



# Mountain Population and Employment


Discussion Paper Series

## OFF-FARM EMPLOYMENT IN SHUIMO TOWNSHIP IN THE HENGDUAN MOUNTAINS OF CHINA

Wang Fei and Chen Guojie

*MPE Series No. 16*

International Centre for Integrated Mountain Development



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MPE 16

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## Foreword

The present discussion paper by Wang Fei and Chen Guojie, entitled "Off-farm Employment in Shuimo Township in the Hengduan Mountains of China", constitutes one of the six location-specific case studies of prominent/potential off-farm activities in mountain regions in the Hindu-Kush Himalayas. These case studies include horticulture, livestock, and small-scale enterprises in the townships of Wenchuan County, Sichuan Province (China), tourism and vegetable farming in Mustang and Dhading districts (Nepal), and natural resource based activities in Shangla Par Sub-division, Swat District (Pakistan).

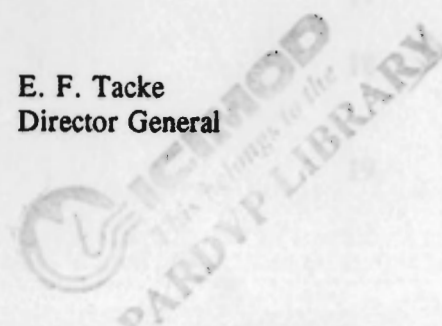
A major issue in mountain development is to create conditions that would help enhance the carrying capacity of the mountain resources and open opportunities for sustainable improvements in the living standards of mountain communities without degrading or depleting the resource base. This is where the promotion of off-farm employment based on comparative advantages assumes such crucial significance in strategies for the development of the mountains. The critical issues, interlinkages and options in off-farm employment in the Hindu Kush-Himalayan (HKH) Region have, therefore, been given primary importance in ICIMOD's programme on Mountain Population and Employment. As part of the programme ICIMOD collaborated with institutions and professionals from China, Nepal, and Pakistan to undertake the regional overview studies on the current state of off-farm employment. This was followed by area-specific case studies on prominent and potential off-farm activities. The regional overview studies are available as part of the Discussion Paper Series of the Mountain Population and Employment Division (MPE Series 12-14).

The case studies analyse and assess the current state of off-farm employment in the respective socioeconomic and resource contexts, identify factors that have inhibited or enhanced off-farm employment and income opportunities, trace the linkages of off-farm activities with agriculture and other sectors, and present guidelines for the future development of potential off-farm opportunities.

These studies were made possible by a grant from the International Development Research Centre (IDRC), Canada, for which I am extremely grateful. ICIMOD was also fortunate to have working on these studies professionals from national institutions in China, Nepal, and Pakistan. The methodological framework and the structure of the studies were mutually agreed upon by participating researchers. From ICIMOD's side the programme was coordinated and executed by Dr. Pitamber Sharma and Dr. Deepak Bajracharya (now with UNICEF).

Readers might be interested to know that all of the six case studies (including the present one) are published under the Discussion Paper Series of the Mountain Population and Employment Division. Also, the Report of the International Workshop on Mountain Off-farm Employment, held in Kathmandu in February 1992, in which these case studies were presented, discussed, and synthesised, has also been published by ICIMOD. ICIMOD is hopeful that these studies will contribute to a better understanding of the problems and prospects of off-farm employment in the mountains.

E. F. Tacke  
Director General



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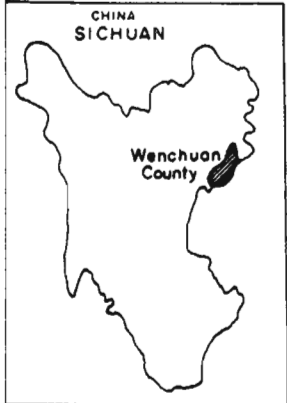
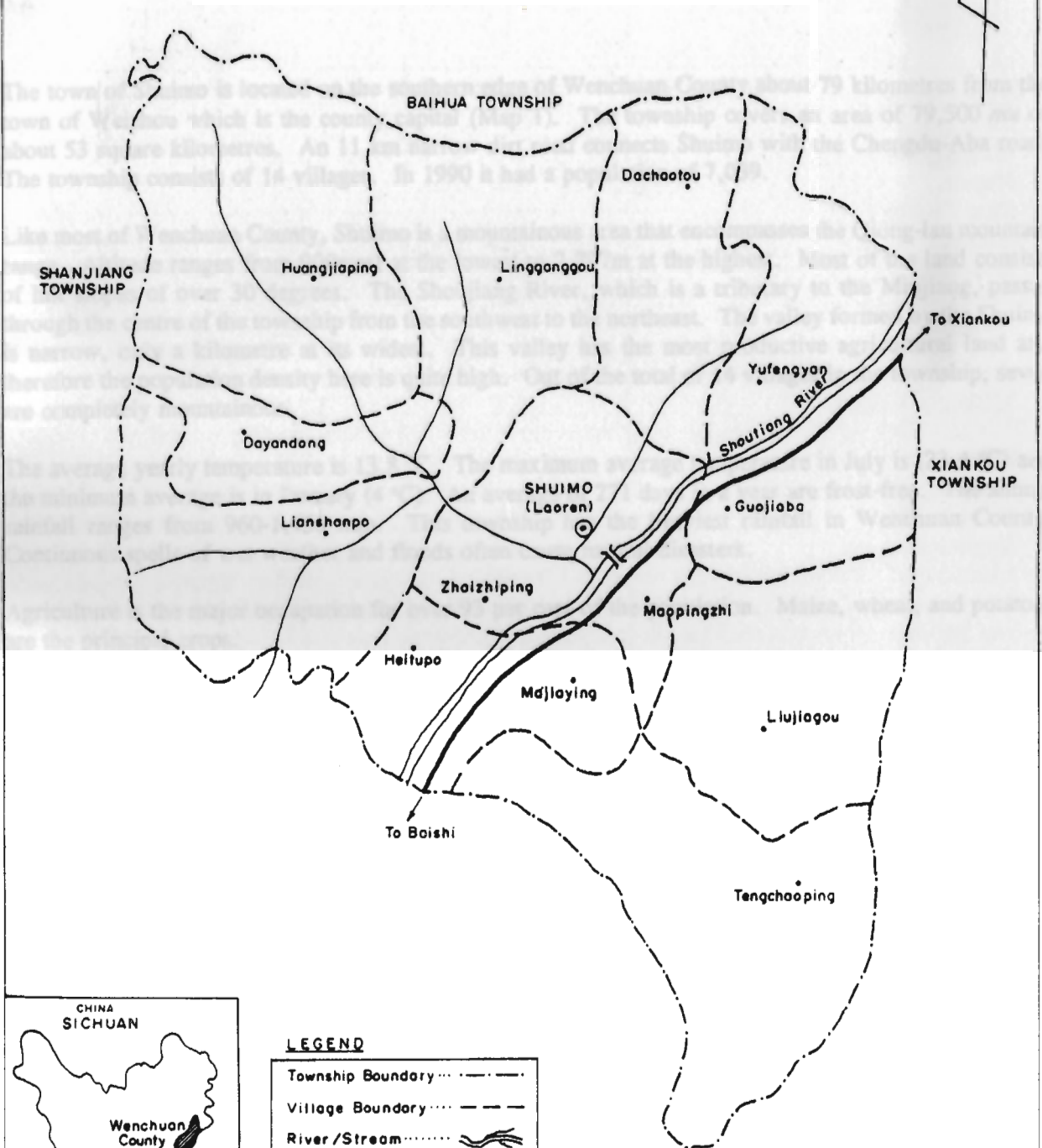
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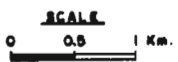


