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THE ROLE OF THE RESPONSIBILITY SYSTEM IN THE DEVELOPMENT OF MOUNTAIN AGRICULTURE

Yu Dafu

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International Centre for Integrated Mountain Development

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PREFACE

ICIMOD's approach to problem-oriented research involves both knowledge reviews and field studies. The focussed reviews and field studies conducted by the Mountain Farming Systems' Division cover various aspects of agricultural development. Since early 1988, a series of 'state of the art' reviews of agricultural policies and programmes were sponsored by ICIMOD in different countries of the HKH Region. The purpose of these studies and of the subsequent National Workshops in different countries was to understand some of the constraints and prospects of mountain area development. These exercises were also aimed at acquiring comparative perspectives of development approaches and strategies in different countries.

This paper was a part of this series of studies commissioned by ICIMOD, and was also presented at the Workshop on "Agricultural Experiences in West Sichuan and Xizang, China," organised by ICIMOD and the Chinese Academy of Sciences, Chengdu, from 6-10 October 1988. The paper examines the gradual development of the *Responsibility System*, the earlier attempts to introduce it, and the evolution of the now widely practised "Household Contract" by examining its impact on Miyi County. It discusses its strengths as well as its weaknesses and recommends the course it might take if it is to continue to establish successful methods of developing mountain agriculture.

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Abstract

In this paper, Miyi County, in the Sichuan Province of China, is taken as an example of the development of the *Responsibility System* in rural China. It is seen from the perspective of a policy of agricultural development, in order to alleviate rural poverty and break away from the subsistence cycle. The previous, stereotyped organisational models were seen to be unsuitable, particularly for the development of mountain agriculture. The suitability of development measures and their sensitivity to mountain characteristics is one of the important concerns of researchers engaged in the development of policies and strategies for mountain agriculture.

The *Responsibility System* is here described and analysed in its various forms; from a system of collective agricultural organisation (which can also be State-owned) to the two main types of *Contract Responsibility System*; viz, related to output and unrelated to output. Currently Miyi County has been practising the *Household Contract Responsibility System* which is output-related.

The *Responsibility System* is seen to have promoted unprecedented development in *Miyi County*, improved agricultural production, and optimised the rural industrial structure. Outputs of grain and of commercial agricultural products have increased substantially and income levels and living standards have improved markedly. The weakness in the system is the small-scale of production, because in Miyi County, the *Responsibility System* is applied at the household level and on small tracts of land only. This in itself has produced a number of socioeconomic and technical problems. One glaring problem is the economic differentiation among different households, among those who are becoming prosperous, and those who are still quite poor; the latter living in regions that are not suitable for large-scale infrastructural development and where there is insufficient coordination between production and the market economy.

The author suggests that the solution to these problems is to guide and implement the paid transfer of land, establish social services, develop cooperative economic organisations, and establish and strengthen, both at individual and at collective level, the organisation and management of State, collective, and individually run organisations. In concluding the author discusses the strengths of the *Responsibility System* and the possibilities of its application to other regions of the world.

An Introduction to 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 (See Map). 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.

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.

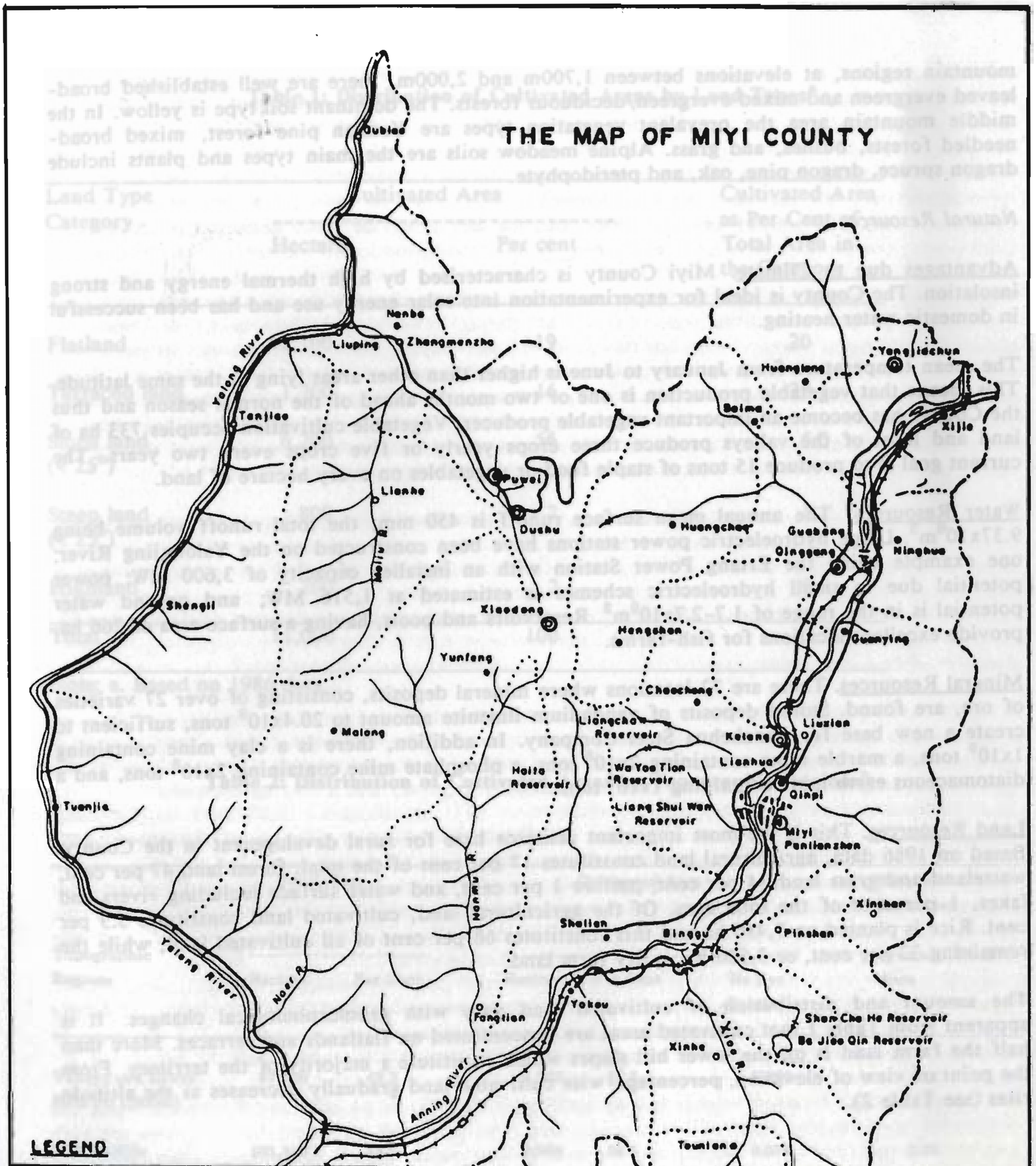
- Seasons are alternately wet and dry. The mean annual precipitation is high and ranges from 900 mm to 1,300 mm. The potential evapotranspiration, representing the water vapour flux under ideal conditions, is greater than precipitation; the average annual evapotranspiration rising to 2,385 mm. Precipitation distribution is uneven. during the dry season (November to April), which is also the season in which temperatures are 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 the 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 5.2m^3/s in the dry season and this rises to a maximum of 3,410m^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 valleys, 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 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


