

CRITERION FOR DEFINING CHINA'S POOR AREAS

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Poverty is an economic concept. Poverty is manifest in such aspects as economy, social welfare, and people's cultural levels. However, its essential characteristic is economic poverty. Poverty can be divided into absolute poverty and comparative poverty. Absolute poverty refers to the economic condition in which the gain in material means of subsistence cannot meet the most basic needs that enable labourers and their families to meet the cost of living. Comparative poverty refers to economic conditions that are below the moderate living standards of a given district. It demonstrates the differences in inter-regional and inter-personal living standards. Comparative poverty is determined by imbalances in social and economic development. In the primary stage of socialism in China, we cannot completely wipe out poverty, we can only change the differentiating criterion of comparative poverty. With the pace of development, absolute poverty will be turned into comparative poverty.

Section A

Poverty Classification in China

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Poverty can be appreciated as a spatial, community, household, or individual process. Poor areas refer to those areas in which a poor economy exists and in which the residents' mean living standards cannot satisfy the most basic demands for food and shelter. In China, the poor are mainly concentrated in rural areas. Owing to the different degrees of poverty among the districts, we divided poor areas into extremely poor areas and poor areas. Extremely poor areas refer to areas in which the economy is so poor that the residents barely have a hand to mouth existence.

1. An Appropriate Research Unit for Poor Areas

In China, for the following reasons, the appropriate research unit for the study of poor areas should be the county.

1. The county is China's basic administrative unit and, for the most part, it is homogeneous in terms of natural conditions, economic conditions, and levels of economic development.
2. The county economy is mainly a rural economy. China's poor areas are mainly rural areas.
3. The county is the unit for which basic social and economic data are available. Historical statistical data can also be used in the analysis of county level data.

2. Classification of China's Poor Areas

China has a vast territory. Climatic conditions are different from place to place. There is also a lot of difference in residents' living and consumption habits in such basic items as food, clothes, heating, etc. In a big country, such as China, it is impossible to use a national criterion to define poverty. There would be too many classifications. Subsidised areas would create further problems. To deal with this problem the cluster analysis method was used to re-classify China's 18 special-purpose, interest-subsidised loan-supported poor areas.

The three principles of classification are as follows:

1. homogeneity in climatic and other natural conditions,
2. common consumer habits and consumption structures, and
3. integrity of the administrative unit at the provincial or district level.

The classification process is as follows.

1. In order to use cluster analysis, seven indicators were selected as cluster elements. These included the percentage of mean expenditure on food, clothes, fuel, daily necessities, cultural services, living services, etc to the mean living expenditure, and the percentage of mean living expenditure to mean net income.
2. The means of the seven elements for 18 areas were traced back to 1985, for which year base-line data were available.
3. A comparison was made between two samples.
4. Poor areas were classified by making use of dynamic clusters, systematic clusters, and fuzzy clusters to repeatedly calculate and compare. The best result was used to classify China's poor areas into three categories.
 - i) Yun-Gui region, including Yunnan Province and Guizhou Province.
 - ii) Southern region, including Sichuan Province, Henan Province, Anhui Province, Jiangxi Province, Zhejiang Province, Fujian Province, Guangxi Province, Hunan Province, Hubei Province, etc.
 - iii) Northern region, including Liaoning Province, Neimong Province, Hebei Province, Shandong Province, Shanxi Province, Lingxia Province, Qinghai Province, Xinjiang Province, Shanxi Province, Gansu Province, etc.

In addition, every county in the northern area was divided into farming counties and pastoral counties. The results match with the division made by the National Statistical Bureau.

3. Comprehensive Evaluation Indicators and a Statistical Model of the Degree of Poverty in Different Areas

Choice of Indicators

The comprehensive evaluation indicators to judge the level of poverty in different counties were chosen based on the following principles:

- i) the indicator should describe the economic condition of poor counties,
- ii) the information should be easy to collect; possibly through annual reports of rural economic statistics published by the national statistical department, and
- iii) the indicators should be comparable across different times and in different districts.

Accordingly, 11 indicators were chosen from five aspects to describe the economic conditions of poor counties.

1. Indicators Reflecting the Level of Rural Production

- i) Mean value of the total rural production of the county (*yuan*).
- ii) Mean value of the total industrial and agricultural production of the county (*yuan*).
- iii) Mean value of the total agricultural production of the county (*yuan*).

