committee.
- Examination of local legislation motions in local People's Congress bodies or their Standing Committees
- Adoption of local legislation motions by local People's Congress bodies or their Standing Committees
- Promulgation of local laws and regulations by local government or the People's Congress

4.2 Land Policy

4.2.1 Changes in Law on Land Administration

The Law on Land Administration is at the centre of land policies. With the development of society and the economy, and hence the emergence of new problems, it has experienced changes that have influenced land policies.

In 1998, the newly revised Law on Land Administration was promulgated. On land-use change, the previous policy stated that the area to be changed should be examined and given limited approval. Now there is a policy of regional land-use control. This policy change aims to prohibit illegal occupation of cultivated land by disassembling the process of examination and approval. In order to manage land more clearly, the new law classifies land into three types: land for agricultural use, land for construction use, and land so far unused. Land-use management should be based on overall land-use planning. Government at various levels should work out overall land-use planning according to the long-term development plan of the national economy and society, the demand for land resources' readjustment and environmental protection, and the land quality and various other needs. According to the overall plan, agricultural use of a particular piece of land can be prescribed. The prescription cannot be changed once it is confirmed.

Given the population pressure, the government has realised that farmland conservation is important for national food security. Farmland conservation has an individual chapter in the new Law on Land Administration. The government encourages individuals or collectives to reclaim unused arable land. It is prohibited to leave land unused. Regulations aim to prevent land from degeneration and to conserve farmland.

Another important change in the new Law on Land Administration stipulates: "*The duration of a farmland contract is lengthened by 30 years. Farmer's use rights to contracted land are protected by law*". During the contract, adjustments in land-use rights among contractors are permitted if assented to by two-thirds of the members of the villagers' committee or two-thirds of the representatives of the villagers and also by the agricultural administration agencies of the county's government. Villagers can participate in land administration according to the new law.

4.2.2 Changes in Land Development Policy

China is facing a conflict between a huge population and limited farmland. Rapid

industrialisation and urbanisation have occupied and will occupy more and more farmland. At present, 26,000 ha per year are built upon and this is expected to increase to 33,000 ha per year.

In 1953, the State Council approved and issued 'Temporary Stipulations on Land Requisition for Construction'. It stipulates the following principles.

- The uses of requisitioned land should be for the construction of national defence projects, factories, mines, railroads, transportation and water conservation projects, municipal engineering, and other economic and cultural facilities.
- The development should be indispensable and the local people's immediate or vital interests must be considered.
- Compensation for requisitioned land should generally equal the total production value of the land over three to five years. Assets on the developed land should also be compensated for at a reasonable price.
- Local farmers whose land is requisitioned should be resettled.

In 1982, the third 'Regulations on Land Requisition for Construction' were issued. The significant changes were as follow.

- Land compensation should equal 3–6 times the year's output value of the requisitioned land. This should be calculated according to average yield in the past three years and the price stipulated by the state.
- The provincial government stipulates the compensation for young crops and possessions on the requisitioned land.
- A development fund for new vegetable plot reclamation should be paid if vegetable plots are to be requisitioned.
- Each agricultural labourer whose land is requisitioned should receive a subsidy equal to two or three times the year's output value of the requisitioned land.
- The sum of land compensation and consolation subsidy should not exceed twenty times the year's output value for the requisitioned land.

Land development policy has played an important role in farmland conservation and the effective use of non-agricultural land. However, there are some problems. Compensation, calculated according to the value of agricultural products, is low compared to industrial products. In addition, the present policy neglects the future generation's demand for land in calculating the compensation. It conceals the true value of land and makes it less valuable. The amount of farmland will continue to decrease greatly if the price does not reflect its true value.

At present, the administration of land requisition remains in comparative disorder. There is no national decision-making procedure for compensation of requisitioned land and resettlement subsidy, and local government usually determines the compensation. The present method of land expropriation is mandatory and does not embody the participation of local people. In general, the farmers receive low compensation.

In order to mitigate the contradiction between population and land and to improve land ecology, the government has made a series of policies on land rehabilitation. These policies have made progress. However, the land rehabilitation rate is still low. At the end of 1994, for example, the rates of rehabilitation and utilisation amounted to only nine per cent of the total excavation and collapsed areas and seven per cent of the total of open-mining area. Recently, these rates increased to 22

and 33 per cent respectively. However, they are still much lower than those of most developed countries, where land rehabilitation rates are generally higher than 50 per cent.

The rehabilitation projects often have a shortage of investment and lack effective channels to raise capital. The price of mineral products does not include the rehabilitation cost. The principle "*whoever destroys the land should be responsible for its rehabilitation*" has no concrete measures to help enforce it. Small mining enterprises, in particular, lack the ability to rehabilitate destroyed land. In addition, there are no standards to assess if rehabilitation is appropriate. There is no stipulation on the duration of rehabilitation, and on inspection, checking, and acceptance.

Large-scale mining is one factor leading to land degradation. The state should make stricter laws and policies to control mining for short-term benefit and to promote rehabilitation of the land mined.

4.3 Policy Implementation

4.3.1 Implementation of Environmental Policy

The current Law on Environmental Protection is not treated as one of the national fundamental laws and, hence, has little force in the NPC (Wang Jin *et al.* 1998). The application of the Law on Environmental Protection places priority on regulations such as air pollution prevention and cure. The Law on Environmental Protection was formed in the planned economy of the past and has not been adapted to the market economy of today. The most important problem is how to deal with the relationship between the regulations on environmental protection and resource conservation and the Law on Environmental Protection.

In China, the laws on environment, resources, and land are separate, and different administrative departments carry them out. There is no synthesised law of natural resource conservation nor a unified administrative institution. Regarding land, although there also is no comprehensive law, there is a complete system of land administration that includes land investigation, assessment, use planning, research, and macro-administration, as the core. This situation means uncertain authority and responsibility and causes chaos in administration between departments. It makes it difficult to manage, develop, utilise, protect, and renew the environment, resources, and land as a whole.

Besides implementing and executing laws and regulations at the national level, local governments issue local stipulations on environmental protection. Particular units, e.g., environmental protection station or city construction office, are responsible for implementing national environmental laws and policies. Local legislation and policy generally pay greater attention to prevention and cure of pollution and less to natural resource conservation. They pay little attention to procedural legislation; and more to punitive legislation. Some local environmental legislation lacks consideration of local characteristics and only repeats national environmental law. Problems such as being complicated and confusing with non-standard wording, imprecise structure, self-contradictory content, and out of keeping with national environmental legislation make laws and policies difficult to implement. Moreover, the most important problem is the low degree of public participation in the process of forming environmental policy. People's awareness of their rights and their legal knowledge is weak.

4.3.2 Implementation of Agricultural Policy

Although the land contract responsibilities system has brought about a boom in the agricultural economy and rural development, problems still exist. Farmers worry that land policies are not stable, although the duration of land contracts has been lengthened by another 30 years. They do not manage their land whole-heartedly or invest in it. On the contrary, they use chemical fertilisers and exploit the land to obtain high yields and maximum profits during the period of contract. They do not consider whether their land use is sustainable or not.

The land contract is based upon the size of the population or the ratio of the population to workers. A single household does not get a complete farm; every household is allocated patches of land in order to maintain equality. Complete fields are broken up. Farmers have to work many small patches, making it inconvenient to manage the land. It is difficult to establish economies of scale.

The disparity between farmers is great. Some farmers receive good education, master advanced agricultural knowledge and technology, and can make money. Some farmers are rich so have the capacity to invest more in their land. They tend to manage and conserve their land well. However, some farmers lack scientific knowledge. They use traditional methods to manage their land. They lack capital for investment. They have lower yields and less benefits. The poorer they are the more they depend on the land. When their land is exhausted, they open up new land on the mountains that leads to soil erosion.

