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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^2 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:

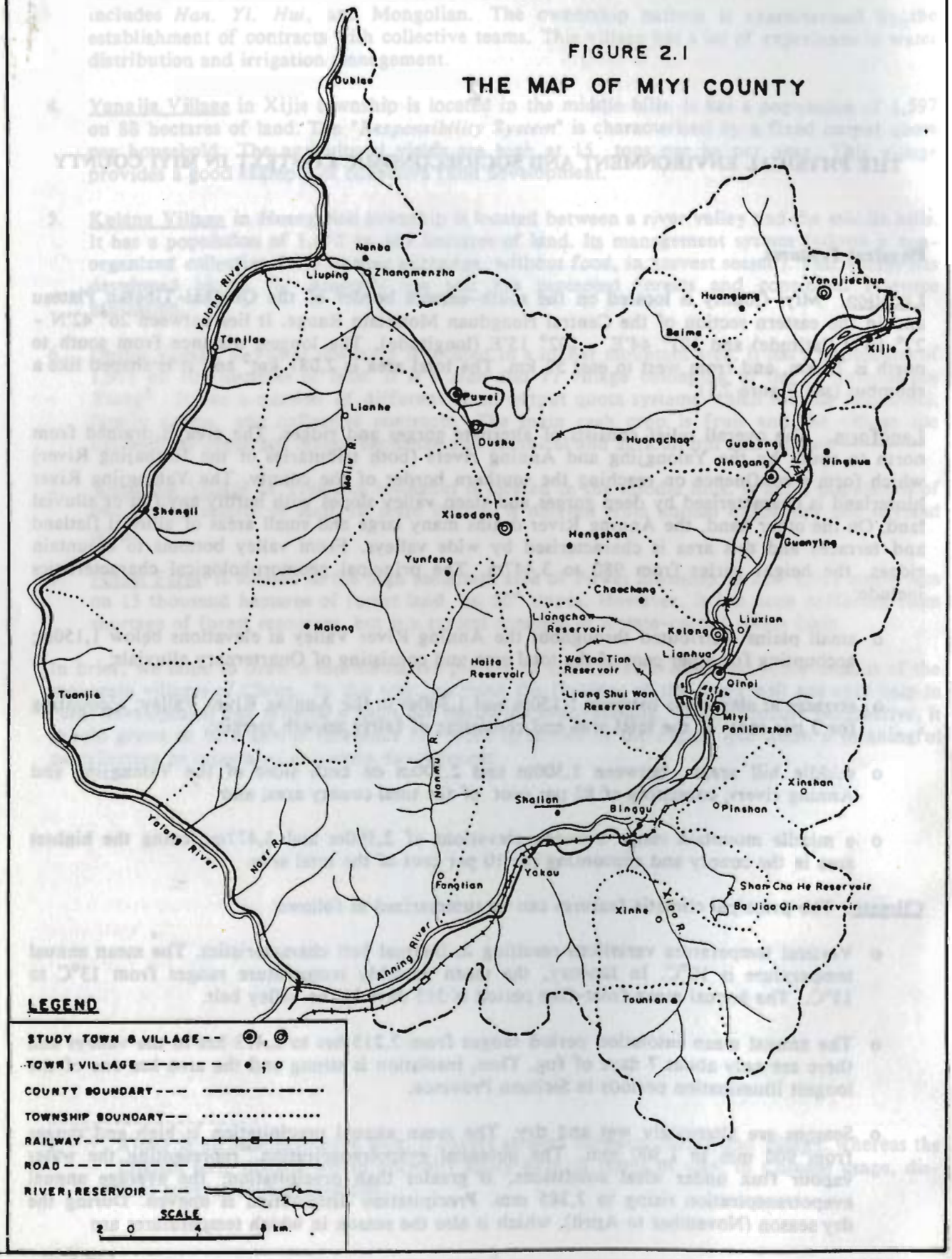
- small plains distributed throughout the Anning River Valley at elevations below 1,150m; accounting for 5 per cent of the total area and consisting of Quarternary alluvials;
- terraces at elevations between 1,150m and 1,300m in the Anning River Valley; accounting for 3 per cent of the total area and consisting of fairly smooth terrain;
- 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
- 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:

- 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.
- 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.
- 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



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.

- 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 Yalonjing 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 m^3/s in dry season and this rises to a maximum of 3,410 m^3/s in the rainy season. The annual mean flood flow rises to 1,640 m^3/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 9.37×10^6 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 $1.7\text{-}2.7 \times 10^9$ 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 vandadium ilmenite amount to 20.4×10^9 tons, sufficient to create a new base for Panzhehua Steel Company. In addition there is a clay mine containing 1×10^9 tons, a marble mine containing 2×10^8 tons, a phosphate mine containing 2×10^8 tons, and a diatomaceous earth mine containing 1×10^8 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[a]

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[a]

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
Total	208,100	100.0	11,030	100.0	0.067	1:19