Map 1

# WENCHUAN COUNTY SHUIMO TOWNSHIP



LEGEND	
Township Boundary	— · — · —
Village Boundary	- - - - -
River/Stream	~~~~~
Highway	—————
Township	⊙
Village	•



## BACKGROUND TO THE STUDY AREA

The town of Shuimo is located on the southern edge of Wenchuan County about 79 kilometres from the town of Weizhou which is the county capital (Map 1). The township covers an area of 79,500 *mu* or about 53 square kilometres. An 11 km narrow dirt road connects Shuimo with the Chengdu-Aba road. The township consists of 14 villages. In 1990 it had a population of 7,039.

Like most of Wenchuan County, Shuimo is a mountainous area that encompasses the Qiong-lan mountain range. Altitude ranges from 900masl at the lowest to 2,297m at the highest. Most of the land consists of hill slopes of over 30 degrees. The Shoujiang River, which is a tributary to the Minjiang, passes through the centre of the township from the southwest to the northeast. The valley formed by the Shuimo is narrow, only a kilometre at its widest. This valley has the most productive agricultural land and therefore the population density here is quite high. Out of the total of 14 villages in the township, seven are completely mountainous.

The average yearly temperature is 13.8 °C. The maximum average temperature in July is (23.4 °C) and the minimum average is in January (4 °C). An average of 271 days in a year are frost-free. The annual rainfall ranges from 960-1,450 mm. This township has the heaviest rainfall in Wenchuan County. Continuous spells of wet weather and floods often cause natural disasters.

Agriculture is the major occupation for over 93 per cent of the population. Maize, wheat, and potatoes are the principal crops.

Most of the population of Shuimo are *Han*. Tibetans, *Qiang*, and *Hui* are the main minority nationalities in the township. Because of the *Han* majority, there is little difference between the culture and lifestyle of the minorities and the *Han* people.

Shuimo township was selected for the case study on off-farm employment because, unlike other areas, it is not regarded as a favourable area for horticultural development. Construction and livestock are important off-farm activities. In terms of access, Shuimo is the only area among the case study areas which is not located along the Chengdu-Aba road. A sample of 48 households, representing the mountain and valley villages as well as different income levels, was selected for the household study.

### Socioeconomic and Resource Profile

In 1990, Shuimo township had a population of 7,039 of which 3,332 or 47.3 per cent were considered to be part of the labour force. It may be noted that in China, economically active males between the ages of 16-60 and economically active females between the ages of 16-55 are regarded as belonging to the labour force. Table 1 presents the distribution of population and labour force in each of the villages of Shuimo.



**Table 1: Population and Labour Force in Shuimo Township, 1990**

Settlements	Total Population	Labour Force	Labour Force as Per Cent of Population
<u>Valley Villages</u>	<u>4,042</u>	<u>1,941</u>	<u>48.0</u>
Yu Fengyuan	670	318	47.5
Naoren	720	342	47.5
Zhai Zhiping	410	200	48.8
Heitupo	263	142	54.0
Maopinzhi	329	174	52.9
Majiaying	756	363	48.0
Guojiaba	894	402	45.0
<u>Mountain Villages</u>	<u>2,997</u>	<u>1,391</u>	<u>46.1</u>
Dachaotao	516	213	41.3
Lingganggou	357	147	41.2
Huanyjiaping	393	217	55.2
Dayandong	362	179	49.4
Lianshanpo	445	188	42.2
Tengchaoping	351	184	52.4
Liu Jiagou	573	263	45.9
<b>TOTAL</b>	<b>7,039</b>	<b>3,332</b>	<b>47.3</b>

About 57 per cent of the population lives in the valley villages. Shuimo has the second largest population in Wenchuan County, second only to Weizhou. Township records on the past population show that the population in 1965, 1978, and 1985 was 5,605, 6,508, and 6,412 respectively. This gives a growth rate of 1.15 per cent per year for the period from 1965-1978. There was, apparently, a negative growth rate in the population between 1978 and 1985. The absolute decline in population during this period was a result of the migration of young males and females to neighbouring counties from mountain villages such as Tengchaoping, Lianshanpo, and Dayandong where living conditions were very poor. This migration was associated with marriages. Because of poor living conditions, young women from other villages did not want to marry men from these villages. As a result, the men moved to their wives' houses after marriage. However, the population growth rate has gone up since 1985. Between 1985-90 the annual growth rate was 1.88 per cent which is a high growth rate in relation to other areas in Wenchuan County. Women make up 47 per cent of the labour force.

The literacy status of the labour force in Shuimo township shows that 42 per cent of the population is illiterate, 33.8 per cent have up to primary level schooling, about 21.0 per cent have up to junior high level education, and only 3.2 per cent have senior high level education.

The total area of cultivated land in Shuimo township is 12,817 *mu* or 16.1 per cent of the total land area (Table 2). About 45 per cent of the total cultivated area is in the valley villages. The average per capita cultivated land comes to 1.82 *mu*, but there are significant differences between the valley and mountain villages. The per capita cultivated land in valley villages is 1.43 *mu* while it is 2.34 *mu* in the mountain villages. Since 1983 a total of 12,766 *mu* of hill slopes (3,654 *mu* in the valley villages and 9112 *mu* in mountain villages) have also been contracted to households under the system of Contracting the Production Responsibility to Households (CPRH).

**Table 2: Breakdown of Land Use in Shuimo Township**

	Cultivated	Land under Forests	Land Suitable for Forests	Other Uses	Total
<i>mu</i> *	12,817	12,766	42,000	11,917	79,500
per cent	16.1	16.1	52.8	15.0	100.0

\* one hectare = 15 *mu*

Shuimo is a typical agricultural township. Maize is the staple crop. Wheat was introduced only in 1952. Cash crops include yellow rape seed and "*moyu*" (a kind of tuber). Other cash crops include garlic and rhizome of *Chuanxiong*, which is a traditional Chinese medicine. Potatoes are also grown in the mountainous parts. The predominant cropping system is maize-wheat.

According to township records, cropping accounts for 47.3 per cent of the total output value in the township. Livestock (35.7 per cent) and sidelines activities (8.8 per cent) are the major sources of income (Table 3). Unlike in other case study areas, horticulture and off-farm activities outside agriculture have not been developed in Shuimo township.