After land is contracted, farmers should have the right to plant any crop they want. However, some departments interfere. For example, the Tobacco Bureau of Luquan County, a local government department, made a contract with local farmers in 1998 for planting flue-cured tobacco. The contract stipulates that every household plant about 0.33 ha of flue-cured tobacco, and the Tobacco Bureau is responsible for purchasing these products after harvest. However, the Tobacco Bureau has a contrary purchasing policy. It lowered the price and grading of tobacco when purchasing from farmers. Local farmers were dissatisfied and accused the Tobacco Bureau of breaking the contract, but to no avail. Cases like this not only increase farmers' suspicions about agricultural policy, but also lead to changes in land use.

The Land contract responsibility system also faces the influence of the 'Domicile Control System (DCS)'. The DCS separates the urban population from the rural population. This policy limits freedom of movement from the countryside to the town or city. Surplus labour in the villages can only do part-time work in the city. In addition, benefit differences mean that farmers receive a lower income than urban inhabitants. Farmers want to leave the village and go to the town or city to make money. Their lands are put aside, or are managed by other people in an extensive way. The DCS and the situation of more people and less land results in part-time agriculture, which is adverse to effective land use and conservation.

Although eco-farming and sustainable agriculture are fashionable and relevant policy exists, and although the Agricultural Bureau of Luquan County declares that eco-farming has been practised for several years, most farmers do not know about these concepts. This kind of separation between policy and farmers is not uncommon.

Eco-farming advocates less use of chemical fertiliser. However, many farmers in Luquan County are using more and more chemical fertiliser. A major reason is the large acreage of flue-cured tobacco. According to a local farmer: "*We are using more and more chemical fertiliser. The fertiliser investment makes up one-third of total expenditure of the whole family. The cropland also seems to be dependent on chemical fertiliser. If you do not put enough fertiliser on the land, the yield will be lower and lower.*"

In talking about the influence of chemical fertiliser on soil structure and underground water, local farmers express the opinion that more chemical fertiliser is not good for soil and underground water (the latter is an important source of drinking water). They say: "*But we have no choice. We have limited farmlands that cannot produce enough grain for us without higher fertiliser input.*"

The first task of most people in rural China is production of enough food for survival. Although farmers are aware that sustainable agriculture and eco-farming are good, and are conscious of the harm caused by chemical fertiliser and pesticide use, they have to choose between survival and sustainable development. If policies do not match the actual situation, farmers do not adopt them.

The government has emphasised policies for advancement of agricultural technology and education. However, like the eco-farming policy, they are not implemented and do not actually benefit farmers. Few new technologies—except fertiliser, pesticides, and plastic film—are accepted by local farmers. In the process of policy implementation, one basic fact was neglected: the majority of farmers only had primary-school education and many are illiterate. Although the government has made efforts to improve farmers' knowledge, they are too busy working and are not interested in literature and scientific knowledge, not to mention articles of law and policies.

4.3.3 Implementation of Forest Policy

Forestry policies are often changed. Recently, a new national forest law has been issued and principles for implementing it are being discussed in detail in the provinces, especially in provinces where there are large areas of forest such as Yunnan. Methods for Forestry Land Administration in Yunnan Province have been issued and relevant policies have been established through co-ordination between various authorities. A special department of forestry policy and regulation was established in 1995 in Yunnan Forestry Bureau. Although some conflicts between agencies exist, the provincial government co-ordinates relevant work, making it easier.

In the process of executing policy and regulation, local officers often protect local vested interest so that policy is distorted. Lawbreakers are usually businessmen. Although the state and provincial government try to manage the timber market, businessmen often bribe officers in order to obtain priority in the timber trade. Luquan County has more than 40 wood factories.

About 15,000 people are responsible for forest policy implementation in Yunnan Province. They compose a strong force and should be a guarantee for implementation. However, they face many difficulties. The story of Luquan County may illustrate the situation.

In Luquan County, the majority of land is mountain and hillside. The main factors causing land degradation are reclamation of steep slopes and deforestation. Although Luquan government has issued

provisions on forest administration and there are many fines that should make it easy to enforce the provisions, the phenomenon of cutting the forest and cultivating the steep hillsides does not disappear completely. The main reasons may be the shortage of forestry staff and the difficulty of their work.

In Pingshan Township, for example, the forest station is responsible for all work related to forestry administration. The station has 24 staff to administer the forestry affairs of 103 villages and 169 sq.km. of forest. Staff have to go to the majority of villages on foot because of poor road conditions. While inspecting the forest, they often face violent resistance by lawbreakers, sometimes running into danger. The forest station hired one person for each office (the basic administrative unit in rural China) to take responsibility for forestry supervision. Each officer has to check the forest and report illegal felling to the forest station. Li Jinshen, who is 26 years old and takes responsibility for protecting the forest of the area administered by Yanwa Office, told us: "*This job is arduous and it is easy to displease the people who break the policy or stipulations. Of course, the wages are too low.*" Lower wages weaken the enthusiasm of forestry staff.

The process of making and enforcing policy should include the participation of local farmers. However, local farmers hardly ever participate. They say: "*We have no choice because this is policy*", while they continue to be discontented with current policy.

The current policy is made 'from the top' and generally considers macro-problems of the whole nation rather than local conditions. They are often hard to implement at the local level. Only policy that is made 'from the bottom up' can be trusted by farmers and arouse their zeal for active implementation.

4.4 Policy in Practice

Usually there are strict articles and sections in local policies and stipulations, their implementation is weak, however. This reduces the operational ability of the policy and gives opportunities for both users and administrative agencies to extract private benefits.

For example, although the 'Provisions on Environmental Protection in Yunnan Province' stipulate that all lawbreaking behaviour will be fined, no concrete quantitative standards are identified. 'Enforcement Method of Rewards and Penalties for Provisions on Environmental Protection in Yunnan Province' stipulates a certain scale for imposing fines. If the circumstances are serious, for example, lawbreakers will be fined from 1,000 to 30,000 *yuan*. However, lawbreakers bribe the staff because supervision is weak. The result is often that the lawbreakers carry on breaking the law and only pay a small fine.

In China, the legal system is not completely independent of political and administrative intervention. Therefore, the role of law is weakened and such phenomena as 'contempt for law' and 'substitution of power for law' frequently happen. Although there are many laws preventing land degradation, it is still severe. One of the main reasons is that the laws are not followed. As in the whole of China, several departments, such as forestry, agriculture, environment and land administration, are concerned with land degradation. There is no special department. Estimation and evaluation are often made intuitively and approximately according to rough secondary data and materials. Contradiction and conflict between different departments are inevitable. YPG has appointed a vice-provincial governor to co-ordinate the interests of each department. This is a typical case in

which the higher leader substitutes authority for the law. It is extremely difficult to study the policy-making and implementing process because there are so many hidden agendas behind the policy.

4.4.1 Local People in the Policy Process

In practice, local farmers are not only the main receivers of policy, but also the direct link between policy and the environment. The majority of local farmers express great zeal for good policies that bring them benefits but also show discontent for inappropriate policies. The main concerns of local farmers are "*to save more money, to earn more money, and to live in a more comfortable manner*". One farmer said "*We learn various laws and regulations, but we do not consider these laws most of the time, we carry on as we usually do.*" He continued "*Every farmer has 0.13 ha of land for food crops. However, almost every household has opened up land on about 1.3 ha of mountain and for various purposes.*" When talking about energy, he said "*There are so many trees in the mountains. It is nothing for us to fell some trees for fuelwood.*" Activities of local farmers have a direct impact on land degradation/improvement.