THE MAP OF MIYI COUNTY
Nanbo
Liuping
Zhengmenzha
Yalong River
Tanjiao
Puwei
Lianhe
Dushu
Shengli
Xiaodong
Yunfeng
Malong
Tuanjie
Yalong River
Anning River
Fangtian
Yakou
Huangchao
Guabang
Ninghua
Baima
Xijie
Hengshan
Liangchao Reservoir
Lianhua
Wa Yao Tian Reservoir
Haita Reservoir
Liang Shui Wan Reservoir
Miyi
Panlianzhen
Xinshan
Shen Che He Reservoir
Ba Jiao Qin Reservoir
Guanying
LEGEND
STUDY TOWN & VILLAGE
TOWN ; VILLAGE
COUNTY BOUNDARY
TOWNSHIP BOUNDARY
RAILWAY
ROAD
RIVER; RESERVOIR
SCALE
2 0 4 8 km.

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 valleys produce three crops yearly or five crops every two years. The current goal is to produce 15 tons of staple food or vegetables on every hectare of land.

Water Resources. The annual mean surface runoff is 450 mm; the total runoff volume being $9.37 \times 10^6 m^3$. 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 ground water 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, wasteland and grass land 34 per cent, pasture 1 per cent, and water surface including rivers and lakes, 1 per cent of the total area. 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 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).

Table 1: Distribution of Cultivated Areas 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
Slope land (< 25°)	6,200	56	5.5
Steep land (< 25°)	800	7	1.2
Highland	200	2	0.9
Total	11,000	100	5.3

Note: a. Based on 1986 data

Table 2: Distribution of Cultivated Areas 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	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 utilization, industrial distribution, and overall organisation and management.

Social and Economic Background

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

Population. The total population of Miyi is 175,085 (1986 data) and this is small compared to the other counties of Sichuan Province. The average density is 84 persons per km^2 and this, too, is lower than the average of other counties in the province. The distribution is uneven. For example, the valley constitutes 42 per cent of the total area and contains 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, *Bias*, 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, 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 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 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.

Basic Concepts of the Responsibility System

The Implications of the Responsibility System

The full designation of the *Responsibility System* is "The *Contract Responsibility System* of Socialist Collective Agriculture". It is a new concept of management that has evolved with the development of Socialist collective ownership and cooperative agriculture in China. The main concepts are described below.

Public Ownership of Land. The public ownership of land is the basic foundation of cooperative agriculture and collective ownership and is also a prerequisite for the *Responsibility System.*

Agricultural Producers' Cooperatives. The cooperatives on the one hand and production teams and households on the other constitute the parties in the contract relationship.

Collective Ownership of Land. Land is owned collectively and the production inputs distributed among the households. Households are given State purchase quotas to fulfill and pay agricultural taxes.

Household Contracts. Households are given land on contract as well as other specialized inputs or machinery. Part of their produce is turned over to the Collective.

A definition of the *Responsibility System* might be that it is a contract system that stimulates productive labour and agricultural management within the Collectives. Within this contract system all items of agreement, responsibility, duty, benefits, and rights have to be clearly defined.

Types of Responsibility System

There are several types of classification according to different principles and uses. According to the type of production a contract can be classified as a job, or output, contract throughout a broad spectrum of classifications (including productivity, labour, management, administration, product handling, and so on; according to the contract unit also it is classified. as labour group, team, or household). Contracts are also classified according to land contract (where the contractor is responsible for managing the land), or profession such as forestry, animal husbandry, fishery, industry, transport, services or subsidiary occupations.

In broad terms however, depending upon the type of production and managing style, classifications can be divided into two general types: (i) a contract responsibility where payment is not linked to output and (ii) a contract responsibility where payment is linked to output. The main types and their interlinkages are given below.

	job contract	by labour by household by oper. group	contract without output link	contract by profession contract by work
Kinds of Responsibility System	output contract	by household by oper. group	contracts with output link	contract by profession
	contract differentiation (from A to Z)	by household by oper. group		contract by land

Contracts not Linked to Output. The main type that falls under this category is the "job contract" which consists of agricultural labour paid for on an hourly basis. It is, in fact, a piece-work wage system. The Collective (production team or agricultural producers' cooperative) draws up the requirements. These requirements include the quantity and quality of work required as well as the time limits set. A quota of workpoints is allotted according to the type and amount of work given. The contractor will receive the stipulated number of workpoints after the collective leadership has assessed his work and judged it to be acceptable. At the end of the year he will receive payment for the total number of workpoints accumulated in cash and kind:

The main problem with this system is that it is only a "job contract" (based on farm labour but not on output) and so there is no assessment of the quality of work. To implement this type of system properly, the man-hour quota for specific types of farm work should be assessed and translated into the relevant number of workpoints. It is, however, difficult to allot such quotas since the tasks are not only numerous but often disorderly. As a result of all these difficulties, this type of contract was not given much importance when the third reform in the *Responsibility System* took place in 1978.

Contracts Linked to Output. There are two kinds of output-linked contract system. The first is an output contract and the second kind is a contract that covers miscellaneous possibilities and can be linked to job type or productivity. The difference between this kind of contract and the one not linked to output is that the former contract is paid whether there is any output or not and this particular kind of contract only involves payment when the end results are shown (i.e. the output).

There are differences between an "output contract" and a "job contract". In the former workpoints are only given according to output no matter what amount of work is involved.

The procedures involved in this include the drawing up of a management or cultivation plan by the collective leadership according to an assessment of the productive capacity of the land involved. They also allot the workpoints to be awarded to the productivity teams, households, and contractors. All crops harvested under each contract become the property of the collective, who redistributes them among the households involved along with the cash earned; based on the workpoints accumulated. Whatever is produced in excess is kept by the contractors themselves.

The workpoint system no longer operates in the miscellaneous types of contract that are linked to multifarious job types and productivity specifications. There is a system of direct reward directly related to output only. The group or household involved contracts land, livestock, or machinery

by deed from the collective. These are used by the contractor during the time stipulated by the agreement and can only be used by the contractor(s). The contractor has the right to manage everything independently based upon a general plan provided by the State or Collective. All crops over and above the contracted amount are kept by the contractor after paying agricultural taxes and providing grain for State-purchasing.

Household Contract. Here the household is taken as the contractor. This system was introduced into Miyi County in 1984 and it is very well-suited to mountain areas where the means of production are underdeveloped. The farmers like this system and it can be forecast that it will be used for a long time (15-20 years) not only in Miyi but in other areas also.