As is evident, valley villages have a slightly higher share of sideline activities than mountain villages. Also, crops and livestock are relatively more important activities in mountain villages. The average income per capita in 1990 for Shuimo township was 651 *yuan*<sup>1</sup>.

Land resources, basically cultivated land and forests, are the major natural resources in Shuimo. There are no mineral resources of note. The potential for hydropower development is also limited. Irrigation potential has been used to the greatest extent possible. Bamboo groves cover more than 5,000 *mu* of area in Shuimo township and occur in several species. Each household has two to three bamboo groves.

### *Infrastructure and Institutions*

Shuimo has the basic infrastructural facilities expected of a minor township in China. All the 14 villages within the township are connected with the central location by a tractorable dirt road. There is one junior high school and eight primary schools of different grades. It also has an agricultural bank, credit facilities, supply and marketing cooperatives, a health station, a public security office, and township divisions of the industrial and commercial administration. All the villages of the township have electricity

<sup>1</sup> In 1987 there were 5.72 RMB *yuan* to one U.S. dollar.

**Table 3: Output Value of Major Activities, 1990**

	Output Value	Per Cent Contribution				
		Crops	Horticulture	Livestock	Sideline	Other
Valley Villages	2,698,662	45.2	0.7	34.8	10.4	5.6
Mountain Villages	1,885,214	50.3	5.4	37.0	6.5	0.8
TOTAL	4,583,876	47.3	2.6	35.7	8.8	5.6

Source: Agricultural Statistics of Shuimo Township.

which is used basically for lighting and some heating. The township is connected to the electricity grid through the town of Xiankao which is located along the Chengdu-Aba road. Wood is the major source of energy for cooking. Firewood (70 per cent), coal (20 per cent), and straw (10 per cent) are the basic energy sources. The town of Xiankao, 11 km from Shuimo, is the second largest town in Wenchuan County and is the most important market for the villages of Shuimo.



## OFF-FARM ACTIVITIES IN SHUIMO TOWNSHIP

The effect of government policy in the development of off-farm opportunities in Shuimo has been at two levels. As in the rest of China, the Contracting of Production Responsibility to Households (CPRH) system has brought about a number of changes in the household economy. The impact has been more pronounced in the areas of commodity production for the market. At the other level, Shuimo has been receiving assistance from the county government in the development of livestock, particularly pig raising. This assistance was started much before 1978 and included the introduction of pigs of better breed, prevention and control of epidemics and other livestock diseases, and training in pig raising skills. The development of livestock in Shuimo has benefitted from this assistance from the county government.

### Types of Off-farm Activity

Two major categories of off-farm employment have been distinguished here: those outside agriculture (non-farm employment) and those within or related to agriculture.

#### *Off-farm Activities outside Agriculture*

According to township statistics, there were 76 rural enterprises providing employment to 351 persons or 10.5 per cent of the total labour force in 1990. All the 76 rural enterprises are non-agricultural establishments. Among these, 65 enterprises are privately-owned and 11 are collectively-run, that is, are either owned and run by the township or the village. The total output value of these rural enterprises in 1990 was 1.02 million *yuan*. Non-agricultural income made up 22.3 per cent of the total rural income. This was lower than the county average by about 11 per cent.

In 1977 there were only 115 employees in the rural enterprises in Shuimo. The total output value from these enterprises was less than 52,000 *yuan*. In 1990 not only the employment but also the output value had increased many times.

The major rural enterprises in Shuimo include industrial, building, transportation, and tertiary (commerce, catering, and services) activities. Among the rural enterprises, construction has a predominant place in terms of both the number of employees and the income value. In 1990 the employment in building/construction was 150. This accounted for 42.7 per cent of the total employment and 59.3 per cent of the total output value (Table 4) in rural enterprises.

**Building/Construction.** The "Shuimo Township Building Team" under the township administration and managed by the CHRP System of is the only building enterprise in Shuimo. It often sub-contracts construction work from the Seventh Construction Bureau of the Ministry of Electricity which is a large State-run construction enterprise in the county. Most of the tasks undertaken by the Building Team are simple but demanding in labour. This speciality has made construction an important rural enterprise.

**Table 4: Breakdown of Rural Enterprises in Shuimo**

Year: 1990

Items	Enterprises		Employment		Total Output Value	
	No.	Per Cent	No.	Per Cent	'000 yuan	Per Cent
Building	1	1.3	150	42.7	601.80	59.3
Industrial	9	11.8	130	37.0	195.4	19.2
Transport	36	47.4	36	10.3	180.8	17.8
Tertiary	30	39.5	35	10.0	37.4	3.7
Total	76	100.00	351	100.00	1015.4	100.00

Rural Industries. In 1990, excluding the building enterprise and a restaurant, there were nine industrial enterprises under the township or village administration. These included a paper plant, brick, sand quarrying, and prefabrication enterprises - all of which employed more than 10 persons each (Table 5).

**Table 5: Industrial Enterprises in Shuimo, 1990**

Enterprises	Employment	Output Value ('000 yuan)
<u>Township-run</u>	<u>113</u>	<u>183.1</u>
Paper	31	37.1
Brick	43	45.7
Prefabrication	14	24.3
Sand Quarrying	21	50.7
Farm Tools	2	2.6
Sawmills	2	22.7
<u>Village-run</u>	<u>17</u>	<u>12.3</u>
Farm Tools	6	4.3
Sand Quarrying	5	4.4
Rape Oil Extraction	6	3.6
TOTAL	130	195.4

For a township with about 7,000 people, the industrial base of Shuimo is relatively poor. There are no enterprises that are run privately. Most of the industries have strong "localisation" factors, i.e., the raw materials are all from the locality and, with the exception of the paper plant, a large proportion of the products are sold locally. All employees in the industries are also from Shuimo township itself.

**Transportation.** All transportation enterprises in Shuimo are individually run. These are mainly self-employment ventures. Most of these are concentrated in Majiaying village. Individual transportation was first established in 1985. In that year, due to the construction project of a State-owned factory, about 110 *mu* of cultivated land was taken over by the State. Many farmers in the village, who lost land because of the project, were paid a considerable sum as compensation. Some farmers used this money to buy mini-tractors. Meanwhile, there were some basic construction projects near the township. This created the demand for tractors. These two reasons encouraged the growth of individual transportation. The drivers who also own the tractors undertake long-distance as well as local transportation. Because of the decline in construction projects, this sector is not doing well at present.

**Tertiary Activities.** The tertiary sector in Shuimo is made up of retail trade, catering, and services. The common features of the tertiary enterprises are small scale, low profit rate, and diverse functions. Most of the tertiary enterprises are concentrated along the road and central locations. Most of these are also self-employment ventures. There is a total of 30 such enterprises employing a total of 35 individuals.

#### *Off-farm Activities related to Agriculture*

Off-farm activities related to agriculture include mainly three sectors, namely livestock, horticulture, and sideline activities. This made up about 50 per cent of the total agricultural income (Table 6) and 47.1 per cent of the total rural income.

