



**Mountain Population and Employment**

**Discussion Paper Series**

**CONTRACTUAL RESPONSIBILITY SYSTEM AND  
RURAL DEVELOPMENT IN MIYI COUNTY,  
SICHUAN, CHINA**

**Chen Guojie,  
Yu Dafu, Wang Fei, Li Jiguang,  
Huang Xiyi, and Li Ling**

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## FOREWORD

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

## FOREWORD

The discussion paper presented here, by Chen Guojie and colleagues, entitled "Contractual Reponsibility System and Rural Development in Miyi County, Sichuan, China" constitutes one of six case studies initiated by ICIMOD in conjunction with the Programme on Organisation and Management of Rural Development.

This programme focused primarily on the organisational resources and their relationship to the management of natural resources for sustainable development and increased productivity in mountainous areas. Across the Hindu Kush-Himalayan Mountains, rural development projects are relying on different strategies for the achievement of the above goal. These strategies are being implemented within a given macro-institutional and legal framework; presumably with adequate attention given to the sociocultural context. The framework and the context limit, as well as offer, possibilities to development agencies. The purpose of the case studies was to examine innovative institutional strategies implemented in projects (carried out by governmental agencies or nongovernmental organisations) and also to analyse and assess the utility and effectiveness of indigenous resource management systems.

I would like to thank the Aga Khan Foundation for the partial financial support in running the programme. I am also grateful for the assistance we received from the Nepal-Australia Forestry Project, the Dhading District Development Project, the Aga Khan Rural Support Programme and the Pak-German Self Help Project. The programme execution from ICIMOD's side was carried out by Dr. Anis Dani (now with AKRSP) and Dr. Deepak Bajracharya.

ICIMOD was also fortunate to have engaged in collaboration with professionals from various national institutions and project implementing agencies in China, Nepal, and Pakistan. Mutual consultations were held at various planning workshops and orientation sessions in Kathmandu and at the project sites. The participating researchers eventually agreed on the methodological framework and the set of questions that they would try to address. Sufficient flexibility was left, so that, at the discretion of researchers, responses could be made to site-specific situations.

**Research Methods.** A combination of techniques was used during the course of the research that lasted between six months to one year.

- o Collation and analysis of existing data from government and project records.
- o Selected open-ended interviews with relevant government officials, project personnel, and key resource persons from the region.
- o Field investigations in 8-12 villages within each project area, selected purposively to cover the various strata, the variable impact of development activities, and a range of resource management activities; rapid appraisal techniques were developed and each village was visited two or three times, altogether for about 7 days, to obtain details of specific components after preparation of an initial village profile.
- o Participant observation of project activities.

The key questions that the researchers were trying to address included the following:

- o Under what circumstances do existing resource management systems undergo institutional innovations?
- o What elements of existing resource management systems can intervening agencies build on: tenurial arrangements? property relationships? organizational structures? functionaries?
- o How do different kinds of interventions compare in terms of their ability to generate sustainable development and sound environmental management?
- o How does the user group internalize the benefits and costs of using the resource? How are risks shared ? If benefits are not equally distributed, how are the losers compensated ?
- o How does the user group ration a scarce resource?
- o How does the user group respond to development opportunities and entrepreneurial endeavours?

**Influencing Factors.** In addition, the following set of questions, which emerged from the reviews and research already conducted by ICIMOD, were also proposed for investigation during the course of the study:

- o Is the propensity of user investment in future returns related to the resource value, i.e., to the perceived value of the resource?
- o Does the tenurial security of the resource to the user influence the time horizon of local resource management?
- o If actual users have more responsibility for management decisions over their resources, are the resources more likely to be managed for long-term productivity at less cost to the supporting agencies?
- o Does increased equity in distribution of resource benefits encourage greater participation by user groups?
- o Will a resource management function be performed more efficiently if the performer is accountable to the local user group?

**Women's Role in Resource Management.** A third set of key questions, which appear to be of critical importance, deals with the role of women in resource management. These are:

- o What role do women have in resource management?
- o Is the role of women of particular importance in the use of certain resources, e.g., forests, grasslands, and water ? If so, do they have any role in decision-making about, and the management of, those resources ?
- o What are the constraints on women's involvement in resource management?
- o How do women perceive their own role in regard to resource management? How do they feel their participation can be improved ?

While the study presented here attempts to touch on all the preceding issues, all of them have not been treated equally. The subject matter focuses upon the institution of different kinds of management system, in China, and their specific effects upon the village communities studied. While the approach gives a comprehensive background to the organisation and management in specific farming communities in Miyi County, the subsequent analysis undertaken has underlined the relevance of the findings to the wider rural community. I am confident that readers will find this approach both interesting and enlightening, especially in light of the conclusions drawn and recommendations made by Chen Guojie and his colleagues.

Readers might be interested in knowing that all the six case studies mentioned above, including the one presented here, are brought out in the Discussion Paper Series of the Mountain Population and Employment Division (i.e., MPE Series No. 6 through 11). We would be happy if you would write to us with your comments and suggestions and join in the discussion on these important issues. ICIMOD is organising an International Workshop on the Role of Institutions in Mountain Resource Management, 1-4 May 1990, in Quetta, Baluchistan, Pakistan, to discuss many of the issues brought out by the case studies and provide a forum for interaction among researchers, development practitioners, and policy makers. The results of the Workshop are forthcoming shortly after the event takes place. ICIMOD is hopeful that these efforts would be useful in generating dialogues on organisational and institutional issues of integrated mountain development.

The views and opinions expressed in the report are our own and we take full responsibility for them.

E.F. Tacke  
Director

Chen Guojie

## ACKNOWLEDGEMENTS

This report, submitted to ICIMOD, is the result of a study on organization and management of rural development in Miyi County, Sichuan, China. All members of the study team spent an appreciable amount of time in the field conducting investigations and collecting and analysing data. Chen Guojie was in charge of the team and the study project. He wrote Chapters 1 and 6, and parts of Chapters 2 and 4. Yu Dafu, Wang Fei, and Li Jiguang wrote parts of Chapters 2 and 4. Chapter 3 was written by Huang Xiyi and Li Ling. Chen Guojie also assumed the task of designing, organizing, revising, and finalizing the report.

We are grateful to Dr. Deepak Bajracharya and Dr. Anis A. Dani for their guidance, encouragement, and support. Dr. Bajracharya has, in addition, been most helpful in editing the original draft and improving on it to a considerable extent. We are also grateful to ICIMOD for the extensive language editing done on the original draft. We would like to thank Miyi County government, cadres, and villagers for their cooperation.

The ideas and opinions expressed in the report are our own and we take full responsibility for them.

Chen Guojie

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## BACKGROUND OF THE STUDY

### Conceptual Issues

Organization and management of rural development in mountain areas is an issue of great practical significance, but it has not previously been subject to much research in China. At present, improvement in rural productivity and consequent social and economic developments are based on three assumptions: (a) the increase in production is the result of technological advancement, which accounts for increases in efficiency and productivity; (b) the optimum distribution of resources results in optimum use of advanced technology; and (c) the rational and scientific management of production in terms of scale and structure increases productivity and accelerates economic development. It is not possible to separate the above three factors, as they are closely inter-related. These three factors, combined together, can result in comprehensive advantages and the acceleration of development. Under the same social, cultural, and physical conditions, the speed of rural development and a consequent rise in living standards depend on the appropriateness of the political, productional, and rural policies drawn up by the Government (mainly central but sometimes provincial). Although the efficient use of resources depends upon the abilities of both producers and managers, within a given social and economic framework, rational and scientific management is the essential factor.

Natural resources provide the raw materials for the existence and development of human societies. Accordingly, they should not be exploited haphazardly but should rather be used in a rational manner in order to realise their full value. In order to do this, effective and efficient structures of management and productivity are essential. Without effective and efficient production, economic development cannot take place and natural resources will be destroyed. Therefore, the study of the organization and management of resources in mountain areas is an essential ingredient of mountain development.

Previously, scientific scholars (including social scientists) paid scant attention to organizing and managing rural development in China, especially in terms of rational resource utilization and environmental sustainability; and short-term profits versus long-term perspectives. One of the reasons for this was that general and specific policies for rural development strategy and productivity systems; as well as organization and management models; were determined by the Government or subject to bureaucratic interventions. Hence, decisions stemmed from individual ideals and wishes or from the will of the State as expressed by key leadership figures. Scientific research, broad-based enquiry, and democratic discussions were missing. Policy makers, at all levels, simply obeyed orders from above and were not conscious of the necessity for a scientific basis to decision-making.

More recently, with the development of a more democratic decision-making process, open to new ideas, and especially with the introduction of the "Contractual Responsibility System", many changes have taken place in rural China. The previous, stereotyped, organizational models that had been applied were seen to be unsuitable. Changes occurred in production methods that had previously relied on orders from above. Different "Responsibility Systems", management models, decision-making processes, and production methods appeared. Every unit, whether town, village,

or household, had the right to make independent decisions. Thus, a new set of circumstances governed the organization and management of rural development. Under the circumstances, the old methods of resource management were unsatisfactory. It was essential to seek new ways of resource utilization.

Agricultural development has a long history in China, and her mountain peasants have unique and rich experiences in the optimum utilisation of mountain resources. However, due to the fact that rural areas of China have been in a "closed" condition for a long time, these experiences have remained individualistic and are scattered over wide areas. Most peasants are poorly educated and few of them understand the trends in, or organisation of, modern agricultural production. They lack knowledge of the market economy, pricing structures, and ecological benefits; they are also unaware of long term strategies to enhance rural development. How to merge traditional patterns with the current trends in rural development is a problem that is urgently in need of a solution.

It is our belief that organization and management, resource utilization and distribution, and ownership systems in rural areas will have a profound influence upon the rural workforce. In this respect, we make the following observations:

- o In order to maintain a certain level of productivity, organization and management methods must be both suitable and stable.
- o An increase in productivity must be met by suitable organisational and management adjustments.

Therefore, it is essential to examine the historical precedents and experiences gained from interactions between management and workforce in China.

- o What kind of management and organization has a positive effect on productivity? What kind does not?
- o What forecasts can be made concerning future trends in rural development?

Only by doing so can management promote local production and assist the rural workforce in realising long term objectives.

The current situation dictates that organisation and management models for mountain areas should be determined after detailed studies have been carried out on local conditions and the availability of resources. Organization and management must be suitable in terms of physical features, resource categories and quantities, and resource combinations. In turn, utilisation and distribution must be supported by adequate infrastructural capabilities. Only then can conditions for sustainable resource use be guaranteed in the long term. Hence, the coordination of the relationship between short-term profits and long-term perspectives is an important focus of this study.

The organisation and management methods for mountain communities should be culturally acceptable to the inhabitants, so that they will enthusiastically adopt them and progressively adapt and improve them. Only in such circumstances can productivity be enhanced. The purpose of scientific organisation is the all round socioeconomic development and modernisation of rural areas. Outmoded practices should be reformed gradually by respecting the felt needs of the peasant community, since they are better qualified to understand rural conditions. The role of government departments should be to provide the necessary information and guidance. In this, the role of the Government should essentially be that of integration among all levels in the village and beyond and in both the industrial and agricultural sectors.

## Study Approach

Miyi County was selected as the area of our study. It represents many mountain characteristics that are typical in Western Sichuan. The area is rich in resources but the level of economic development is low. Destruction of the ecosystem is clearly evident. Recently the county has been experimenting with "vertical agriculture"<sup>1</sup> and is renowned throughout the Province for these efforts. This afforded the possibility that its experiences might be of value in other areas.

As in the other areas of China, Miyi County has experienced a number of changes over the past 40 years. Its organisation and management systems, ownership patterns, and distribution and productivity scales have changed a great deal. Some of these changes have been successful, others have not. The study examined this aspect on the basis of results attributable to the "Contractual Responsibility System". We have analysed data on a case by case basis, including farm output quotas, and examined the changes that have taken place in recent years. We also evaluated the role of the current "Contractual Responsibility System" in selected villages as well as its efficacy in problem-solving. The conclusion of our findings is given at the end of the report.

The study pursued a methodology that combined learning and problem solving; it also summarised the preceding experiences learned and absorbed them into a fresh approach. We combined the macro-level geographical research with the micro-level sociological research. Concurrently we tried to assess the historical process, existing situations, and organisation and management patterns as they related to rural development. It is hoped that the findings would help determine the necessity of maintaining the balance between rural development and management, economic development and carrying capacity, and resource utilisation and sustainability. Furthermore, we hope that the findings from village studies would show many patterns that are representative of the macro-level. By combining the micro and macro methodologies, we hope to analyse the mutual relationship between the human ecological system, and the natural environment and social organization and human behaviour. By synthesising the essentials of the overall situation, and the effect of the changing national political system on production responsibility, we expect to analyse developments in villages, towns, and the county.

The study villages are selected so that they represent the overall situation in Miyi County in terms of historical conditions, cultural background, and the physical setting. A brief description of the eight villages is provided below.

1. County Farm. Located in the outskirts of Miyi township along a river valley, it has 124 employees on 19 hectares of land. As a State Farm, it is representative of cooperative rural ownership and the conditions are appropriate for production of grains, cash crops, fishing, and animal husbandry, as well as sideline production.
2. Qinpi Village in Lianhua township is located in a river valley. It has a population of 3,400 on 187 hectares of land. Farm output quotas are fixed for each household, and the villagers are engaged in a wide variety of jobs such as milling, trading, grain cultivation, cash crop cultivation, transportation, and labouring. It has a well developed trading economy and one of the highest living standards in the County.
3. Qinggang Village in Guabang township is located between a river valley and the middle hills. It has a population of 1,522 on 127 hectares of land. It has a mixture of ethnic groups which

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1 "Vertical agriculture" refers to a system of plantation on terraces. Various crops are staggered so that one crop can be assisted or protected by another and thus more varieties of crops can be harvested by taking advantages of the vertical zonations.

includes *Han*, *Yi*, *Hui*, and Mongolian. The ownership pattern is characterised by the establishment of contracts with collective teams. This village has a lot of experience in water distribution and irrigation management.

4. Yangjia Village in Xijie township is located in the middle hills. It has a population of 1,597 on 88 hectares of land. The "*Responsibility System*" is characterised by a fixed output quota per household. The agricultural yields are high at 15 tons per ha per year. This village provides a good example of collective fund development.
5. Kelang Village in Huangchao township is located between a river valley and the middle hills. It has a population of 1,672 on 109 hectares of land. Its management system follows a non-organized collective form (labour exchange, without food, in harvest season). This village has developed biogas for domestic use and has protected forests and controlled resource utilization.
6. Dushu Village in Puwei township is located in a higher mountain area. It has a population of 1,971 on 107 hectares of land. It is a *Han* and *Yi* village belonging to the *Yi* autonomous *Xiang*<sup>2</sup>. It has a number of different fixed output quota systems which include household, family group, and collective contracts. The main cash crop is fruit and the village has successfully organised labour exchange and technical and agricultural associations.
7. Xiaodong Village in Yingfeng township is located in the middle hills. It has a population of 690 on 54 hectares of land. Its main income is derived from animal husbandry and dryland crops.
8. Forest Farm is located in the high mountain area of Puwei township. It has 1,912 employees on 15 thousand hectares of forest land on 50° slopes. However, it has been suffering from shortage of forest resources, but is a typical example of a state-owned forest farm.

In brief, we hope to draw a representative picture of the characteristics and achievements of the mountain villages of China. In this way, we think the findings of the study will not only help in rural development but provide a basis for future decision-making. In the broader perspective, it should prove to be a useful reference for other countries in the region and make a meaningful contribution to integrated mountain development.

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2. *Xiang* is an administrative unit. It covers an area between county and village. Whereas the English term district would normally apply here in terms of size, in Chinese usage, district governs several counties.

## THE PHYSICAL ENVIRONMENT AND SOCIOECONOMIC CONTEXT IN MIYI COUNTY

### Physical Features

**Location.** Miyi County is located on the south-eastern border of the Qinghai-Tibetan Plateau and in the eastern section of the Central Hengduan Mountain Range. It lies between 26° 42'N - 27° 10'N (latitude) and 101° 44'E - 102° 15'E (longitude). The longest distance from south to north is 73 km, and from west to east 52 km. The total area is 2,081 km<sup>2</sup> and it is shaped like a rhombus (see Figure 2.1).

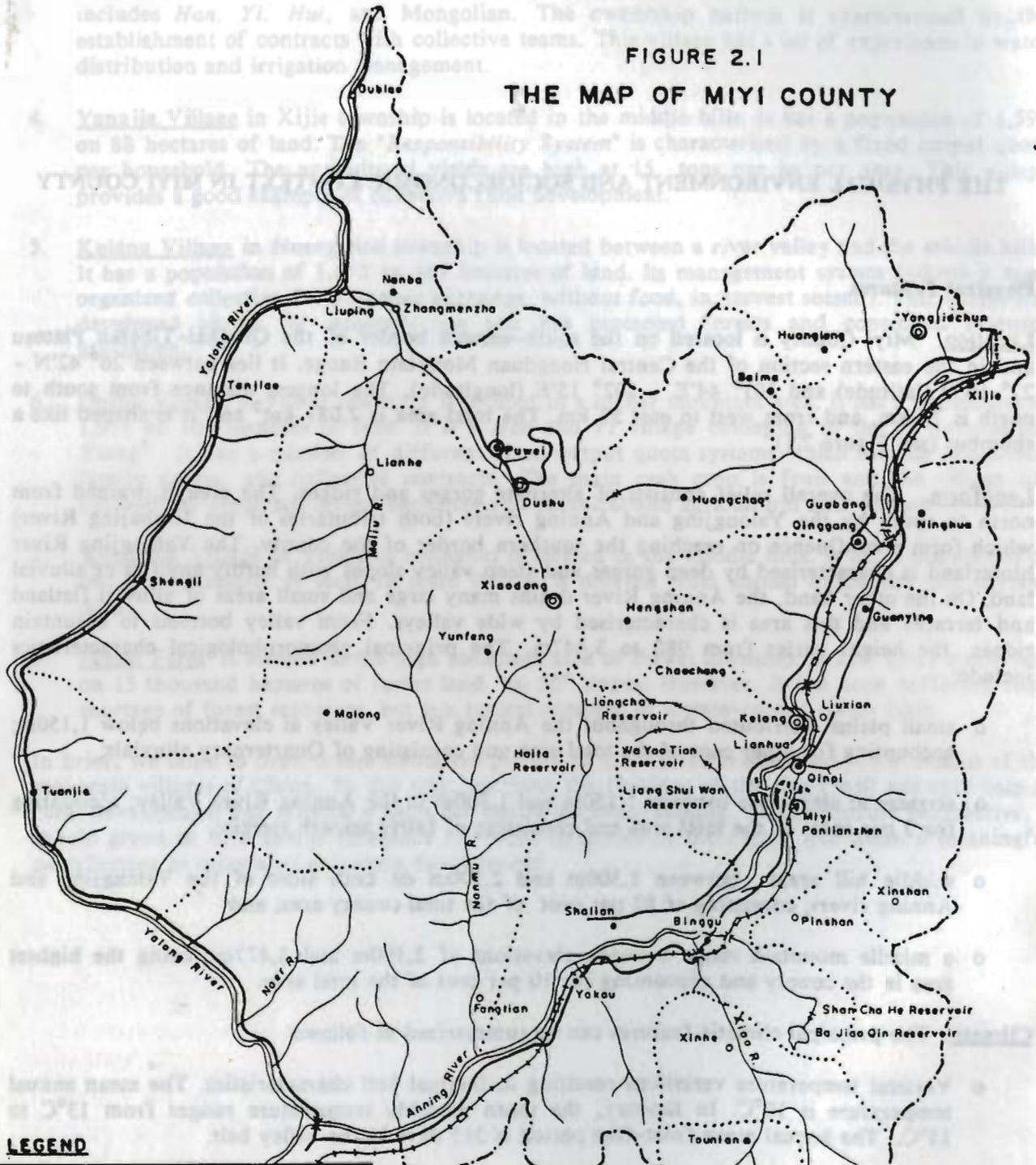
**Landform.** The overall relief consists of alternate gorges and ridges. The area is drained from north to south by the Yalongjing and Anning rivers (both tributaries of the Jinshajing River) which form a confluence on reaching the southern border of the county. The Yalongjing River hinterland is characterised by deep gorges and steep valley slopes with hardly any flat or alluvial land. On the other hand, the Anning River drains many large and small areas of alluvial flatland and terraces and this area is characterised by wide valleys. From valley bottoms to mountain ridges, the height varies from 980 to 3,447m. The principal geomorphological characteristics include:

- o small plains distributed throughout the Anning River Valley at elevations below 1,150m; accounting for 5 per cent of the total area and consisting of Quarternary alluvials;
- o terraces at elevations between 1,150m and 1,300m in the Anning River Valley; accounting for 3 per cent of the total area and consisting of fairly smooth terrain;
- o middle hill areas between 1,300m and 2,500m on both sides of the Yalongjing and Anning rivers; consisting of 82 per cent of the total county area; and
- o a middle mountain range between elevations of 2,500m and 3,477m; being the highest area in the county and accounting for 10 per cent of the total area.