Differences between Household Contracts and Private Ownership

The household contract combines the unified management of the Collective with the management of household units, and household management is predominant. It is linked to output and differs from private ownership because, in the latter, the land and all means of production are owned privately by the household and management is economically independent of the collective.

In the output-linked contract there are three main characteristics, and these are described below:

- The basic means of production, such as land and irrigation facilities, belong to the collective and are only used by the household for the contracted period. Should the household become involved in alternative employment, they cannot sub-contract the land or inputs. They are also not permitted to build housing, remove the soil, or dig graves on the land. When the contract is completed the land reverts to collective ownership and only the Collective can use the land freely.

- According to the stipulations laid down in the contract, the household must hand over a certain amount of the produce realised to the Collective. Out of this, the Collective pays pensions to the families of those in the People's Liberation Army and of revolutionary martyrs; in addition needy families, receive assistance; cadres receive perquisites; water conservation and road construction works are carried out; and so on.

- The amount to be produced is determined by the Collective and large inputs are controlled by the Collective.

The Rise and Development of the Responsibility System

Historic Background of the Responsibility System

The *Responsibility System* evolved during the latter stages of the cooperative movement (1955/56). Elementary Agricultural Producers' Cooperatives were very popular at that time. Mutual aid teams had improved the methods of dealing with natural calamities; promoted water conservation works; promoted road construction works; and had partially solved the problem of cash and input shortages in farm households. Therefore, a certain amount of agricultural development had taken place and people were becoming more prosperous. This led to the establishment of Advanced Agricultural Producers' Cooperatives in rural China. The basic characteristics of these cooperatives have been described in the following passages.

Collective Labour and Management. Collective labour and management led to carelessness on the job on the part of farmers because they no longer had to worry about the whole production process. In turn, since productive management was left to the direction of lower level operatives, leaders often issued confusing or contradictory orders, "like a swarm of bees" or *dafalong* in Chinese.

Workpoint Allocation and Distribution. Workpoints were allocated according to hours worked. This did not bring about any real distribution according to how well someone worked or according to productivity. Farmers were simply allocated workpoints on the basis of time and since payment was made on the basis of workpoints, the really productive workers often lost out. The agricultural production cycle lengthened and became more complicated with more technological innovations. As a result, there were no middle products and actual work was assessed on the quantity and quality of fruit at harvest time; this meant that those who did not work well shared the productivity of the better farmers. It is obvious that, since agri-products depend a great deal upon the qualilty and quantity of work at different stages, workpoint allocation according to time does not fairly reward the more conscientious and productive workers. In addition, everyone ate in a canteen "from the common pot" so there was no proper system of reward and punishment.

Dafulong and the "common pot" hindered the development of agriculture. In order to explore better ways of production the *Responsibility System* was introduced in some regions. Until that time collective labour with a unified system of accounting and distribution, based on workpoints, had been regarded as the only correct model for agricultural development within the Socialist philosophy. Therefore, the *Responsibility System* was initially seen as heterodoxy and suffered censure and repudiation. As a result, it was not established at that time.

Following this came the period of the "Great Leap Forward" and the "People's Commune Period" and these resulted in an increase in the *dafulong* and "common pot" syndromes. This resulted in five negative trends and they were:

- a premature transition to Communism
- an exaggeration of working styles; posturing,
- the carrying out of orders by force, and
- personal priveleges for the cadres.

These were populously referred to as the five adverse winds: the wind of communism, the wind of exaggeration, the wind of blind commands, the wind of coercion, and the wind of privelege.

Added to all this, the effects of natural calamities brought agricultural production to a standstill creating an adverse economic situation in China. The country and the people suffered heavy losses and famine ensued.

To reverse this trend, in November 1960, the Central Committee of the Chinese Communist Party issued a statement concerning the policies implemented in the rural communes and directed that efforts should be made to correct the "leftist" deviations, commencing by rectifying the organisation and management of the collective economy. As a result of this the *Responsibility System* was once more introduced, but on a larger scale, and a rapid reversal of the adverse situation was witnessed. The rural economy became more productive. However, at this time also some political elements were not in tune with the thinking at national level and the *Responsibility System* was once more abandoned.

During the decade from 1966-1976 China went through a "Cultural Revolution". This was a period of ceaseless class struggle which brought the rural economy to the verge of collapse. The "Cultural Revolution" ended in 1976 and policies to reform the agricultlural system were once more introduced in 1978. This time there were strong demands from the farmers themselves for the reform of "leftist" farming policies. Hence, the *Responsibility System* was introduced for the third time. Since 1979, the *Responsibility System* has made rapid advances and has been successful. In the current model there are two important modifications, and they are that the values of both collective unified labour and individual decentralised labour are simultaneously maintained and that the system has been able to arouse the enthusiasm of both collective management and individual managers.

Conclusion

The rise and development of the *Responsibility System* was on the whole consistent with the situations prevailing in China.

Because Miyi County is an underdeveloped, isolated mountain area, there is a delay in its receiving information concerning centralised decision. As a result, the third introduction of the *Responsibility System* did not take place in Miyi until 1980. This meant that it was in a position, by then, to benefit from other people's experiences. As a result, at the end of 1982, just two years after the reintroduction of this system, the number of production teams on "output contracts" and "farm work contracts" was 299 and 555 respectively; 92.13 per cent of the total number of production teams in Miyi County. By 1984, the percentage of production teams applying for farm work contracts was 64.78%, and they all had had experience of household contracts. Table 3 depicts the rise and development of the *Responsibility System* in Miyi County.

Stages in the Development of the *Responsibility System*

There were four stages in the development of the agricultural *Responsibility System* in Miyi County.

(i) The Centralised Development Stage. The document entitled "Resolution on a Few Problems Concerned with the Acceleration of Agricultural Development", adopted by the Fourth Plenary Session of the Eleventh Central Committee of the Chinese Communist Party, on September 28th, 1979, affirmed the "contract" production and management system of group output. This, in fact, was an official approval of the *Responsibility System*. Coming at a time when the system was still under dispute, it gave added impetus to its re-emergence, and, within two years, it had spread rapidly. Twenty per cent of all production teams were involved in "Household Contracts"

The main problem with the group contract was its continuing relevance upon the workpoint system. Thus, productivity remained mediocre and farmers were still eating "from the common pot". These drawbacks in the group contract arrangements led to the farmers welcoming the Household Contract system.

At this stage, there are many different types of the latter contract in Miyi. Public land is managed by all households collectively and agricultural taxes, State purchase and collective quotas, and grain ration land are all managed by individual households. Thus management by household is mixed.