**Livestock.** Livestock is a traditional off-farm activity. Commonly raised animals include pigs, cattle, and fowl.

Pigs are the main livestock raised in Shuimo. Almost every household raises a certain number of pigs. A household has an average of 2.6 head of pigs. Most farmers raise pigs for self-consumption. Pigs also fulfill the demand for manure. In 1990, income from pig-raising was nearly 1.5 million *yuan*. Income from pig-raising made up 34.6 per cent of the total agricultural income. According to township records

**Table 6: Breakdown of Agricultural Income in Shuimo**

Total Agricul- tural Income ( <i>yuan</i> )	Cropping Income ( <i>Yuan</i> )		Non-cropping Income ( <i>Yuan</i> )					
	Crop total	Grain only	Non- crop total	Hor- cul- ture only	Husbandry		Side- line	Fish- ing
					Total	Pig raising only		
4,328,462	2,168,042	1,739,833	2,159,975	120,898	1,634,710	1,495,769	404,367	445
Per Cent of total	50.1	40.2 (80.2)	49.9	2.8 (5.6)	37.8	34.6 (91.5)	9.3 (18.7)	*

Source: Statistics of the Rural Economy in Shuimo Township

Note: Figures in parentheses are percentages of respective sub-totals.

\* Less than 0.1 per cent.



171,705 kg of pork were sold in 1990. This is 45.6 per cent of the total pork production (Table 7). This indicates its important role in both agriculture and in the rural economy. At present, pig raising is still based on traditional skills, and the output and profits are not high. There is no household specialised in pig-raising in Shuimo as yet.

**Table 7: Basic Information about Livestock in Shuimo (1990)**

	Pig	Cattle	Sheep	Poultry		Total
				Birds	Bee (box)	
No. raised	3,684	339	510	11,283	85	
Meat production (kg)	376,452	-	-	1,382		
Per Cent of meat production sold	45.6	-	-	81.3		100.00
Eggs (kg)				27,188		
Per Cent of egg production sold				50.4		
Total Income (yuan)	1,495,769			138,541	400	1,634,710
Per Cent of Total Income from Sales	46.3			53.1	100	47.0

Source: As for Table 6

Cattle is used mainly for draft power. In 1990, there were 339 head of cattle, every 4.4 households had one head of cattle. Before the 1960s there were many sheep but now sheep raising has declined rapidly because of the limited market demand and the lack of grazing land. In 1990, there were only 510 head in the whole township.

Every household keeps poultry, mainly chickens. Other fowl include ducks and geese. Beekeeping is also an activity pursued by some households. Poultry is an important auxiliary source of cash for most farm households.

**Horticulture.** Unlike in the northern part of Wenchuan County, climatic and soil conditions in Shuimo township are not fit for the growth of apples, Chinese peppers, and other common fruits found in northern areas. Apples and peppers are staple horticultural products in Wenchuan County and have a lucrative market. Many farm households plant a few species of fruit trees just for self consumption.

For a long time, tea was the main horticultural crop in Shuimo. Before 1984, there were large tea gardens which were collectively owned, and Shuimo was an important base of tea production in Wenchuan County. Since 1984, the tea gardens have degenerated rapidly because of two reasons. The first reason is that no one paid attention to the management of existing tea gardens because the gardens were also contracted out to farm households. The second is that local people, including both township officials and farmers, think local tea is not profitable and does not have a good market. In 1990, the total output of tea was approximately 22,112.5 kg, and the income was only 29,225 yuan (Table 8).

**Table 8: Output and Income from Horticulture and Forests (1990)**

	Output	Income (yuan)	Per Cent of Output Sold	Income from Sale (yuan)
Tea	22,113.5 (kg)	29,225	85.2	21,044
Timber	295 (m <sup>3</sup> )	76,076	100.0	76,076
Bamboo	30,000 (kg)	4,050	100.0	4,050
Lacquer	455 (kg)	10,920	100.0	10,920
Fresh Fruit	100 (kg)	262	73.9	201
Walnuts	20 (kg)	165	38.0	72
Other Dried Fruits		200	80.0	160
Total		120,898		112,523

Source: Statistics of Rural Economy in Shuimo Township, 1990

Shuimo has natural conditions favourable for the production of timber and bamboo and was selected as a base for afforestation by both the prefecture and county in 1980. Since then, a large area of uncultivated land has been afforested. Now plants have grown large enough to be selectively harvested, but most of the income from timber does not go to the local villages and farmers. Timber is State property. The villages and concerned farmers can receive only 20 per cent of the total income from timber. Villagers and farmers can only use the woods in areas contracted to them. The felling of trees is strictly controlled by the Government because of the forest protection policy. Therefore, the amount of timber cut down in Shuimo is small although the forest area is large. In 1990, only 295 cubic metres of timber were harvested from Shuimo forests.

Bamboo groves are widespread in Shuimo. There are many species also. But bamboo has not been used properly. In 1990, the income from bamboo was only 4,050 yuan.

**Medicinal Plants.** From 1985 some farmers have started to plant three species of trees used in traditional Chinese medicine. These are *HuangBo* (*Phellodendron*), *Duzhong* (*E. ulmoides*), and *Houpu* (*M. officinalis*). Local biological conditions are ideal for the growth of these plants. These are known as *Shanmuyaochai* by the local people, and this literally means "three medicinal plants". The profit margin from these medicinal plants is quite high. According to rough estimates based on current market prices, the expected net income of *Shanmuyaochai* would be: *HuangBo*, 1000 yuan/year/mu; *Duzhong* 3,000 yuan/year/mu, and *Houpu* 300 yuan/year/mu respectively. These incomes are higher than those of other existing crops. Because of the big profit, *Shanmuyaochai* has been selected as a key income generating project by both the township officials and local farmers. There is a rising enthusiasm for cultivating these plants. In 1990, the village of Lianshanpo alone, 480,000 saplings of *Duzhong* and *Huangbo* have been planted.

Lacquer and *moyu* are other cash crops in Shuimo. Although the output of lacquer was only 455 kg in 1990, it has significant potential. *Moyu* (a kind of tuber which is thought to be very nourishing) used to be a widely cultivated traditional crop in Shuimo. In the 1930s, the output of *moyu* was about 250,000 kg per year. The emphasis on cereal grains in later years led to the neglect of *moyu*.



Sideline Activities. Sideline activities in Shuimo mainly include seasonal jobs, weaving bamboo articles, and professional trades such as carpentry, bricklaying, and blacksmithing. The total income from sideline activities in 1990 accounted for 9.3 per cent of the total agricultural income. Seasonal jobs, which include construction (irrigation, road building) and logging, are activities that take place within the county during the slack farming season.

### *Spatial Variations in Off-farm Activities*

The variations in off-farm activities within agriculture between mountain and valley villages are not that wide, although the valley villages have definite advantages. It is estimated that 57.3 per cent of the total income from off-farm activities within agriculture is generated from valley villages. In terms of off-farm activities outside agriculture, however, 91.2 per cent of the income is generated in valley villages.