2. Indicators Reflecting the Condition of the Rural Industrial Structure

- i) Ratio of the county's total agricultural production value to total non-agricultural production value.
- ii) Percentage of the county's total rural industrial production value to total rural industrial and agricultural production value. Generally speaking, the poorer the economy of the area the less the percentage of total production value to total industrial and agricultural production value.

3. Indicators Reflecting the Level of Rural Residents' Income

- i) Mean annual net income of the county's rural residents (*yuan*).
- ii) Mean annual income of the county's rural residents.

4. Indicators Reflecting the Degree of Agricultural Commodity Production. This is indicated by the percentage of the county's rural agricultural and side-line production to the total rural production value. This indicator is positively related to agricultural production.

5. Indicators Reflecting the Level of Rural Residents' Consumption

- i) Mean annual living expenditure of the county's rural residents (*yuan*).
- ii) Mean annual per capita grain available to the county's peasants (in *jin*, of which one is equal to 500g).
- iii) The percentage of expenditure on food compared to the total expenditure on living, which is also called the Engel co-efficient.

Choice of Samples and Proof of Data Reliability

Based on the economic statistics data for rural counties, published by the National Statistics Bureau (1985), 728 rural counties were chosen as the sample. Among these, 636 counties are defined as poor counties and 92 counties are non-poor counties lying in poor areas. Some non-poor counties were represented in the sample, because the climate, resources, and farming methods in the non-poor counties are roughly similar in the same district. The non-poor counties were chosen also for comparative analysis. It was assumed that the national definition of poor counties is, to a certain degree, reasonable and people's qualitative understanding roughly confirms to our definitions of the poor counties. The 1985 data were used because the first year of the 7th Five-year Plan emphasised poverty alleviation and the definition of poor areas. The annual data of more than 600 poor counties from 1985 to 1987 were analysed and a dynamic regression model was established.

Establishment of a Statistical Model

Principal component analysis and stepwise regression analysis were used to develop the model. This yielded the following results.

Yun-Gui region, 83 counties in the sample. The equation of regression is:

$$Y = -30.82 + 0.0591X_1 - 1.5802X_2 + 0.2246X_3 \quad (1)$$

Southern region, 255 counties in the sample. The equation of regression is:

$$Y = -10.52 + 0.0179X_1 - 3.0706X_2 + 0.1736X_3 \quad (2)$$

Farming area in the Northern region, 149 counties in the sample. The equation of regression is:

$$Y = -4.97 - 0.0191X_1 - 0.5502X_2 + 0.1363X_3 \quad (3)$$

Pastoral area in the Northern region, 53 counties in the sample. The equation of regression is:

$$Y = -23.21 + 0.0144X_1 + 0.0983X_3 \quad (4)$$

In the above equations of regression, X_1 , X_2 , X_3 respectively represent the mean annual agricultural production value of the county, the percentage of the county's total agricultural production value to total non-agricultural production value, and the mean annual net income of the rural residents in the county. These three indicators show three qualitative characteristics: the level of agricultural productivity, the condition of the rural production structure, and the level of rural residents' income. X_1 is calculated according to constant prices in 1980, X_2 is calculated according to the prices in a given year, and X_3 is calculated according to comparable prices in 1985.

Mean net income (X_3) is mainly used for rural residents' living expenditure, so it is necessary to take price fluctuations into account while calculating the comprehensive evaluation indicator for other years. Price fluctuations mainly influence peasants' expenditure on commodities. The percentage of peasants' expenditure on commodities to their total living expenditure has been taken as 58 per cent, which was the national average from 1981 to 1985. If X_3 was mean net income during the reporting period, and P the price index of the basic year, the calculation of mean net income (X_3) after deducting the element of changing prices is:

$$X_3=0.42X_3+0.58X_3/P \tag{5}$$

4. The Criterion for Classifying Levels of Poverty in Different Poor Areas

The degree of poverty and the classification of counties by the degree of poverty was based on the numerical values shown in Table 1.