**Climate.** The principal climatic features can be summarized as follows:

- o Vertical temperature variations resulting in thermal belt characteristics. The mean annual temperature is 19°C. In January, the mean monthly temperature ranges from 13°C to 15°C. The annual mean frost-free period is 315 days in the valley belt.
- o The annual mean insolation period ranges from 2,213 hrs to 2,413 hrs in the valleys and there are only about 7 days of fog. Thus, insolation is strong and the area has one of the longest illumination periods in Sichuan Province.
- o Seasons are alternately wet and dry. The mean annual precipitation is high and ranges from 900 mm to 1,300 mm. The potential evapotranspiration, representing the water vapour flux under ideal conditions, is greater than precipitation; the average annual evapotranspiration rising to 2,385 mm. Precipitation distribution is uneven. During the dry season (November to April), which is also the season in which temperatures are

FIGURE 2.1  
THE MAP OF MIYI COUNTY



**LEGEND**

STUDY TOWN & VILLAGE	⊙, ⊚
TOWN, VILLAGE	•, ○
COUNTY BOUNDARY	- · - · - · - · - ·
TOWNSHIP BOUNDARY	· · · · ·
RAILWAY	- - - - -
ROAD	—————
RIVER, RESERVOIR	~~~~~

SCALE  
2 0 4 8 km.

highest, the precipitation accounts for only four per cent of the yearly average. Seventy-seven per cent of the annual precipitation occurs from June to September. Seasonal evapotranspiration is marked. In spring, when precipitation is lowest, evapotranspiration is at its maximum constituting 59 per cent of the yearly average. This renders the valleys hot and dry.

- o The vertical climatic variations range from subtropical to temperate. The changes correspond to the topographical sequence from south to north and from valley - lower hills - lower/mountains - middle mountains.

**Rivers.** The Yalongjing and the Anning are the two main rivers in the county. Both are subject to appreciable fluctuations in discharge. The water head of the Yalongjing varies by 130m within the county and the Anning is subject to abrupt fluctuations that fall off rapidly and dry up; the minimum flow is  $5.2 \text{ m}^3/\text{s}$  in dry season and this rises to a maximum of  $3,410 \text{ m}^3/\text{s}$  in the rainy season. The annual mean flood flow rises to  $1,640 \text{ m}^3/\text{s}$ .

**Vegetation.** Vegetative cover and soil groups are clearly demarcated and vary according to topography. In the valley, the soil is suitable for rice cultivation. These valleys are characterised by grasslands mixed with shrubs and trees. The soil is often red in colour and mangoes, bananas, lemon grass, Chinese flowering quince, and kapok grow. In the lower hills and on the valley slopes the soil varies in colour from reddish brown to red. It supports sparse trees, shrubs, and steppe land. Shillac and mulberry plants grow in this region.

In the lower mountain areas, at elevations between 1,500m and 1,700m, the vegetation shifts from Savannah woodland, bush-wood, and Steppe to broad-leaved evergreen forests. The soil is yellow and oranges and apples are examples of the types of crops that grow in this region. In the lower mountain regions, at elevations between 1,700m and 2,000m, there are well established broad-leaved evergreen and mixed evergreen/deciduous forests. The dominant soil type is yellow. In the middle mountain area the prevalent vegetation types are Yunnan pine forest, mixed broad-needled forests, bushes, and grass. Alpine meadow soils are the main types and plants include dragon spruce, dragon pine, oak, and pteridophyte.

## **Natural Resources**

**Advantages due to Climate.** Miyi County is characterised by high thermal energy and strong insolation. The county is ideal for experimentation into solar energy use and has been successful in domestic water heating.

The mean temperature from January to June is higher than other areas lying at the same latitude. This means that vegetable production is one or two months ahead of the normal season and thus the county has become an important vegetable producer. Vegetable cultivation occupies 733 ha of land and most of the valley produce three crops yearly or five crops every two years. The current goal is to produce 15 tons of staple food or vegetables on every hectare of land.

**Water Resources.** The annual mean surface runoff is 450 mm; the total runoff volume being  $9.37 \times 10^6 \text{ m}^3$ . Large hydroelectric power stations have been constructed on the Yalongjing River; one example being the Ertang power station with an installed capacity of 3,600 MW; power potential due to small hydroelectric schemes is estimated at 1,516 MW; and groundwater potential is in the range of  $1.7-2.7 \times 10^9 \text{ m}^3$ . Reservoirs and pools, having a surface area of 266 ha, provide excellent locations for fish-farms.

**Mineral Resources.** There are 72 locations where mineral deposits, consisting of over 27 varieties of ore, are found. Stored deposits of vanadium ilmenite amount to  $20.4 \times 10^9$  tons, sufficient to create a new base for Panzhehua Steel Company. In addition there is a clay mine containing  $1 \times 10^9$  tons, a marble mine containing  $2 \times 10^8$  tons, a phosphate mine containing  $2 \times 10^8$  tons, and a diatomaceous earth mine containing  $1 \times 10^8$  tons.

**Land Resources.** This is the most important resource base for rural development in the county. Based on 1986 data, agricultural land constitutes 17 per cent of the total, forest land 47 per cent, waste land and grass land 34 per cent, pasture 1 per cent, and water surface including rivers and lakes, 1 per cent of the total land. Of the agricultural land, cultivated land constitutes 5.3 per cent. Rice is planted on 7,480 ha and this constitutes 68 per cent of all cultivated land, while the remaining 32 per cent, or 3,580 ha, is dry farm land.

The amount and distribution of cultivated land vary with geomorphological changes. It is apparent from Table 2.1 that cultivated areas are concentrated on flatlands and terraces. More than half the farm land is on the lower hill slopes which constitute a majority of the territory. From the point of view of elevation, percentage-wise cultivated land gradually decreases as the altitude rises (see Table 2.2).

Table 2.1: Distribution of Cultivated Area by Land Types<sup>a</sup>

Land Type Category	Cultivated Area		Cultivated Area as Per Cent of Total Area in the Category
	Hectare	Per Cent	
Flatland	2,100	19	20
Terraced land	1,700	16	28
Sloped land (<25°)	6,200	56	5.5
Steeper land (<25°)	800	7	1.2
Highland	200	2	0.9
	11,000	100	5.3

Note:

a. Based on 1986 data

**Table 2.2: Distribution of Cultivated Area by Topographic Regions<sup>a</sup>**

Topographic Regions	Total Area		Cultivated Area			Ratio of cultivated Area and Total Area
	Hectare	Per Cent	Hectare	Per Cent	Ha Per Capita	
Valleys and Lower Hills (< 1,500m)	87,800	42.2	6,960	63.1	0.066	1:12
Middle Hills (1,500m - 2,500m)	101,200	48.6	3,980	36.1	0.076	1:25
Middle Mountains (> 2,500m)	19,100	9.2	90	0.8	0.015	1:212
<b>Total</b>	<b>208,100</b>	<b>100.0</b>	<b>11,030</b>	<b>100.0</b>	<b>0.067</b>	<b>1:19</b>

**Note:**

a. Based on 1986 data

As far as the land use structure is concerned, the proportion of cultivated land to the total territory gradually decreases as the land rises from the valley to the mountain areas. Conversely, the proportion of forests to total land area increases. In terms of agricultural production, the higher the altitude the greater the income from forest products and livestock whereas income from agriculture diminishes. The proportion of food crops to cash crops increases with the elevation. The total output in food crops and the per unit rice yield decreases with altitude. Conversely, the proportion of corn and wheat in total food production increases with altitude.

**Potentials of Vertical Agriculture System.** Miyi is the centre of tropical and subtropical cash crop production in the middle latitude regions of China. The main valley crops are mangoes, pineapples, bananas, litchis, Chinese flowering quince, kapok, sisal hemp, olives, oil palm, and sugar cane. In the lower hills, the crops are pineapples (annual output 1,000,000 tons), pears, peaches, pomegranates, mulberries, and oranges. The main crops in the middle mountain areas are Chinese prickly ash, mushrooms, Chinese medicinal plants, sweetgrass, and flowers (suitable for the perfume industry). The county has 458 species of wild animals, is an important exporter of cattle, and an ideal area for livestock development (oxen, sheep, and goats).

The variations in environment and natural resources at different elevations provide a comparative advantage in mountain areas such as Miyi County. The spatial management of such resources along different vertical zonations is the basis for further development of vertical agriculture in the county. Villages in the area have the potentials therefore of drawing up plans and projects to improve on resource utilisation, industrial distribution and overall organisation and management (see Table 2.3).

Table 2.3: Vertical Agriculture in Miyi County

Physical Characteristics	Landscape Characteristics	Production Specific Properties and Existing Problems	Direction for Future Development and Key Steps in Management
<p>River valleys and flat land, below 1150m;</p> <p>Mean annual temperature, 19.4° C to 20.5° C;</p> <p>Mean annual rainfall, 900-1100mm;</p> <p>Alternate dry and wet seasons;</p> <p>Rich alluvial soil and red earth.</p>	<p>Rice growing on 90 per cent of agricultural area;</p> <p>Sugarcane main cash crops;</p> <p>Mangoes and other tropical fruits abundant;</p> <p>Scattered grass slopes.</p>	<p>Over-populated, not enough land;</p> <p>Per unit output high;</p> <p>Good communications;</p> <p>Advantages of agricultural technology;</p> <p>Irrigation constraints, limited solar insolation</p> <p>Village industries undeveloped.</p>	<p>Expand production of sugarcane, tropical fruits, and other cash crops;</p> <p>Increase attention to fishing;</p> <p>Develop village industry and processing of agricultural products;</p> <p>Integrated administration of Anning River.</p>
<p>Hills and small basins, between 1150m to 1500m;</p> <p>Mean annual temperature, 17.6° C. to 19.4° C;</p> <p>Mean annual rainfall, 1100mm to 1360mm;</p> <p>Long dry season;</p> <p>Strong solar insolation;</p> <p>Red mountain earth;</p>	<p>Animal husbandry and agriculture play dominant role;</p> <p>Cultivated land distributed on terraces;</p> <p>Subtropical trees sparse, abundant grassland and mulberries.</p>	<p>Good communications;</p> <p>Vegetables grown in winter;</p> <p>Late sugarcane harvest affects summer crops;</p> <p>Village industries undeveloped;</p> <p>Limited sideline productions.</p>	<p>Attach importance to afforestation;</p> <p>Keep rice area stable;</p> <p>Expand winter vegetable production and management of fishing;</p> <p>Develop water conservation for protection against drought.</p>
<p>Highland, between 1500m to 1700m;</p> <p>Mean annual temperature, 16.6° C to 17.6°</p> <p>Mean annual rainfall 1360mm to 1440mm;</p> <p>Medium insolation;</p> <p>Yellow earth, medium fertile land;</p>	<p>Food crops dominate;</p> <p>Mainly sloped land and terraces;</p> <p>Oranges and apples in abundance.</p> <p>Evergreen and broadleaved forest, trees sparse;</p>	<p>Low and unstable yield;</p> <p>Lack of irrigation;</p> <p>Grassland of low quality;</p> <p>Serious soil erosion;</p> <p>Land fertility decreasing;</p> <p>Resource use is inefficient</p>	<p>Develop diversified undertakings based on raising silkworms and fruits;</p> <p>Enrich grass land and animal species to expand animal husbandry;</p> <p>Afforestation of wasteland;</p> <p>Decrease soil erosion</p>
<p>Lower mountains between 1700m to 2000m;</p> <p>Mean annual temperature, 14.9° to 16.6° C;</p> <p>Mean annual rainfall, 1440mm to 1460mm</p> <p>Good radiation;</p> <p>Reddish-yellow earth with rich organic manure;</p>	<p>Corn cultivation;</p> <p>Superior fruit products</p> <p>Not much cultivated land;</p> <p>Higher concentration of forest cover;</p> <p>Poor soil structure and texture</p> <p>Evergreen and mixed forest</p>	<p>Development of animal husbandry and agriculture inefficient;</p> <p>Weak organisations for more efficient production;</p> <p>Great potentialities in forestry and animal husbandry;</p> <p>Poor communications;</p> <p>Shortage of energy;</p>	<p>Rational use of forest resources;</p> <p>Improve natural grassland to develop animal husbandry;</p> <p>Improve communications;</p> <p>Increase the output of fruits</p>
<p>Middle mountains over 2000m;</p> <p>Mean annual temperature 6.7° C to 14.9°;</p> <p>Mean annual rainfall 1460mm to 1950mm</p> <p>Yellow brown soil;</p>	<p>Steep slopes;</p> <p>Very limited cultivated land;</p> <p>High proportion of animal husbandry</p> <p>Mixed forest, bushes and grassland; Yinan pines.</p>	<p>Much wasteland and sparse population;</p> <p>Poor communications;</p> <p>Primitive cultivation systems;</p> <p>Animal species degenerating;</p> <p>Slow growth and low economic level.</p>	<p>Improve mountain infrastructure;</p> <p>Expand use of chinese medicine and native remedies;</p> <p>Adjust crop distribution;</p> <p>Improve animal species;</p> <p>Protect forest and prevent forest fires.</p>

## Social and Economic Background

Miyi County's headquarters are based at Panzhihua Town. It is located at the edge of Sichuan Province and is an impoverished mountain area in need of development. It has a long history of agricultural development with pronounced local economic characteristics. Today it lies at the transitional stage between a self-sufficient subsistence economy and a trading economy.

**Population.** The total population of Miyi is 175,085 (1986 data) and this is small compared to the other counties of Sichuan Province. The average density is 84 persons per km<sup>2</sup> and this, too, is lower than the average of other counties in the province. The distribution is uneven. For example, the valley constitute 42 per cent of the total area and contain 74 per cent of the population. The average population density in the valley is 200 persons per km<sup>2</sup> and this decreases to less than 50 persons per km<sup>2</sup> in the mountain areas.

Apart from the *Han*, there are several minority ethnic groups in Miyi. The *Han* comprises 89 per cent of the population, the *Yi* 9 per cent, the *Lisu* 0.9 per cent, and the *Hui* 0.7 per cent; in addition, there are small groups of Mongolians, *Bais*, Tibetans, *Shuis*, and *Mans*.

The total number of people engaged in agriculture is 147,000 or 84 per cent. This means that the cultivated land absorbs most of the labour force. The illiteracy and semi-literacy rates are high and only 46 per cent of the population are over twelve years of age. In the areas where minority ethnic groups reside, such as Malong, Baima, Huanglong, and Xinshang, the illiteracy and semi-literacy rates are 63 per cent, 73 per cent, 89 per cent, and 66 per cent respectively. In Baima, Huanglong, and Xinshang, the female illiteracy rate is 94 per cent, 93 per cent, and 97 per cent respectively.

**Economic Structure.** An analysis of the economic production (Table 2.4) shows Miyi as a predominantly agricultural county, both previously and currently. Dependence on local agricultural production plays a vital role in both agricultural and industrial productivity. Agricultural production accounted for 95 per cent of the gross production in 1949 and 45 per cent in 1986. In addition, 85 per cent of the labour force is engaged in agriculture, over 90 per cent of the population live in villages, and the level of town and city development is low: for example, no town has over 10,000 people and the county town has a population of only 8,214.

Industry is not well developed. The total output amounts to \$ 12.95 million. The main industries are sugar refining, food processing, mining, construction materials, and printing. Cottage and village industries are developing slowly and accounted for \$ 3.2 million in 1986.

**Regional Differences.** There are distinctive regional differences in economic development. Generally speaking, the valleys are developing rapidly in both industry and agriculture. Most of the towns are concentrated in the valleys because of the convenient communications' network. The average income ranges from US\$ 160 to US\$ 270 per year and a few people earn more than US\$ 2,702.7 a year. The lower hill zone comes second with average income ranging from US\$ 110 to US\$ 160 per year and the middle mountain area, where the minority ethnic groups live, lags behind. In an average year, food production (52,630 tons) just meets the demand (per capita availability = 300 kg). In the years when natural calamities take place, government relief has to be given. The average income at such times decreases to below \$ 54 per year.

Table 2.4: Value of Economic Outputs (1986) in Miyi County

Sectors	Output Value		Fixed Assets	
	Million \$	Per cent	Million \$	Per Cent
<u>Agriculture</u>	18.99	45.1	6.91	27.9
Crops	11.85	28.1	3.56	14.4
Forest	1.03	2.4	0.51	2.1
Animal Husbandry	4.71	11.2	2.14	8.6
Sideline Production	1.12	2.7	0.27	1.1
Fishing	0.28	0.7	0.42	1.7
<u>Industry</u>	12.95	30.8	10.91	44.0
<u>Construction</u>	4.57	10.9	0.43	1.7
<u>Transportation</u>	2.28	7.6	3.88	15.7
<u>Post and Telecommunication</u>	0.10	0.2	0.38	1.5
<b>Total</b>	<b>42.09</b>	<b>100</b>	<b>24.79</b>	<b>100</b>

*Socioeconomic Transformations: 1949-1989*

**Economic Development.** There has been an increase in the total output value of both industry and agriculture. The annual industrial output rose by 266 times from \$ 48,000 in 1949 to \$ 12.75 million in 1986 (using a fixed conversion rate \$ 1=3.70 Yuan). The agricultural output increased by 4.2 times from 1979 to 1986, i.e., from \$ 2.9 million to \$ 12.2 million, when calculated according to 1970 prices (Table 2.5). The gross production of grain during the same period increased by 1.6 times from 14,670 tons to 52,630 tons. The per capita annual output rose correspondingly from 160 kg to 300 kg. (Table 2.6).

In 1949 the annual agricultural output accounted for 80 per cent of the total output but currently it is 55 per cent. This means that industrial output is levelling with that of agriculture. Within the agricultural sector, forestry was the foremost area in 1949. At that time, a large amount of

Table 2.5: Agricultural Output Values in Miyi County: 1949-1986

Unit: x 10,000 Yuan<sup>a</sup>

Year	Total	Crops	Forests	Stock Farming	Sideline Production	Fishery
1949	1,065	341	400	238	85	1.3
1951	1,031	332	397	219	81	1.6
1956	1,297	484	398	302	121	1.6
1959	1,698	743	382	357	214	1.6
1961	1,109	419	370	217	101	1.5
1966	1,712	814	350	411	135	1.9
1969	1,191	636	33	390	130	1.9
1971	2,374	1,318	30	497	527	1.9
1976	2,202	1,313	16	552	319	1.9
1978	2,823	1,734	86	624	398	1.1
1981	2,524	1,731	66	498	234	5.1
1984	4,752	3,084	160	927	563	18.4
1986 <sup>b</sup>	4,519	2,840	222	1,050	367	40
1986 <sup>c</sup>	7,027	4,382	381	1,743	416	104

## Notes:

- a. \$ 1 = 3.70 yuan  
 b. at 1970 prices  
 c. at 1986 prices.

income came from selling timber and livestock rearing. Today farming is the leading occupation. This presents a more reasonable structure. In 1949 grain accounted for 90 per cent of all crop cultivation but today it only accounts for 49 per cent. A greater increase has taken place in cash crop cultivation than in grain production. In addition to the grain harvest, the peasants also have much more cash income.