The areas in which mountain villages have advantages include horticultural and medicinal plants such as *Phellodenidron* and *E. ulmoides*. Valley villages, naturally, have a larger concentration of rural enterprises as well as tertiary services and transportation activities. Among the township-run enterprises, only one sawmill is located in a mountain village. Over 70 per cent of the workers in Shuimo Building Team are from valley villages. The prospects for sideline activities are also greater in valley villages.

The demand for *moyu*, both domestic and international (particularly Japan), has been on the rise in recent years. It is estimated that one *mu* of *moyu* can bring in over 200 *yuan* net income. This is a considerable source of cash income. At present *moyu* production is on a very small scale. The main constraint is that *moyu* saplings are not easily available.

### *Labour Demand for Major Activities*

Labour demand for major crops was estimated on the basis of information derived from the household survey. Among the crops grown in Shuimo, maize is the staple crop and is the most labour intensive. One *mu* (15 *mu* = one hectare) of maize requires a total of 30-35 *gongs* (one *gong* = a labour day of 8 hours). This includes 10-12 *gongs* of ploughing and land preparation; two *gongs* for sowing; two to four *gongs* for manuring; eight to ten *gongs* for weeding (which is normally done twice); and six to seven *gongs* for harvesting and storage. Wheat requires about 18 *gongs* per *mu*. The labour demand for raising pigs is difficult to estimate because the demand decreases with the rise in the number of pigs. Pig raising is also a labour intensive activity, second only to maize. *Shanmuyaochai* requires only about five to six *gong* per *mu* whereas *moyu* needs only three *gongs* per *mu*. Both these crops do not demand much labour except during planting and some manuring.

### **Potential Off-farm Activities in Shuimo**

On the basis of information from key informants as well as from the sample households, pig raising, horticulture (medicinal plants), and sideline activities appear to be the off-farm activities with the most potential in Shuimo.

Pig-raising in particular has advantages both for farming and non-farming activities. Medicinal plants like *Shanmuyaochai* have considerable advantages from the point of view of environment because these can be grown on uncultivated, marginal lands and along hill slopes. The experiences in neighbouring counties with similar natural conditions show that the potential of these medicinal plants is considerable in Shuimo. The only problem is that it takes five to six years for *Phellodenidron* to be mature (to yield the bark from which traditional medicine is made). For *Encommia ulmoides*, the maturation time is six



to eight years. Although cultivation of these plants brings in more cash, the farmers express the fear that change in the policy regarding CPRH would be disastrous for farmers cultivating these plants. Others also expressed the fear that the trees, once they are mature, might be stolen.

The potentials of *moyu* have been dealt with earlier. However, there is a scarcity of *moyu* seeds and it is only since 1988 that most farmers have come to realise the demand for *moyu*. One of the additional advantages of *moyu* is that it can be interplanted with maize and wheat. While the tuber is used for food, the plant is good fodder. Before 1950 there were seven private mills processing *moyu*. Many old people do still have the requisite skills.

Other activities with potential include tea plantations, bamboo, pears, lacquer and grapes. Bamboo articles have a considerable market demand and their manufacture could be an important sideline activity.

### **Factors Affecting Off-farm Employment in Shuimo**

A number of factors have contributed to as well as inhibited the growth of off-farm activities in Shuimo Township. Some of the major factors will be discussed under the headings below.

#### *Support to Livestock Development*

As indicated earlier, pig raising in Shuimo has been assisted by the county government as this area was known for pig-raising even before 1978. Although this assistance has contributed to the growth of the activity in Shuimo, there are no households as yet that specialise in this activity. There is, however, enough scope for such development in the future.

#### *Support to the Construction Sector*

Shuimo Township Building Team is a major source of off-farm income and employment in this township. The Building Team has received assistance from the Seventh Construction Bureau in terms of both technical guidance and contracts.

#### *Learning from Neighbouring Townships*

After the economic reforms, particularly after 1980, the county government placed a lot of emphasis on the development of apples and peppers. However, since this township did not have natural conditions favourable for the development of such fruits, no aid or assistance was provided by the county government. It was only in 1989, when township and village leaders visited a neighbouring county to share experiences, that the potential of medicinal plants, such as *Phellodenidron* and *Encommia ulmoides*, in Shuimo was realised. During the past two years the county government has begun to provide saplings of these plants at subsidised prices and has encouraged farmers to plant these on the contracted hill lands.

#### *Market Opportunities*

The products of most village and township-run enterprises, such as bricks, prefabricated components, sand, farm tools, and wood, are mostly sold in the local market or markets within the county. Paper is the only product that has a market outside the county and province in southeastern China.

The township building team has, in the past, been involved in building bridges, hydropower stations, and irrigation structures among other things. However, the number of persons employed in the building teams has declined slightly since 1989 as a result of the reduction in construction activities. Most workers are engaged in building activities for almost nine months in a year.

Livestock products, particularly pork and piglets, have a market both within the township and within the town of Xiankao. Xiankao, which has a population of 11,000 (with non-agricultural identify cards (IDs), has a great demand for livestock products and prospects of specialisation in this area are significant.

*Moyu*, as indicated earlier, has a market domestically as well as in southeast Asia. This market has led to the growth of private merchants dealing with *moyu* who come from outside the county. Similar market opportunities exist with respect to *Phellodenidron* and *E. ulmoides*.

### *Capital and Technology*

Capital for most rural enterprises has been generated locally by the township government or individually. The Paper Plant was set up with loans (36.4 per cent of total investment) and government aid funds (27.2 per cent) for technology innovation. Township enterprises that run at a loss are to a certain extent subsidised by the County Enterprise Bureau. For enterprises such as the Building Team, which is a major source of off-farm employment, the Township Enterprise Office has been offering financial assistance for technical training. Bank loans have also been provided for individual transport (up to 40 per cent in some cases). It is the livestock sector that has not received assistance from financial institutions in spite of the fact that considerable extension assistance has been provided in this area.

### *Food Grain Self-sufficiency*

The drive for food grain sufficiency in the 1960s had a negative impact on the development of medicinal plants and *moyu* in this township. Although the production of maize, and later wheat, increased, the advantages that could have been derived from specialisation were foregone. At present (1990) Shuimo township produces 501.5 kg of grain per capita per year while the county average is only 446 kg per capita per year. About 6.8 per cent of the grain output is sold. This proportion is higher than that for the county (2.9 per cent) as a whole. As in other townships, maize is bartered for rice in the Township Grain Purchasing Station managed by the Government.

### *Role of Tradition*

The lack of knowledge and adequate information on the market economy has remained a factor affecting the growth of off-farm employment. Also, traditional notions of expenditure on weddings and house construction are so strong that the bulk of the cash income goes into these activities. Risk aversion is typical of highlanders in China.