Table 3: The Rise and Development of the Agricultural *Responsibility System* in Miyi County

Year		1980	1981	1982	1983	1984
Total Number of Production Teams		832	924	927	927	929
Teams Adopting *Responsibility System*	Teams Contracting Output by Group	666				
	Teams Contracting Output by Household	166	800	299	6	
	Teams Contracting by Household Generally			555	919	929
Teams not Adopting *Responsibility System*				73	2	0
Percentage of Teams Practising Output linked Contracts from Total Numbers in Miyi		about 20	86.5	92.13	99.78	100
The Percentage of Teams Practising link Output linked Contracts by Household from Total in Miyi			20	59.87	99.14	100

(ii) Growth of the Household Contract System. On September 27th, 1980, the Central Committee issued a "Summary of Discussions on the Problems involved in Further Strengthening the Agricultural *Responsibility System*". It was a summary of discussions held by the First Secretaries of the various Party Committees in the Provinces. It concluded in affirming the value of the *Responsibility System* and pointed out that it was essential to support it in order to increase productivity and income. It especially stressed that the Household Contract was a way of maintaining links with the masses, improving production, and solving the problems of basic needs in the mountain areas. Finally, they declared that the "Contract System" was dependent upon a Socialist economy and was in tune with Socialist ideals.

Under the guidance of the summary issued at that time, Miyi County developed rapidly and in 1981, 70 per cent of households were practising the Household Contract System and 20 per cent "outpput contract farm work by household". However, the method of accounting and payment was still dependent upon the workpoint system and teams had no initiative to manage. This meant that their skills were not being exploited to the full.

(iii) Growth of Miscellaneous Contract Systems. By the end of 1981, many different kinds of *Responsibility System* had been approved by the Government. However many demerits as well as merits of the system emerged. Comparatively, Household Contract farm work is the best for agricultural production, especially in the mountain areas and farmers are free to manage the way they see fit. As a result, this is the most acceptable contract in Miyi County and it spread rapidly, within one year, from 1981-1982 until more than 60 per cent of all production teams were Household Contract teams. In its turn this put an end to the custom of "eating from the common pot" and farmers became more involved in management.

The farmers were happy with this system and in fact, were apprehensive that a further change in government policy might negate the developments that had taken place. However, in January, 1983, the Central Committee issued a circular entitled "Discussions on the Current Rural Economic Policy", in order to put the farmers' minds at rest. The circular stressed the strengthening and perfecting of the *Responsibility System* and reaffirmed the commitment of the Central Government.

(iv) Expansion of the Household Contract System. From 1983 to 1985, the output contract system in agricultural production expanded. The number of production teams in 1983 was 99.14 per cent of the total number of production teams in the County. This situation continued throughout and the contract period was prolonged on the basis of no changes within 15 years. Such issues as duties, rights, and interests were legalised but, on the other hand, weaknesses were found in individual labour and management. These weaknesses were related to the prevention and control of plant diseases, elimination of pests, and the dissemination of advanced technology, etc. There were also problems related to the placement of surplus labour force before, during, and after production.

It can be seen that the "household contract" system is still not perfected and is still subject to many improvements. After 1986, a number of measures were introduced to correct the weaknesses that had arisen. A system of "double-level management" was introduced (this refers to the method of contracting out work that can be handled best at household level to households, at collective level to collectives). Professional contracts, transferring land on a small-scale to skilled farmers are now being undertaken in some places.

The Current Practice of the Responsibility System in Miyi County

This section examines the different ways of practising the *Responsibility System* in the farming, forestry, and pastoral areas. By 1985, most areas in the County had adopted the household contract system. Because of the vertical climatic differences, and the diversified forms of agriculture practised in the valleys, foothills, and mountain areas, practise of the *Responsibility System* also varied depending upon whether the production team was involved in farming, forestry, or animal husbandry.

Farming Areas

Farming is mainly based in the valleys and foothills and is characterised by the cultivation of grain crops (wheat and maize) and commercial crops (sugar cane and vegetables). Here, the dual level management system is practised. Contracts are mainly Household Contracts but some specialised products are managed by the collectives (industries, pisciculture, and large orchards).

The Collective divides the available land equally among the population according to the quality of land, and the land is given out in Household Contracts.

Should arable land have been left uncultivated as wasteland, whoever reclaims it has the right to use it. Should he not use it after reclamation, it reverts to the Collective.

Specialised contracts handled by the Collectives are usuallly of more commercial value. These include orchards, mulberry fields, and tea gardens. Irrigation facilities are also managed by the Collective.

Farming implements and cattle are bought and/or owned by the collectives and are sold for cash to the contract households.

Forestry Areas

A household may contract to work in certain forest or barren hillside areas. They are expected to (i) prevent forest fires, (ii) prevent the indiscriminate felling of trees, and (iii) carry out afforestation works to the degree stipulated by the Collectives. Felling is carried out by specialised lumberjacks or lumbering teams under the direction of the State or the Collectives. A quota "bonus" is paid to the contractor for felled timber on the basis of each cubic metre of timber felled. If timber is felled from an area not normally included in the "felling area" the contractor receives a salary from the State or the Collective, according to the month or season of the year, against him not being able to carry out or not being able to completely carry out the contract.

Pastoral Areas

The contracts undertaken in the pastoral areas are similar to those in the farming areas. Grazing land is divided and the management and grazing rights are decentralised.

The Organisation and Management of the Responsibility System in Miyi County

There is a comprehensive organisation and management system, in Miyi County, for carrying out the *Responsibility System* and signing contracts.

First, the County administration signs a contract with the municipalities, for micro-projects on a broader socioeconomic scale, in terms of industrial and agricultural output, grain output, State purchase quota, agricultural tax, conscription, birth control, and basic services. Basic services include all those items borne by the County Government, such as chemical fertilizers, insecticides, plastic film (for soil temperature conservation), etc. The municipality in turn signs a contract with the villages, the villages with the cooperatives, and the cooperatives with the farm household.

The basic content of contracts signed is, by and large, the same; including items, period, and type of contract as well as allocating responsibilities to the contractor and the contractee, rights, obligations, penalties, services, alterations, and termination. Generally the lower the level of contract, the more specific the details. Contracts between cooperatives and household are the most detailed.

In Miyi County land is usually contracted out for 15 years. However, the contents of the contract are checked and revised on a yearly basis.

Changes in Agricultural Productivity in Miyi County After Introducing the Responsibility System

Comparison of Agricultural Productivity Before and After the Introduction of the Responsibility System

The system as a whole was introduced in Miyi County in 1980 and the Contract System in 1984. During that year productivity increased. Tables 4 and 5 indicate the annual changes and the average rate of increase, under a number of selected headings within a ten year period (i.e. 5 years before and 5 years after introduction of the *Responsibility System*).