Table 1: The Poverty Criterion and Alleviation of Poverty in Different Areas

Region	Formula for calculating poverty and degree of poverty	Poverty criterion and alleviation of poverty		
		Extremely poor counties	Poor counties	Non-poor counties
Yun-Gui	$Y=0.0591X_3-1.5802X_4+0.2246X_5$	$Y < 58.8$	$55.8 < Y < 77.1$	$Y > 77.1$
Southern	$Y=0.0179X_3-3.0706X_4+0.1736X_5$	$Y < 43.5$	$43.5 < Y < 80.0$	$Y > 80.0$
Northern farming	$Y=0.0191X_3-0.5502X_4+0.1363X_5$	$Y < 40.8$	$40.8 < Y < 58.5$	$Y > 58.5$
Northern pastoral	$Y=0.0144X_3+0.983X_5$	$Y < 41.1$	$41.1 < Y < 59.8$	$Y > 59.8$

Note: The formulae for calculation are equations 1....4 without the constants.

The points of partition can be calculated for every corresponding indicator by using the concept of concentrate interval.

We call $[h_{k1}, h_{k2}]$ the concentrate interval of point h_j , if $H = \{h_2, h_3, \dots, h_n\}$ is an ordered data sequence, $h \in H$, and moreover $1 < j < h$ are the specially significant points in H . If the interval $[h_{k1}, h_{k2}]$ satisfies the following condition:

$$k_1 < j < k_2, \text{ for any } l_1, l_2, \text{ when } 1 < l_1 < j < l_2, \text{ we have the formula.}$$

$$\sqrt{\frac{k_2(h_i-h_j)X(h_i-h_j)}{i=k_1(k_2-k_1+1)}} < \sqrt{\frac{I_2(h_i-h_j)X(h_i-h_j)}{i=I_1(I_2-I_1+1)}} \quad (6)$$

Suppose Y_j is a point of partition, let the corresponding indicator element be $X_{j1}, X_{j2}, \dots, X_{jm}$. When calculating the mean, X_1, X_2, \dots, X_m , of the value of the elements included in the concentrate interval and the variance, $0_1^{-2}, 0_2^{-2}, \dots, 0_m^{-2}$, we take $[X_1 - 0_1, X_1 + 0_1], [X_2, 0_2, X_2 + 0_2], \dots, [X_m, 0_m, X_m + 0_m]$ as the approximate numerical value having a range of $X_{j1}, X_{j2}, \dots, X_{jm}$. Table 2 shows the partition values for Poor and Extremely Poor counties with respect to a number of indicators.

According to the criterion in Table 1, and the data for 297 poor counties which were supported by a national special purpose loan in 1985, we calculated and found that 294 counties are classified into poor counties, with the rate of coincidence at 99.2 per cent. According to the National Criteria of Nutrition and Hygiene drawn up by the China Physiology Association and their units, the per capita kilo calories consumed by Chinese people is 2,350kc. The kilo calorie figured out in Table 2 roughly conforms to the two above-stated criteria.

Table 2: Interpretation of Economic Implications of the Degrees of Poverty

Region	Degree of poverty	Comprehensive evaluation indicator value	Mean net income/capita of rural residents	Mean total agri. production value per year of agri. working force	Times of total agri. production value against total non-agri. production value	Mean annual grain availability per capita (jin)	Daily calory food per capita (kc)
Yun-Gui	Extremely poor counties	55.8	154.1 \pm 10.27	443.3 \pm 26.39	4.9 \pm 0.49	450	2330
	Poor counties	77.1	228.7 \pm 12.33	519.1 \pm 28.94	3.4 \pm 0.31	470	2410
Southern district	Extremely poor counties	43.5	229.8 \pm 2.52	627.2 \pm 29.00	2.9 \pm 0.25	475	2388
	Poor counties	80.0	369.6 \pm 4.41	1137.6 \pm 63.66	2.5 \pm 0.17	504	2450
Northern farming district	Extremely poor counties	40.8	219.4 \pm 14.00	795.4 \pm 81.95	2.8 \pm 0.59	455	2340
	Poor counties	68.5	350.0 \pm 10.23	1257.6 \pm 91.25	3.2 \pm 1.00	487	2487
Northern pastoral district	Extremely poor counties	41.1	279.3 \pm 16.93	1138.2 \pm 134.5		440	2380
	Poor counties	59.8	401.1 \pm 12.47	1843.5 \pm 112.12		482	2501

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- The 18 poor regions are: (1) the Gubei mountains, (2) the Wuyang mountains, (3) the Dabie mountains, (4) the Dabie mountains, (5) the Dabie mountains, (6) the Dabie mountains, (7) the Dabie mountains, (8) the Dabie mountains, (9) the Dabie mountains, (10) the Dabie mountains, (11) the Dabie mountains, (12) the Dabie mountains, (13) the Dabie mountains, (14) the Dabie mountains, (15) the Dabie mountains, (16) the Dabie mountains, (17) the Dabie mountains, (18) the Dabie mountains.
- The dependent proportion (old, young, disabled, very old) of the population has been increased by the government. The government has been increasing the proportion of the population in the old, young, disabled, very old, and very old categories. The government has been increasing the proportion of the population in the old, young, disabled, very old, and very old categories.