**Agricultural Infrastructure.** Over the past forty years \$ 6.2 million have been invested in irrigation works. There are fourteen canals, and 1,460 ditches capable of irrigating fields of 66 ha or more. The effective irrigated area totals 7,780 ha. The area producing stable yields, despite draught or excessive rain, had risen from 1,130 ha to 5,130 ha between 1953 to 1985 (an increase of 4.5 times).

The County had no reservoirs or hydropower stations until 1953 but by 1985 there were 13 reservoirs with a total installed storage capacity of 16.30 million cubic metres and 303 small hydropower stations with a total installed capacity of 5239 KW.

In addition, a large area has been constructed for stable high yield production of agricultural commodities. The future objectives include the allocation of 670 ha each for corn (with the targetted yield of 15 tons/ha), sugarcane (with a targetted yield of 15 tons/ha), early vegetables, subtropical fruits, tropical fruits, tropical forest along the Anning River Valley, and propagated meadowland. It is hoped that this will improve the economic situation of 10,000 families.

Table 2.6: Changes in Population, Land Use, and Grain Output

Year	Population	Total Cultivated Area (ha)	Total Grain Output (tons)	Grain Yield (kg/ha)	Average Cultivated Area Per Person (ha)	Average Grain Per Cap. (kg)
1949	93,694	10,230	14,670	1,430	0.11	160
1951	95,818	16,700	21,290	1,990	0.12	220
1956	104,280	12,040	38,130	3,170	0.12	370
1959	102,612	11,760	33,270	2,830	0.12	320
1961	99,483	11,540	25,630	2,220	0.13	260
1966	118,369	11,920	41,420	3,470	0.12	350
1969	131,439	11,110	40,850	3,680	0.10	310
1971	144,644	11,460	53,900	4,700	0.09	370
1976	166,120	11,130	54,570	4,900	0.08	330
1978	168,056	11,120	62,310	5,600	0.07	370
1981	173,064	11,060	60,070	5,430	0.06	350
1984	174,255	10,950	64,750	5,910	0.06	370
1986	175,085	10,880	52,630	4,840	0.06	300

**Improvements in the Socioeconomic Environment.** Over the past forty years every town in the county has acquired an access road. The average road density is 22.6 km/km<sup>2</sup>. Seventy kilometres of the Chengdu-Kunming railroad cross the county and there are seven railway stations. The mail route is 181 km and the delivery line 259 km. There are telephone services in all 28 townships. There has been a remarkable increase in commercial activity; the number of people involved in 1986 being 2457. Retail sales totalled \$3.78 million (1986). Also in 1986, scientists and technicians accounted for 2.2 per cent of the population and numbered 3,822. The education system consisted of nursery schools, primary schools, middle schools, and adult education facilities. Compared to 1949 there have been considerable socioeconomic improvements that have laid the foundation for future developments.

There is no denying, however, that the development level is still quite low. The literacy rate is low and infrastructural improvements are needed in the fields of transport, communication, education, and industrial and rural enterprises. In 1987 the output per capita was \$ 280 and the per capita income was \$ 113. Throughout the last forty years, there have been considerable development constraints. Progress has been uneven, especially in the forestry department which has not yet recovered its 1949 level. There has been excessive destruction of resources and these cannot be replaced in the short term.

## Rural Ownership Patterns and Corresponding Responsibilities

### *Changes in Ownership Patterns: 1949-1988*

Fundamentally, rural ownership is based on the socioeconomic system of the states. Since 1949, the developments in Miyi County have followed the same pattern as the developments in China as a whole. Therefore, over the past forty years, the change in ownership patterns has followed the national trend. The key dates are as follows:

- 1949-50 "Private ownership" in which landlords had control of the means of production.
- 1951-52 Land reform period. Farmland was divided among the peasants and ownership remained private.
- 1954-55 Spread of "mutual aid groups". "Elementary agricultural cooperatives" emerged side by side with "mutual aid groups". Cooperatives were small and comprised of a few dozen families only. Income was distributed according to a member's share of cultivated land and the amount of income invested.
- 1950-57 "Advanced agricultural cooperatives" established, larger than the "elementary cooperatives", and these were the size of the present day villages. Income distribution was according to the amount of labour expended and not according to the share of land owned. Both cooperative types existed side by side.
- 1958-60 "People's communes" were established as the only form of farming organization. Each commune equalled the size of the current townships. Initially, members worked in groups, invested collectively, and divided the produce equally, irrespective of pay. Afterwards, however, the "production brigade" (currently the village) became accountable for production and the produce was distributed according to labour expended.
- 1960 A period of economic hardship for the whole county. A few "communes" reverted to the "advanced cooperative system" but the majority remained in the same situation as in 1958 and 1959.
- 1961-71 In mountain areas and areas inhabited by minority ethnic groups, the "advanced cooperatives" were reestablished. In the valleys and areas inhabited by the *Han*, the "communes" remained. However, "the production team" was accountable for production and distribution was managed through "production brigades". The "communes" and "brigades" deducted a percentage from the produce. This system was called "ownership at three levels".
- 1972-79 Farming was once more reorganised into "people's communes". Most "teams" and several "brigades" were accountable for production.
- 1980-81 The "Family Contract System" was introduced.
- 1982-86 Most production was based on the "Family Contract System", family unions, and groups throughout the county.
- 1987-88 "Cooperatives" were restored. However, these differed from those existing in 1950. They were based on a system of mutual help and public welfare.

Type of ownership plays an important role in resource organisation and management in mountain areas. In China, the type of ownership was attuned to the political system for quite a long time. Only in the last ten years have economic principles based on resource commodities been introduced. Ownership determines the manner in which land and other resources are developed and this, in turn, influences the organisation and management of rural markets, expertise, technology, and lifestyle.

Until 1951, the private ownership system prevailed and most land was owned by one or two landlords in every village; the peasants were merely tenant farmers. Sowing and harvesting, as well as rental payments, were all done on an individual basis. After the introduction of land reforms, the peasants owned and shared the land. There was no radical management transformations. The only difference was that rent was not paid to the landlord. Families owned equal amounts of land according to family size and families still remained the units of production.

During the period of "elementary cooperatives", the peasants shared in the planning process to some extent. Collective discussions were held to decide what and how to plant. During the "advanced cooperative" era, however, most of these decisions came from the higher authorities and during the "commune" period this became even more so. Labour arrangements, too, were decided from above, work was performed in groups and the groups started and ceased work together. The authorities laid down a lot of regulations concerning how work was to be done and what technologies were to be used.

After introducing the "Contractual Responsibility System", different types of "responsibility system" emerged. Resources were organised and managed in a variety of ways. Cultivated land was managed according to the felt needs of the peasants and some of the land was entrusted to them (for example, for sugarcane production).

#### *Effects of the Changes on the Production System*

The effects of the changes described above on resource management and the production pattern are outlined below.

1. The changes in ownership patterns and the corresponding responsibilities coincide with fluctuations in productivity. Where the system has not been well received, production has declined and resources have degraded. During the past forty years, we can pinpoint a number of periods of low yield, and even negative growth, in Miyi County in terms of the rural economy. These took place mainly between 1959 and 1962, i.e., during the "cultural revolution" and the "commune" period. These two periods were characterised by emphasis on politics and neglect of productivity. As far as organization was concerned, the emphasis was on size and collection. Communal ownership was enforced and individual activity declined. Thus, individual and diversified management systems were ignored and no matter what the different conditions or parameters, one uniform system was adopted throughout.

The land reform period from 1952-1955, when land was distributed among the peasants, and the family contract period, that has been in operation since 1982, are characterised by increased productivity and optimum resource use. This is mainly because the decision-making was in the hands of the farmers and human resource capacities have therefore been mobilised.

2. The repeated changes had a destabilising influence on the organisational structure and the people had no confidence in the Government. Short-term rural exploitation was a result and this led to extensive forest damage. In 1958, during the "Great Leap Forward", trees were felled on 38,100 ha of forest area for use in the steel industry. The forest area between 1300m to 1700m became Savannah. During the "Cultural Revolution" (after 1968), the general chaos and lack of management gave the peasants the opportunity to fell even more trees and again extensive damages were sustained by the forests. In Guabang township, for example, the forest area diminished from 1,800 ha to 70 ha. In 1978, the forests near the villages were contracted to families and, fearing the policy might again change, the farmers cut down the trees. These three periods, called the "Three Eight" are looked upon as tragedies because of the amount of destruction that occurred.
3. The failures in the efforts towards rural development can be attributed to some specific **features** which are enumerated below:
  - o Placing political idealism before production, leading to alienation from reality and use of resources to serve political ends.
  - o Interference from above and forcing farmers to comply with orders from the outside instead of following their own convictions.
  - o Emphasis on establishing large, collective organisations with egalitarian distribution systems.
  - o Lack of consideration for regional or ethnic differentiations and applying one uniform method throughout.
  - o The longest period without a policy change was from two to three years, thus causing instability.
  - o The ultimate consequences of reduced production and the destruction of forests.

### **Current Organisation and Management System**

Miyi County is developing at a moderate pace today. Its current characteristics are representative of its past developmental experiences and are typical of those in other areas of Western China.

1. Directives from higher bureaucratic levels are combined with the individual choices of peasant farmers.
2. A mixed economy that combines a planned market economy with a traditional, self-sufficient, small scale economy.
3. Macro-decisions at county level are normally based on scientific research. Decisions come through a structured planning process. The peasants' management decisions, however, are based on practice, experience, and tried and tested methods of cultivation. Therefore, the management and organisation of natural resources needs to be approached from a number of aspects.

## *Administrative System*

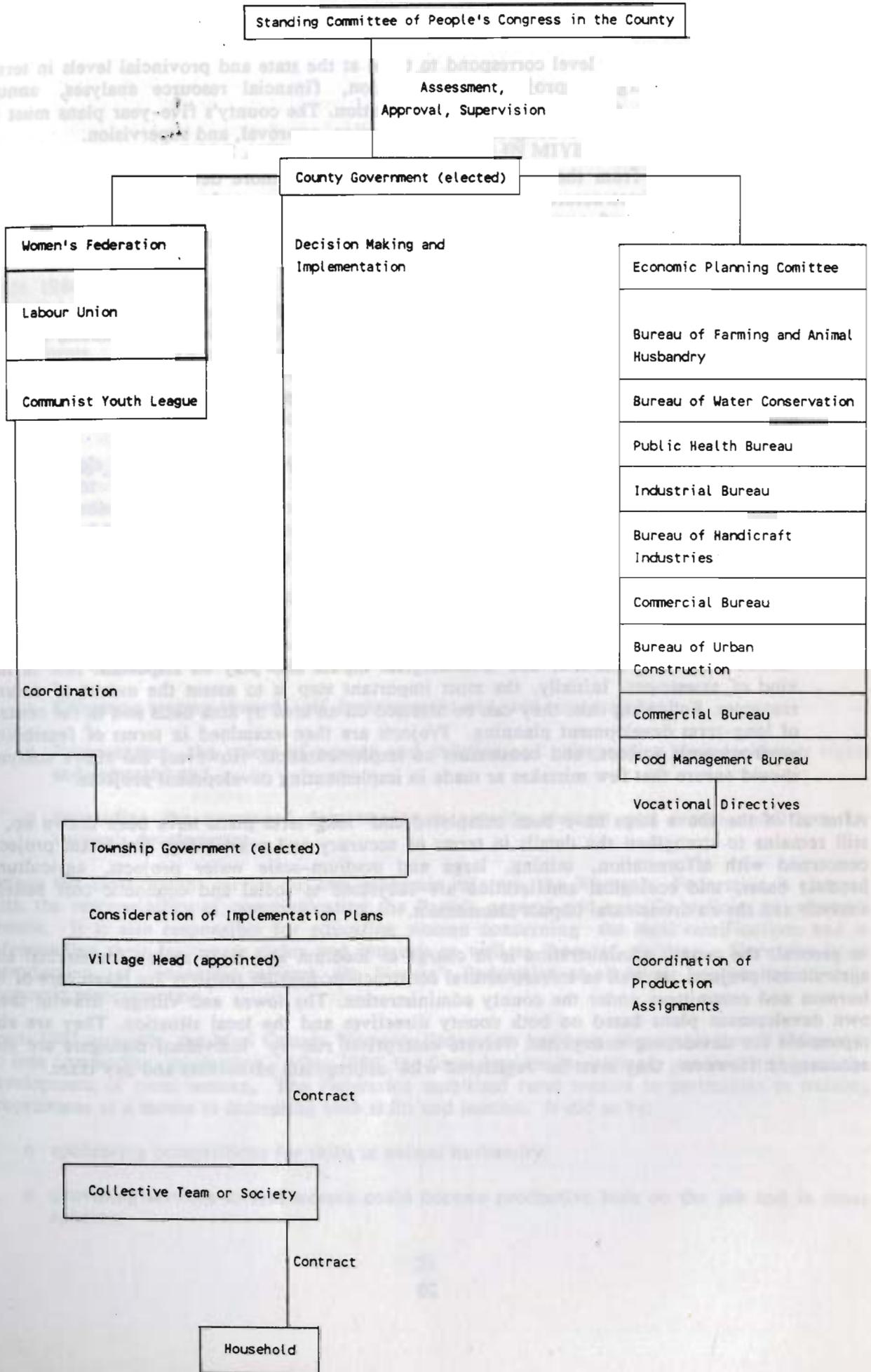
The administrative system affects natural resource management at different levels.

1. The county administration is responsible for policy decisions concerning the overall development, planning (strategic, regional, medium, and long term), large projects, and engineering.
2. Each county bureau or committee is responsible for a number of professional departments in the townships and villages and directs them in the organisation and management of natural resources (Figure 2.2). The **Economic Planning Committee** is in charge of annual plans, five year plans, fund allotments, checks and balances, production, and quality control. The **Financial Bureau** is in charge of income, circulation of funds, financial allocations, and loans. The **Commercial Bureau** looks after markets, taxes, and revenue. The **Urban Construction Bureau** looks after basic construction, township construction, and environmental protection throughout the county. The **Bureau of Farming and Animal Husbandry** is in charge of land use, farming, animal husbandry. The **Water Conservancy Bureau** looks after the use, protection and management of water resources. It also implements the construction of medium level water conservation works. The **Industrial Bureau** is in charge of state-owned industries in the county. The **Bureau of Town Enterprises** looks after the management and organisation of small scale industries at the town, village, and household level. The **Communications' Bureau** looks after communications as well as the circulation of goods and services. The **Bureau of Forestry** is in charge of forest development, lumber, afforestation, forest protection, and soil protection. The **Land Office** takes charge of regional research into the planning and development of natural resources as well as land protection. The **Scientific Committee** supervises scientific and technological development, new applications of the same, and experimental and applied research for natural resource utilisation.
3. Township administration comes under the county administration. Production assignments and plans are handed down to the townships by the county administration and these are then disseminated down to the village level. Professional directives are issued by county bureaus to the township but the townships organise the villages in carrying out these directives.
4. Village leaders organise production management and sign contracts with every household and collective team.

Time Frame for Planning. The integrated development and planning of management systems takes time factors into consideration in order to facilitate planning over the long term and medium term, such as five year development plans, annual plans, etc. Planning at the macro-level (for twenty to fifty years) gives direction within the socioeconomic framework of the whole county. Such plans indicate the basic requirements for the optimum use of natural resources, describe the combination and distribution of industries, main development regions, and projects. They also outline the goals according to economic capacity, main technological facilities, budget, institutional management, and implementation capacity.

Medium scale development plans (until the year 2000) combine the economic development of the State, as stipulated in each five year plan, and the macroscopic analyses to determine the targets for each area of the county. Time factors are taken into consideration while reflecting on implementation levels, optimum combination of projects, investments, establishment of marketing systems, and measures for environmental protection.

Fig. 2.2: Administrative Structure in Miyi County



The five year plans at county level correspond to those at the state and provincial levels in terms of time, investment targets, project implementation, financial resource analyses, annual implementation strategies, and methods of implementation. The county's five-year plans must be submitted to the County People's Congress for examination, approval, and supervision.

The annual plans stem from the five year plans but contain more detailed targets, plans for investments in basic infrastructure, target yields, product value, product quality, and requisite investments. Supervision of annual plans is done by statistical analysis and by monitoring implementation on a monthly basis. The annual plans are submitted to the County People's Congress for approval.

**Decision Making Procedure.** At the macro-level, decisions should be based on sound analysis in order to bring about effective organisation and management of rural development. Sound analysis is derived from the following steps:

1. analysis of resources to determine their variety, quality, distribution, combination, and accessibility.
2. Structural analysis to determine the functional bases of industry, agriculture, ecology, and technology.
3. Functional analysis to determine economic, ecological, social, and technological benefits of development projects and thence assessment of the optimum targets.
4. Conditional analysis to assess the development situation (negative or positive) and any factors that might limit development. Other factors that are taken into consideration include guaranteed levels of labour, land availability, and financial capability. In addition, human resources, markets, and technological inputs also play an important role in this kind of assessment. Initially, the most important step is to assess the extent of natural resources. Following this, they can be assessed on an area by area basis and in the context of long-term development planning. Projects are then examined in terms of feasibility, environmental impact, and constraints on implementation. However, the above analyses should ensure that few mistakes are made in implementing development projects.

After all of the above steps have been completed and long-term plans have been drawn up, it still remains to strengthen the details in terms of accuracy and practicality. Important projects concerned with afforestation, mining, large and medium-scale water projects, agricultural product bases, and ecological amelioration are subjected to social and economic cost benefit analysis and the environmental impact assessment.

In general, the county administration is in charge of medium and large scale commercial and agricultural projects as well as infrastructural construction. Smaller projects are taken care of by bureaus and committees under the county administration. The towns and villages draw up their own development plans based on both county directives and the local situation. They are also responsible for developing enterprises. Private enterprises run by individual managers are also encouraged. However, they must be registered with appropriate authorities and pay taxes.

## ROLE AND STATUS OF WOMEN IN MIYI COUNTY

### Women's Organisations and Their Functions

Since 1980, with the initiation of rural reforms based on the "Contract System", significant changes have taken place. Women are becoming an important force in rural development, and we have attempted to assess in this chapter their role and status before and after the introduction of the reforms. Women's activities are the concern of the All Chinese Women's Federation. At present, there is very little development by non-governmental organisations in the field of women's activities. Most services are provided by the All China Women's Federation and its branches. The organisational structure is given in Figure 3.1.

The Women's Federation in Miyi County has four staff members who have experience in primary development work and women's work. Twenty eight townships have full-time directors of women's federations who have received different types of training in rural development. One hundred and thirty-four villages also appoint deputies to the Women's Congress.

The Chinese Women's Congress has given the All China Women's Federation the function of safeguarding women's interests and promoting equality between men and women. The specific functions are outlined as follows:

- o Encouraging women to participate in reforms and economic reconstruction;
- o Educating women towards self-improvement and skill enhancement;
- o Representing the voices of women and children and safeguarding their legitimate rights and interests; and
- o Persuading the concerned departments to provide services and create conditions for women's development.

Before the Government carries out any economic reforms, the Women's Federation is charged with the responsibility of communicating the Party's general and specific policies to women's groups. It is also responsible for educating women concerning the legal ramifications and in safeguarding their legitimate rights and interests as well as those of children. Since the latest introduction of economic reforms, the Women's Federation at all levels has worked towards economic reconstruction.

From 1983 onwards, the Miyi County Women's Federation has been encouraging rural women to go into commodity production. After 1986, the focus became increasingly concentrated upon the development of rural women. The Federation mobilised rural women to participate in training programmes as a means to increasing both skills and income. It did so by:

- o sponsoring competitions for skills in animal husbandry;
- o providing services so that women could become productive both on the job and in other spheres;

Figure 3.1: Organisational Structure of the Women's Federation

Organisational Structure	Remarks
<pre> graph TD     A[All-China Women's Federation] --&gt; B[Provincial Women's Federation]     B --&gt; C[Municipal Women's Federation]     B --&gt; D[State Women's Federation]     C --&gt; E[County Women's Federation]     D --&gt; E     E --&gt; F[Township Women's Federation]     F --&gt; G[Rural Women's Congress]     G --&gt; H[Women's Branch Organisations]             </pre>	<p>There are functional offices and departments for women's rights and interests, organizational work children's work, and propaganda. Various decentralised offices take care of urban and rural women's interests.</p>
<p>County Women's Federation</p>	<p>There are no branch offices</p>
<p>Township Women's Federation</p>	<p>There is a Director and relevant working personnel.</p>
<p>Rural Women's Congress</p>	<p>There is only a Director at this level</p>
<p>Women's Branch Organisations</p>	<p>Their establishment depends upon the local situations.</p>

- o by running joint classes with the scientific association, agricultural office, and animal husbandry bureau; by providing forage, fruit saplings, and improved seeds to rural women; and by helping women to sell their agricultural products at harvest time; and
- o providing more than \$ 2,700 in interest-free loans and \$ 540 in interest-tied loans to rural women; and
- o selecting model families through which it encourages commodity production.