Table 4: Comparison of Agricultural Productivity from 1975-1984 in Miyi County

	Grain *jin* person[1]	Commodity Grain 0.5t year	Contribution to the State *jin* person	Commodity pigs head household	Total[2] Output in Yuan[3]/ person	Cultivated Lands Mu[4]/ person
Before R.S.						
1975	729	23020	159	--	188	1.16
1976	646	20660	141	--	160	1.14
1977	673	20180	136	1.41	--	1.12
1978	837	20790	140	1.22	--	1.1
1979	749	22400	153	1.41	190	1.10
After R.S.						
1980	852	25700	175	0.99	198	1.10
1981	809	26520	181	1.64	227	1.10
1982	857	27040	163	1.61	249	1.10
1983	741	27820	187	1.75	258	1.10
1984	866			1.71	318	1.09

1/ *jin* 0.5 kg.
2/ Animal output value is based on the unchanged price of the base year.
3/ From 1975 to 1984 the value of the *yuan* changed from 1.48 *yuan* per U.S. dollar to 2.82 *yuan* per U.S. dollar.
4/ There are 15 *mu* to one hectare.

Table 5: Average Yearly Increase Before and After the Introduction of the Responsibility System (in per cent)

	Total Output of Grain	Grain Output per Person	Total Agricultural Output Value	Output Value per Person
1975-79	0.9	0.68	2.68	0.27
1979-80	10.68	13.75	4.42	4.21
1980-84	0.85	0.41	13.0	12.58

Note : The output value is based on the unchanged price of the base year.

It can be seen from the above tables that the *Responsibility System* has promoted agricultural production in Miyi, considering that, on average, the area of cultivated land decreased. Area of cultivated land is a key factor in grain production and, in this respect, the system is limited. However, it has little impact on overall production, even if the State policy on grain does little to increase grain production; the agricultulral output has increased significantly, and the living standards have improved along with State and public income.

Agricultural Productivity and the State of the Environment

Agricultural productivity has a socioeconomic base whereas the environment is dependent upon natural conditions.

The new system brought about a change in the attitude towards investment in the agricultural sector. Contractors are now willing to buy fixed assets and invest in land and agricultural inputs. Table 6, for example, shows the quantities of chemical fertilizer purchased each year. The figures decrease after the introduction of the *Responsibility System* because farmers were not able to buy the quantities they required in State-run shops and resorted to buying from the free market. This is not reflected in the Table.

Table 6 shows a gradual rise in the amount of chemical fertiliser applied after the introduction of the *Responsibility System* based on payment related to output (1982-84). This shows the willingness of farmers to spend money on improvements. Likewise there was an increase in spending on plastic sheets, electricity, insecitides, improved implements and cattle. Expenditure was, in some areas, five-fold what it was before the System was introduced.

Ecological changes have taken place in the agricultural environment. The best examples are the replacement of marginal cultivated land by forests and grazing lands. As a result steep slopes, subject to water loss and soil erosion have gradually recovered their perennial or evergreen plant cover. The situation has been gradually improving since 1982. In 1985, alone, there were 1420 *mu* of regenerated land (0.89% of the total); this included 825 *mu* of forests and 568 *mu* of grazing land.

Table 6: Changes in the Quantities of Chemical Fertilizer Used Five Years Before and Five Years After the Introduction of the *Responsibility System* (Miyi County)

	Before R.S.					After R.S.				
Production Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
The Amount of Chemical Fertilizers t/yr	3081	2362	2549	5454	6251	5615	6019	7949	8387	11880
N fertilizers t/yr	2577	2091	2257	4662	6190	5303	5724	7401	8015	11648
P fertilizers t/yr	503	272	292	792	61	304	252	427	359	228
K fertilizers t/yr	--	--	--	--	--	8	43	1212	13	4

In the middle mountians, a large number of single crop farms have begun to practice vertical or "multi-layer" agriculture[1]. This ensures full use of light and heat and economical usage of limited farmland. At the same time this type of agriculture helps diminish water loss and soil erosion besides regulating the temperature of the soil.

Ecological degradation increased during the collective period because the main task of the Collectives had been to produce grain, and this led to the extension of cultivation on to marginal lands. Slopes, forests, and grazing lands suffered. The promotion of a diversified economy has taken away the pressure to cultivate marginal lands and has provided the means to regenerate the slopes, forests, and grazing land.

Changes in the Agriculture and Agriculture-based Industries

Here, we intend to analyse only the structural changes between agricultural industries and agriculture and changes in the share of cultivation, stock-raising, forestry, subsidiary occupations (mainly handicrafts, processing of natural materials, and building); and fish farming.

Table 7 shows the proportionate decline in the total output value of agriculture after the indroduction of the *Responsibility System* and Table 8 shows the increasing share of agricultural industries. This is a result of the development of a merket-based agricultural economy.

Table 7: The Changes in Output Value between Agriculture and Industry from 1975-1984 (Miyi County)

Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Industry %	25.21	28.45	29.99	30.83	32.28	38.69	41.64	34.61	39.21	39.60
Agriculture %	74.79	71.55	70.01	69.17	67.72	61.31	58.36	65.39	60.79	60.40

It can be seen from Table 8 that Forestry and Fish Farming (fishing, fisheries) were previously extremely poor sectors, and that these have improved. It can also be seen that agriculture has on the whole improved a great deal, although not in traditional cultivation. Horticulture has now begun to play a significant role. Horticulture, unlike grain-farming, requires special skills as well as information and marketing techniques. This has all been made possible by the change in system.

Elements of the Responsibility System Promoting Agricultural Productivity

How did the System work? We have described the possible factors of the System in the passages below.

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

Eleminating the *Dafulong* and "Eating from the Common Pot". Unlike in the Commune Period, one is rewarded according to the amount of work one does, and everyone is obliged to share in productive labour. A spirit of healthy competition has been introduced, and basic-level cadres who would have previously simply given orders have now joined in the work.

Table 8: Agriculture and Agricultural Industries Before and After the Introduction of the *Responsibility System* (Miyi County)
(Output Value in %)

	Before R.S.					After R.S.				
Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Agriculture	60.54	59.62	57.33	61.37	64.15	62.73	67.05	67.63	66.76	67.64
In which:										
Vegetables						0.82	2.45	2.75	4.29	5.50
Fruits						0.27	0.35	0.30	0.49	1.10
Forestry	1.67	0.74	3.65	3.06	1.40	1.65	4.06	6.53	3.29	3.7
Stock-raising	22.41	25.05	25.47	22.08	21.64	22.92	21.07	20.04	18.65	17.53
Subsidiary occupation	15.92	14.50	13.30	14.08	13.11	12.25	7.58	5.44	10.83	10.61
Fish farming	<0.1	<0.1	<0.1	<0.1	<0.1	0.46	0.24	0.34	0.47	0.52

Economic Returns Related to Labour Inputs. Now farmers are in complete charge and are fully responsible for their own productivity. It is up to them to improve conditions, inputs, and outputs throughout the productivity cycle. As a result, tasks that previously took 25-30 days (planting and harvesting) now only take 15-20 days.