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

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-suficient 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^2 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^2 and this decreases to less than 50 persons per km^2 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
Agriculture	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
Industry	12.95	30.8	10.91	44.0
Construction	4.57	10.9	0.43	1.7
Transportation	2.28	7.6	3.88	15.7
Post and Telecommunication	0.10	0.2	0.38	1.5
Total	42.09	100	24.79	100

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 mission, 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[a]

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[b]	4,519	2,840	222	1,050	367	40
1986[c]	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 aquired an access road. The average road density is 22.6 km/km^2. 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:

   - Placing political idealism before production, leading to alienation from reality and use of resources to serve political ends.
   - Interference from above and forcing farmers to comply with orders from the outside instead of following their own convictions.
   - Emphasis on establishing large, collective organisations with egalitarian distribution systems.
   - Lack of consideration for regional or ethnic differentiations and applying one uniform method throughout.
   - The longest period without a policy change was from two to three years, thus causing instability.
   - 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 allottments, 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.

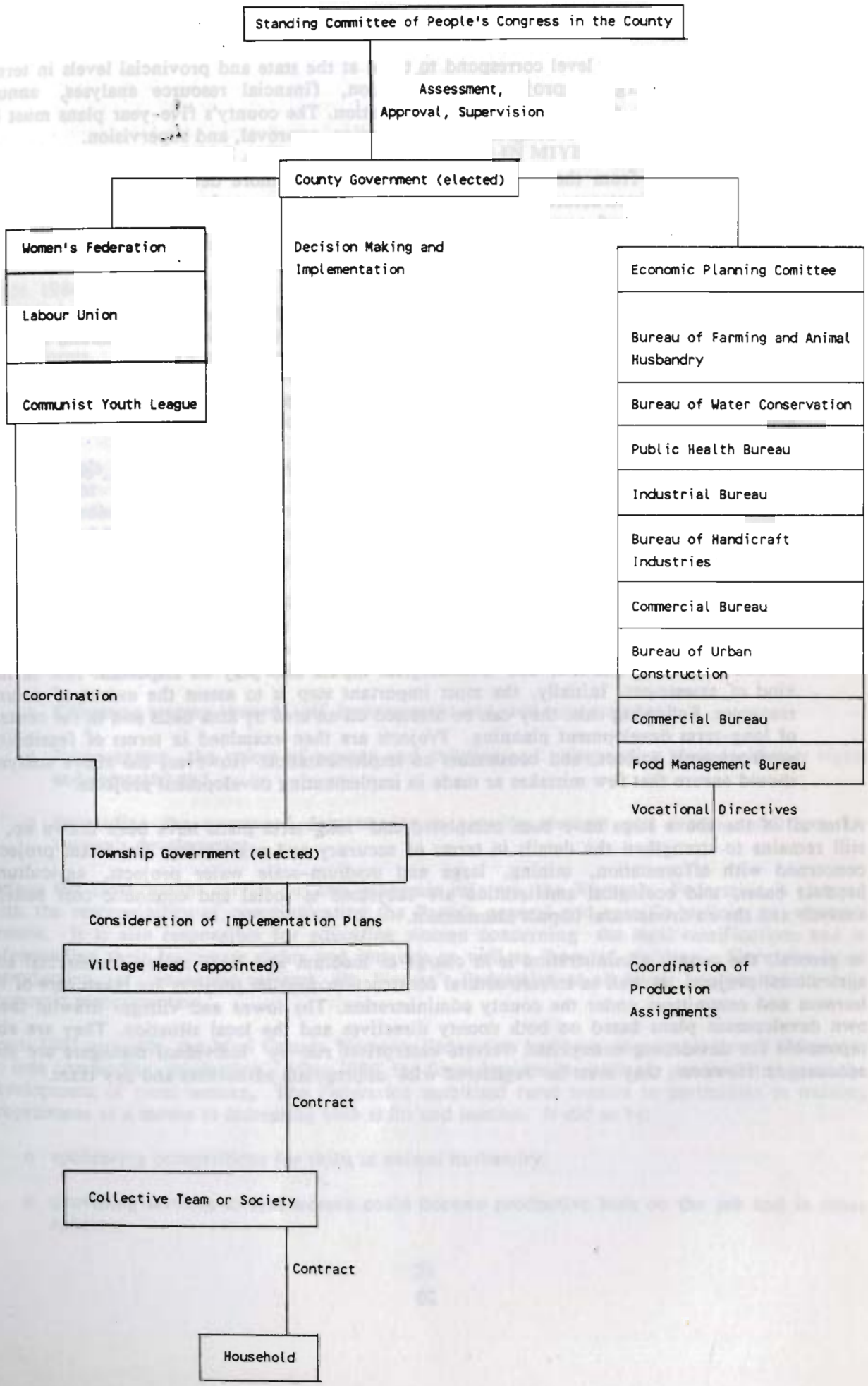
3. Township administration comes under the county administration. Production assignments and plans are handed down to the townships by the county administration and these are then disseminated down to the village level. Professional directives are issued by county bureaus to the township but the townships 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 ar 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 assessement.

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 drawup their own development plans based on both county directives and the local situation. They are also reponsible for developing enterprises. Private enterprises run by individual managers are also encouraged. However, they must be registered with appropriate authorities and pay taxes.