RESEARCH ON CLASSIFICATION AND DEVELOPMENT OF THE POOR AREAS IN CHINA

Jiang Dehua

Introduction

There are 664 officially designated poor counties in China, excluding Xizang (Tibet) and certain minority areas of western Sichuan which fall under special minority administration.¹ Of these counties, 434 belong to the 18 delineated poverty regions identified by the central government,² 251 of which are supported directly by the central government with interest discount loans (and additional special funds for the "three west regions"³), while the remaining 183 are supported by their provincial (or autonomous region) governments with a combination of provincial and central government funds. Of the 230 counties which do not belong to the 18 regions, 51 counties are supported directly by the central government and 179 by provincial governments. The 664 poorest counties can be divided into three categories, according to average income per rural resident.

The poorest category includes 97 counties with average per capita net incomes of less than 150 *yuan*. These have a population of 16.566 million receiving less than 200 *yuan*/capita, which accounts for 57.49 per cent of this area's rural population.

The middle category includes 146 counties, with average per capita net incomes of 150-200 *yuan*, and a population of 24.217 million receiving less the 200 *yuan*/capita, accounting for 48.31 per cent of the rural population.

The remaining category includes 421 counties, with average per capita net incomes exceeding 200 *yuan*, but with a population of 51.903 million receiving less than 200 *yuan*, accounting for 39.22 per cent of the rural population.

The impoverished areas of China are mostly situated in remote and, especially, mountainous regions, old revolutionary bases, or regions with significant proportions of minorities among their populations. Seventy-eight per cent of the counties (including those in Tibet) are concentrated west of a relatively continuous line running from south

¹ The writer is very grateful to Bruce Stone, Melanie Snyder, and Zhang Junfang for their advice and editing assistance in revising this paper.

² The 18 poor regions are: (1) the Qinba mountains, (2) the Wuling mountains, (3) the Wumeng mountains, (4) the Dabie mountains, (5) the Southern Yunnan mountains, (6) the Hengduan mountains, (7) the Taihang mountains, (8) the Luliang mountains, (9) the North-western Guangxi mountains, (10) the Jiu-wan-da-shan areas, (11) the Nuluerhu mountains, (12) the Xihai areas, (13) the Dingxi areas, (14) Tibet, (15) the South-western and North-eastern Fujian revolutionary bases, (16) the Northern Shaanxi revolutionary bases, (17) the Jinggang mountains and Southern Jiangxi revolutionary bases, and (18) the Timeng mountain revolutionary bases.

³ The "three west regions" include the Gansu Corridor, the Dingxi arid areas of Gansu, and the Xihai areas in the southern Ningxia mountains.

of the Greater Hinggan Mountains between Heilongjiang and Inner Mongolia to the Bashang Plateau in northern Hebei; the Taihang mountains between Hebei and Shaanxi; the Wushan mountains in Hubei; the Wuling mountains bordering Hunan, Hubei, Sichuan, and Guizhou; the Miaoling mountains in southern Guizhou; and finally to the Karst Region of Guangxi and Yunnan. This is in sharp contrast to the poor areas of eastern China which are like isolated islands. The east-west differences in poverty distribution are much larger than the north-south differences.

Many unfavourable factors contribute to poverty in these poorest regions.

Deteriorating Natural Conditions

Soil erosion in the mountains, drought in the northwest regions, flood and waterlogging in areas that are intersected by mountains and plains; lack of soil and water in karst areas; poor red soil in the south China hills; and poor soil, drought, waterlogging, salinity, and alkalinity in the north China lower plains. These contribute to a vicious circle of poverty in terms of natural conditions associated with agriculture.

Special Historical Factors

Throughout recorded history the living conditions in some of the minority nationality areas have been poor. Even in the 1950s, some of these societies could be considered technologically backwards and primitive, and today they are still among the poorer areas of China.