Right of Management. The *Responsibility System* gives farmers the right to manage their own land and their own labour. According to the contracts undertaken, they fulfill State purchase and agricultural tax quotas, after which they can diversify their activities and are free to dispose of the surplus crops either through the market mechanism or for processing.

Security: Because a contract is made for several years, farmers no longer feel insecure. Previously, frequent changes in agricultural policy made farmers insecure. Now, they can plan over a number of years and are confident enough to increase their inputs. They have begun to cultivate pieces of land that were abandoned by them in the past and pay a lot of attention to increasing the fertility of the soil.

Introduction of Modern Science and Technology. Vertical agriculture has been introduced (multilayer or stereo-farming) in the mid-mountain areas and has brought about appreciable improvements in the standard of living. Improved varieties of seeds and scientific methods of disease and pest control are being applied.

The Socioeconomic Benefits of the *Responsibility System*

Social Benefits

The following passages list the social benefits that have resulted from the introduction of the *Responsibility System.*

Improvement of Socialist Productive Mechanism in the Rural Areas. Formerly, it was presumed that collective ownership meant that everyone owned all means of production and the benefits should be shared out equally whether one worked equally or not. Families did not even have small tools of their own. Now that ownership is shared between Collectives and households, the form of collective ownership has not fundamentally changed but it has become more realistic and people are more secure and satisfied with this system.

Improvement in Distribution. Distribution mechanisms have improved. Formerly, distribution was on the basis of handing over everything to the Collective. Distribution would then be on the basis of workpoints. Now, a portion of each contracting household's produce is given to the Collective to be redistributed collectively, and the remainder belongs to the producers themselves. The workpoint system is discontinued and collective distribution is related to output and the value of output.

Workers' Initiative. The position of the labourers and their relationship to the production process has changed. Previously, they made not decisions concerning production and management, but simply took orders from the cadres on production teams and the Cooperatives. Even meetings that were held for "discussions" were a mere formality. All profit and all loss was borne equally by everyone. Now, the contractors are responsible for production and management. They are no longer controlled but control. The initiative now belongs to those who actually do the work.

Improvement in Living Conditions. Living conditions have improved in terms of food, clothing, shelter, and transportation. As far as food is concerned, the diversification of agriculture means that there is also more variety in the diet. Previously, coarse grain foods were mainly consumed, now farmers can afford to eat better food. In the context of housing, about 20-30 per cent of farm families are building new houses and brick and tile buildings are replacing the common wooden houses.

Social and cultural activities have also increased. Most households have radios, and some have T.V. sets, taperecorders, and even refrigerators. Generally speaking, the material and social conditions have obviously improved.

People Feel Secure. The Chinese peasants have suffered a great deal because of long periods of upheaval and frequent changes. Quite often they did not have enough to eat or wear. Now, this problem is quickly disappearing. The Contract System has removed the insecurity of *Dafulong* and restored the idea of being in control of one's own destiny. The Central Committee of the Chinese Communist's Party's endorsement of the *Responsibility System* has made farmers feel stable and secure. The Household Contract has restored the family's role and stabilised the social order. Many farmers who had left their farms during the Commune Period have returned home on their own initiative.

The system has also played the relationship between farmers and cadres on a more equal basis. Previously cadres controlled distribution, could take more for themselves, and also controlled who got more and who got less. There was a lot of resentment from the farmers and bad feelings between cadres and farmers. Cadres would sometimes resort to beating or sewaring at the peasants, and this was not an uncommon phenomenon. Cadres were also seen to be socially extravagant with public wealth and caused a lot of wastage agriculturally also. This led to instability in the rural areas. Now the role of the cadres is much diminished and the income of the collective is restricted.

Economc Benefits

Increased Incomes. Incomes have increased along with the increase in productivity and the change in distribution system. Individual incomes have risen and collective incomes have decreased. The grain and cash income of farmers has risen appreciably (Tables 9 and 10).

Table 9: Increase in Per Capita Annual Income of the Rural Population in Miyi County after the Adoption of the Responsibility System

	Before R.S.							After R.S			
Years	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Per Capita Grain Ration jin person/year	487	477	449	585	528	550	551	611	851	977	
Per Capita Cash Income Yuan/person/year	79	73	80	95	101	106	108	120	214	285	337

1/ Based on data obtained through selecting randomly one village from 7 townships (27 townships in the whole County) with different natural conditions and productivity levels.

Table 10: Per Capita Annual Average Increase Rate of the Cash Income of the Rural Population in Miyi County (%)

1975-1985	Before Introducing R.S. 1975-79	Transition Period 1979-80	After Introducing R.S. 1980-82	Period of Development of R.S. 1983-85
15.6	6.3	5.0	28.1	54.1

Grain supplies do not really represent the increase in income, because grain can be freely bought and sold. Cash is much more indicative of the rise in income level. The data in Tables 9 and 10 show a remarkable economic benefit for peasant farmers. Before 1980, there were no production teams in the County with cash incomes of more that 150 *yuan*/person and up to 1982 there were four teams with incomes of 300 *yuan*/person, 170 teams with 150-300 *yuan*/person, and 315 teams with 100-150 *yuan*/person. Production teams with a per capita income of less than 100 *yuan* made up 53 per cent of the total.

By 1984, the County had a number of families with a per household cash income of 5,000-10,000 *yuan* (1,000-2,000 *yuan*/per person and US$ 1,500-3,000 per household). A 40 household team had six households with an income of 5,000-10,000 *yuan*. By the end of 1987, the number of ten thousand *yuan* households had reached 20.

Development of a Market Economy. The policy has been to promote technological innovations. Improved early maturing vegetables have been produced and soils are being improved. Ways are designed to encourage the flow of market products. The price of grain has risen because farmers are now allowed to sell it on the free market. Before, peasants did not have surplus grain to sell and all the grain was purchased by the State Ministry of Commerce. Previous to the *Responsibility System* the commodity rate of grain was 20%, afterwards it rose to 50%, and in recent times it has risen as high as 60%. Similar situations prevail for other agricultural products as well as horticultural and livestock products.

Early maturing vegetables are a new feature. These vegetables are in great demand and actually fall short of the market for these products. Vegetables are transported by rail to North, Northeast, and Northwest China.

The varieties of agricultural products and products from subsidiary occupations have increased substantially. However, the quantities purchased by the State are limited. In 1984, the quantity purchased over 1975 was 1.78 times more and 1.52 times more than in 1979. In 1984, State-purchased fruits amounted to only two per cent of the total production, vegetables three per cent, and other products such as beef, mutton, poultry, and eggs only 10 per cent or so. Therefore, hundred day markets have been established (where buying and selling take place every day). Rural markets take place every 100 days, 7 days, and 5 days depending upon the location. In the towns (previously only 20% of the 27 towns had markets) there is a merket every three days.