Because of the activities of the Women's Federation, in line with the economic reforms, considerable changes have taken place in the role and status of women in Miyi County.

### Observations from Selected Villages and Households

During the survey taken of the eight villages, attention was given to an understanding of the role of women, and the changes that had taken place in their economic, family, and social status after the introduction of reforms. The villages chosen are representative of Miyi County in terms of natural resources, social conditions, and economic conditions. Initially we conducted a general survey on the status of women throughout the eight villages, and this was followed by more detailed investigations based on responses from four to five households selected from each village. They gave information concerning age, education, occupation, income and expenditure, daily time schedule, marital status, number of children, and aspirations. This involved 38 families and when this part of the study was complete, we chose Yangjia as a sample village for the purpose of more detailed analysis. Based on all the information collected, a clear picture emerged concerning the changes in women's role and status pertaining to rural mountain development.

Labour Division According to Gender. Rural women do most of the housework as well as all kinds of work relating to agricultural production. However, after the introduction of the "Production Contract System" a number of changes have taken place. Table 3.1 shows labour division gender-wise for Yangjia Village in 1982.

This figure indicates that:

- o housework and livestock raising were solely the responsibility of women previously but are now shared by husbands and wives;
- o men are responsible for making preparations for production and for marketing;
- o women take part in sowing crops but their concentration is on kitchen gardens where they also produce some cash crops; and
- o there is reasonable division of labour in both forestry and fruit production; men being in charge of purchasing and developing waste land, planting trees, and applying fertiliser.

The type of work undertaken by women in Miyi County depends upon traditional work habits, practical considerations or needs, and their own initiatives. They are capable of all kinds of work and are capable of playing an important role. However, the kind of jobs they actually do are limited by traditional role perceptions.

Table 3.1: Division of Labour in Yangjia Village, Miyi County

Sector	Sub-Sector	Activities	Before 1984		After 1984	
			Female	Male	Female	Male
Housework		Cooking	+	-	+	-
		Washing	+	-	+	-
		Shopping	+	-	+	-
		Cleaning	+	-	+	-
		Feeding Babies	+	-	+	o
		Educating Children	+	+	+	+
Agriculture	Crop Production	Transplanting Rice	+	+	+	+
		Harvesting Rice	+	+	+	+
		Carrying/Threshing Rice	+	-	-	+
		Cutting/ Carrying Sugarcane	+	+	-	+
		Managing Farmland	+	+	+	+
		Drying Grains	-	-	-	-
	Tree/Fruit Production	Land Clearing & Planting Trees	-	-	+	+
		Looking After Trees	-	-	o	+
		Harvesting Fruits	-	-	-	-
	Raising Livestocks	Purchasing Fodder	-	+	-	+
		Managing Fishponds	-	+	+	+
		Feeding Ducks & Fish	-	+	+	+
		Raising Pigs/Chicken	+	-	+	o
		Cleaning Animal sheds and Ponds	o	+	+	+
Non Agriculture	Industrial Processing	Pressing sugarcane	-	+	+	+
	Transportation	Carrying sugar	-	+	-	+
	Commerce		-	-	+	-
	State Employment		-	+	-	+
	Service trades (restaurants/hotels)		-	-	+	-
	Construction		-	+	-	+

Notes:

- + indicates positive involvement
- indicates no involvement
- o indicates occasional involvement only

Differences in Male/Female Income and Expenditure Patterns. Peasant households account for 98 per cent of the total in Miyi County and more than 80 per cent of them are crop farmers who concomitantly raise domestic livestock. Developments in crop farming have led to an all round increase in family income, including women's contributions. Before the economic reforms, a woman earned only eight work points a day whereas a man earned ten work points a day. Apart from raising one or two pigs for domestic purposes, farmers were not permitted to engage in sideline production. The amount of housework women had to do also meant that they were not very productive. Currently, income from sideline production accounts for 50 per cent of the total family income. A sample survey of 38 families showed that in 34 per cent of families, women contributed half of the family income, in 37 per cent of families, the husbands earned more than their wives, and in 29 per cent of families, wives earned more than husbands.

After the analysis of men and women's income, it could be seen that women's income had increased faster than men's (see Figure 3.2). Besides this, the income of peasant farmers are now higher than those of civil servants and this was certainly not so previously. A survey of eight households where husbands were employed by the State revealed that the income ratio between men and women was 30:70. However, in families where husbands engage in odd jobs, transport, lumbering, or construction work, husbands make much more than their wives. Wives engaged in catering, trading, crop planting, and livestock raising make more money than their husbands. Among families, with more than \$ 270 per capita income annually, wives make more money than their husbands. Generally, there are more Han women with incomes that surpass those of their husbands than women from minority ethnic groups (see Table 3.2).

With the rise in rural women's income, the rural rate of expenditure has characteristics that differ from the previous ones (see Table 3.2):

- o A housewife needs to spend money on clothes, shoes, and health care just like everyone else. In addition, she requires about \$ 3 per annum to buy necessities for her personal hygiene. A woman from a family earning a per capita income of more than \$ 270 annually buys high quality clothes etc.; one from a family with a per capita income of over \$ 16 annually spends more money on clothes and shoes than her husband and children; and one from a family earning less than \$ 16 annually spends the same amount on clothes and shoes as her husband and children.
- o A woman's total expenses are generally lower than those of her husband and children who have additional expenses which include school fees for children and wine and cigarettes for husbands.
- o Personal expenses for women under 30 are more than those for women in other age groups.

The above points serve to show that not only do rural women contribute a great deal to their families, but they also spend very little on themselves.

Family Relationships and Status. Before the introduction of the "Contract System", women had a lower status than their husbands because they earned much less and were steeped in traditional ideas. Therefore, all the decisions were made by the husband. However, since the rural economic reforms, women's income has risen and, consequently, so has their status.

- o The rise in economic status has improved family relationships. In Yangjia village, out of 318 families, five per cent of them used to quarrel frequently because there was not enough money. In 1988, the number was only one per cent of the total.

FIGURE 3. 2

INCOME PATTERNS, 1980 - 88.

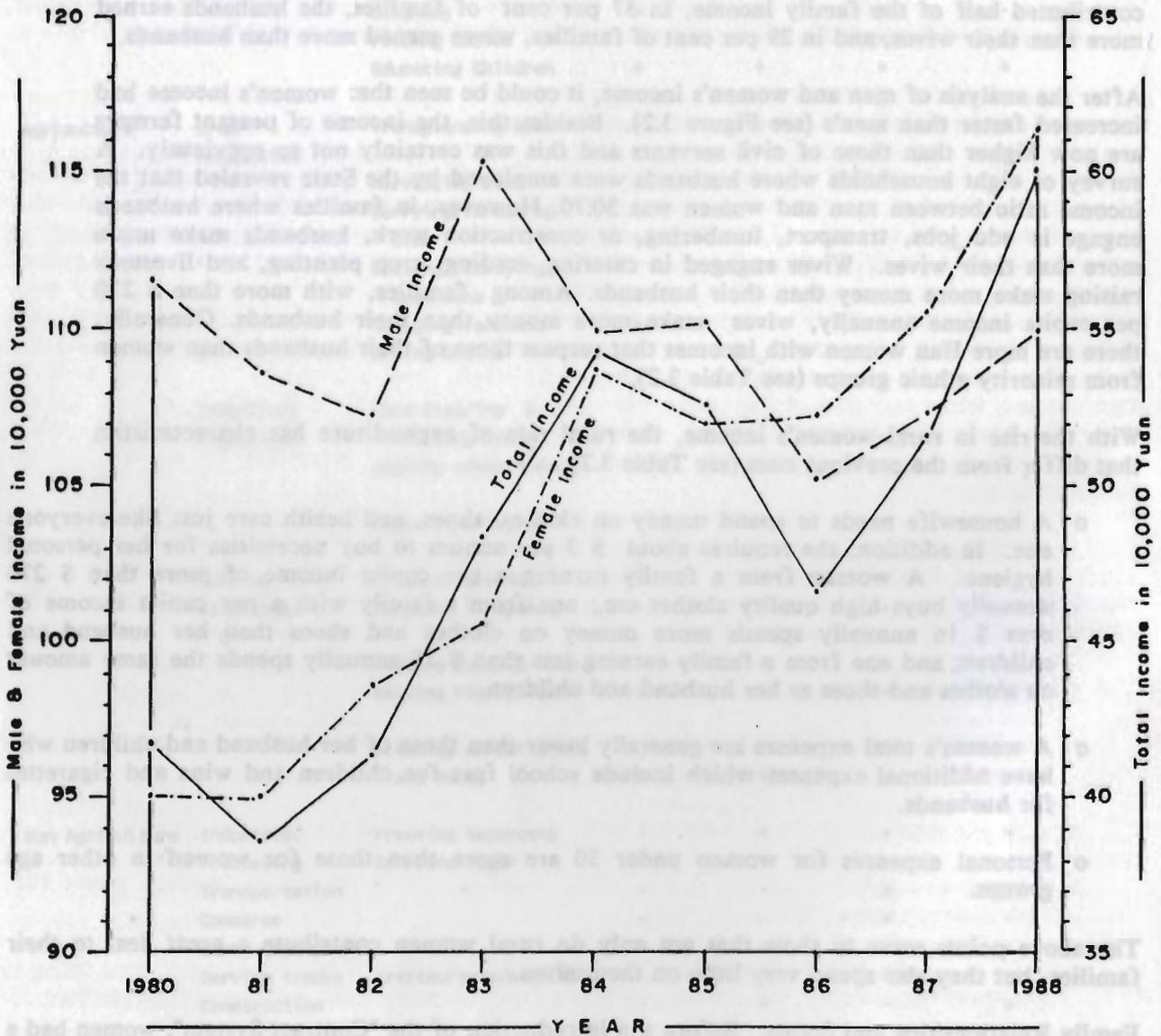


Table 3.2: Income Characteristics in Miyi County

	Average Family Income (\$)	Income Ratio (Husband:Wife)	Wife's Personal Expenses Compared to Family Income (Per Cent)	Husband's Personal Expenses Compared to Family Income (Per Cent)
<b>Production Sector</b>				
Crop Production	1,350	36:64	3.5	3.0
Raising Livestocks	1,770	33:67	1.9	2.5
Forest & Fruit trees	960	61:39	1.6	3
Trading	5,900	10:90	2.1	1.5
<b>Categories by Per Capita Income (\$)</b>				
<50	220	65:35	-	5.0
50-150	730	68:32	3.5	5.0
150-250	1,130	52:48	2.7	4.0
>250	1,840	45:55	1.8	3.0
<b>Nationality</b>				
Han	1,500	40:60	2.8	4.2
Others	1,140	50:50	2.5	3.0

- o Differentials between husband and wife in terms of time spent on productive labour as opposed to maintenance labor (household work) are decreasing. However, wives still do more housework than their husbands as a survey of 38 families showed.

Year	Labour Differentials between Husband and Wife (hrs/day)	Time Spent on Housework by Husband and Wife (hrs/day)
1983	10 : 14	0.5 : 5
1988	11 : 13.5	1:5 : 4.5

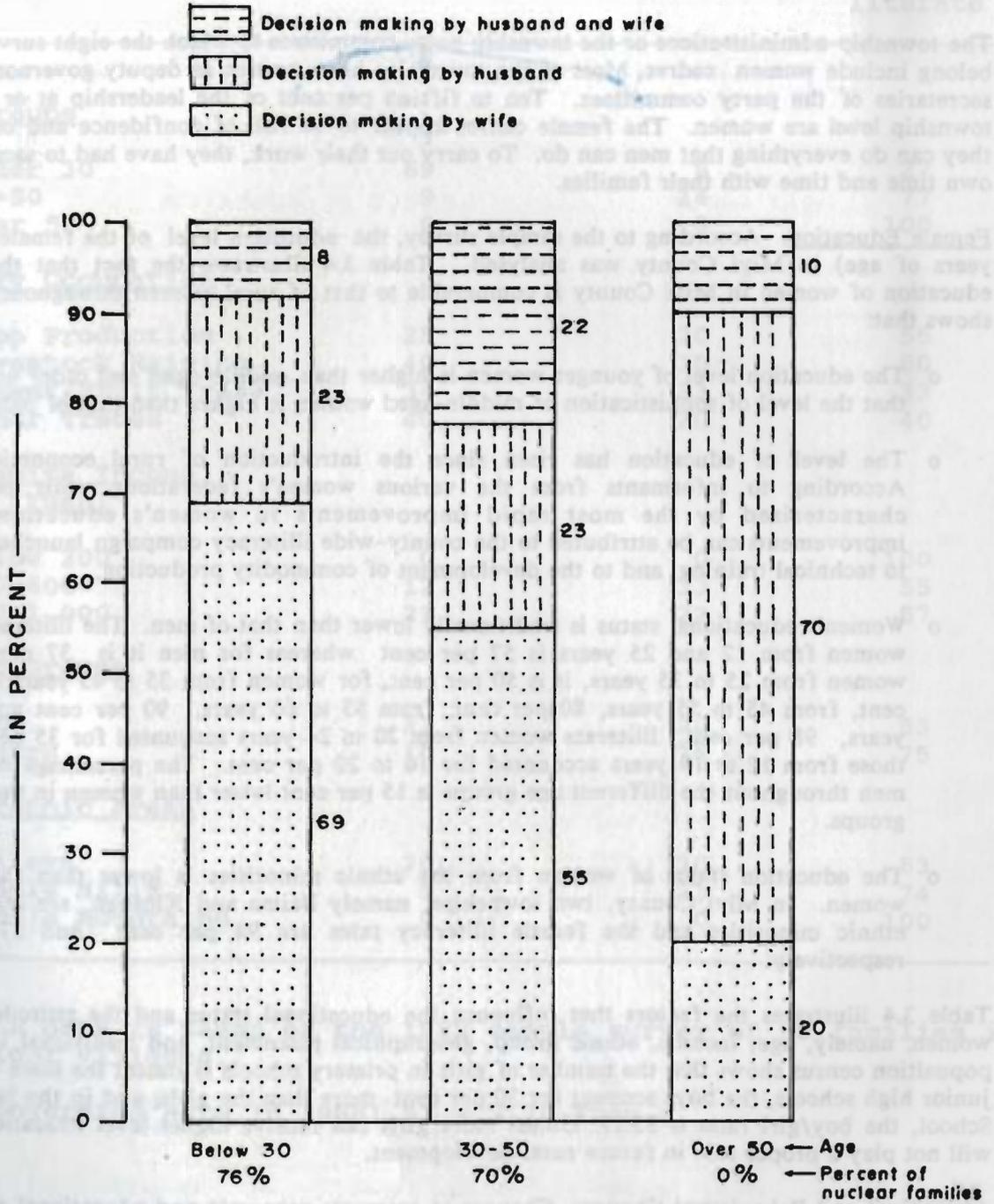
- o Husbands no longer make all the decisions. This is apparent from Table 3.3, which is based on a survey of 38 households in eight villages. In small families, the relationship between husbands and wives is more balanced (Figure 3.3).

**Women's Social Activities and Status.** Any rise in rural women's economic and family status must result in an increase in their participation in social activities and a consequent rise in social status. Since 1985, the County Women's Federation has run technical classes for over 14,000 students and in 1987 it sponsored a women's farming competition in which 26 per cent of the women farmers

Table 3.3: Decision Making among 38 Households in Eight Villages

Village Name	Decided by Husband and Wife (per cent of households)		Decided by Husband only (per cent of households)		Decided by Wife only (per cent of households)	
	1983	1987	1983	1987	1983	1987
Qingpi	37	45	42	33	20	21
Kelang	20	50	60	10	20	40
Zhongzi Farm	30	33	40	33	30	33
Qinggang	20	30	20	20	60	50
Yangjia	80	80	15	5	5	15
Dushu	25	30	35	20	40	50
Xiaodong	10	33	80	33	10	33
Average of 8 Villages	32	43	42	22	26	35
Average of 38 families		58		21		21

**FIGURE 3.3**  
**PATTERNS OF DECISION MAKING BY AGE GROUP**



in the county (8,120 women from 4,060 households) took part. Altogether 6,120 women from 3,080 families attained the required standard and this was 76 per cent of the total participants. Two-hundred-and-two women were commended for their skills in raising pigs, ducks, and silkworms. Through participation, in a number of different activities, women have improved their farming skills, and through social participation, they have acquired an increased sense of social responsibility.

The township administrations or the township party committees to which the eight survey villages belong include women cadres. Most of the townships have women as deputy governors or vice-secretaries of the party committees. Ten to fifteen per cent of the leadership at or above the township level are women. The female cadres appear to be full of confidence and believe that they can do everything that men can do. To carry out their work, they have had to sacrifice their own time and time with their families.

Female Education. According to the sample survey, the education level of the female (above 16 years of age) in Miyi County was analysed. Table 3.4 illustrates the fact that the level of education of women in Miyi County is comparable to that of rural women throughout China. It shows that:

- o The education level of younger women is higher than middle-aged and older women, and that the level of sophistication of middle-aged women is higher than that of older women;
- o The level of education has risen since the introduction of rural economic reforms. According to informants from the various women's federations, this period was characterised by the most rapid improvements in women's education. These improvements can be attributed to the county-wide illiteracy campaign launched in 1984, to technical training, and to the development of commodity production.
- o Women's educational status is traditionally lower than that of men. The illiteracy rate for women from 12 and 25 years is 57 per cent whereas for men it is 37 per cent; for women from 25 to 35 years, it is 50 per cent, for women from 35 to 45 years it is 60 per cent, from 45 to 55 years, 80 per cent; from 55 to 60 years, 90 per cent and over 60 years, 98 per cent. Illiterate women from 20 to 24 years accounted for 35 per cent and those from 12 to 19 years accounted for 16 to 20 per cent. The percentage of illiterate men throughout the different age groups is 15 per cent lower than women in the same age groups.
- o The education status of women from the ethnic minorities is lower than that of Han women. In Miyi County, two townships, namely Baima and Xinshan, are inhabited by ethnic minorities and the female illiteracy rates are 94 per cent and 97 per cent respectively.

Table 3.4 illustrates the factors that influence the educational status and the attitudes of rural women: namely, age, income, ethnic group, geographical placement, and traditional ideas. The population census shows that the number of girls in primary schools is almost the same as boys; in junior high schools, the boys account for 30 per cent more than the girls; and in the Senior High School, the boy/girl ratio is 85:15. Unless more girls can receive higher level education, women will not play a proper role in future rural development.

Attitudinal and Behavioural Changes. Changes in women's economic and educational status have led to changes in outlook and behaviour.

Table 3.4: Level of Women's Education (in Per Cent)<sup>1</sup>

Categories	Middle School & Higher	Primary School	Illiterate and Semi- literate
<u>Age Groups</u>			
under 30	69	8	27
30-50	9	14	77
over 50	0	0	100
<u>Primary Occupation</u>			
Crop Production	25	20	55
Livestock Raising	40	10	50
Forest/Fruit Trees	34	33	33
Other Trades	40	20	40
<u>Per capita Income Group (Yuan)<sup>2</sup></u>			
Below 200	0	0	100
200-600	12	33	55
600-1,000	21	22	57
<u>Ethnic Groups</u>			
Han	27	20	53
Others	10	15	75
<u>Topographic Areas</u>			
Valleys	20	30	53
Middle Hills	5	21	74
Middle Mountains	0	0	100

**Note:**

1. The data is based on the 1988 sample survey of 38 families in eight villages.
2. Conversion Rate in 1988: \$1 = 3.70 Yuan

**Marriage Customs:** Figure 3.4 indicates that the number of people choosing their own marriage partners decreases as age increases and increases with educational status. There are also more people from the Han who choose their own partners than from other ethnic groups. Marriage customs are directly related to the educational and economic status of women.