Out-of-date Modes of Production and Undiversified Industrial Structure

The major products of the poor areas are staple food crops. Industry and sideline activities are less developed than in other areas of China. Only the simplest farm tools, such as bamboo and wooden ploughs, predominate in some remote areas. Chronic low and unstable yields and even slash-and-burn methods may still be found.

Underdeveloped Transportation and Information Systems

Many poor areas cannot be reached by road and have no telecommunications. Mountain trails are difficult to travel. People therefore have little connection with the outside world.

An Enclave Outlook, Exacerbating and Reflecting an Undeveloped Commodity Economy

An enclave attitude influences people in some regions to stay in their home villages rather than sell their products or provide surplus labourers to other areas.

Rapid Increase in Population without Adequate Economic Growth

The natural population increase in poor areas is about two to three per cent per annum. The dependent proportion (old, very young, disabled, and occupied but unremunerated people) who cannot support themselves is more than 60-80 per cent. Diseases are

prevalent because of low-quality medical facilities and poor health conditions, as well as low levels of food intake and specific nutritional deficiencies. One or more endemic diseases prevail in 73 per cent of poor counties.

Low Quality and Availability of Education

The proportion of illiterate or semi-illiterate persons is 35-55 per cent in most poor areas. The number of teachers per hundred thousand students is 600-900, lower than the national average of 956.

Many of these factors are results as well as causes of poverty in these regions.

Because of the above conditions, some of which have been exacerbated by misguided policy decisions, poverty has continued to persist and presents a national problem. A series of readjustments and reforms in recent years have been aimed at solving the poverty problem.

The Basis for Classifying Poor Areas

Several principles should be considered when developing a system of classification for China's impoverished areas.

General Similarities in Natural, Social, and Economic Conditions.

Natural conditions include climate, topography, and natural resources. Social and economic conditions include population density and distribution, nationality, educational levels, transportation, living standards, and overall development.

Major Natural, Social, or Economic Factors Which may be Critical for Defining Poverty in a Particular Region

The poverty of Inner Mongolia and the Xinjiang Autonomous Region is closely associated with drought. The poverty pattern of the gully areas in the Loess Plateau is strongly associated with soil erosion. The poverty pattern of the karst mountains in South-western China is caused by large and pronounced karst areas.

County Boundaries as Basic Units for Regional Composition

Six hundred and sixty-four counties are poor areas by official designation as of 1987. Provinces, and even prefectures, as units of aggregation, are too large. The numbers of townships and villages are too unwieldy; availability of data for the latter, as well as for prefecture aggregations, is problematic.

The Current Perception of Appropriate Measures for Alleviating Poverty

According to the principles for identifying the poor areas described above, the poor areas in China can be classified into six patterns and 21 sub-patterns as given in the following passages.

1. The Loess Plateau

Bound by the Qinling and Funiu mountains in the south, the Great Wall in the north, the Taihang mountains in the east, and the Riyue mountains in the west, the entire Loess Plateau includes a large area of 226 counties and municipal areas covering 406,000 square kilometres. One hundred and two counties are officially designated as impoverished in central and eastern Gansu, the southern Ningxia mountains, and the plateaux of western Shanxi and northern Shaanxi.

Seventy per cent of the Loess Plateau is characterised by loess layers, 10-200 metres deep, with some scattered stone or rock mountains. The loess is composed of loose and loamy soil, good for farming. Per capita cultivated land is officially estimated at two to three *mu* -- higher than the national average.

Coal, oil, and waterpower are abundant. The areas yield (136,400 million tonnes of reserves in Shanxi and Shaanxi coal fields in 1985) 40 per cent of the country's total coal output. Major power stations in or near the area are in the Longyangxia, Liujiaxia, Bapanxia, Yanguoxia, Qingtongxia, Sanshenggong, Tianqiao and Sanmenxia gorges, with a total generating capacity of 23 million kilowatts. The Huangho River Basin has a total of 40 million kilowatts of waterpower potential, 26.5 million kilowatts of which is associated with the main channel.

Mountains, ridges, mounds, and mesas as well as level ground, basins, valleys, and gullies, make the topography of the area complicated. For centuries the Loess Plateau has been known as the birthplace of ancient Chinese culture and the cradle of the Chinese nation. People have accumulated traditional expertise with animal husbandry and dry farming. Stony and rocky mountains and loess hills are utilised for forestry and animal husbandry; desert or semi-desert areas are used for animal husbandry, mesa is used for dry farming, and valleys are used for diversified economic and farming activities.