### *Spatial Variations in Labour Demand and Supply*

In Shuimo township the valley areas (villages like Majiaying and Maopingzhi) have a greater supply of labour and so there is what could be termed "surplus" labour in these areas. On the other hand, in mountain villages, like Tengchaoping, there is a shortage of labour for essential farm and off-farm activities. In these villages life is a little difficult because of a lower economic level and so many young

people migrate to the valley settlements. Tengchaoping village had a population of 350, 15 years ago; it has the same population now. One group of households in Lianshanpo had 160 residents 15 years ago; it has 110 now. In one group of households in Dayandong village there were 80 farmers in 1983; there were only 40 in 1981. Shortage of labour has meant that even the lucrative off-farm activities, such as the collection of medicinal plants, cannot be undertaken.

In addition to those noted above, other factors like the poor state of the road and communication infrastructure, lack of adequate extension, and lack of training affect the level and extent of off-farm employment in Shuimo township.

### The Contribution of Off-farm Income to Farm Households

Information gained from surveying the income breakdown of sample households indicates that off-farm activities are playing a more and more important role in the economic and daily life of most farmers. Some basic information about the sample households is presented in Table 9. Table 10 presents the income breakdown of the households.

**Table 9: Basic Information from Sample Households (1990)**

Number of Sample Households	Population	Labour Force	Cultivated land ( <i>mu</i> )	Sowing area ( <i>mu</i> )	Fixed Assets for Production ( <i>yuan</i> )	Animals cattle (head)
48	286	153	483.4	653.74	33,351	7

Source: Sample Household Survey

In Table 10 (i) gross income means the total of all kinds of income received, including income both in kind and in cash; (ii) cash income means the cash actually received by selling goods or providing services; and (iii) income from building is paid in variable wages and is not fixed.

It is evident that the cropping sector is predominant in the context of income. This brings in to focus the farmers' dependence on subsistence cereal production. Agriculture in these sample households is for subsistence. However, the total gross income of all off-farm activities taken together surpasses income from cropping. In the case of cash income the case is different. The share of cropping decreases sharply. It is only 12.4 per cent. This shows the important role of off-farm activities. Livestock play a critical role in both gross income and cash income. In gross income, they contribute 36.5 per cent and in cash income the share goes up to 47.7 per cent.

Sidelines are an important source of cash income. In the cash income structure, the earnings from sidelines contribute 20.8 per cent of the total income.

The role of non-agricultural activities (rural enterprises) in income structure is not as important as off-farm activities within agriculture. Their total share in gross and cash income is only 7.3 per cent and 16.2 per cent respectively. Among non-agricultural activities, tertiary services contribute 5.3 per cent and 11.9 per cent of the total gross income and cash income respectively.

In short, off-farm activities are mainly within agriculture and livestock and sideline activities are the two critical ones. Off-farm activities outside agriculture do not play a key role in the income of farm households.



**Table 10: Income Breakdown of Sample Households (1990)**

	Gross Income		Cash income	
	yuan	per cent	yuan	per cent
Cropping	96740	45.1	11845	12.4
Horticulture and Forestry	3836	1.8	2692	2.8
Livestock	78186	36.5	45732	47.7
Sidelines	19933	9.3	19933	20.8
Fishing	200	0.1	140	0.2
Industries	1500	0.7	1500	1.6
Transportation	2400	1.1	2400	2.5
Building	-	-	-	-
Tertiary Sector	11360	5.3	11360	11.9
Other Trades	272.50	0.13	272.50	0.3
Total	214427.50	100.00	95874.5	100.00

Source: Sample Household Survey

## LINKAGES OF OFF-FARM ACTIVITIES

The most important and obvious linkage between off-farm activities and the farming system is the interrelationship between livestock and cropping. In Shuimo, most of the animal fodder comes from cropping. Maize is the staple feed for pigs, cattle, and fowls. On the other hand, livestock contributes manure and draft power to cropping. Pigs are the principal source of manure. In Shuimo, the use of manure is at par with that of chemical fertilizer. Cattle are the solitary source of power, and their role in cropping will not be replaced by other means for a long time. Another critical contribution of livestock to the farming system is that livestock is the most important source of cash income in farm households in Shuimo. In Shuimo, the expenditure incurred in farming operations and daily life is heavily reliant on livestock. In fact, in many sample households the money for purchasing seeds and fertilizer comes directly from the sale of animal products.

Horticulture (including medicinal plants) has both positive and negative influences on the farming system. The development of *Shanmuyaochai* and *moyu* has increased, and will continue to increase land use. At present, all the *Shanmuyaochai* and *Moyu* are interplanted with cereal crops. This interplantation has increased the multiple crop index of cultivated land. Therefore it has promoted the full use of limited cultivated land, but negative effects are also apparent. For example, soil fertility has declined due to interplanting. Another negative effect is that after *Shanmuyaochai* have grown high enough, these medicinal trees hinder seriously the growth of other crops. Therefore, it is crucial to encourage and guide farmers to plant *Shanmuyaochai* on uncultivated land, although it is more convenient to plant them directly on cultivated land.

Development of off-farm agro-activities has promoted the diversification of the farming system. A few newly-introduced activities, such as planting *Shanmuyaochai* and *moyu*, raising rabbits, and beekeeping activities have helped to make the farming system more diverse and more stable.

The negative effects of the development of off-farm agro-activities on the farming system are also obvious. One of the negative effects is that an increase in the scale of off-farm agro-activities may lead to a conflict with the cropping system in terms of the demand for labour. The high output-input rate will attract the farmers' interest from cropping to off-farm activities. This situation may harm grain production.

In Shuimo, non-agricultural activities are the source of inputs to cropping. Agro-based industrial enterprises depend heavily upon the sustainable development of the farming system.

# EMPLOYMENT IMPLICATIONS OF OFF-FARM ACTIVITIES IN SHUIMO TOWNSHIP

The contribution of off-farm activities to household income clearly shows the employment implications of off-farm activities in Shuimo. The labour days used by two farmers, Zhang and Shun, show the interrelationship of farm and non-farm activities in terms of employment.

Zhang Xintai is from Huangjiaping, which is a mountain village. His main activities are farming, odd jobs related to logging, and raising pigs, and cultivation of medicinal plants. During the slack agricultural season (months, 6, 7, 11, 12) he is engaged in logging in the State-owned forest for the Township Forestry Station. He is engaged in farm (crop-related) activities for 40 to 50 per cent of the time. About 20-30 per cent of his time goes to off-farm activities on the farm. Months three, four, five and nine are particularly busy months for crop activities (Table 11).