Increase in State Income and the Promotion of Industries

Poorer production teams were given tax rebates in the beginning, but this is now disappearing as there are few poor production teams. As individual households become richer, less subsidies are needed from the State, therefore, State income increases. In 1985, the net financial surplus in the County was 4.38 times that of 1980 and in 1984 it was 3 times that of 1980. The average yearly increase during 1980-1985 was 32.06 per cent. In 1984, the agricultural tax increased by 46 per cent over 1980 and by 71 per cent over 1975.

Along with these developments, however, the rural surplus labour force has also increased. This has led to the establishment of industrial enterprises and industries run by households, either singly or in a group, villages, towns, and the State. Increase in agricultural productivity currently supplies sufficient raw materials for industrial production. In Miyi County industrial production increased from 25.21 per cent of the total output in 1975, to 32.28 per cent in 1979, and 39.60 per cent in 1984.

Problems of the *Responsibility System*

Differential Capacity among Households

Households differ in a number of respects, in the context of their abilities to benefit from the system. These have been described below.

1. Discrepancies in numbers in the labour force.

2. Discrepancies in management skills and capabilities

3. Discrepancies in conditions of production and technical equipment and input because of socioeconomic factors (some farmers have a greater facility for procuring good quality inputs etc than others).

4. Discrepancies in commodity conversion rates (some households are more remote and cannot market their products as easily as others)

These factors are bound to create discrepancies in rural prosperity between one household and another. The current discrepancy in increase in income is relative, based on the simultaneous increase of income among all income groups. There will be inevitable increase and decreases in income in the course of development. Some discrepancies will be inter-regional and others intra-regional. For example, in 1980, in the towns, on average the difference between the maximum and minimum incomes was 2.34 and by 1982 the income differential had increased to 8.54. In 1980, in production teams, on average, the difference between maximum and minimum income was 5.01, in 1981 it was 7.68, and by 1982 it had increased to 10.

Therefore, based on income differential, on the household basis, before the *Responsibility System* it was 1-5 and afterwards it became 5-20. By comparing a few poor minority families from mountain areas with a few *Han* families from the river valley areas one can come up with an income differential of from 50-100.

Discrepancies between a Market Economy and a Planned Economy

A market economy is based on the demands for a number of commodities and the market mechanisms to produce and distribute them. The planned economy is management of goods and services according to unified, centralised planning. The former produces according to guided planning and the latter according to ordered planning. There are obviously discrepancies between the two. After the adoption of household contracts, the contradictions become more obvious. An example of these contradictions can be seen by examining sugarcane and vegetable production in Miyi County.

Sugarcane production is subject to ordered planning by the State. Miyi is the main cultivation area in Sichuan Province. A sugar refinery producing sugar worth 10 million *yuan* a year pays four million *yuan* yearly to the County. However, farmers derive little benefit from it because they receive an income of only 500 *yuan* per mu for their cane. Sugar is the only crop that can be grown within the year, thus, they cannot grow grain.

Vegetable production on the other hand, is quite different. One season of early maturing vegetables brings a return of 1,000 - 1,400 *yuan*, 2-2.8 more than sugar production. The growth period lasts for only two months and after the vegetables are harvested, rice can be planted. The income from vegetables together with that from grain gives an annual benefit per mu which is

3.3 to 3.5 times that of sugar cultivation. Thus it is difficult to get farmers to engage in cane cultivation (ordered planning) when vegetable production (guided planning) is so beneficial.

Reappearance of Old Social Conflicts

After the move to household management, farming families have begun to rely once more on blood relations. Patriarchal traditions have re-emerged and this had led to inter-familial disputes (e.g. over water, land boundaries, irrigation ditches, etc.). This, in its turn, can lead to the reassertion of feudal superstitions and loyalties and other backward customs. Although there are few regions where this problem exists, (perhaps accounting for 3-5% of all farming households) when it occurs it usually does so amongst families in the extremely poor areas or amongst families in the much richer urban areas.

Reduced Scale of Production

The household - level of production has reduced the scale of agricultural production and land management to several *mu* of land per family. This leads to fragmentation of lands, particularly in the mountains, so that each family has an equal plot. This means that the several *mu* can also be scattered throughout several places. This is a serious weakness, and hampers development. Farming small scattered plots of land does not facilitate rational management and families are unable to take proper advantage of improved technological inputs.

Hindrance to the Construction of Large-Scale Water Reservoirs

Most of the large-scale water reservoirs in Miyi were constructed from the 1950s to the 1970s. They have long been in disrepair and are flooded or silted up. Since there is now no centralised labour force, it is difficult to get farmers to construct such works anymore. Table 11 depicts the construction of such works over the years, and the change in water storage capacity in the County.

After 1980, it is found that the number of irrigation channels increased slowly. From 1955-1965, 235 new channels were constructed and from 1975-1985, 82 new channels were constructed. The number of large-scale reservoirs has not increased, but has reduced considerably. Even the construction of small ponds has almost ceased. From 1955-1965, 230 new ponds were built with an increase of 1.2 million m^3 of storage capacity and from 1975-1985, the total storage capacity increased to 2.48 million m^3, but two-thirds of the ponds had been constructed before 1980 (Table 11).

Hindrance to Agricultural Modernisation

Roads are a basic condition for the modernisation of rural areas. Although main roads and feeder highways are financed by the State, village roads in mountain areas are constructed with funds raised from the farmers themselves. Road construction is expensive because of the topography and benefits are low because of the scattered population. Collective accumulation of funds is low, and therefore it is difficult to build roads. When labour was centralised, such activities were easy to organise, now that has changed.

Household division of management is not conducive to the promotion of advanced agricultural technologies either. Some technologies (seed selection, pest and disease control) need time for experimentation and a certain amount of basic investment. All these things involve benefit and risk. When risk is there and benefits cannot be guaranteed it is difficult to secure the involvement of households. Two adjoining households had fruit trees that were invaded by pests. One sprayed

insecticide, the other did not. This meant that even the household using a modern technique did not benefit as the insects from the unsprayed trees simply spread.

Mechanisation is also a problem. This does not make too big a difference in mountain areas where mechanisation would be difficult anyway, but it makes a big difference in the plains.

Table 11 : The Number of Water Reservoirs Built Over the Years in Miyi County and the Change in Storage Capacity

Year	Total Channels	Total Reservoirs		Small Water Ponds	
		Numbers	Storage Capacity 10000 m^3	Numbers	Storage Capacity 10000 m^3
1975	1392	10	864	617	272
1976	1402	15	989	626	328
1977	1420	10	1448	651	315
1978	1432	18	1448	664	360
1979	1441	21	1528	669	396
1980	1446	23	1675	685	436
1981	1451	23	1675	691	452
1982	1457	23	1675	692	453
1983	1459	23	1675	695	456
1984	1467	23	1675	696	461
1985	1474	13	1630	714	520

Education

Investment in education has been hindered for two principal reasons. These are outlined below.