When talking about policy implementation, a local leader said "*Policy-makers are not tired when they make policy but are too tired to enforce these policies. Too many policies come from various upper agencies. But we must execute them as a whole. The cadres at the basic level are responsible for too many things, even various household affairs.*"

Chapter 5
Policy Impact

Influenced by the policy of sustainable agricultural development, more than 1,200 experimental sites with an area over 6.67 million ha had been established in China by the end of 1995. Policies of agricultural resource conservation and environmental protection have played positive roles in agricultural development. Although food security is an important objective, government also makes an effort to conserve agricultural resources and environment rather than merely increase production. Projects have been undertaken for soil conservation and the establishment of basic farmland, agricultural infrastructure, water conservation, shelter forest, and so on.

The present policy of agricultural investment is not effective. In some remote areas, both communities and individuals are too poor to invest in the land. Agricultural products only satisfy local subsistence needs. The investment for agriculture can only be raised through non-agricultural employment. In recent years, however, there has not been adequate employment opportunities in towns and cities for labourers from the countryside. In addition, farmers cannot obtain adequate loans from banks because of state limits on agricultural loans. As a result, limited inputs lead to lower production efficiency and inadequate land investment. The government should increase agricultural investment or loans, encourage farmers to invest in agriculture, and renew the idea of self-sufficiency. These practices will increase production and labour efficiency, and prevent land degradation and protect the environment.

The agricultural policy in China encourages the development of village and township enterprises (VTE). VTE appeared because of the conflict between excess labour in countryside and limited employment opportunities in cities. Since 1979, VTE have developed rapidly. In 1990, for example, the total output value of VTE accounted for 30 per cent of the national total. VTE have changed the binary economic structure of countryside-city and agriculture-industry. It has contributed much to improvements in farmers' living standards. However, VTE also engenders problems such as resource waste and environmental pollution owing to their poor equipment, technology, and management. The development of VTE

has occupied large areas of cropland. The small scale of VTE usually results in poor land-use efficiency and wasting of land resources. The conflict between land scarcity and the large population becomes more serious. Owing to lack of technology, talents and investment, VTE often operate in an extensive and underdeveloped manner. The environment is polluted and resources are seriously wasted and destroyed. Exploitation without reclamation causes heavy erosion. In some poor areas, policies for economic growth and poverty elimination are given preference, and environmental protection and resource conservation are usually ignored.

Policies, such as those on pricing and distribution of agricultural products, agricultural subsidy and international agricultural trade, are established in China. They can influence changes in land-use patterns. Low prices of agricultural products can inhibit farmers from investing in agriculture. When agricultural products are brought into the market economy, their price increases gradually, which stimulates farmers to invest in and protect their croplands. The policy of state monopoly for purchasing and marketing solves the difficulties of selling and storing agricultural products. The policy of agricultural subsidy gives some assistance to the distribution of basic agricultural materials such as fertiliser and agricultural membranes. Reduction of taxes after natural disasters is beneficial for restoring production. These policies increase the farmers' capacity for investment, promote proper land use and prevent land degradation. The government imports grain to areas where land is short so cultivated slopes can be returned to forest or grassland. This reduces pressure on land and is beneficial for better land utilisation and management and for control of land degradation on a wide scale.

The new forest law has played an important role in encouraging people to plant trees, improve the environment, and practise sustainable development. The 'Three Fixations' in forestry policy, however, have an impact on deforestation. They are too simple and lack support (Zhang Jianguo *et al.* 1992). The problems concentrate on uncertain forestry ownership. Forest farmers fear that the policy might change again as in the past. So, after woodlands were reallocated to farmers, they cut down the trees. If large areas of mountain forest were reallocated to farmers, the inevitable outcome was the acceleration of deforestation. No money was allocated for planting new woodlands. Under the policy of afforestation, two kinds of forest bases were established in Yunnan Province during the period from 1976 to 1994. They were the timber forest base and economic forest base. The main species of timber forests are Chinese fir, Armand pine, and *Eucalyptus*. The planting area has reached 0.35 million ha. The main species in the economic forest base are Persian walnut, hairy chestnut, and oil tea. The area has reached 53,000 ha. Dry fruits and fast growing timber forests were planted in 1995. The planned planting area is 0.28 million ha. The main species in the latter forest type are Chinese fir, Yunnan pine, Armand pine, *Eucalyptus*, bamboo, westsouth birch, common teak, and Chinese yew. A shelter forest project for the middle and upper Yangtze River was completed during the period from 1989 to 1995 and covers 0.31 million ha.

5.1 Policy Impact in Luquan County

In the following sections, the impact of policy on farmland per capita, the production of grain and flue-cured tobacco, forest, water, and soil erosion will be examined. The years 1949, 1957, 1965, 1980, 1990 and 1997 have been chosen as points at which to measure the impact of these policies. Among these years,

1949 marked the establishment of new China, 1958–59 is the period of the Great Leap Forward that advocated the rapid production of steel and emphasised rapid increase in grain production. There was a major natural disaster from 1960 to 1962. The subsequent three years were a period of economic readjustment. Between 1966 and 1976 was the so-called Cultural Revolution that impacted on every aspect of the society. This was followed in 1978 by the beginning of reform and opening up in China. The Contract Responsibility System began in 1980, when the period of contract was stipulated as 15 years. The new Law on Land Administration has now prolonged the contract period for another 30 years.

In Luquan County, the farmland per capita decreased by 15.6 per cent from 1949 to 1957 (from 0.171 ha to 0.144 ha). It was cut by 39.2 per cent from 1958 to 1965 and by 12.1 per cent from 1980 to 1997. The decrease in farmland per capita was 57.9 per cent from 1957 to 1997. During the past 40 years, the population in Luquan County increased by 98.8 per cent and the agricultural population reached 425,447 at the end of 1997. The rate of population growth is slowing down but this cannot be attributed to one specific policy.

The average grain output decreased by 27 per cent, from 2,250 kg per ha in 1957 to 1,642 kg per ha in 1965. Subsequently the yield of grain rose by 69.8 per cent to 2,789 kg per ha. It fell sharply from 1980 to 1990 by 31.6 per cent and less sharply between 1990 and 1997. Since 1980, China has carried out the Contract Responsibility System which encouraged farmers to take part in agricultural production and manage their land. It was intended that the grain output per ha would rise. In fact, the reality in Luquan County shows the reverse. There are many factors that can influence grain yield, and they are difficult to separate. Land degradation is one such factor.

As with grain production, flue-cured tobacco production is also erratic. Except for 1960, the yield per ha of flue-cured tobacco generally increased during 1942 to 1975. After 1975 the average yield generally decreased, but 1990 is another exception. From 1980 to 1985 yield was cut by 5.1 per cent from 1792 kg per ha to 1700 kg per ha. Yield decreased by 21.1 per cent from 1990 to 1997. Yield decreases can be attributed to land degradation because flue-cured tobacco not only needs lots of soil nutrients but also contributes to deterioration in soil structure.

In 1950, the forest coverage rate in Luquan County was 46.2 per cent. After the Great Leap Forward and Cultural Revolution, coverage rate decreased to 23.4 per cent in 1978. It increased to 28.4 per cent in 1990. In the period from 1953 to 1990, the tree-planting area on bare mountains was 93,000 ha. The total conserved area was 33,000 ha, including 25,000 ha of timber forest. The area renewed was between 133.3 and 666.7 ha per year. The number of trees planted compulsorily was 1.5 million, but the survival rate was only about 30 per cent because of improper management.

The forest of each township in Luquan County has changed greatly since 1980. The total area of all categories of forest in Luquan County increased by 0.53 per cent from 1980 to 1990. However the area of quality forest decreased by 51.8 per cent, and sparse forest area decreased by 94.0 per cent. The change in area of brush forest and barren mountain suited to forest rose by 143.5 and 289 per cent respectively. The main reason for this is that farmers cut down many trees at the beginning of the contract responsibility system for forest land. During the past ten years, local farmers opened up lots of

farmland by destroying forest land because of the pressure of an ever-increasing population.