**Table 11: Distribution of Annual Labour Days for Two Farmers in Shuimo Township**

Months	Zhang (days)			Shun (days)			
	Farm	OFEA on the Farm	Free	Farm	OFEA on the Farm	OFEA Outside Farm	Free
1	20	5	5	0	20	0	10
2	10	0	20	5	0	0	25
3	20	0	10	15	0	0	15
4	30	0	0	30	0	0	0
5	20	0	10	10	0	0	20
6	10	15	5	10	0	0	20
7	0	25	5	0	0	30	0
8	10	10	10	0	0	30	0
9	30	0	0	25	0	0	5
10	10	5	15	5	0	0	25
11	15	15	0	10	0	0	20
12	10	20	0	0	30	0	0
Total	185	95	80	110	50	60	140
Percentage	51.4	26.4	22.2	30.6	13.8	16.7	38.9

In contrast to Zhang, Shun (who is from the valley village) spends about 25-35 per cent of his time in crop-related farm activities. Shun works in the Naoren village-run oil extraction plant, which is a seasonal enterprise, for about two months in a year (months seven and eight). He undertakes odd jobs for about 50 days during the winter.



While Zhang has about 80 days free (including festivals), Shun has about 140 days free. The two cases show a typical distribution of labour days in different farm and off-farm activities.

### Implications of Off-farm Activity for Women and Low Income Groups

In Shuimo, off-farm activities affect women in many respects. First, women undertake more work in off-farm agro-activities than men. Household surveys, show that women undertake almost all the animal raising chores and half of the related work (Table 12). This has augmented the already heavy burden of agriculture on women, and it will tie women to land-based activities more strongly. Second, women's participation in most non-agricultural activities is less than that of males. Among the total of 130 industrial workers, females accounted for nine employees, only 6.9 per cent of the total. Among the total of 150 building workers, only 10 are females. The share of female workers in tertiary activities was much higher than in industries and building. This indicates the necessity of releasing women from the land to participate actively in non-agricultural activities.

**Table 12: Division of Labour by Gender (contribution in per cent)**

Type of Activity	Female	Male	Total
	%	%	
Industry	6.9	93.1	100
Construction	6.7	93.3	100
Transport	0	100	100
Tertiary Services	40	60	100
Horticulture and Forestry	45	55	100
Livestock	60	10	70*
Sideline	30	70	100
Farming*	50	50	100

\* 30 per cent is contributed by theoretical non-workers (i.e., females below 16 and above 55 and males below 16 and above 60).

As a result of the lack of funds, operational ability, and other causes, the participation of low income families in off-farm activities is lower than that of other groups. In some villages the difference in wealth between the "rich" and the "poor" has increased considerably, but off-farm activities are helpful in alleviating poverty. Most off-farm activities do not require complicated skills or large amounts of funds, therefore, everyone can undertake them without much trouble. The poor can earn cash to improve the productivity of farming as well as their living standards.

One of the biggest obstacles to the low income group's participation in off-farm activities is that they are reluctant to take risks. They prefer to spend money on wedding or death rites. For example, in Shuimo

township many low income families have not planted *Shanmuyaochai* or other tree crops, but many middle and high income families have. The required investment for *Shanmuyaochai* is very low. It is only 66 yuan/mu for *Huangbo*, 120 yuan/mu for *Duzhong*, and 60 yuan/mu for *Houpu*. Even the poorest family can manage to afford it, but they do not make the investment.

### Profiles of Some Pioneers in Off-farm Activities

As in other townships and counties in this area, the pioneers in off-farm work are normally educated persons with previous experience in the township/county administration. The cases of Xiao Yeuyon and Luo Zhongchen are typical.

Xiao Yeuyong is a 50-year old farmer with junior high school level education. He is from Naoren village. At present his main occupation is mushroom cultivation. Farming is his subsidiary work. In 1986 he became interested in mushroom cultivation (through a newspaper report) while working as an accountant in a village-run brick plant. When the brick plant started to show declining profits, Xiao realised that he should now look for new avenues for remunerative employment. He began to learn the skills for cultivating mushrooms through a correspondence course. After four years of learning through practice, (and a number of problems) he now is a skilled mushroom cultivator. In 1990 he resigned from his job. He makes a net income of 2,000 yuan per year through the sale of mushrooms. His mushrooms have a ready market in Shuimo as well as in Xiankon. He plans to expand the scale of operations but is constrained by the lack of funds.

Luo Zhongchen from Dachatau is 49 years' old and has a junior high school level education. He is a village leader with farming as his main occupation. He is a carpenter and is also partly engaged in horticulture-related activities as well as pig-raising. His interest in the cultivation of medicinal plants and other cash-crop trees dates back to 1984. Since that time he has planted over 10 types of cash-crop tree on his contracted hill land of about 1.5 mu. The plants include *Phellodenidron* (120 plants), *E. ulmoides* (125), *Magnolia officinalis* (50), lacquer trees (150), persimmons (25), cherries (5), grapes (6), pears (10), walnuts (6), and plums (7). Since 1989 he has also been cultivating *moyu* on 1.5 mu of his cultivated land. Many of the plants have now begun to bear fruit. In 1990 he received an income of about 400 yuan from *Phellodenidron* alone. The total investment in these plants has been only 40 yuan.

## IMPACT OF OFF-FARM ACTIVITIES ON THE ENVIRONMENT AND ON RESOURCES

Medicinal plants, other fruit trees, and *moyu* provide off-farm employment based on comparative resource advantages. Some of the positive and negative aspects (or indicators of "success" and "failure") of the major off-farm activities are noted below.

### a) Raising Livestock

- Positive Aspects:
- Enhances self-reliance
  - Improves the soil fertility of cultivated land
  - Enhances both forward and backward linkages with cropping
  - Enhances female participation in income generation

- Negative Aspect:
- Reduces farmers' motivation towards new off-farm activities

### b) Planting *Shanmuyaochai* and *Moyu*

- Positive Aspects:
- Makes full use of otherwise unused land
  - Enhances the opportunities for the poor
  - Contributes to market growth
  - Enhances the natural resource base
  - Increases diversification
  - Generates considerable net income

- Negative Aspects:
- May lead to decline in soil fertility
  - Involves risks because of uncertain market demands

### c) Sideline Activities

- Positive Aspects:
- Generates sizeable seasonal employment
  - Has good opportunities for major activities with substantial labour demand
  - Enhances the opportunities for the poor
  - Based on traditional skills

- Negative Aspect:
- Decreases the production scale of certain operations in a household



d) Building

- Positive Aspects:
- Generates sizeable non-agricultural employment
  - Has improved the access to the outside world
  - Has enhanced skill levels

- Negative Aspects:
- Increases the dependence on outside enterprises
  - Decreases the utility of local resources
  - Limited access for females

e) Tertiary Activities

- Positive Aspects:
- Contributes to growth of market and service centres
  - Enhances backward linkages with the farming system
  - Enhances female participation

- Negative Aspects:
- Discourages rational distribution of population and resources (migration from mountain villages to valley villages).
  - Not easily accessible to the poor

## ANALYSIS OF A MAJOR OFF-FARM ENTERPRISE: SHUIMO PAPER PLANT

In 1990 Shuimo township had 76 rural enterprises with 351 employees. Most enterprises in Shuimo are rudimentary economic operations. Their technology is simple, production scale small, employees few, and the management is mostly informal. In order to understand the operation of an enterprise in-depth, the Shuimo Paper Plant was selected for three reasons: First this off-farm activity is important and has a great deal of potential in Shuimo; secondly, it has close linkages with the local community and thirdly, it is a typical local business firm and is well organised and equipped.