**FIGURE 3.4**  
**MARRIAGE PATTERNS AMONG WOMEN**

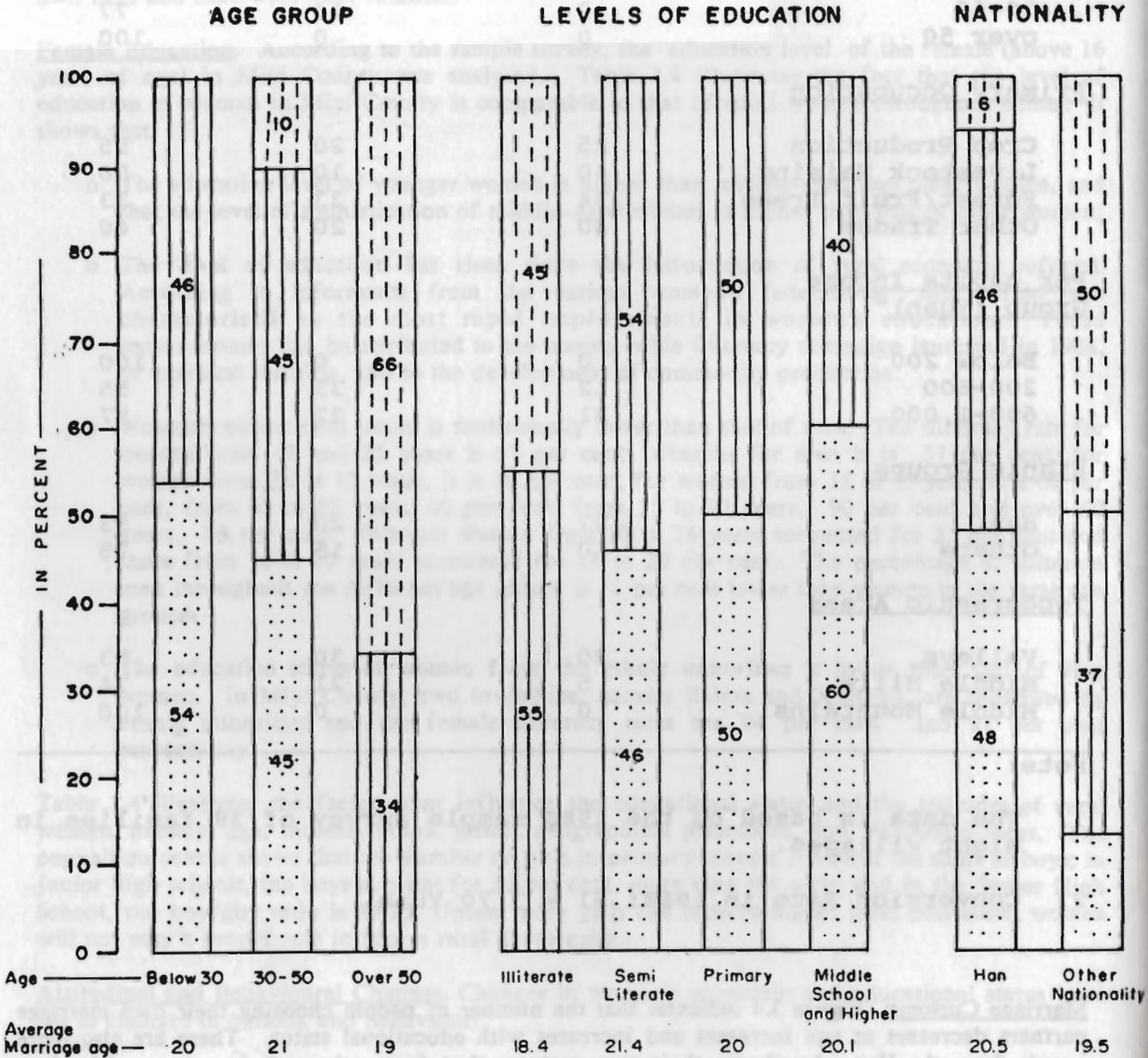
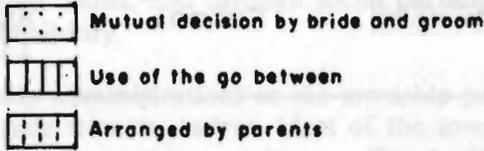


Table 3.5: Child Bearing Patterns of Women<sup>1</sup>

Categories	Average Number of Children	Average Age When First Child Born	Average Age When Last Child Born
<b>Age Groups</b>			
Under 30	1.3	23.0	23.3
30 - 50	3.0	21.9	29.4
Over 50	4.0	21.1	40.0
<b>Education Level</b>			
Illiterate	4.4	21.0	38.8
Semi-literate	1.5	21.7	25.7
Primary School	1.5	21.2	26.5
Middle School & Higher	1.4	23.4	23.7
<b>Nationalities</b>			
Han	2.2	22.2	27.6
Others	3.8	21.7	29.0

**Note:**

1. The data is based on the 1988 sample survey of 38 families in eight villages.
  - o Since the 1970s, family planning policies have been introduced and these have brought about a number of changes in child-bearing patterns (see Table 3.5).
  - o Fifty per cent of the women in the 38 peasant families surveyed wished their children to receive higher education. They had already started to save money for that purpose. They stated that whenever their children remained academically successful they would support them, otherwise they would be welcome to come home to work.

**Main Findings**

Several conclusions can be derived regarding the differentials in rural women's roles and status as affected by area, profession, education, ethnic group, and family background.

1. Younger age groups are characterised by their preference for nuclear families, fewer children, better education, and greater engagement of both the husband and the wife in income-earning activities.
2. Compared to women in the middle hill areas and valleys, women in the mountains have bigger families, spend more time on housework, bear children longer, earn less income, and take fewer contraceptive measures. The parameters affecting them include

environmental conditions, productivity structure, percentage belonging to ethnic minorities, cultural traditions, and birth control policies. As cultivation has been extended on to new land only recently, there has been little return on investment as yet (for example, most fruit trees have not yet born fruit). Families in the middle hill areas have lower incomes and higher expenditure than those in the valleys.

3. The economic and social development of the mountain areas, inhabited by minority ethnic groups, are behind the Han areas. Transport facilities in the mountains are poor; there is less water and heating facilities; and deep-rooted cultural traditions influence the attitudes of the women. It is extremely important that the county develop these areas to keep pace with other areas so that minority women can enjoy the same economic, social, and family status as the Han women. This means that the involved departments will have to create new jobs and emphasise education, especially that of girls, so that they will be able to play a better role in rural development. This, in its turn, ensures that an increased income contributes to an improvement in the all round quality of life.
4. The economic concept of rural commodities has influenced the role of rural women in production. As yet, it is in the initial stages. However, women's jobs are still limited to agricultural and traditional subsidiary occupations. In 1987, only 58.1 per cent of agricultural products were processed. Agricultural industries, commerce, and services are still in the developmental stages. Though the county has made some progress, it is far behind the advanced rural areas. Women's concepts of their role in the economic structure need to be strengthened. In the valleys, development has been more rapid and women have begun to play prominent roles in productive life. In the mountains, however, progress has been slow and the status of women needs to be improved.
5. Since 1984, due to the implementation of economic reforms, the economic status of the county has risen rapidly compared to the past and to the rate of development in neighbouring countries and in the Province of Sichuan as a whole. The Women's Federation in the county, in cooperation with the relevant functional departments, has mobilised, trained, and assisted rural women to develop production. Many women have prospered through these efforts. For example, among the women taking part in these activities, 1,415 families increased their income by \$ 11 per capita; 756 families by \$ 17 per capita, and 909 families by more than \$ 23 per capita.
6. Rural women have played an important role in the development of mountainous areas. They have, through their own efforts, moved towards the attainment of equal status in the economic, social, and family spheres. However, due to their work loads and domestic chores, rural women feel physically and psychologically oppressed. Such heavy responsibilities are not conducive to improvements in their independence and spirit of enterprise. Methods must be found to ameliorate this situation.

## ORGANISATION AND MANAGEMENT IN RURAL COMMUNITIES

### Functions of the Village

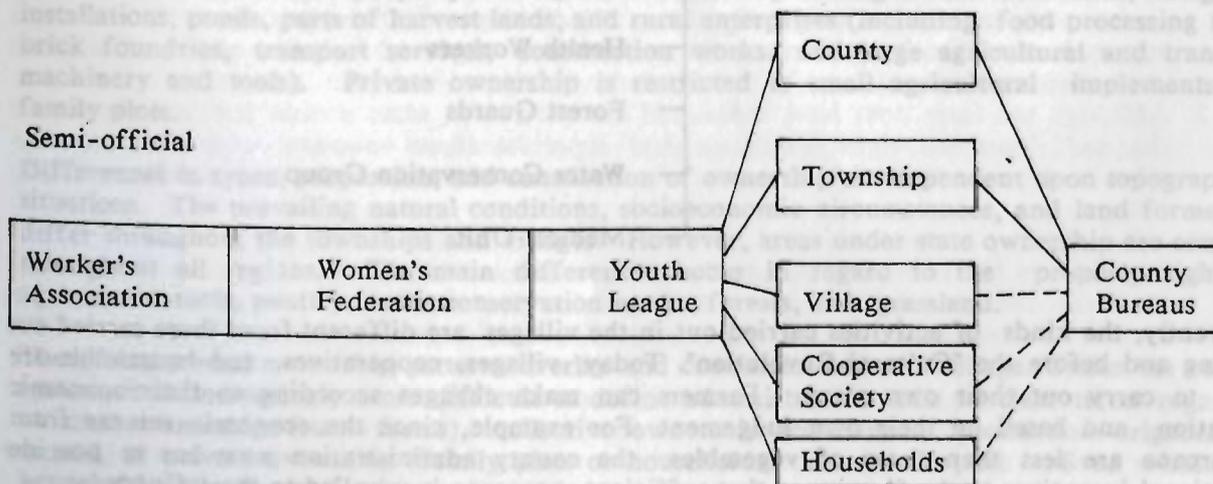
Organisational Characteristics of Villages. There are four major characteristics of villages in mountain areas:

- o A certain population scale is maintained. In Miyi County all villages have between 1,000 to 5,000 inhabitants.
- o Predominance of natural groupings, some of which are ethnic, groups that have a long history of coexistence.
- o Villages have been subject to a series of name changes depending upon political changes and different management systems. However, the historical units have remained intact.
- o The village is only an "organisational unit" under the township. It has no electoral, government or legal system of its own.

Position of the Village in Rural Organisation. The village is an administrative unit under the township. it administers the cooperative society under which operate the households. This results in a vertical organisation structure as presented in Figure 4.1.

Village Structure. Each village is similar. The village head is in charge of organisation and management. He also relays directives from the higher administrative levels to the village and vice versa. He is responsible for administering the various cooperative societies and for heading the people's committee.

Figure 4.1: Hierarchy of the Organisational Structure

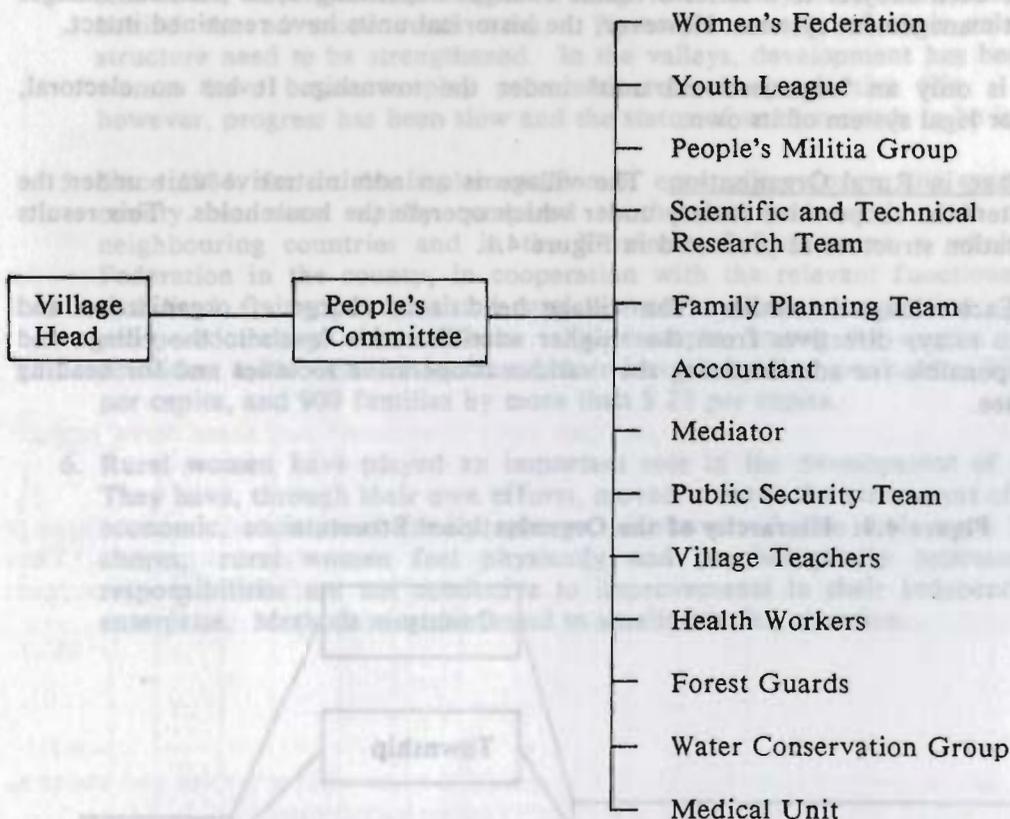


The people's committee consists of five to seven members. They and the village head are selected by the villagers. The committee is responsible for village development and day to day administration. Each member is responsible for a specific area such as production, accounting, militia, women's services, public security, and mediation. Specialists can be appointed by the committee, to deal with specific problems, on a full time or part time basis. The organisational structure in the village is given in Figure 4.2.

### Organisational and Management Functions

The village, therefore, is not only in charge of its own administrative affairs, it is also responsible for production management. Without this being so, it would not be possible for the village to implement the directives coming from the county and township levels. For example, had the village not been in charge of agriculture, management of water conservation would be impossible and the prevention and cure of plant diseases would be extremely difficult.

Figure 4.2: Organisational Structure in the Village



Currently, the kinds of activities carried out in the villages are different from those carried out during and before the "Cultural Revolution". Today, villages, cooperatives, and households are free to carry out their own plans. Farmers can make changes according to their economic situation and based on their own judgement. For example, since the economic returns from sugarcane are less than those of vegetables, the county administration now has to provide additional incentives to the farmers so that sufficient sugarcane is supplied to the refinery.

Similarly, a Cooperative Credits' Association is established in each township in order to provide funds to farmers for agricultural expansion. The interest rates charged are lower than those charged by the Government Credit Society. The overall list of village functions is presented below.

1. To implement policies coming from higher administrative levels. The village head has the right to convene and preside over village meetings for this purpose.
2. To elect representatives to the People's Congress at township level.
3. To implement the tasks assigned by the township. These may include conscription, state purchasing of grain, family planning, etc.
4. To implement village welfare services and pay teachers' salaries; to provide relief for widowers, widows, and orphans as well as providing health services for the village.
5. To sign contracts with cooperatives, household groups, and households for agricultural production tasks.
6. To facilitate the use of agricultural technology and commercial services by farmers.
7. To mediate in disputes among the cooperatives.
8. To direct the distribution and management of the collective fund.
9. To organise and manage rural enterprises.
10. To coordinate with other villages in water conservation, highway construction, forestry, and cooperative enterprises.

#### **Ownership Patterns under the "Contractual Responsibility System"**

Current Ownership Types. There are currently three types of ownership in Miyi County: state, collective, and private. Collective ownership is, however, predominant over the others.

State Ownership is confined to land, rivers, communication networks, highways, large reservoirs, and parts of the forest property. Collective ownership manages cultivated land, irrigation installations, ponds, parts of harvest lands, and rural enterprises (including food processing mills, brick foundries, transport services, construction works, and large agricultural and transport machinery and tools). Private ownership is restricted to small agricultural implements and family plots.

Differences in types, proportion, and constitution of ownership are dependent upon topographical situations. The prevailing natural conditions, socioeconomic circumstances, and land formations differ throughout the townships and villages. However, areas under state ownership are common throughout all regions. The main differences occur in regard to the property rights to agricultural tools, poultry, water conservation works, forests, and grassland.

Therefore, several ownership patterns overlap and coexist in the same village. Under the current system, it is increasingly more difficult to define administrative units in clear terms regarding national ownership (state farms), collective ownership (communes, production brigades, or teams), or private ownership (family plots or households) than in the past. Even within one household, collective and private ownership systems coexist.

## *State Ownership*

In recent years, there have been progressive economic reforms in China. The state ownership pattern has changed to one that is similar to those of the villages in terms of management and labour arrangements. Some characteristics of national ownership remain in the overall management pattern but collective production and private contracting systems are also practised.

On the Miyi State Farm there are 124 employers on 19 ha of land. One fifth of this area is occupied by a pond where fish and ducks are raised. In addition, cows are raised and grain, sugarcane, and vegetables are grown. The following forms of ownership are in practice.

1. The land, pond, weir, and cows belong to the State. The weir for irrigation is used by the whole farm and is maintained collectively. The land, pond, and cattle are contracted separately and managed by groups or households.
2. Ducks, fish, pigs, large tools, and agricultural machinery (tractors and automobiles) are collectively owned and managed. The ducks and fish are, however, contracted out to households.
3. Small agricultural implements (hoes and ploughs, for example); small livestock (chickens, rabbits, and pigs); septic tanks, and seeds are privately owned and managed.

Before 1984, State Farms came under state ownership completely. Funds were allocated annually and they were managed according to the regulations laid down for State Enterprises. Wages were paid to the staff and other workers on a monthly basis and profits and losses accrued to the State. During that period, the Miyi State Farm lost \$ 8,000 per year on average.

Since 1984, contract management has been instituted. Fish, ducks, and cattle have been contracted to different collectives and the planting of sugarcane and paddy as well as pig-raising have been contracted out on a household basis. Every contractor has to pay a certain quota back to the farm based on the type of contract. Any surplus of profit over the quota belongs to the contractor. Likewise, the deficit has to be covered by the contractor also.

Although the State Farm comes under the national ownership category and many of its characteristics are quite specific to this category, it has some characteristics in common with the villages. Below we have compared these characteristics.

1. In comparison to the ordinary village, the farm has a comprehensive plan and assumes social responsibilities and obligations. Production must comply with the County's stipulations. These may include the provision of improved varieties of fish, fowl, and cattle outside the farm.
2. Although the farm does have individual contracts with some groups and households, all the staff have the right to discuss and supervise these contracts. All plans must be submitted to the "Worker's Congress" for approval. This does not apply to the ordinary villages.
3. The farm is better organised than the villages. It has 14 management personnel, including the Farm Director and a deputy. Management personnel are in charge of finance and accounts, supply and marketing, production and technology, and reception. The "Worker's Congress" has 20 members. Its function is to represent the staff, approve production plans, supervise finances, allocate work, and appoint the farm director (by election). It is also the responsibility of the "Worker's Congress" to impeach and dismiss the Director if his/her performance is found wanting. This, too, is a process that does not apply to the ordinary village.

4. The farm has a well-organised material and technological supply system. Although contracts are made with groups and households, common activities such as feed distribution, manure supplies, seed propagation, agricultural tool acquisitions, external relations, and traffic are managed by the management personnel and their offices. Therefore, production contractors are guaranteed supplies and technological inputs. This does not apply to the villages.
5. Food grain is supplied by the State on the basis of 16 kg month per person. In the villages, the peasants are dependent upon what they can grow or else they must purchase grain on the open market.
6. The difference in income between the rich and the poor is on average less than in the villages. In 1987, the average annual income per person was \$ 380. The highest income was \$ 1,080. The director earned \$ 860 and the lowest income earned was \$ 270.