One notable impact on forest has been from the policy of natural reserves. Jiaozi Mountain Natural Reserve has been established in Luquan County. Before its establishment, precious plants and wildlife were randomly destroyed owing to illegal felling and hunting and poor management. The situation in this natural reserve is now gradually improving.

In Luquan County, the policy on population control has controlled the increase of population and decreased the pressure on land. During the period from 1977 to 1990, the birth rate remained between 14.62 and 17.32 per cent. The percentage of second births was 37.32 per cent. The percentage of first births rose to 51.13 per cent. Birth control has reached 81.48 per cent. Otherwise there would have been an additional 84,835 children in the past 14 years. This has contributed to an increase in living standards and eased social and economic conditions such as conflicts between less land and fewer opportunities of education, housing and employment, and greater population. Local farmers said that they do not want to have more than two children because more children means a greater burden and less land per capita.

In Shangyan Village of Yanwachong Office of Luquan County, there was a small reservoir at the bottom of the valley before 1978. However, the reservoir has been almost fully silted in the past 20 years because of severe soil erosion. It has even become paddy field during dry years; its surface is about 3m higher than the valley bottom outside the dam. This situation resulted from the lack of strict policies at the village level to manage soil erosion. Also villagers abandoned penstocks that had been destroyed or partially filled by eroded soil. During the period of the Great Leap Forward, villagers spent a lot of time building a long penstock for the purpose of irrigation and erosion control. Nevertheless, this penstock has never been used because deforestation led to drying up of the water source.

Policies of poverty elimination have problems. In Yanwachong Office of Luquan County, many villagers complained that they have not received enough help although the policies are there. For example, a subsidy of 70 *yuan* per 0.067 ha should have been received for planting chestnut trees, but only 7 *yuan* per 0.067 ha was distributed. In another example, the government encourages the establishment of township enterprises, such as mining, to develop the local economy. An enterprise contracted two mountain sites for five years mining at the cost of 5,000 *yuan*. Now the mountain is degraded because of opencast mining. In the summer of 1998, severe soil erosion caused by the destruction of the mountain damaged more than 10 per cent of the cropland in the village. The village lost 10 tonnes of grain and 1.33 ha of farm land.

One leader from Yanwachong Office also spoke about another effect of the poverty elimination policy. *"Although the government carries out compulsory education and has a preferential policy in minority regions, tuition fees are still high."* Tuition for children is a major expenditure for most rural families. For example, 20–30 per cent of students could not graduate from junior middle school and no more than 10 per cent could graduate from senior middle school in Yanwachong Office.

The village is a smelting furnace of various policies that mix together and fuse at last.

The main aim of poverty elimination is to help farmers overcome poverty and build an income through promoting agricultural productivity. However, the farmers have found that crop cultivation cannot make them rich; they are bound by the limits on land that restrict their creativity and lessen their choices.

Chapter 6
A Case Study of Shangyan Village, Pingshan Township, Luquan County

Luquan Yi and Miao Nationalities Autonomous County, an upland and poor area in the Hindu Kush-Himalayan region, was selected for the case study. In order to understand the policy process, policy impact, interface between policies, and land degradation, Shangyan Village, a typical land degradation site in Pingshan Township of Luquan County, was chosen for field work at the community level.

There are 81 households and 308 people (161 men and 147 women) in the village. Although Luquan is a Yi and Miao national autonomous county in Yunnan, most of the population in the village are Han. The average landholding is 0.034 ha per person. The average annual income is 1,040 *yuan* per capita. The average grainholding is 205 kg per capita.

Surrounded by hills and mountains, Shangyan Village is located in a valley. A small river flows through a reservoir that has become flat land because of serious soil erosion and sedimentation. The sediment in the reservoir increased by almost 10 cm per year. Every summer, heavy rain brings floods to the small village. Farmers have to rebuild and repair their cropland each year. Watershed and soil erosion becomes more and more serious because of deforestation, mining, and reclamation in the mountains. The situation is typical in the county and throughout Yunnan Province.

The objectives of this field work were as follow.

- To identify stakeholders who can affect or be affected by land policies and their implementation and by land management inside and outside the community
- To recognise the responses of stakeholders to land policies
- To compare the rights of men and women to the land
- To understand the people's livelihood, land use, and natural resource management in the community
- To identify access patterns of land-users
- To analyse the interface between policies and land management

- To find the reasons for land degradation and to provide suggestions for countermeasures

This field work was carried out by means of anthropological methodologies such as PRA (participatory rural appraisal), semi-structured interviews through checklists, interviews of important figures, and group discussion.

In China, the most powerful stakeholders are government departments at national, provincial, and local levels. These government organisations are responsible for policy-making, policy implementation, and policy readjustment. Land policies are implemented from the top to the bottom. Various community-level organisations of the government are responsible for carrying out polices. Through these organisations, polices are brought to every village, every family, and every person.

6.1 Social Organisations and Land Policy Implementation Process

The lowest government organisation in the village is Yanwachong Office. There are nine positions in the office; three are full-time and the others are part-time. The full-time staff are the party branch secretary of Yanwachong Office, the director and the accountant. Six part-time staff include the forest protector, family-planning worker, agricultural technical worker, health care worker, women's director, and veterinarian. One of them is a woman and responsible for women's affairs in the office. Yanwachong Office looks after 11 natural villages, 421 households and 1,709 people, of whom 1,107 are Han, 62 Yi, 147 Miao, and 387 Lisu.

Every land policy is put into effect in the community by the office. Policies are implemented from a higher level to a lower level. Implementation in the community is usually delayed. For instance, the central government issued the Household Contract Responsibility System in 1978 to distribute land to individuals. Yanwachong Office started to implement the policy in 1981. All land was distributed by 1982.

The farmers enthusiastically supported the policy during the implementation process. They wanted to manage land and production by themselves, but they worried that it might not happen. On the other hand, administrators delayed because policies changed so fast and often in the opposite direction to before. They feared that they would lose their positions if they implemented a wrong policy. For example, before 1978, supporting privatisation was seen as a serious mistake. A special method was created for dealing with the special situation. Lands were not distributed to individuals immediately. Instead, land-use rights were distributed to production teams (a natural village) in 1981. There were reasons for doing it this way. The production team was the smallest collective. If the policy was wrong and did not continue, the mistake of running a private-ownership system could be avoided and it was easy to return to the old rules. On the other hand, if the policy continued, they had already taken the first step on the new way through their actions. When in 1982 it was obvious that the policy would continue, administrators took the second step of distributing land to individuals.

This example shows the typical implementation process of national policies. Administrators with different understandings of policies produce different results in policy implementation. People often complain that policy implementation is slow and deviates from its path. On the other hand, the administrators of community-level organisations often complain that they have to

confront lots of challenges. They have to work according to policies and orders from various higher organisations; and they also have to consider the farmers and local situation. Policies are not always suitable. Stakeholders representing different economic and political power groups are often in conflict with each other because of differing interests and views. The community-level office plays a role as a negotiator between higher levels and farmers.

The process of policy implementation from Luquan County to Shangyan Village has to take three steps: from the county government to Pingshan Township government, from the township government to Yanwachong Office, and from the office to Shangyan Village. The staff of Yanwachong Office and the head of Shangyan Village carry out the policy at the community level. They usually hold meetings to discuss a work plan and use means such as broadcast, backboard report, panels and slogans to inform farmers about the policy. The most useful method is to visit families in the village and talk to them. Routine government work is also linked from higher levels to lower levels. For instance, routine forest work is carried from the forest bureau in the county to the forest station in the township, then from the station to the forest protector in the office.

In the process of policy implementation, leaders in the community play the most important roles. These people often have some special background such as higher education or having a powerful relative in the community. They have much influence in the village. The staff from the office are not only rural leaders, but also farmers. Their families are living in the villages. All of them take part in agricultural work. Most, except for the three full-time staff, cannot support themselves with their wages. They have to work in the fields or find non-agricultural work.