### Background to Shuimo Paper Plant

Shuimo township is noted for its bamboo which is an ideal raw material for paper. In the 1920s someone had attempted to operate a paper plant here. In 1937 a simple paper plant called Lide Paper Plant was established in Mozhigou. After six years of operation, it went bankrupt. In 1958, Shuimo Paper Plant was established on the site of the bankrupt Lide Paper Plant. It had 30 to 40 employees and produced 20 tons of paper annually with an output value of 25,000 *yuan*. In 1962, the plant was closed down. After a year, it was reopened but its ownership changed from State-owned to collectively-owned.

In 1978 the plant moved to its present site, the scale of production expanded, and technological equipment was improved.

### *Type and Scale*

Shuimo Paper Plant is situated near the township centre and is linked to the road. The plant is a collective enterprise directly under the township government. It is a small enterprise by national standards in terms of both plant size and production scale. The plant now has 31 regular staff and workers.

At present, the plant produces rough toilet paper, kraft paper, crepe paper, and *Huangqian paper*. *Huangqian paper* is a kind of paper used in certain rites and makes the most profit among the four kinds of product.

### *Organisation and Management*

The management at Shuimo Paper Plant includes one director, one deputy director, one accountant, one cashier, one storekeeper, and two sales' people who are also in charge of material supply.

Director and deputy director handle all the plant affairs by themselves. Theoretically, according to the signed contract, the director has full power over plant operations, but his authority is often limited. This is the most important reason why the plant is not doing well.

Because the paper plant is a key enterprise in the township, the township administration pays a lot of attention to the development of the plant. In order to operate the plant in a better manner, the township administration is assigning a deputy township governor to be responsible for plant affairs.

### *Technical Innovations*

Technological innovations were introduced to modernise the Shuimo Paper Plant between 1986 and 1989. As a result, obsolete manual tools were replaced by mechanical equipment and both the production scale and technical requirements have also been upgraded. The planned production capacity has been upgraded to 800 tons per year, although this target still remains to be achieved in real production. The investment for this modernisation was about 550 thousand *yuan*. This investment was realised from three sources: bank loans (200 thousand *yuan*), government funds (150 thousand *yuan*), and civil loans (200 thousand *yuan*). The civil loan was from Majiaying village. This village had received a considerable sum in the form of compensation for the loss of cultivated land as a result of the construction of a factory. The village loaned 200 thousand *yuan* for investment, a large sum of money in Shuimo, to the paper plant under the condition that the plant must employ 25 farmers from the village as regular workers.

During recent years, the plant has paid considerable attention to technical training. Most of the workers have received short-term basic training. The plant sent 17 staff and workers for further training. Since 1986 the total expenditure for training reached 24 thousand *yuan*. These trainees have become the technical backbone of the plant.

### *Marketing*

Many of the plant's products are sold locally. *Huangqian* paper, which is a major product of the plant, is sold mainly to Hunan and Zhejiang provinces.

Before 1988, the operation of the plant was controlled directly by the township administration. The administration determined the annual output of the plant. Poor planning resulted in poor sales because the products did not have sufficient market demand. Since 1989, the plant has been given more operating powers, and it can decide on the type and quantity of production based on market demand.

Raw materials include mainly bamboo and waste paper. Both can be obtained locally. Income earned from the plant has helped farming activities in terms of buying seeds and fertilizer. In the busy season, the plant hires about 20 seasonal workers for purchasing and transporting bamboo.

### *Extension and Support*

The plant, as indicated earlier, has received support for its expansion programme in terms of credit, technical training, and technological modernisation. However, for the plant to be sustainable there must be a continuous source of raw material. The bamboo groves that are there at present cannot provide raw material for expanded production in the long run. The farmers need, therefore, to be motivated and encouraged to plant more bamboo on appropriate lands. Extension and support in this aspect has been lacking. This indicates a lack of long-term planning.

The case of the Shuimo Paper Plant shows that there are many successful elements to this particular off-farm activity: use of local raw materials; the high-value, low-bulk nature of the product; linkages with the farming system; and a source of income for the township administration as well as the farmers.

On the other hand, lack of proper long-term planning, negligence regarding the creation of a sustainable raw material base, and poor management are some of the problems facing this enterprise.



## GUIDELINES FOR FUTURE DEVELOPMENT

The existing off-farm activities in Shuimo are based on comparative resource advantages. Future efforts in the promotion of off-farm activities should clearly be based on these advantages. In this context, the following guidelines can be suggested:

- 1) The vast hilly area in Shuimo township can be used for the cultivation of a variety of cash-crop trees. Efforts, therefore, need to be directed towards motivating and encouraging households in such ventures.
- 2) Shuimo township has definite advantages for the cultivation of medicinal plants, *moyu*, and bamboo. These are not only suitable for the natural conditions prevailing in Shuimo but also have a prospective market. Other cash trees such as lacquer and walnuts and fruits such as persimmons and grapes also have potential. Cultivation of these fruits and cash-crop trees in combination with medicinal plants will not only lead to the better use of mountain diversity but also help farmers to avoid the risks associated with changes in market demand.
- 3) Livestock-rearing especially pig raising has prospects in the area. Efforts to provide extension support for pig-raising in the field of epidemic prevention should be strengthened. Local government has not been able to meet the demand for extension support. Large-scale pig raising should only be promoted with caution because the local farmers have still not mastered the essential techniques and methods.
- 4) Promotion of off-farm activities in Shuimo township should take the spatial variations into consideration. While horticultural crops and medicinal plants have advantages in the mountains, the valley villages provide scope for the promotion of off-farm agriculture. The scope for the development of rural enterprises in processing medicinal plants and *moyu* needs to be investigated.
- 5) Although Shuimo township is linked with the Chengdu-Aba road, the condition of the present road is very poor. Improvement in the road's condition as well as communication facilities is therefore necessary.
- 6) Technical guidelines and skill training need to be provided before new activities, such as the cultivation of *moyu* and medicinal plants, are undertaken.
- 7) Market information is extremely essential if farmers are to be encouraged to undertake new off-farm activities. The local government department for rural enterprises should make efforts to procure and provide such information to concerned households. This is particularly true in the case of medicinal plants, *moyu*, and bamboo.

- 8) Many of the off-farm activities and their promotion are contingent on the continuation of the contract responsibility system. It is therefore necessary to allay any fears that households may have on this score. Also, local government should not interfere in all township activities and village-run enterprises but delegate responsibilities according to the contract responsibility system.
- 9) The county government should make efforts to help low income farmers in this township as it has done in other townships. Provision of inputs (*moyu* seeds, for example) at concessional prices, preferential loans from local banks, and training in the required techniques are areas where support is needed.
- 10) Public security, particularly with respect to the care and protection of cash-crop trees, has to be strengthened to encourage farmers to plant medicinal and cash-crop trees. An area of concern to farmers is the protection of such trees on contracted hill lands.

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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