### *Collective Ownership*

Before 1984, accountability in the collective ownership system was at three levels: "People's Commune", "Village Brigade", and "Cooperative". This has changed since the introduction of the "Contractual Responsibility System". Currently, collective ownership operates at the following levels: the village, the cooperative, and the household group. The townships are not considered to be collective production units, except in the case of the few enterprises that they still own. At present, collective ownership does not operate as a single unified system but has been replaced by a variety of ownership patterns that coexist, change, and reorganise constantly. Management under a collective ownership system does not include a large number of activities as it did previously. Its major role is confined to managing village enterprises, technical agricultural inputs, and public welfare. Day to day activities have now been replaced by household and collective contracts. The activities are flexible and are determined by the village, the cooperatives, and the households themselves.

Principal Collective Activities. Collective management of the cooperative economy decreased considerably after the introduction of the "Contractual Responsibility System". At one point, collective activities had almost completely disappeared; although they have now gradually started to recover. Currently, collective activities in Miyi County cover the following areas:

- o water conservation projects;
- o technical services such as those involving the prevention and control of plant diseases and pests or introduction of progressive technology;
- o information in relation to production before, during, and after production activities; and
- o welfare activities for the benefit of those who, for some reason or other, cannot engage in normal labour activities.

In their organisation, these activities differ from that in townships and villages. To illustrate these differences we have taken specific examples from different villages.

1. Guabang township has a collective water conservation project. It is being implemented by laying down a rule for the contribution of 20 days of voluntary labour per year; by charging fees for water based on the total amount of cultivated land in irrigated areas; and by insisting that families that cannot contribute labour pay for labour hire or send substitute labour. Labourers are hired by the Water Management Committee and are paid approximately 40 cents for every cubic metre of earth that they dig.

When a new water conservation project is to be established, the Water Management Committee under the township administration organises the construction and deputs the necessary labour. Labour wages are met through the above-mentioned water fees. When the construction is complete, annual maintenance works are undertaken by voluntary labour. Should voluntary labour be insufficient, the water management committee uses the money realised through water fees to hire the necessary labour.

2. In Qingpi Village, an service station has been established by the township administration. It is manned by technicians from the villages and operates on a part time basis. The technicians are partly self-employed on their own land and draw half of their wages from the village. Their responsibilities are to guide every household on agricultural problems such as plant disease and pest control, advice on planting periods, and improved species, etc. One of the agricultural technicians from Qingpi village is deputed to work in the township service station for one month a year.

Also, production and other technical services are provided by the agricultural service station. Production services include the allocation of transport; the distribution of seeds; the distribution of chemical fertiliser; and the dissemination of information concerning products and supplies.

3. In Qinggang Village, social welfare activities for the welfare of the unemployed include staple food supplies to households who have the right to "five guarantees" (food, clothing, medical care, housing, and burial expenses). Grain is distributed on the basis of an allotted average per head. The land belonging to such households is cultivated by labour employed by the collective but the produce belongs to the household. Pocket money is also shared equally among every household under this category. Usually, the amount comes to about \$35 per year. Each villager pays on average 27 cents annually to the township administration towards the support of these households and this in turn is allocated among the villages.

### *Production Contract*

After the implementation of rural reforms, the "contract system" was introduced. Agricultural production is realised through a series of contracts made at different levels. The county administration signs a contract with the township, the township with the village, the village with the cooperative, and the cooperative with the household. The content of these contracts includes such items as the types of crops, areas of cultivation, and the amount of produce over a one year period. The normal contract system is not very popular in Miyi County because the amount of work allocated to each household is excessive; variability in the productivity of land among the households is high; and the amount of cultivable land is limited. This means that farmers are not confident that they can fulfill the contract obligations. As a result, only 11 or 12 townships operate the normal "Contract System". However, the "contract system" is retained for special products. A good example of this is fruit production which has three types of "contract system":

- o "Team Contracts" are carried out by cooperative teams where orchards are large enough and where the trees are owned collectively. The orchard is divided into plots and these are assigned to households. Income is distributed individually according to the amount of work expended and a percentage of the total income is put aside for improvements and extensions.
- o "Household Contracts" operate in hilly areas where trees are scattered and where less than 500 fruit trees occupy each piece of land.

- o "Household Union Contracts" operate by dividing the total number of trees among a collection of households (e.g., in Dushu Village, 14 households have an orchard management contract with the village). Five aspects of management are controlled by the union as a whole: planning, nursery stock, management techniques, control of pests and diseases, and sales. Each household has a separate production contract with the union. During the first three years, the village does not take any of the profits; from the fourth year to the seventh year the village takes 1.5 kg of fruits per tree; and thereafter, the village takes 2.5 kg of fruits per tree and \$ 81 for every ha of land.

Amongst the three contract systems, the third appears to be the most satisfactory. It not only involves production, techniques, and sales but also fixes the output and income at household level which makes it more interesting to farmers.

Contract Particulars. Contracts are drawn up by the township administration. These are sent out to every cooperative at the beginning of the year. The cooperatives and households, jointly and consultatively, fill in the forms. The contract becomes effective from the date of its acceptance by the township administration. The particulars include contract period, method, legally responsible individuals, and so on. The material and technical conditions relevant to the contract are also provided. Production targets to be met and dues to be paid are also stipulated. Responsibility for paying state taxes is jointly met. In addition, all regulations concerned with the use and protection of public property must be observed. Conditions under which contracts may be terminated are also outlined.

A detailed description of how such a contract works can be taken from the example of Qingpi village. Its cooperative society has 237 members and on average each member cultivates 0.044 ha of land. Vegetables are produced as a cash crop.

The responsibilities and benefits laid down in the contract are as follows:

- o Each person must plant 0.022 ha of sugar cane and 0.022 ha of vegetables.
- o Each person must pay \$ 5.40 to the cooperative society and \$ 4.90 per year to the State in agricultural taxes.
- o Each person can buy 250 kg of rice at state-controlled prices after he has sold 600 kg of chillies and cucumbers at state-controlled prices.
- o The right to use the contracted land extends for 15 years and the cooperative cannot take back the land during this period.
- o Land must be properly utilised and cared for. It cannot be bought and sold but it can be exchanged with someone working under the same contract.
- o Responsibility for public welfare (as assigned by the collective) must be undertaken. In return, the parties issuing the contract must ensure:
  - o the provision of fertiliser at state-controlled prices;
  - o technical guidance and services.
  - o collection of annual taxes (\$ 5.40 per head) and use them for the benefit of the collective; and
  - o the maintenance and protection of public property.

Should the contract be broken by the farmer, any of the above services may be discontinued by the parties issuing the contract. However, negotiations usually take place in an effort to solve the problem. If, on the other hand, a contract is broken by those issuing the contract, submission for compensation may be made to higher authorities by the farmer.

### *Labour Exchange*

Labour is exchanged on a reciprocal basis between farm households during certain seasons. It is very common in Miyi County and exists in each of the eight villages studied. There are several reasons for the prevalence of labour exchange and these are outlined below.

After the introduction of the "Contract System" in 1982, farming activities were based on single household units and were heavily reliant on manpower. Farming is undertaken on a very small scale and the level of mechanisation is low. In addition, farming is a seasonal occupation. Sowing and harvesting, for example, have to be completed within a limited period of time. Consequently, farmers often face a labour shortage problem in the busy periods. Most households cannot afford to hire labour and those who can are slow to leave traditional customs; hence, the evolution of the labour exchange system.

Remuneration and types of labour exchange among different households are roughly equal in value. For example, one day's labour merits one day's labour in return in the same season between any two households. In other words, it is an exchange of equal value in terms of time but the households do not bother about the concrete nature of the work performed. This is an important factor if the labour exchange system is to be maintained over a long period of time. No money changes hands and this is an important distinction between exchange and hire. In Miyi County, labour exchange takes place in the daytime and food may be supplied by the host. This results in three types of labour exchange all involving some kind of extra remuneration as follows:

- o Host does not provide food but may provide cigarettes, beer, or other beverages. (This is the most common kind of exchange in Miyi county and involves Qingpi, Dushu, and the State Farm).
- o Host provides lunch. (This is common in Guabang and Xizie). This system is the second most common but it has a number of drawbacks. The most common drawback is that the provision of lunch can degenerate into competitive feasting among households. (In the case of Guabang and Xizie, the township administration had to issue a ban on expenditure on "lunches").
- o The third type of exchange is that in which the host only supplies tea and drinking water. In this case, the relationship is based only on labour cooperation. Although this is rare in Miyi County (it is only practised in Kelang Village), it is the ideal type of labour exchange.

There is no fixed pattern to labour exchange, no leadership, and no organisers. Sometimes it is coordinated by cadres from the village and township but usually it is organised among the participating households themselves.

It normally takes place between neighbours or relatives in the same village but it can take place between farmers in two different villages or townships. For example, farmers in Guabang township exchange labour for rice planting with another township.

The number of labourers exchanged differs according to the type of work. The lowest number is two and the highest over 30. Commonly, however, seven to eight helpers are sent. Ten households can exchange labour among themselves on a stable basis over a long period of time.

The sequence of exchange is determined by the order of activities in individual households. Usually, there are no problems with this system because all households do not undertake the same tasks at the same time.

Labour exchange takes place throughout the year, but is more prevalent during the busy seasons. In Miyi County, the busiest season is from December to March, because, in this period, farmers harvest the sugarcane and sow and harvest early spring vegetables. The second busiest season is from June to September when crops sown in Spring are harvested and winter crops are planted. As a result, these two seasons have the highest frequency of labour exchange.

Labour exchange is a traditional system and it was very common before the "Commune Period". During the "Commune Period", labour exchange disappeared because the village headman arranged farming activities for the whole village. After the introduction of farm output quotas, labour exchange reappeared. However, with the change from a subsistence economy to a commodity-based economy, labour exchange will gradually be replaced by wage labour. The result of work distribution, based on the "Responsibility System" is that the means of production are contracted out to households. This means that everything produced belongs to the household apart from that portion that has to be paid as taxes. The amount of taxes collected is standardised and is based on the size of land area and size of population. This means that the more one works, the more one earns so that there is no longer any form of collective distribution. However, collective redistribution still exists. The collective still has the right to deduct a certain percentage from each contracting household and this income is redistributed in a number of ways.

- o For the special care of the families of militia men and revolutionary martyrs.
- o For the care of the disabled
- o For paying the wages of cadres
- o For the development of welfare services
- o For investing in collective businesses
- o For redistribution to families if any surplus remains after meeting the above expenses.

Redistribution of surplus among households does occur in villages where there are good collective enterprises with abundant income. These are still very few in Miyi County.

Because of work and management by households; among which there are great differences in topographical conditions, supply of natural resources, and infrastructural facilities; production levels also vary a great deal and this has resulted in a wide income gap between the rich and the poor.

Some families, with many pairs of hands and good working conditions, earn \$ 2,700 a year. This is far more than the average income of workers, professors, high ranking officers, or State leaders. However, at the other end of the scale, there are extremely poor families, who just get enough to meet their basic necessities, and there are yet others who barely get enough to survive. Kelang village is a good example of this discrepancy. The highest income is \$ 270 per capita per

annum and this accounts for 25 per cent of all households in Kelang. The lowest income is \$ 16 per capita per annum and this accounts for five per cent of all households. The average income for the village is \$ 122 per capita per annum. The rich families own trucks and tractors. Six families have private trucks and 38 have private tractors. At the same time, three families have barely sufficient to cover their basic needs and live on relief provided by the collective fund.

Before the introduction of the "Contract System", this kind of discrepancy between rich and poor did not exist. However, most households were low income households; the average income being \$ 27 per capita per annum. Now, most households earn more and standards of living have improved. Those households with decreased incomes are rare but the disparities make the poverty of those few households more obvious. This is the difference between gradual development and rapid development. Most households support the present policies and are not desirous of change. However, the cadres have different points of view. They believe that the "Contract System" should be revised within the spirit of the present system.

We examined the situation of some of the impoverished families and analysed the reasons for their poverty as follows:

- o the families are short of labour;
- o the families are not too intelligent and have not been able to implement production plans; and
- o The channelising of the means of production is faulty; it permits those who have favourable contacts to buy fertilisers etc. at state prices and resell them at much higher prices which many farmers cannot afford.

The village headmen state that it is impossible to eliminate the wide gap between rich and poor. However, some special policies have been formulated in an attempt to do so. They are:

- o guidance to poor households by cadres and cooperative societies;
- o reformation of essential supply channels; stress is to be laid on the support of poor households and the Government is to be requested to supply essential production inputs directly to the households; and
- o increase of subsidies to poor families by increasing reserves and setting up additional collective funds.

## **Natural Resource Utilisation Patterns**

### *Innovations in Optimal Use*

In the villages of Miyi County, at present, resource use is not at the optimum. For example:

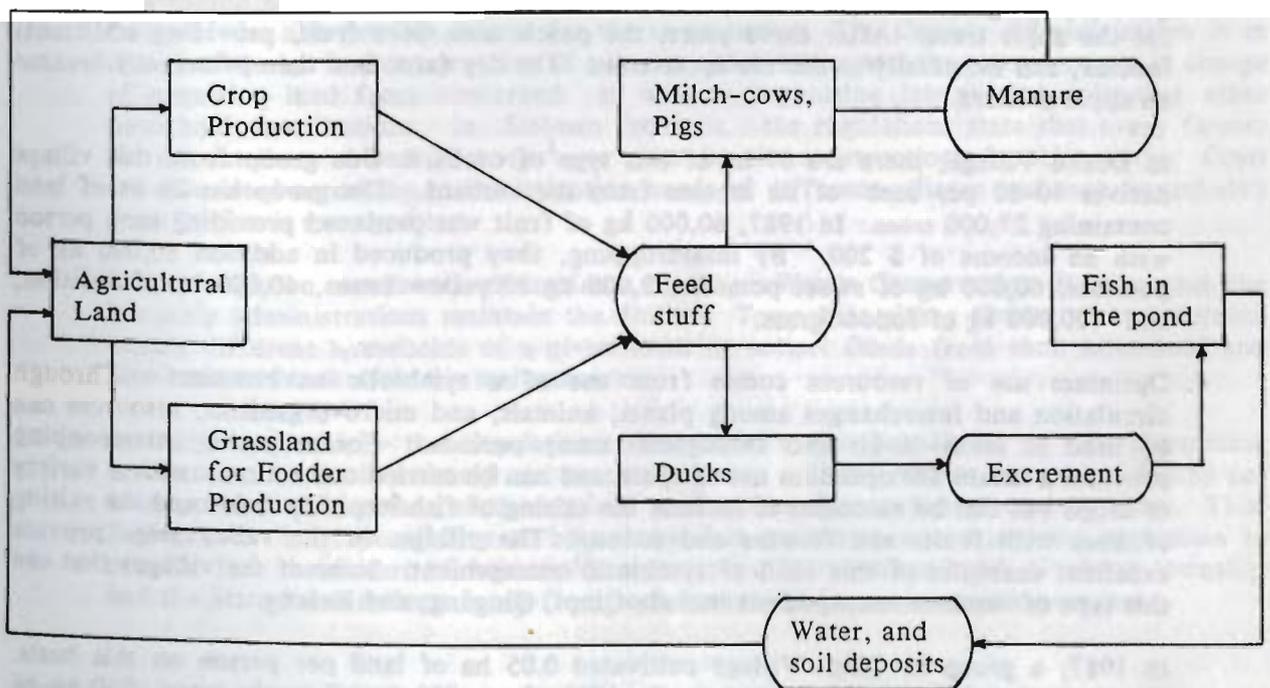
- o optimum utilization of water and soil resources is limited;
- o resource use is based on low level traditional agriculture and rarely on post-harvest processing; and
- o resource use is widely dispersed amongst different production units (e.g. township, village, or family).

In recent years, however, with the development of "vertical agriculture," advances have been made in the optimum use of natural resources. This has been based on planning for "vertical agriculture" as the focus for a comprehensive agricultural system. Resource use varies from the valley to the middle and high mountains. Each village has its own characteristics in terms of resource use. In the eight villages studied, we have found the following types of resource use to be common:

1. Optimum use with a crop-livestock mix (milch cows, pigs, fish, and ducks). Crops are planted on farmland and the by-products are given to the cows, pigs and ducks. The water and the soil deposits from the fish ponds are used as fertiliser. Circulation of resources is as shown in Figure 4.3.

The county farm follows this model. It has 124 workers, 7.33 ha of fish pond, 6.67 ha of grassland, 38 milch cows, 14 oxen, 2,740 sheep, and 120,000 ducks. A fish pond, occupying 0.73 ha of land, is adequate for 2,500 ducks. The duck excrement is used as fish food. The production without using any other kind of feed amounts to 458 kg of fish for every *mu* (0.06 ha). This is twice the amount of fish produced before the use of ducks. By using soil deposits and water from the fish pond, sugarcane production rose to 1.3 tons per *mu* (0.06 ha). Similarly, the production unit in Lianhua village farms a 10 ha orchard and has established a fishpond and a rabbit farm. Peanuts and sweet potatoes are intercropped with the fruit trees. The sweet potato leaves are used as fodder for the rabbits; the rabbit excrement as feed for the fish; and the water from

Figure 4.3: Crop-Livestock Mix in Agriculture



the fishpond for irrigating the orchard. In 1987, this orchard, which is under contract to seven families, realised an income of \$ 17,500 each family earning \$ 2,500.

2. Bio-gas is generated by using fodder provided by grassland and pig excrement as the raw materials. The sludge from the digester is an excellent fertiliser. Kelang village, in particular, uses this system. Out of 53 families, 47 families have 8 m<sup>3</sup> biogas plants. The investment involved ranges from \$ 80 to \$ 110 per family but in return, the village saves \$ 1,080 to \$ 1,350 annually on fuel and one third of the labour previously needed to collect fuel. Seventy three hectares of barren mountain, fenced off in 1985, has now become shrubland.

Lin Jingyin, a villager from Chaochang township, manages 0.66 ha of land under contract. He keeps pigs and fish and produces biogas from their excrement. He propagates fish by using liquid effluent from the biogas digester and raises earthworms using the sludge. The earthworms are then fed to chickens and fish. Lin earns \$ 2,700 a year.

3. Optimum use of light, heat, soil, and fertiliser is achieved by creating a "vertical agriculture" model based on the altitude and the growth period of crops and trees. By judicious arrangement of crops at various levels, optimum benefit is derived from light and heat. This is beneficial to farmers in providing short-term as well as long-term income.

In Dushu Village, farmers developed dry farmland by planting apple trees (*arbor*, bearing fruit after 7 years) and peach trees (shrub variety, bearing fruit after 3 years) at the rate of 70 trees per *mu* (0.06 ha). Intercropped with the fruit trees were yellow beans, radishes, and potatoes; all of which can be harvested within a year. In the first few years, the sparse foliage of the apple trees permitted the filtration of sunlight and the healthy growth of vegetable crops. This provided cash income and vegetable humus as fertiliser for the apple trees. After three years, the peach trees bore fruit, providing additional income, and eventually so did the apple trees. The dry farm land then principally became an apple orchard.

In Dushu Village, there are 67 ha of this type of orchard. One group from this village derives 40-50 per cent of its income from the orchard. The group has 21 ha of land containing 27,000 trees. In 1987, 60,000 kg of fruit was produced providing each person with an income of \$ 200. By intercropping, they produced in addition 80,000 kg of potatoes, 60,000 kg of sweet potatoes, 2,000 kg of yellow beans, 40,000 kg of radishes, and 100,000 kg of fodder grass.

4. Optimum use of resources comes from use of a symbiotic environment. Through circulation and interchanges among plants, animals, and micro-organisms, resources can be used at many levels and throughout many periods. For example, intercropping provides a means for optimum use of space and can be carried out not only with a variety of crops but can be extended to include the raising of fish in paddy fields and the raising of bees with fruits and flowers and so on. The villages in the valley areas provide excellent examples of this kind of symbiotic management. Some of the villages that use this type of resource management include Qinpi, Qingang, and Kelang.

In 1987, a group in Qinpi Village cultivated 0.05 ha of land per person on this basis. Crops produced totalled 15 tons/ha. In 1987, from 459 kg of staple crops, 950 kg of vegetables, 850 kg of sugarcane, and a pig, each person earned \$ 80 per *mu* (0.06 ha).

Intercropping permitted them to earn enough cash and keep the grain or staple crops they had produced.