6.2 Farmers and Land Management

Farmers in Shangyan Village consist of the largest group of land-users. In rural China, collectives own land and farmers are the land contractors. They can only use land that the office distributed to them in the early 1980s. They can not buy or sell land and only have the rights to use land. The farmers pay agricultural tax to the state.

In 1982, Shangyan started to practice the economic reform policy. All collective lands were distributed to every family. Sixty per cent of the land was distributed according to the population size and the other 40 per cent was distributed according to labour. Before 1992, landholdings were readjusted every five years. Families whose landholdings decreased returned the extra shares. Most decreases in population were caused by death and immigration. Families whose numbers increased received additional shares. Families that had to give up land used to return poor quality land. So poor quality land changed hands frequently. After 1992, the central government stated that land contracts would not be changed for the next 30 years in order to protect farmers' rights to land use in the long term. Land readjustment stopped. From 1992 to 1998, because of population change and limited land, the average landholding in every family changed. Individuals in families that increase in size now face decreasing living standards because of land shortage and a lack of non-agricultural work. Some families decreasing in size are not able to manage their land because of shortages of labour or investment. Therefore, some families let other families use their lands to produce crops and tobacco and obtain money and crops. Transferring 0.066 ha of tobacco land can yield around 350 *yuan* per year.

There are two perspectives on land readjustment or land contract stability. Leaders in the office argue that it is necessary to keep the land contract stable. When lands were readjusted every five years, the poor land along the river was given up first. No one really cared for this land. It used to be passed from household to household. No ownership means lack of responsibility. So the land deteriorated and became useless. Land readjustment caused land degradation. On the other hand, farmers have a different perspective. There are few opportunities for them to find non-agricultural jobs in villages or towns. Most farmers are dependent on the land. They say "*Some families have to support three persons on one parcel of land. Two persons do not have land. They cannot enjoy the land equally. A gap appears between rich and poor. So land readjustment is necessary and should be practised to ensure the basic needs and living standards when the number of people in a family increases.*"

6.3 Women's Right to Land

Women are the main users of land and important stakeholders in land management. They perform 70 per cent of the work in the village and have an important responsibility in the agricultural system. However, they do not have full rights to land use and decision-making. The government has tried for a long time to give equal rights to women. When land was distributed in 1982, women—including unmarried girls—obtained shares.

In many rural areas, such as Shangyan Village, however, there is a gap between the ideal and reality. Rural people have a traditional patriarchal family system. If a woman marries a husband from another village, she leaves the community and loses her share of land without any compensation. Even if she marries a man in the same village, she cannot use the land of her previous family. Her brothers or other men in the family will take her share of land. Land is always handed down to men in families. A divorced woman without a son often becomes homeless with no land to use. There are often rules to prevent a woman's husband entering a community because land and natural resources are limited. A man who marries a woman from another village cannot register as a community member of his wife's village if the woman has a brother. If a family has no son, only one daughter is allowed to let her husband live with her in her village. Although legally men and women have the same rights to land, the reality is different. Traditional practices tend to deny women rights to land.

6.4 People's Livelihood and Land Use in the Community

In order to understand land degradation in the community, we need to consider local people's livelihoods. In the upland, local people's activities for subsistence directly affect environmental sustainability. In Shangyan Village, there are two harvests a year: wheat and beans in the spring; and rice, tobacco, and corn in the autumn. Cultivated lands in the village can be classified into two types: paddy field and rain-fed cropland. Labour allocation and production are still traditional. Men are in charge of important and heavy work. Women are responsible for less important but time-consuming and troublesome work such as collecting fuelwood, preparing manure, transplanting seedlings, and growing vegetables.

The agriculturally busy season is from the end of the third month to the tenth month (lunar month). Tobacco and other crops are raised. Raising tobacco and dry-processing need a lot of time and labour. Tobacco is the most important cash crop and rice is the staple food. During the off-

season from the eleventh month to the second month of the following year, young men often move into cities or towns to find work because there is no work to do on the land.

After paying agricultural tax, few householders have crops to sell. In fact, more than half of the householders have to buy rice and other grains when they sell tobacco. Wheat, corn, and beans are important foods when the rice is insufficient. About seven families do not have enough grain and income to meet their basic needs.

Farmers think the main reason they could not produce enough food is the shortage of land. When landholdings per capita became smaller because of population growth, farmers started to exploit mountain land and other natural resources for subsistence. Some unsustainable activities, such as deforestation, reclamation of steep slopes, and mining, appeared. For most local people, however, these activities did not bring anything but floods and degraded surroundings. About 0.4 ha of land along the river are washed away by floods almost every year. With the heavy rains in 1998, flooding covered 1.33 ha. Some paddy fields produced about 13,500 kg per ha of rice in the past, but only produce about 5,400 kg per ha now. Rice production per family decreased by 1,000 kg in 1998. Farmers cannot sell all of their tobacco because the tobacco firm in the county cut its purchasing requirements. Unshelled tobacco was piled high near every house in the village.

6.5 Natural Resources, Environmental Degradation and Land Policies

Natural resources in Shangyan Village are limited and degraded because of unsustainable activities. Most of the forest has gone. The main vegetation on the hills and mountains is in the form of bushes, shrubs, and grasses. Reclamation, deforestation, and mining have aggravated environmental degradation and led to increasing poverty.

The head of Shangyan Village told us that 40 people do not have a share of cropland and have to reclaim mountain land. During the 12 years from 1985 to 1997, reclaimed mountain land increased by 3.33 ha in the village. About 3 ha are used to plant tobacco to earn money. About two-thirds of reclaimed lands are illegal. Although villagers are fined each year, they continue to use the land. The population has increased by 65 per cent in the village over the past 27 years but the village's legal landholding remained the same. According to the land and forest polices, reclamation on slopes over 25° is forbidden. In 1998, Shangyan Village voted in a new head. The first thing he did was to address illegal reclamation. At the same time, some wastelands that were contracted to a company for mining have returned to the village because the contract expired. The new head called on every family to plant Chinese chestnut trees on the wastelands and illegally reclaimed lands. Each family received a share of the land after reforestation.

The head said: "*It is good for both farmers and forest officers. Most of the villagers are happy to get a share of the land. Before the trees grow, farmers will plant crops with the trees. After the trees mature, they harvest Chinese chestnuts. The officers are also happy to solve the problem of illegal reclamation.*"

The village head understands the relationship between people's livelihood and land conservation. Community conservation needs to benefit local people.

6.6 Deforestation and Improper Forest Policies

In the Great Leap Forward Movement at the end of the 1950s, deforestation for fuel to smelt steel destroyed much forest in Shangyan Village. The second period of deforestation happened in 1984–85 when the government contracted forest land to households, and villagers started to fell the trees. Many trees in Shangyan Village disappeared in one year. Although the county government recognised that this policy was wrong and tried to stop it by returning individual deforested land to collectives, the order was not put into effect because they feared it might cause further deforestation if the policy was changed so extremely. From this example, it can be seen that policy can affect land use and management. Also the use of land by stakeholders can affect policy-making and policy implementation. About 13 years have passed and people can now see the situation more clearly. A group of local people discussed the topic and concluded the following.

- Extreme change of ownership

In the past, farmers had been educated in idea of public ownership. *"Every tree or straw belongs to the collective."* Overnight, things changed completely. People did not find it easy to adapt to the new situation. They could not accept the fact that individuals themselves now owned hundreds of trees. They did not know how to deal with so many trees. They did not know the use of the trees and how to manage the forest.

- Lack of confidence in the new policy

The policy changed so fast and was so different from the past. Although villagers were satisfied with the policy, they feared that the good time could not last long. Almost every farmer had had bad experiences with policy change. They did not believe a policy could continue for a long time. They were not able to consider the future, but just thought of the rights and benefits of the present.