The value of Child Labour. The "Household Contract" System has increased the use of child labour. More and more children are leaving school, and some families even encourage them to do so. They argue that the quality of rural education is poor and that it is better to save schooling expenses if children are not going to get opportunities to enter colleges or polytechnics; they may as well earn money.

Cost-benefit of Education for the Single Household. The benefit of education for a single household is low. The knowledge and technology obtained at great cost is not going to be applied on large tracts of land, and, with this reasoning, farmers desist from sending their children to school.

Rational Use of Natural Resources

Most farm households have two principal objectives : (i) to produce enough food for their own needs and (ii) to produce sufficient surplus to sell for a profit. The division of land into small plots is not conclusive to a rational use of natural resources. Soil improvement measures are not pursued because of the intensive use of these small plots of farmland. On such a small-scale, it is not possible to make the best use of light, heat and water conditions, etc.

The "Household Contract" System has also hindered the rational use of bio-resources. Miyi County has a comprehensive category of land types suitable for vertical agriculture. Advanced varieties of plant species could be imported from outside and would prosper under these conditions. However, this would have to be pursued on a large scale.

On the other hand, farm households are gathering and digging up wild plants (medicinal) and hunting wild animals as subsidiary occupations. Monocultivation has resulted in the destruction of certain plant varieties. The use of bio-resources is greater than protective measures taken to make their use sustainable.

Finally, sources of energy are not used properly. Mountain areas are rich in water resources, but even small hydro-power stations need a great deal of investment. Single families cannot possibly make this kind of investment and water energy remains underutilised. Similarly with coal which is mined at random by individual families. They remove only the thin surface seams, destroying the thicker seams underneath. What they cannot mine they abandon, destroying the resource base and the land surface.

Conclusions and Recommendations

The Strengths of the Responsibility System and People's Participation

The *Responsibility System* has a number of weaknesses and strengths. These are briefly outlined in this section.

Eradication of Poverty. Most households thrive on the individual management of land. They work hard and accept the responsibility. Eighty per cent of all farming households in the County come under this category. Many, who lived in poverty before, are now thriving. However, they still worry about possible policy changes.

Appeasement of Initial Opposition. Fifteen per cent of all households (those who did not have sufficient labour, army families, and Martyrs families [the latter two receiving pensions from the Collectives]) feared for their security and were not receptive to the new system. However, since they have begun to realise that their basic living standards will not deteriorate they are beginning to accept the system..

Attitudes of the Chronic Jobless. The less than five per cent of households, that make up the idle and chronic jobless, naturally oppose the system, since previously they did well without working. However, they do not have any influence on the overall situation. Overall, therefore, rural people accept the *Responsibility System.*

Encouragement of the Inherent Initiative of the Rural Population. The inherent potentials of the rural populations have been drawn out. Rural areas are technologically backwards, but the human factor in this system has brought out the latent creativity that was hitherto subdued in the rural population.

General Applicibility of the *Responsibility System*. The System is not location-specific. It is flexible enough to be applied not only to other areas in China but to other areas of the world. It is essential to be aware of its restrictive conditions and weaknesses before establishing the System. However, the key factors remain the form of ownership and control over the means of production. The Chinese version has, as its prerequisite, the public ownership of the means of production (here meaning land). Countries who may be contemplating establishing the public ownership of land could consider the *Responsibility System* as a means of making this change-over more widely acceptable.

After all, ownership of small, fragmented areas of land is not conducive to development on a large-scale, or to the economic benefit of individual households. Yet, State ownership and frequent policy changes do not always lead to amelioration of this situation. This is where the *Responsible System* can play a meaningful role. Even where situations exist where some landlords still own large tracts of land and hire labour, various systems can be introduced within the philosophy of the System that are neither detrimental to the landlords nor the labourers. These would not only bring about the overall development of agriculture but would be beneficial to the State, to the landlords, and to the hired labour; the latter because they too would have a share of the profits by distribution of dividends or other means.

Recommendations

Encouragement of Land Transfer. In Miyi County, problems have arisen concerning the prevention and control of plant diseases and the elimination of pests. These problems are more in evidence in the valleys where grain and tropical crops are grown. However, the rural economy is not yet well-developed and farmers should not be compelled to adopt measures they do not understand. In rural areas there are few opportunities for off-farm employment. On the other hand, if skills are not adopted, it will be detrimental to agricultural development. Already, town and collective enterprises can support a large number of labourers. Incomes should be increased in these industrialised sectors to attract those without agricultural skills off the land and skilled farmers should be subsidised and technological inputs made available to them

Households who transfer their agricultural plots must at the same time, be guaranteed their grain rations.

Improvement of Rural Level Management. The rural level of management mentioned above: (a) household and (b) collective is suitable for mountain regions. It enables the better farmers to

increase their skills and at the same time enables those raised in a rural environment to retain their linkages with the land while working in industry.

Improvement of Socialised Systems of Production and Marketing. Regional cooperative and service organisations should be established. These should cover all aspects of production from input supplies to marketing techniques. These should be established right down to the village level and should be in charge of a number of affairs, as outlined below :

- Contract arrangements; readjustment, evaluation, and management of land.
- Construction, management, and use of large-scale water reservoirs.
- Storage, usage, and replacement of former public property.
- Contract arrangements in the context of guidance and supervision of former collective enterprises.
- Planning and construction of services for water, pastures, forests, roads, and for village public welfare services.
- Supervising State-purchasing of grain.
- Other public service activities.

Establishment of Labour Organisations. Such organisations should be established at all management levels to facilitate the spread of advanced technologies and provide funds for various educational and service activities.

Establishment of Construction and Agricultural Development Funds. Shortage of funds is the principal obstacle in all areas of agricultural development. Therefore, cooperative organisations should be established in order to overcome this problem. They can collect funds from a number of sources.

1) The Agricultural Aid Fund - given by the State to assist and subsidise poor farmers.
2) Investment in cooperatives whether within the County itself or outside.
3) Fund-raising from the farmers themselves.
4) Foreign aid or investment.

Strengthening of Investment in Education. This is the key to all development. Education is the fundamental requirement for all productive activity and development.

Stabilization and Improvement of Rural Policies. To guarantee the steady development of agriculture, the present policies should not be changed but rather improved upon within a stable environment. This will encourage farmers to invest in their land and skills and will enhance productivity.

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 proverty of mountain communities, ICIMOD is concerned with the search for more effective development responses to promote the sustained well being of mountain people.

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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, 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 Farming Systems constitutes one of the four thematic research and development programmes at ICIMOD. The programme deals with agriculture defined broadly to cover all land-based activities (cropping, horticulture, forestry, livestock farming, etc) and their support systems. Currently the major focus of the programme is on the factors and processes contributing to the sustainability/unsustainability of mountain agriculture. This is carried out by examining (through both knowledge reviews and field studies) the sensitivity of public and private interventions to specific mountain conditions. The explicit consideration of the latter conditions can alone assure a mountain perspective to public policies and programmes in the agricultural sector.

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