### *Irrigation and Water Distribution*

1. There are 2,282 irrigation works throughout the county and they irrigate 8,070 ha of land. Stable yields are guaranteed for 5,530 ha, notwithstanding drought or excessive rainfall. There are nine reservoirs, each with a storage capacity of over 10,000 m<sup>3</sup>. There is also a large scale irrigation canal (Qianjing).

Most of the reservoirs were built from 1958 to 1974 and they are all owned by the State or by collectives. Since 1984, their management has been contracted out to households or household groups. Large irrigation works such as the Qianjing canal, however, are managed by the Miyi Hydroelectric Bureau which comes under state ownership. The bureau manages the canal directly and contracts the management of its ditches to townships, villages, and cooperatives.

Under the townships, irrigation works come under two forms of management. The first method involves management of water projects by each unit, according to the area of farmland irrigated. The second involves delegating management of all water projects to one administrative unit, no matter whether their land is being irrigated by these projects or not.

Both the county and townships retain professionals to maintain irrigation works and supervise water distribution. Guabang township employs two such professionals at the rate of \$ 22 per month. They have contracts with the township to maintain each of its main ditches.

2. Construction funds for large projects are collected, by the administration, from the farmers who also provide labour for the construction. The County Administration is in charge of design and construction of culverts and bridges; and the townships are in charge of acquiring land from concerned as well as organising labour and collecting other household contributions. In Sichuan Province, the regulations state that every farmer has to contribute at least 20 *gongs*<sup>1</sup> per year for the construction of public works. Costs are calculated according to the irrigation needs of different villages and each household's contribution is averaged out.

Large irrigation works are maintained by Miyi Water Conservation Bureau and the township administrations maintain the ditches. Townships either divide the maintenance among different households of a given town or collect funds from each household and hire labour to look after the maintenance.

In Xijie township, the regulation states that every household, not completing maintenance works in a timely and proper manner, will be fined at the rate of \$ 1.35 per head per day to hire the people required to complete the work neglected by them. Thus Xijie allots the responsibility to households but maintains a contingency regulation to provide for the failure of households to comply. On the other hand, Guabang township and the State Farm collect funds from each household for maintenance purposes.

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1. A *gong* is a period of eight hours' work for one person.

3. Water rates are collected for managing and maintaining irrigation facilities. Rates vary from place to place and allocations within these rates. Guabang and the State Farm collect such rates. Guabang charges \$ 3.50 per *mu* (0.06 ha). Sixty per cent of this is used for the maintenance of the main canal and 40 per cent for managing irrigation facilities. The State Farm charges \$ 8.10 per *mu* (0.06 ha), \$ 2.70 goes for managing irrigation facilities, and \$ 5.40 for maintenance. For the fish pond, the rate charged is \$ 13.50 per *mu* (0.06 ha). In Xijie township, the administration only charges an irrigation rate because the villages are responsible for maintenance. The rate is \$ 0.70 per *mu* (0.06 ha).
4. Water distribution is determined according to the area of cultivated land. Distribution is equal for every *mu* (0.06 ha) of land. However, because of the seasonal characteristics of farming, every household wants to be the first to receive water and, consequently, there are many disputes. To resolve this problem, irrigation is provided according to the natural flow of the current. The upper reaches are irrigated first and the lowest last. Township cadres, village cadres, and cooperative cadres; as well as farmers and irrigation technicians; are mutually responsible for supervision. This is common practice throughout the county. In Guabang township, during periods of shortage, each village irrigates for three days in turn. Within each village, the cooperatives irrigate an area at a fixed time, and within the cooperatives its members do likewise. Mutual supervision is practised and if the water is scarce, the paddy seed beds and then the fields are irrigated. Amounts of water are calculated according to area to be irrigated and discharge from the ditches. Irrigation sequences are sometimes decided by drawing lots, but this solution is usually only applied to cooperatives within a village and farmers within a cooperative.
5. When there is sufficient water, there are usually no disputes. However, whenever there is a shortage, bitter disputes ensue. These disputes are usually settled by the village cadres, cooperative cadres, or irrigation technicians. However, township cadres may be called in; especially if disputes occur among villages or cooperatives. The settlement is based on mediation concerning the irrigation sequence and water quota. Some townships have regulations concerning this. In Xijie, such a regulation states that the sequence for use of township ditches is to be decided by the village head and the village sequence is to be decided by the township head. No matter what the position of the person who violates water regulations, he will be responsible for all losses incurred. For this reason, cadres involved in mediation of disputes must not only be fair but must be seen to be fair.

## Management of Rural Funds and Markets

### *Rural Funds*

Rural funds are the resources for agricultural development and expansion. Funds are realised from three sources:

- o State funds for agriculture. The People's Congress, the Provincial Government, and the County allocate annual funds for agricultural development. The amounts to be allocated are based upon natural resources and the socioeconomic conditions in each area, and these amounts are distributed through the lower level administrative units. Special treatment is given to remote mountain areas. Normally, funds are administered by the county administration and are used in administrative expenses and on public works' construction. Very little trickles down to the townships or villages for the support of poorer households.
- o Loans can be obtained from State Banks. Usually the county or township administration has to stand as a guarantor. Interests are low and in some cases no interest is charged at all.

- o Personal savings are disparate and some households have no savings at all. Some of the townships and villages are attempting to establish cooperative funds. In this respect, township cooperative foundations exist but there are none at the village level.

Xijie township is an example of a township with such a fund. Contributions come from the following sources:

- o \$ 9,200 came from savings accumulated during the "commune period"
- o The township administration contributes \$ 1,350 per annum
- o Township enterprises contribute \$ 2,700 from their profits every year.
- o Miscellaneous amounts of money saved and invested by commune members total \$ 23,500.

The total amount in the fund is \$ 36,750 and this is used in the following ways:

- o Priority loans are given to households for agricultural inputs. Interest on these is low, 0.57 per cent annually.
- o Loans are given for such projects as orchard development and piggeries at annual interest rate of 0.66 per cent.
- o Loans for medicinal purposes at 0.96 per cent interest annually.
- o Loans for purchase of superior quality goods at an annual rate of 0.96 per cent.
- o Short-term loans for trade and business investments (3-5 months) at an annual interest rate of 1.2 per cent.
- o The foundation has a management committee and its members are elected by the shareholders. The committee controls and decides how to use the funds.

### *Commodity Circulation and Market System*

1. Commodities circulate in two ways. The first way is through the "invisible" structure of state monopoly in purchasing and marketing. The other "visible" structure is that of marketing and trading in a free market system. The most important agricultural commodities come under state monopoly and this is an important policy mechanism of the planned economy. Within this, mandatory prices are fixed. The traditional rural market remains the main trading system in West Sichuan. Markets are usually held in a square or an open place on certain days of the week or month. State trading agents, rural suppliers and marketing cooperatives, private businessmen, farmers, and town residents conduct transactions in the rural market place. The prices are not fixed and are open to negotiation. Wares include farm products and hand-made goods. The "Business and Industry Bureau" determines the site of the market and is responsible for administration.
2. In Miyi, certain staple commodities such as grain and sugar cane are state controlled. The "Food Bureau" is responsible for grain purchasing and it is mandatory to sell sugarcane directly to the county sugar factory. Each year, the county Administration plans food and sugarcane production in consultation with the various township authorities. The village committees, in turn, are responsible for signing contracts with the farmers. A special

agent collects the products directly from the farmers and the grain is handed over to shops run by the food bureau. The sugar cane is transported directly to the factory and factory pays for the transportation. The county supplies a certain amount of scarce agricultural inputs in order to encourage farmers to produce monopoly goods. The prices of these inputs are fixed and acquisition is based on exchange. For example, if a farmer sells one ton of sugarcane, he will receive a voucher to buy 60 kg of fertiliser.

3. There are 27 markets in Miyi and most of them are periodic rather than continuous. Continuous markets are not feasible because of the low population density and lack of purchasing power. Markets are of three types; namely, basic, local, and central. A basic market serves a township on a retail basis and supplies all the normal farm household needs. In Miyi, there are 20 of these. At the intermediate level, there is the local market which has an important function as a wholesale centre. The hinterland covers more than a single township area, and in Miyi there are six such markets. The central market, which is held in the county town of Panlian, is the largest market of all. It is the most important exchange centre between Miyi and other counties or cities. As such it plays the key role in wholesale purchasing from within the county to points elsewhere and from outside the county to markets inside.

"The Bureau of Business and Industrial Administration" is responsible for administering the markets. Its duties include mediating business issues, dealing with and punishing unfair or illegal practices, scheduling market days, collecting expenses, and constructing and maintaining market places.

Agricultural inputs are principal commodities in the markets. These include such items as chemical fertilisers, plastic sheets, and seeds. The "Agricultural Bureau" looks after seed supply and the "County Supply and Marketing Cooperative" is generally responsible for marketing agricultural inputs in rural areas. Because of a nation-wide deficit of such inputs, only partial amounts of the total inputs needed can be supplied at fixed prices. The remaining inputs are bought on the wholesale market at high prices. State monopoly of purchasing and marketing is illustrated in Figure 4.4.

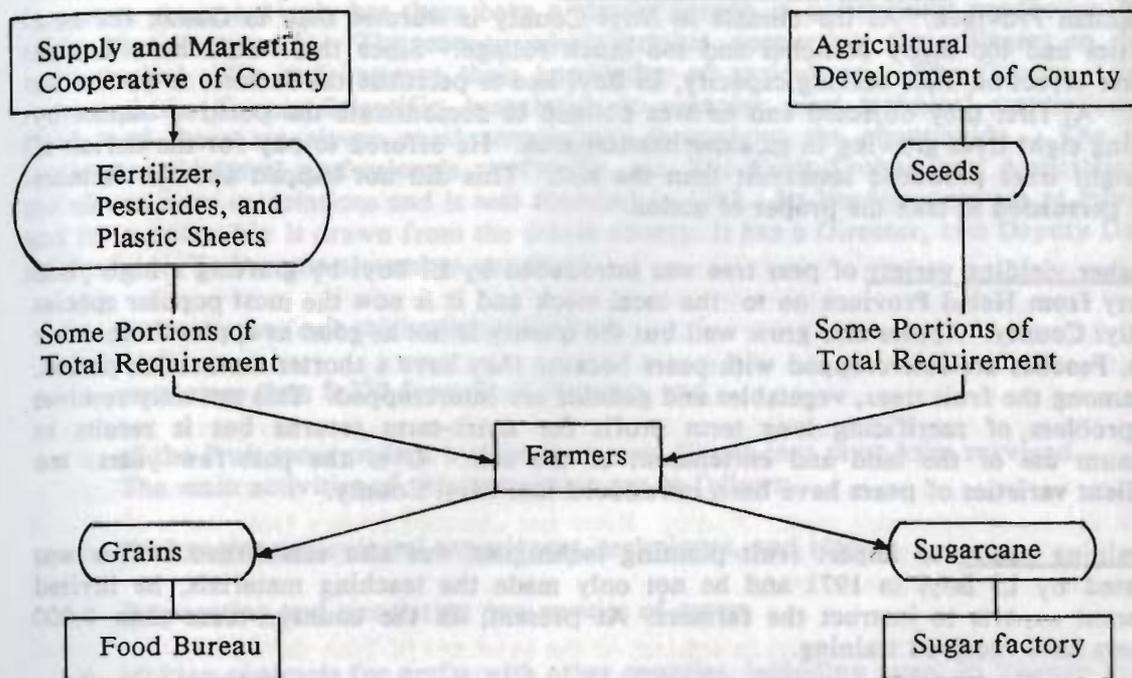
### **Guidance by the County Towards Agricultural Production**

Agricultural production systems are no longer forced on farmers. Today, the county administration guides the rural areas by supplying technological inputs; by providing consultation services; and by introducing experimental projects. Apart from exercising the state monopoly in the purchase and marketing of grain and sugar cane, the county respects the wishes of the farmers in production arrangements.

#### *Technical Guidance by County Cadres*

The organisation and management of agricultural production is complex because of the different categories involved. Every sector needs its own specialists in order to organise and manage its specific operations. In China, most counties emphasise agricultural production and there are many related units among which the "Agricultural Bureau" plays a prominent role. In Miyi County, there are ten agricultural units: the Agrotechnical Station, Seed Supply Centre, Horticultural Station, Animal Husbandry Centre, Veterinary Station, Plant Conservation Centre, Accounts' Guidance Centre, Broadcasting Centre, Statistics Centre, and County Farm. These all come under the "Agricultural Bureau" and employ personnel and cadres to look after the organisation and management of their special sectors. Although the townships have no special agricultural organisations, they employ a number of agricultural professionals such as agricultural

Figure 4.4: State Controlled Purchasing and Marketing



technicians, mechanics, water conservationists, foresters, horticulturalists, estate managers, book-keepers, and broadcasters. These are collectively called "Team of Eight".

In the villages, three people are occupied with production on a part-time basis. They are the headman, the branch secretary, and a clerk. Therefore, the county administration assigns officers or cadres to the villages to help them implement county level decisions. One example of such an officer is Li Boyi who graduated from Jiangjin Agricultural College in 1965. He became the Deputy Director of a horticultural station and is currently the Director of the Department of Vertical Agriculture in the County. While working at the horticultural station in charge of vegetable and fruit cultivation, he was successful in developing fruit farming in Miyi county by using the following methods:

1. By examining the situation properly. Directives had been given to develop tropical fruit cultivation. However, Li Boyi discovered that the temperature dropped below zero every ten years. Since this would have destroyed all the tropical fruits, he introduced the cultivation of peaches and pears propagated from local stock and persuaded the administration to develop apple and pear cultivation in mountain areas.
2. Through demonstration experiments, Li Boyi persuaded the farmers that growing pears, apples, and peaches was profitable. In Xinglong Village of Puwei township, a few households were selected in 1968 to cultivate apple and pear trees. Dushu village in Puwei township was also selected to experiment in pear and peach cultivation. Li Boyi was able to show that by intercropping fruit trees with peanuts and vegetables, more profits could be realised than through vegetable production alone.

3. Because local varieties were of poor quality and had low yields, new varieties of pears and apples, along with improved planting techniques, were introduced from Ganzi Prefecture in Sichuan Province. As the climate in Miyi County is warmer than in Ganzi, the new varieties had too many branches and too much foliage. Since this would have had an adverse affect on their bearing capacity, Li Boyi had to persuade the farmers to prune the trees. At first they objected and he was obliged to demonstrate the positive impact by pruning eight trees growing in an experimental area. He offered to pay for the deficit if the eight trees produced less fruit than the rest. This did not happen and the farmers were persuaded to take the proper of action.

A higher yielding variety of pear tree was introduced by Li Boyi by grafting a high yield variety from Hebei Province on to the local stock and it is now the most popular species in Miyi County. Apples also grow well but the quality is not as good as apples from other areas. Peaches are intercropped with pears because they have a shorter maturation period, and among the fruit trees, vegetables and peanuts are intercropped. This not only resolves the problem of sacrificing long term profit for short-term returns but it results in optimum use of the land and enrichment of the soil. Over the past few years, ten excellent varieties of pears have been introduced into Miyi County.

4. A training centre to impart fruit planting techniques was also established. This was initiated by Li Boyi in 1971 and he not only made the teaching materials, he invited different experts to instruct the farmers. At present, in the county, more than 1,000 farmers have received training.
5. Fruit planting was divided into bioclimatic zones and experiments conducted in three different areas which were classified as follows:

- o Valley areas from 980m to 1,000m where oranges, bananas, and papayas can be grown.
- o Mountain areas from 1,500m to 2,000m which are suitable for cultivating pears, peaches, apples, plums, and cherries.
- o Areas above 2,000m which are suitable for cultivating dry fruits.

Currently four townships, Puwei, Hangshan, Huangchao, and Salian are the major areas for pear and peach cultivation and the three townships of Lianhua, Linhua, and Mianhua are the major areas for the cultivation of oranges and bananas. According to the studies conducted, four prerequisites are necessary for establishing orchards:

- o Good irrigation
- o Sufficient access and infrastructure (roads)
- o Plentiful stretches of land
- o High commercial value of the fruit species to be grown.

Within the county new orchards have been established at Puwei township (100 ha), Malong township (27 ha), and Huangcao township (66.66 ha). Agricultural conditions and the production base greatly affect the development of the collective rural economy. However, depending upon the cadres and the quality of their techniques much can be done to improve conditions all round.

## *Science and Technology Associations*

In recent years, not only has there been a steady growth in agricultural production but farmers' skills have improved. The county administration encourages the villagers to develop new technological skills and improve their knowledge of agriculture. The County Administration requested the County Scientific Association to organise rural technical associations in special fields and there are eleven rural associations throughout the countryside. The membership includes agricultural professionals, craftsmen, etc. The Fruit Technicians' Association is one of the eleven rural associations and it was founded in 1988. Its headquarters are at Puwei township and its membership is drawn from the whole county. It has a Director, two Deputy Directors, and a Secretary. To become a member one must:

- o master some fruit cultivation technique,
  - o earn more than \$ 270 from fruit farming, and
  - o of the fruit trees grafted by him/her, over 80 per cent must have survived.
- The main activities of this association are as follows:
- o Exchanging agricultural experiences, techniques, and ideas,
  - o Propagating and circulating new species of crops,
  - o Making contracts for grafts with other counties, including some in Yunnan Province.

The funds for these activities come from the grafting services provided.

## *Other Agricultural Development Techniques*

Other measures implemented in Miya County include:

- o Sending young people to agricultural school or college. Normally the arrangement is that the student's village pays the cost of the education and the college sends the student back to the village.
- o Inviting scientists and experts to give topical lectures.
- o Conducting training courses at township, village, and team level.
- o Sending villagers to agriculturally more advanced areas so that they can communicate new techniques to their own areas.

## **Ecological Issues in Rural Development**

It is necessary for each region to maintain the optimum of ecological stability in order to establish stable long-term social and ecological development. Without this, environmental degradation results and retrogression sets in. However, this has not been universally acknowledged by all cadres in Miya County, especially the village leaders. To a certain degree, development, in the last dozen or so years, has resulted in a concomitant degeneration in the environment. Currently, the serious problems can be described as follows:

**Erosion and Forest Depletion.** Before 1958, the forest cover was 62 per cent and this was mostly primeval forest. Current cover is only 45 per cent and this is mostly sparse woodland and secondary shrubs. From 1958 to 1987, deforested region in the lower reaches of the mountain areas rose by 10 metres and the total forest area decreased by 970 ha. The total amount of wood volume also decreased to 13,513,700 m<sup>3</sup>. The shortage of forest resources is a big problem. The County Forest Farm established in Puwei township in 1958 managed 150,000 ha of forest initially and now manages only 40,000 ha. During the past 30 years, almost 1,300,000 m<sup>3</sup> of timber has been felled. At the current rate of extraction, i.e. 60,000 m<sup>3</sup> yr, the remaining 200,000 m<sup>3</sup> of timber will be exhausted in the next three years and 1,917 workers will lose their jobs.

With the destruction of the forests, the water storage capacity of the area has decreased to 12,486,000 m<sup>3</sup>, i.e. equivalent to a reservoir covering 250 ha and enough to irrigate 10,000 ha of paddy fields. Before 1957, the rivers in the county (Heat, Chaochong, Linxi, and Ganlan) were constantly being renewed. Now in the dry season (February) they dry up. Before 1985, 94 per cent of the farmland in Puwei township was irrigated, now the figure is 56 per cent. Henshan township had 170 ha of irrigated land before 1958, in 1976 110 ha, and now the figure is 50 ha.

Soil erosion has become a serious problem and on average there is a loss of 108 tons which is equivalent to 330 ha of cultivable land. Anning River has changed from a clear water river to a red water river. Silt has shortened the lifespan of many new reservoirs and the Shinfa reservoir, in particular, had to be rebuilt three times.

**Frequent Natural Disasters.** The county is subject to the extremes of both drought and torrential mountain rainfall. Each year from November to May there is little rainfall and the climate is so dry that the amount of evaporation is greater than the water supply. Then from June to November there is so much rainfall that the total precipitation is 89 per cent of the annual total. Floods inundate the farmland and destroy villages. Previously, some villages (such as those in Yungfeng township) had never experienced such drought and floods, but due to ecological instability, the dry seasons are becoming longer, the planting seasons are delayed, and the mountain floods are more frequent.