- 'A free dinner'

Farmers received the forest at no cost. It was an unexpected 'free dinner'. People did not value trees because they did not pay for them. People did not feel guilty, when they stole other people's trees.

Now, as a result of deforestation, some people have to travel far to collect fuelwood in other communities' forests. Collecting fuelwood is the women's responsibility. Deforestation has created more work for women. With deforestation, floods and other disasters are increasing and more serious. The community faces a situation of decreasing outputs and land degradation. Local farmers have tasted the bitter fruit of environmental degradation. Now they have recognised land degradation is serious. They do not cut trees and fuelwood in the mountains. They want to plant trees and are against mining.

6.7 Mining and Interests of Stakeholders

Now there are six mining sites near Shangyan Village. Although government organisations try to control the mined acreage, mining is another human activity that has caused environmental degradation in the area. The head of Shangyan Village said:

"Mining has had a negative influence on our living conditions. The condition of the land is deteriorating and output is dropping. I am strongly against mining. My view represents not only that of our village, but also of ten other villages in the Yanwachong Office."

Although both the local people and policy are strongly against illegal mining, legal mining activities continue in the area.

If illegal reclamation is considered as subsistence activity, mining should be seen as an activity for making money. Compared with reclamation, there are fewer participants and they are better off than the farmers. Miners can be organisations or individuals from inside or outside the community. For instance, a collective enterprise of Pingshan Township contracted to mine land in Shangyan five years ago. It paid 8,000 *yuan*. When the contract expired, the land was in poor condition.

One miner told us how he obtained mining rights. The application process is as follows: village to Yanwachong Office to mining-control committee of township to forest station of township to land bureau of county. All processes have taxes such as forest tax, land tax, reforestation tax, and other taxes for management. He applied to mine 0.13/ha of land. He paid over 1,000 *yuan* in taxes. In addition, he had to pay the Yanwachong Office when mining started. Transporting one truck of ore from the community costs 50 *yuan*.

From the above process, it is clear that people who can mine are not common people. They not only have better economic conditions, but also have some relationship with government organisations. In fact, miners and some organisations share an interest in mining. One forest staff member said: *"Mining is good for reforestation. When ore and stone are taken from the land, it is good to plant trees."* Local people who suffer from the results of mining obtain nothing. So farmers are strongly against mining although the leaders in the village are not so dissatisfied.

The above analysis shows that deforestation, reclamation, and mining are the main factors leading to land degradation. Local people have the following suggestions for future land-use.

- To close the mountains for reforestation
- To return illegally reclaimed land to forest
- To stop mining
- To repair the reservoir and harness the river

6.8 Policy Impact in Contemporary History

Before 1949, landlords and rich farmers made up 20 per cent of the population and owned about 80 per cent of the cropland. In order to abolish the old land system, eradicate all forms of exploitation, and meet the land need of poor farmers, the central government of new China issued the Land Reform Law in 1949.

Luquan County started to carry out the Land Reform Law in 1952. Land reform teams were organised and went to every village. The status of every family was identified according to its landholding quantity, exploitation quantity, and the degree of taking part in work. The class status in rural areas was divided into landlord, rich farmer, middle farmer, and poor farmer. The lands, houses, tools, and cattle of landlords were confiscated and redistributed.

Land reform was completed in Luquan County in November 1952. The old land system was destroyed completely. The landholding quantity and productive material of every person was equal and even. After land reform, poor farmers became enthusiastic producers. In Luquan, the total output of grain reached 50,475 tonnes and grain-holdings per capita were 135 kg in 1952, an increase of 14 per cent compared to 1949.

However, some poor farmers lacked land-management skills and experienced poor economic conditions; they had to sell their land, especially when they faced natural and man-made calamities. Rich farmers started to buy the land. Thus a new polarisation began. In order to prevent this trend, it was considered necessary to abolish private ownership of productive materials. Cooperatives were established as an experiment in 1954 in Luquan. People, along with their land, productive materials, and cattle, joined cooperatives. After agricultural cooperation transformation was completed in 1956, 192 cooperatives operated in Luquan. All farmers earned their income and grain according to their working contribution to the cooperatives. Private ownership of productive materials was replaced by public ownership. However, every family had a small plot of land to plant vegetables or cash crops and raise pigs and chickens. At the same time, private mountains and trees also joined the cooperatives. However, because of the low compensation, many households cut their trees before joining the cooperatives. Deforestation took place everywhere.

In 1958, the central government initiated the Great Leap Forward. In the spring ploughing season, the government of Luquan County used military methods to manage agricultural production. More than 60,000 farmers were organised into contingents of the people's militia to complete the Great Leap Forward in agriculture. The target for the average yield of grain was 15,000 kg per ha (it was actually 2,220 kg per ha in 1957) and for average grain-holding per capita 1,500 kg (it was actually 156 kg).

Then the 192 cooperatives were merged into 12 People's Communes. Members of the communes were not allowed to carry out household production. Markets were closed. Vegetable land, domestic animals, and fruit trees were taken into communes. Public dining rooms were opened. Many labourers were put to build irrigation structures, repair roads, and make steel, leaving only the old, sick, and children to take part in agricultural work. As in other rural areas in China, serious starvation affected the county from 1959 to 1961.

During the Steel-Production Movement in the Great Leap Forward, there were three big sites and dozens of small sites for making steel in Luquan. Trees were cut and made into charcoal to smelt the iron. The forest almost ran out of fuel. Even some religious forests did not avoid the destruction. Forests that had been conserved for a thousand years disappeared in the twinkling of an eye. This caused the greatest deforestation since new China had been established.

In order to provide pit props for Dongchuan Copper Mine, the forest was cut. For example, 4,300 sq.m of wood was cut in the Wanbaoshan forest of Luquan County. However, according to investigation teams from the Yunnan Forest Bureau and Yunnan Transportation Bureau in 1960, 5,680 sq.m. of wood were waiting to go to Dongchuan because of transportation problems; 3,800 sq.m. of wood rotted because of poor management.

The results of the Great Leap Forward were tragic. Luquan County experienced three years of starvation, the rural economy was broken, and the natural environment destroyed. The forest cover in Luquan County decreased from 46.2 per cent in 1950 to 23.5 per cent in 1973.

Chapter 7
Conclusion

Since the establishment of the People's Republic of China, the government at all levels has made policies, laws and stipulations on land resource conservation. These policies have played a role in land use and prevention of land degradation. However, the government has also enforced some inappropriate policies. The policy of increasing steel production during the Great Leap Forward is the most outstanding example as it led to the destruction of the forests in China. The policy of harvesting Grain Production led to vast reclamation of range and forest lands. The land contract responsibility system also caused disorder in the beginning.

The impact of policy on land degradation takes various forms. Some nation-wide policies, such as increasing steel production can directly cause land degradation or environmental changes. Some policies do not show negative effects immediately but long after their implementation. The chemical fertiliser policy is one example. In order to produce more grain to meet the demands of the increasing population, the government has encouraged farmers to use nitrogenous, phosphate, potash, and compound fertilisers and pesticides since the beginning of the 1950s. Until recently, people did not realise that chemical fertilisers and pesticides had polluted the environment. So the government introduced a new policy of sustainable and ecological agriculture. Policy impacts may be caused by overlaps. Many inappropriate policies mixed together may result in land degradation. In China, policies for the environment, resources, agriculture, forestry, and land are separate, and different administrative departments implement them. This scattering of laws and legislation and the disunited administration easily cause chaos through unidentified authority and responsibilities. Conflicts also arise in China's huge special localities; it is necessary for local government to make detailed policies and enforcement provisions according to local conditions.

Farmers' attitudes and actions are important factors influencing land use, land management, and land degradation. Most present policies and stipulations pay more attention to abstract national interests and neglect local farmers' immediate

benefits. They neglect the active participation and abilities and initiatives of local farmers in policy-making and policy implementation. They regard local farmers as passive policy-acceptors and do not encourage participation, which leads to a separation of policy-making and implementation.

The understanding of farmers would be improved through education and training. This is an important and urgent task because greater understanding is the premise of sustainable development.

The present pattern of policy-making and implementation from the top should be combined with a bottom-up process. In order to prevent an overload of information feedback during policy implementation, a supervising organisation should be established.

At present, there are no accurate data on land resources and their dynamics either at the national or local levels. The situation will increase difficulties for quantitative research on land degradation. In addition, local land administration agencies often lack capital to prevent and control land degradation.

The process of land degradation can be regarded as the result of interaction between physical processes and human activities. In developing countries, land degradation and poverty are closely linked. Land degradation is not only an environmental issue, but also a social issue (Blaikie 1987) as people are trapped in the poverty, population, and land degradation spiral. It is also influenced by international and inter-regional factors such as international economics, international trade patterns, international financial aid, international disputes over debt, domestic regional differentiation, and regional policies.

Generally, if degraded land is taken out of high-intensity use and allowed to recover for a period, it can be restored. Basically, the restoration (including 'managed' restoration) of degraded land is a process of natural evolution. However, as it is typically slow and protracted, it is necessary to adopt more direct measures based on large-scale social investment to rapidly enhance land capability to meet the needs of local development and people's needs, as well as achieving a relatively stable ecological balance.

Land degradation occurs when there are problems of balance within the 'population-resources-environment-development' system. Reconstruction of degraded land must address the root socioeconomic causes. The social approaches to the ecological reconstruction of degraded land are summarised theoretically in the following passages.

- Laying the foundation for 'sustainable development'

Sustainable development is defined as "*development that meets the needs of the present without compromising the ability of future generations to meet those of the future*" (WCED 1987). The most urgent problem in land-degraded regions is securing resources for basic living. In degraded areas basic farmland has to be improved with high and stable yields to ensure grain supply and basic needs. Only in this way, will it be possible to return cultivated slopeland to economic forests and grassland.

- Importance of social investment

Different from restoration, the process of reconstruction requires large-scale social investment to bring about a rapid change in degraded lands. Social investment includes labour and capital from both inside and outside the area.

- Optimising landscape ecology based on local conditions

Ecological reconstruction of degraded land should be carried out in accordance with local landscape and environmental conditions. In this way, ecological reconstruction will not only improve the degraded land, but also establish an eco-economic system with high and stable yields.

- Innovating ideology

In many regions where land has deteriorated, it is often the case that the main obstacle to reconstruction is the ideas of local people. They are often hesitant to adopt new approaches. Local people should be encouraged to move away from the idea of a closed small-scaled farm economy and develop an economy based on commodity production.

- Transforming institutions and policy

Ecological reconstruction of degraded land and the fight against poverty require the transformation of institutions and policy. Firstly, socioeconomic structural reforms in poor regions where land is degraded are necessary. For example, constructing basic farmland can be taken as one of the major goals of the land contract responsibility system, and the task of land reconstruction should be written into policy. A corresponding family planning policy controls the pressure of population on land resources. In addition, village leaders should be open to new ideas, willing to take risks, and committed to working together. Secondly, the design and administration of land reconstruction and anti-poverty efforts also need to be transformed. China's anti-poverty programmes should be transformed from focussing on humanitarian support for the poor to institutionalised support, from relief programmes to development programmes, from individual anti-poverty projects to comprehensive projects, and from support of poor regions to support for poor people (Kang Xiaoguang 1996). The central government should adopt an equitable investment policy and increase investment to poor regions where the per capita investment has been at a low level for a long time.

- Introduction and popularisation of suitable science and technology

Reconstruction of degraded land needs scientific planning and design. The development of a poor region should be based on appropriate technology, but this does not mean it is always necessary to employ the newest technology. Often, it is better to use ready-made 'intermediate technologies' (Schumacher, 1973). These are simple and suitable methods that are easy to popularise. Ecological reconstruction on a larger scale should take advantage of science and technology to tackle key problems. The implementation of educational assistance plans is important to improve farmers' knowledge.

- Identification of key issues and strategy

The reconstruction of degraded land involves issues not only at the local community level, but also on larger inter-regional scales. Reconstruction of degraded land should lay down realistic plans appropriate for different time frames. They should be co-ordinated so as to relieve poverty and achieve long-term sustainable development.

Bibliography

(Not necessarily cited in the text)

ARIRPY (Agricultural Resource Investigation and Regional Planning of Yunnan Province) (1992). *The Materials of Second Detailed Soil Survey in Yunnan Province*. (internal material) (in Chinese)

Blaikie, P. (1987). *Land Degradation and Society*. New York: Methuen & Co.

Cai Yunlong (1994). 'Sustainable Development: A New Approach to Manearth System Optimization'. In *Chinese Journal of Applied Ecology*, 6(3): 329-333. (in Chinese)

Cai Yunlong and Smit, B. (1994). 'Sustainability in Chinese Agriculture: Challenge and Hope'. In *Agriculture, Ecosystem and Environment*, 49: 279-288.

Cai Yunlong (1994). 'Models of Poverty Elimination and Sustainability Development in Karst Areas of Southwest China'. In *Sustainable Development in China*. Beijing: Peking University Press. (in Chinese)

Comprehensive Investigation Team of Academy of Science for Tibet Plateau (1984). *Agricultural Geography of Tibet*. Beijing: Science Press. (in Chinese)

Conway, G.R. (1985). 'Agroecosystems Analysis'. *In Agricultural Administration*, 20: 31-55.

The Detailed Land Survey Office and the Land Administration Bureau of Luquan Yi and Miao Nationalities Autonomous County (1992). *The Detailed Investigation Report of Luquan's Land Use Status Quo*. (internal material) (in Chinese)

ECSY (Editorial Committee of New Survey of Yunnan Province) (1996). *The New Survey of Yunnan Province*. Kunming: People's Press of Yunnan. (in Chinese)

The Editorial Committee of Local Annals of Luquan Yi and Miao Nationalities Autonomous County (1995). *The Annals of Luquan Yi and Miao Na-*

tionalities Autonomous County. Kunming: People's Press of Yunnan. (in Chinese)

The Editorial Committee (1995). *The Annals of Luquan Yi and Miao Nationalities Autonomous County*. Kunming: People's Press of Yunnan. (in Chinese)

The Editorial Committee (1990). *A Survey of Luquan Yi and Miao Nationalities Autonomous County*. Kunming: Yunnan Nationality Press. (in Chinese)

The Editorial Committee (1990). *A Survey of Luquan Yi and Miao Nationalities Autonomous County*. Kunming: Yunnan Nationality Press. (in Chinese)

The Forest Investigation and Planning Institute of Yunnan Province (1989). *Natural Reserves of Yunnan*. Beijing: Forest Press of China. (in Chinese)

Grant, J.P. (1994). *The State of the World's Children 1994*. New York: UNICEF/Oxford University Press.