**Degradation in Quality of Land.** Traditional agricultural methods along with lack of conservation measures has led to degradation in the quality of land. Each year 88 per cent of the land is cultivated and 12 per cent only is used for regeneration. Chemical fertilisers are used excessively and this makes matters worse. The area of land with P deficiency is 88 per cent, the area with K deficiency 79 per cent, the area with N deficiency 55 per cent, and the area deficient in organic fertiliser 45 per cent. On hilly grasslands, the vegetation is seriously degraded and the output of grass has decreased from 12.5 tons/ha (1958) to 6.2 tons/ha.

**Destruction of Mineral Resources.** In 1980, in Tuanjie township, the Yangjiawan and Tontan iron mines, with geological reserves 510,000 tons (55 per cent FeO) and 610,000 tons (60 per cent Fe O) respectively, went into production. The average production is 5,000 tons per annum and the highest output has been 20,000 tons per annum. After the mines had been given to the peasants on a contract basis, only the rich, easily accessible one was mined.

There was no production planning, no accumulated funds, and the income was used up. As a result, the mines have been running at a loss since 1987. Workers have been laid off and production has decreased. In 1986, a serious accident occurred in which seven miners died.

**Serious Sources of Pollution.** There are three serious sources of pollution which are harming the environment. They are effluents from factories on the upper reaches of the Anning River, from the Jianbao Shan Mine in Huili County, and from the county sugar mill. All are directly

discharged, all year round, into the Anning River. The main pollutants, which include ammonia, insecticide, Cd, and Pb, have caused fish and aquatic life to die, crops to turn yellow, plant stems to wither, and plant roots to decay. In 1986, water pollution affected 330 ha of farmland (3 per cent of the total cultivated area); air pollution affected 190 ha (0.09 per cent of the whole county); and soil pollution affected 180 ha (1.7 per cent of all cultivated land).

**Environmental Consciousness.** So far, very little has been done to conserve the environment. From the top leaders to the humblest peasants, the main emphasis has been on improving incomes and economic benefits. In the area of ecological balance and environmental conservation, there is a great deal more talk than action. Cadres interviewed rarely initiated discussion on the topic. When questioned about this, their responses were vague and evasive. Over the long term this will be to the severe detriment of socioeconomic development. The increasing pollution of air, water, and soil is a constant constraint on resource organisation and the management of rural development.

## CONCLUSIONS AND RECOMMENDATIONS

### Assessment of the "Contractual Responsibility System"

The assessment here focusses on the changes since the introduction of the "Contractual Responsibility System". There are four stages to the changes in rural organisation and management:

- o The "Contractual Responsibility System" changed the principle of equal distribution of benefits. The distribution system now provides more income for those who do more work.
- o Based on this change in the distribution system, economic structures also changed and led to the disintegration of the ownership patterns among the commune, the brigade, and the production team. Various economic organisations, such as industrial complexes, rural and township enterprises, credit foundations, and joint-stock firms have been established, following the policy of decentralisation. These are run by local people rather than by local government departments.
- o The production structure has been adjusted in order to realise better economic returns. The single production pattern, prevalent in traditional rural cultivation systems, has been changed into diversified, all round agricultural development (combining forestry, animal husbandry, sideline production, fishery, industry, commerce, construction, transportation, and associated services).
- o An adjustment in socioeconomic relationships has brought about better trading relationships among farmers, rural organisations, and government departments. The state monopoly on purchasing and marketing of agricultural products has been broken. Pricing is not subject to so many restrictions now, and products are managed and marketed in a variety of ways.

The reforms outlined above have provided the basic patterns for agriculture and forestry development in Miyi County. It is a feasible pattern, considering the rapid development of production forces in the county. In the last four to five years, the rate of development surpassed the sum total of the previous 30 years and living standards have increased considerably. The farmers are satisfied with the current management and contract systems. During the study, we did not hear anything negative in this respect, and, hence, we are able to predict that productivity will continue to increase until the year 2000 A.D, if the organisation and management systems do not change. Currently, farmers are hoping that the present system will stabilise and that there will be no further changes in rural policy. It is possible that if the "Contractual Responsibility System" continues to be implemented in all production areas (apart from that of grain production), developments will improve in all areas of production (cash crops, industry, trade, transportation, rural enterprises, and education).

The current organisational and management forms are flexible enough to include state, collective, and private systems. Within the collective system there are variations, such as those by towns, villages, communes, and even by groups. Hence, the farmers feel free to choose the system that suits them and to make whatever adjustments are necessary, to suit their needs. By doing so, radical reforms are avoided in favour of gradual change, unlike in the past when reforms were frequent and farmers negatively motivated.

However, in Miyi County, reforms are still in the initial stages and there is no doubt that improvements are necessary in ownership patterns, economic operations' and economic control mechanisms. The "Contract System" has resolved land use problems, but has not addressed the key problem of ownership. This means that farmers are still not fully independent in the production and management aspects in agriculture.

Rural marketing is another problem area. State monopolies in purchasing and marketing still play an important role. Economic control mechanisms are used by the administration mainly to control and adjust the economic activities of farmers rather than to develop them. The existing laws and democratic management organisations have, therefore, not been capable of guaranteeing the full participation of farmers in economic development. This can be attributed to the fact that the organisation and management in Miyi County are as yet not sufficiently democratic, lawful, or reasonable and need considerable improvement.

### **Rural Development Problems in Miyi County**

Advances have been made in reforming the prevalent systems and there is no doubt that the county has developed in socioeconomic terms. The problems connected with rural development have already been discussed in Chapter Three and this section will be devoted to discussing the weaknesses in the current development process. It is our belief that attention should be given to these problems now, before they become insurmountable obstacles to all future developments.

#### *Small Scale of Management and Production*

Fixed production quotas during the "Commune Period" resulted in small scale management and production in farming. Capacity is very low because farmers cultivate small pieces of land. Each family owns about 10 pieces of land of which the largest areas are less than 0.06 ha and the smallest less than 0.006 ha. Such small pieces of land can only be suitable for small-scale farming and limited production.

The "Contractual Responsibility System" went into operation in 1981/1982 and production reached an all-time high in 1984. However, from 1984 to 1988 agricultural production fluctuated and grain production actually decreased. This demonstrates that the actual impetus stimulated by the "Contract System" could not be maintained. Any system that is to sustain agricultural development should be dynamic and capable of adopting and adapting to new measures on a continuing basis. With increased modernisation and mechanisation, current methods become unsuitable. When agricultural production become intensive, it is necessary to adjust the organisational structure accordingly. Farmers should be asked to carry out reforms in organisation and management willingly and consciously rather than having it forced upon them from above. To ensure this requires foresight and judgement concerning when to carry out reforms and at what level production should be developed.

### *Disparity between Rich and Poor Farmers*

At present, this is a glaring problem. During the "Commune Period", everyone was poor and disparities were not so obvious. With the reforms, the following differences have appeared:

- o Areal differences: Valley areas with their favourable natural and economic conditions are better off, whereas mountain areas are poor. For example, in Qinpi Village (3,400 inhabitants) the income per capita is \$270 and in Xingshan township (1,614 inhabitants), the per capita income is less than \$27.
- o Disparities within the same village: Rich people have per capita income as high as \$ 2,700 or more. The per capita income among the poor in the same village may be as little as \$ 270 or less. The rich own new houses and electronic goods, whereas the poor do not have enough for food and clothing. This disparity shows itself in other ways too. For instance, the rich compared to the poor are healthier, better educated, and more skilful.

The above factors render it difficult to improve the conditions of the poor and the Government is finding it difficult to resolve the disparities. The current policies encourage the rich to become richer and the administration merely subsidises the poor instead of introducing measures to get rid of poverty. Unless this problem is soon solved, further socioeconomic developments will be seriously hindered.

### *Increase in Rural Labour Force*

In 1986, the surplus labour force in the county totalled 28,860 and accounted for 42 per cent of the agricultural labour force. The following reasons account for the surplus labour:

- o There are more people than land. Each person has less than 0.06 ha of land. Qinpi Village provides an example of what we mean. Though there are many employment opportunities in this village, the surplus labour is as high as 40 per cent. Of those employed, 40 per cent are involved in cultivation, 10 per cent in animal husbandry and pig-raising, and 10 per cent in rural enterprises, travel, and transportation.
- o In some areas, specialised production is being carried out. For example, in Liagpan Village, one family has contracted an orchard of ten hectares. They organise all the work among the family members.
- o The efficiency of the farmers has increased. During the Commune Period, the farmers commenced and ceased work at the same time in the same field and efficiency was low. After the establishment of the "Contract System," efficiency improved. Previously, field work stretched over the whole year, currently it is completed in three to four months. This is the major reason for the surplus labour force.
- o Surplus labour figures vary in different seasons. This is because farming is seasonal and is still largely manual. Harvesting and planting are peak seasons in terms of labour use and there is a slack season that lasts for four months.

Surplus labour is a common problem in Miyi County. The only way to solve it is by creating more employment by setting up rural enterprises and developing trading and transportation. However, such developments are limited because of poor education and the low management capacity of farmers.

### *Irrigation Projects in Disrepair*

Almost all the irrigation projects, whether large, medium, or small, have long been out of repair. From 1949 to 1979 there was an increase in area under irrigation in the range of 70-700 ha each year (except for 1960, 1961, and 1969). Since 1980, the rate of increase slowed down each year. In 1980, the increase was only 20 ha; in 1981, 50 ha; in 1982 it was nil, and in 1983, 20 ha. However, by 1984, the area under irrigation decreased by 230 ha and in 1985 and 1986, it decreased even further.

Of the eight villages studied, only Qinggang was able to increase the area of land under irrigation from 1984 to 1987. Guabang township, to which Qinggang belongs, repaired a canal for irrigating 350 ha and increased the area of irrigated land by 170 ha. The cultivated land under this township totals 640 ha. The other seven villages have not done any irrigation extension works since 1980 and their canals are in a state of disrepair.

Irrigation is extremely important for agricultural production, especially in mountain areas. In the past decades, the county had undertaken a lot of irrigation construction works, but currently irrigated areas account for only 30 per cent of the total cultivated land. Of the eight villages studied, only Qinggang has improved on irrigation. It now has 130 ha cultivated area of which 87 ha are irrigated. There are few irrigated areas in the other seven villages. How to repair and construct irrigation projects is a matter that needs serious attention.

### *The Problem of Environmental Protection*

This problem has already been described. Degradation has chiefly been caused by extensive farming and unplanned development of the small farmer economy. Eventually the result could be the destruction of all natural resources; thus hindering agricultural and socioeconomic development.

### *Paradoxes between Government Directives and Farm Management*

Currently the production quotas for main crops, such as grain, rape seeds, sugarcane, and pigs are still fixed by the State and the products are purchased by them. There is an obvious contradiction between state monopoly and free marketing principles. Most farmers do not want to produce fixed crops and they do not want to sell to the State. For instance, the production of sugarcane competes with vegetable production. Farmers do not want to plant sugarcane because the inputs in terms of labour and capital are high. However, quotas are fixed by the State (at both provincial and county level) and the cane is compulsorily purchased by the county's sugar mills. The production is assigned by the county to townships, by townships to villages, and villages to families. Amounts are assigned according to the size of the family and total area of land cultivated. Because farmers do not like this assignment, although they plant the fixed amount of sugar cane every year, the output is low. In addition to the small size of production, the fields are scattered and the purchase and transportation difficult.

In addition, there are other problems that can be anticipated:

- o Educational levels are not adequate and the illiteracy rate is high; by 1987 only 2.2 percent of the population were engineers or technicians. This impedes development. Some township enterprises have no assistant engineer.

In 1988, the county was short of \$ 270,300 dollars for education and this resulted in serious problems at the middle and primary school levels. With the help of the county administration, some research institutes at provincial level have formulated a number of comprehensive programmes for socioeconomic and scientific development by the year 2000. However, unless the educational standards are improved, the people will not be able to implement them. At the village and township level, the concern is to improve income. In the eight villages studied, farmers have no long term development plans because they are satisfied with their work and with the current living standards. They do not think in terms of what will happen beyond the year 2000 or even about potential crises in a more localised context.

- o Prices of materials for agricultural production, such as, chemical fertilisers, farm machinery, chemicals, and plastic sheets, have risen; they are also in short supply. This is a hindrance to development.
- o At present, there is little competition for fruit production; prices are high and marketing has presented no problems. However, this will not be so in future (five to ten years hence) when other mountains areas enter fruit production. At that time pricing mechanisms, marketing, transportation, and preservation will pose a number of problems.

### Recommendations for Future Development

Today Miyi County is in a position to provide sufficient food and clothing for its population. The people are striving to improve their incomes and this should lay a sound basis for agricultural modernisation in the next century.

#### *Improvement of Overall Production Capacity*

By the year 2000, development will have reached quite a high level. Per capita income will be more than \$ 270 and grain production per capita will be 400 kg. The development indicators forecasted for the year 2000 A.D. are as shown in Table 5.1. The calculations are based on 1980 prices.

In order to achieve the objectives, a great deal of attention will have to be given to the use of natural resources within the next ten years. The pattern of resource usage should account for the double pronged approach to industrial development and the three-tiered economic development system.

Table 5.1: Development Targets for 2000 A.D.

Total Population	201,500	
Total Grain Output	79,643	tons
Total Sugarcane Output	30,000	tons
Total No. of Pigs	169,600	head
Total Volume of Retail Sales	\$ 72.35	million
Output Value of Industry & Agriculture	\$ 66.28	million
Output Value of Agriculture Only	\$ 25.48	million
Gross Income	\$ 77.06	million
Revenue	\$ 8.97	million

The base is that of grain production which is stable, integrated, and complex. Industry should be divided into local industries and rural enterprises in order to develop the local economy and increase the revenue of mountain areas. This will, in turn, improve the living standards and gradually establish integrated industries, business, and the transport and service sectors.

Three tiered economic development involves the integrated use of local resources, including:

- o The comprehensive production and processing of sugarcane.
- o The production, processing, packaging, and distribution of non-staple foods
- o The development of mining, production of building materials, and extraction of diatomite, granite, marble, and limestone.

#### *Change in Organisation and Management Systems*

Increase in production will cause changes in the organisational system. Accordingly, the organisation and management in terms of the exploitation and protection of natural resources will also change. The socioeconomic system will be affected by these changes and the consequential adjustment will bring about changes in it also.

The principal goal of the county is the modernisation of agriculture and rural construction. The development process has to take into consideration the transition from traditional to modern agriculture which includes a number of changes such as:

- o from self-sufficiency to commercial production,
- o from simple usage to cyclic integration, and
- o from simple administration to comprehensive organisation and management systems

In the immediate future, changes will merely convert the scattered self-sufficient economy into a large-scale marketing economy. However, the basic management forms will not have to change a great deal but detailed adjustments in the current system will be necessary. The county administration will have to improve its policy making procedures and reinforce the "Contract System". Village development needs to undergo the following changes:

- o Families who specialise in particular products should be encouraged to get contracts for large areas of land. Currently they manage areas that are under 0.33 ha in area. Orchard plantations, animal farms, and grain production should be encouraged and the involved families should be given contracts and permitted to hire labour.
- o Cooperative organisations should increase. Groups of families in specialised occupations should be encouraged to form collectives. They will be responsible for running large orchards, fish farms, animal farms, and small reservoirs. Villages, as well as family collectives, can undertake such contracts, and other types of cooperatives, based on joint stock in industries or in agriculture, can be formed.
- o Some farmers should be encouraged to relinquish farming and engage in processing and handicraft industries, building construction, transportation, trades, and services. This will bring about a desirable decrease in the number of traditional agriculturalists although it will result in a more complex societal structure.

- o Two types of production, namely family-scale and collective scale, should coexist. Most farmers will be involved in both forms of production for a long time to come.
- o Since rural development requires a lot of capital, cooperative credit funds should be established. Under the "Contract System", construction of middle and large-scale projects (roads, large reservoirs, and irrigation canals) will pose problems. Apart from state allocations, it will be necessary to collect money from farmers for such projects. Cooperative credit funds will also be useful for the establishment of agro-based rural enterprises.

In the near future, organisation for rural economic development should be more flexible and be adaptable to the farmers' felt needs and local conditions.

#### *Constraints on Future Development*

The following is not a comprehensive list of constraints but rather a number of suggestions for overcoming the constraints that we have observed.

Objectives of further reforms should be based on:

- o pluralistic ownership systems and a variety of production and management forms which permit independence of both producers and enterprises, so that internalisation of procedures and disciplines conducive to greater production will develop;
- o improvement of marketing systems and commercialisation of the rural economy; and
- o administrative reforms on the rural economy should use the market mechanism, i.e., state adjustment of markets which in turn influences rural enterprises.

The following are the land reform measures that should be adopted:

- o land ownership systems (e.g. private, collective, and state ownership) should be permitted to exist simultaneously;
- o ownership of land tilled by farmers should be recognised by law; and
- o based on the above, land should be divided into grain fields and "contract" fields. Fields under the "Contractual Responsibility System" should be allocated to families or collectives and should be managed independently. In return, the families will fulfill certain obligations to the State such as selling their products under contract and protecting the environment. Mortgages should be raised on the land and some of the income derived paid to the collectives according to the terms of the contracts.

Rural policy implementations must be a continuous process. Adjustments should be made based on previous experiences until a point is reached where organisation and management patterns adjust gradually and continually, avoiding a large amount of upheaval. At the same time, some administrative organisations need to be changed to suit the requirements of commercial enterprises. Informal organisations that have been successful should be formalised and administered under relevant laws.

The county should improve socioeconomic conditions by basing development efforts on actual village conditions. To do so, villages should be categorised for the purpose of macro-level development and inputs should be timely and appropriate.

Marketing systems should be improved, especially for production inputs; funds should be made available and techniques provided to support rural development. Land use should be revised; production techniques and materials improved.

Contributions from science and technology should be augmented. Dissemination systems should be related to resources and products and qualified personnel should be trained to provide proper information and guidance on new techniques. Service systems need strengthening in order to establish firm bases for commodity production, processing industries, seed selection, land use, farming techniques, cultivation techniques, vegetable and fruit preservation, transportation, and markets.

Farmland, water resources, areas under irrigation, and land extensions in middle mountain areas should be improved and enlarged. Reforestation should be encouraged not only for domestic and commercial purposes but for water and soil conservation. Known techniques should be used to convert slope land into terraces, improve the quality of dry farm land, and increase soil fertility.

Enhancement of environmental protection and stabilisation of the ecosystem is essential. An Environmental Protection Organisation should be established at county level to monitor the environment and programmes that will affect it. It should also launch and implement environmental protection programmes and continually promote the same.

Finally, universal education is the most important factor in development. Compulsory education to middle school level should be introduced. In order to implement this, more funds will have to be allocated in order to improve the schools, quality of teachers, and quality of curriculum. Vocational schools should be established to develop technical skills for rural development.

ICIMOD is the first international centre in the field of mountain development. Founded out of widespread recognition of environmental degradation of mountain habitats and the increasing poverty of mountain communities, ICIMOD is concerned with the search for more effective development responses to promote the sustained well being of mountain people.

The Centre was established in 1983 and commenced professional activities in 1984. Though international in its concerns, ICIMOD focusses on the specific, complex, and practical problems of the Hindu Kush-Himalayan Region which covers all or part of eight Sovereign States.

ICIMOD serves as a multidisciplinary documentation centre on integrated mountain development; a focal point for the mobilisation, conduct, and coordination of applied and problem-solving research activities; a focal point for training on integrated mountain development, with special emphasis on the assessment of training needs and the development of relevant training materials based directly on field case studies; and a consultative centre providing expert services on mountain development and resource management.

Mountain Population and Employment constitutes one of the four thematic research and development programmes at ICIMOD. The main goal of the programme is to identify viable off-farm alternatives and practical approaches to employment generation, income enhancement, and sustainability of mountain environments. Currently, the major focus of the programme is on three interrelated topics: (1) assessment of critical issues and options in mountain off-farm employment; (2) environmental regeneration and employment promotion through rural women's organisations; and (3) promotion of small towns and market centres for decentralised mountain development.

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