Huang Xianjin and Cheng Longqian (1995). *The Science of Land Policy*. Changsha: Chinese Mining and Metallurgy University Press. (in Chinese)

Jin Ruilin (1990). *The Legal Science of Environment*. Beijing: Peking University Press. (in Chinese)

Jin Ruilin (1998). *The Law on Environment of China*. Beijing: Law Press. (in Chinese)

Institute of Geography, Chinese Academy of Science (1983). *Natural Conditions and Resources for Agriculture in China*. Beijing: Agricultural Press. (in Chinese)

Kang Xiaoguang (1996). 'The 1990s: The Strategies of Anti-Poverty in China'. In *Economic Newspaper*, May 6. (in Chinese)

LABY (Land Administration Bureau of Yunnan) (1994). *Selected Laws and Stipulations on Land Management*. (internal materials) (in Chinese)

LABY (Land Administration Bureau of Yunnan) (1996). *Selected Laws and Stipulations on Land Management*. (internal materials) (in Chinese)

LABT (Land Administration Bureau of Tibet Autonomous Region)(1994). *Appraisal of Land Resources in Tibet Autonomous Region*. Beijing: Science Press. (in Chinese)

LGPL (Lead Group of Popularising Laws in Agricultural System in Yunnan) (1997). *Selected Laws and Stipulations on Agriculture*. (internal materials) (in Chinese)

Liu Hui (1995). 'Types and Characteristics of Land Degradation and Countermeasures in China'. In *Natural Resources*, No. 4. (in Chinese)

Liu Xinhua (ed.) (1998). *The Full Version of the New Land Administration Laws*. Beijing: Chinese Price Press. (in Chinese)

Marten, G.G. (1988). 'Productivity, Stability, Sustainability, Equability and Autonomy as Properties for Agroecosystem Assessment'. In *Agricultural Systems*, 26: 296-316.

Meadows, D.L. (1995). 'It is Too Late to Achieve Sustainable Development, Now Let Us Strive for Survivable Development'. In *Journal of Global Environment Engineering*, 1: 1-14.

ODSSK (Office of Detailed Soil Survey of Kunming City) (1986). *The Soil of Luquan County*. (internal material) (in Chinese)

SBL (Statistics Bureau of Luquan Yi and Miao Nationalities Autonomous County) (1997). *The Statistics of National Economy and Social Development of Luquan Yi and Miao Nationalities Autonomous County*. (internal material) (in Chinese)

SBY (Statistics Bureau of Yunnan Province) (1994). *Statistics Bulletin of Yunnan Province*. Kunming: People's Press of Yunnan. (in Chinese)

Schumacher, E.F. (1973). *Small Is Beautiful*. London: Blond & Briggs.

SPC (State Planning Commission) (1996). *Report on Population, Resources and Environment of China*. Beijing: China Environmental Science Press. (in Chinese)

SPC & SSTC (State Planning Commission & State Science and Technology Commission) (1994). *China's Agenda 21: The White Book on Population, Environment and Development of China in the 21st Century*. Beijing: China Environmental Science Press. (in Chinese)

Wang Chaifa (1995). *New Study on the Basic Problems of the Law on Environment*. Beijing: The Environment Science Press of China. (in Chinese)

Wang Jin, Lin Feng and Zhao Yuhong, (1998). *Theory of Local Legislation*. Beijing: Democracy and Legality Press. (in Chinese)

Wang Yiming, *et al.* (1991). *Study on Exploitation of Western Yunnan's Resources*. Beijing: Science and Technology Press of China. (in Chinese)

Wang Xianjin (1988). 'Present Conditions and Future Trends of Croplands in China and the Counter-measures'. In *Newsletter of Chinese Institute of Territory Economics*, No. 30. (in Chinese)

WCED (World Commission on Environment and Development) (1987). *Our Common Future*. Oxford: Oxford University Press.

WCU (World Conservation Union, World Wide Fund for Nature, United Nations Environment Programme) (1991). *Caring for the Earth*. London: Earthscan.

Zhang Kunming (1994). 'China's Policies on Environment'. In *Sustainable Development in China–International workshop on China's Agenda 21*. Beijing: Ocean Press. (in Chinese).

Zhang Kunming (1994). 'China's Policies on Environment'. In *Sustainable Development in China–International workshop on China's Agenda 21*. Beijing: Ocean Press. (in Chinese).

Zhao Zhuocheng (1990). *Study on Resources Exploitation of the Northwest of Sichuan*. Beijing: Science and Technology Press of China. (in Chinese)

about the author

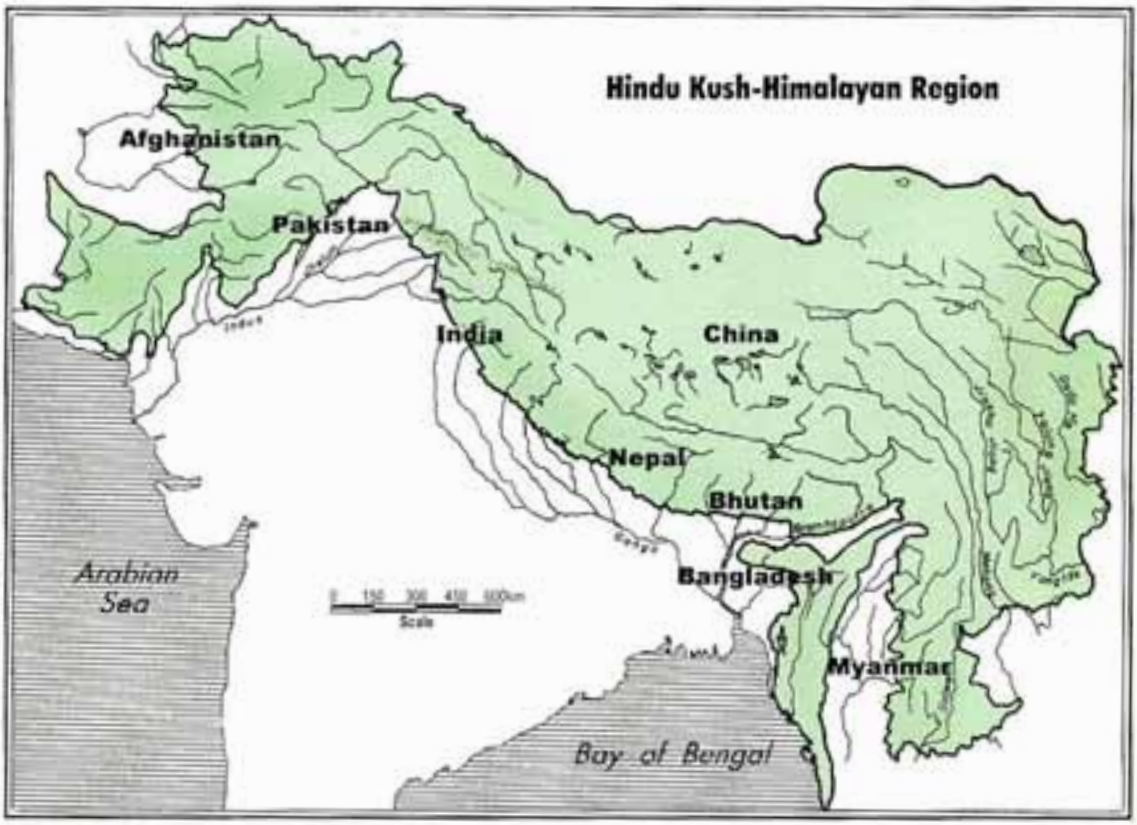
Dr. Cai Yunlong is Professor at the Department of Geography, Peking University, Beijing, China. He is a noted expert on land policy and land use planning in China with a focus on the Chinese Himalayas.

Dr. Zhang Jian-ling is a faculty member of the Department of Urban and Environmental Science, Peking University, Beijing, China. His specialisation is rural development and rural economic planning.

Ms. Zhu Xia is an anthropologist working as a research scientist at the Institute of Folklore, Yunnan Academy of Social Sciences, Kunming, China. Her current interests are gender and development in the Chinese Himalayas and participatory research in the Chinese countryside.

Participating Countries of the Hindu Kush-Himalayan Region

- Afghanistan
- Bangladesh
- Bhutan
- China
- India
- Myanmar
- Nepal
- Pakistan



International Centre for Integrated Mountain Development

4/80 Jawalakhel, G.P.O. Box 3226, Kathmandu, Nepal

Telephone : (977-1) 525313
e-mail : distri@icimod.org.np
website : http://www.icimod.org.sg

Facsimile : (977-1) 524509,
: (977-1) 536747
Cable : ICIMOD NEPAL