Serious natural difficulties constrain prosperity in this area.

Soil Erosion

The loess is made up of fine sand, 60 per cent powder. Erosion caused by loess soil, sparse vegetation, and frequent rainstorms in summer is among the most extreme in the world. Eighty per cent of the total area and most of the poor counties have a serious erosion problem. The average annual volume of soil erosion equals 3,000-10,000 tonnes per square kilometre in the lower reaches of the Kuyiehe River at Shienmu county (35,000 tonnes).

Drought

The plateau is situated in the transitional space between eastern monsoon China and northwestern arid China. The climate ranges from semi-humid to semi-arid and arid. The annual average temperature ranges from 6° to 14°. The annual frost-free period varies considerably within the region, ranging from 110 days to 250 days. Decreasing from southeast to northwest, the mean annual precipitation is 600-700mm in the

southeast and below 300mm in the northwest. Seasonal distribution of precipitation is uneven. Seventy per cent of the precipitation occurs in the months from June to September, usually in the form of storms. Since only fifteen to twenty per cent of the precipitation occurs during winter and spring, spring drought is severe. Sometimes mid-summer to autumn droughts also occur. Hot and dry winds and frequent sandstorms aggravate drought conditions, making farming and many activities difficult. Drinking water for people and livestock is inadequate in many areas.

Shortage of Fuel, Feed, Fertiliser, and Timber

The Loess Plateau was once covered with dense forests, lush grassland, abundant resources, and fertile soil (during the Xi and Zhou Dynasties, 32 million hectares, or 53 per cent of the area, was forest). Since the Qin and Han Dynasties, however, forests and grassland have been partially destroyed as a result of immigration to the frontier, poorly managed and conceived reclamation of wastelands, civil war, and development of industry and roads. A vicious circle of increasing degradation and poverty arose as farming was clumsily developed, while forestry and animal husbandry weakened; soil erosion increased; and regional availability of fuel, feed, organic fertilisers, and timber decreased.

Spread of Endemic Diseases

Diseases seriously endanger people's health and have become important limiting factors in regional development. One of the main endemic diseases, Keshan disease, prevails in 29 counties (28 per cent of the 102 poor counties), with an associated morbidity rate of 5-60 per cent. Thyroid swelling is found in 25 counties (23.5 per cent), with a morbidity rate of 3-10 per cent. Kaschin-Beck is found in 41 counties (40 per cent), with a morbidity rate of 1-15 per cent. Fluorine poisoning is found in 66 counties (64.7 per cent), with a morbidity rate of 0.1-7.0 per cent. Lung cancer, tuberculosis, and other infectious diseases also exist in the area.

Low Agricultural Productivity

Foodgrain yields in the Loess Plateau are low and unstable -- averaging about 1.5 tonnes per hectare. Oil crop yields are substantially lower. In times of drought, it is difficult to save seeds in some of the areas, endangering subsequent production. Annual average foodgrain availability per rural resident was 269 kilogrammes in 1986. But this quantity must cover not only food, but allocations for feed, seed, cash sales, and storage, as well as waste.

Given an understanding of the above problems, it is possible to outline directions that future development should take. Accordingly, the following major management efforts are proposed.

Afforestation and Management of Forests and New Grasslands. Efforts need to be made to increase forestry and animal husbandry. Loess hills with gullies should be reforested. Farming needs to be integrated with forestry and animal husbandry. In high altitude areas the major attention should be given to developing forestry.

Change to Intensive Farming. In better farmlands the emphasis should be on intensive, high-yielding cultivation. If necessary, moving mountain communities ("suspended villages") with serious soil erosion problems to valley areas may be considered.

Contracts for Comprehensive Management of Basins. Watershed management has been an effective measure for many years. Contracts will allow for management by integrated households, integrated villages, and integrated counties.

Development of a Commodity Economy. Considerable development of the commodity economy is needed. Agriculture, forestry, and animal product processing needs active attention, along with local mining, transportation system, rural trade, and service sectors.

Four sub-patterns characterising the Loess Plateau poor area can also be delineated and specific measures designed to help these areas.

The Central and Eastern Gansu Arid Plains and Hills' Region

Here major emphases should be on grassland conservation; rational utilisation of valleys for agriculture; widespread planting of trees; and development of industry and sideline production.

The Southern Ningxia Mountain Region

The area includes eight poor counties. Emphases should be on afforestation and integrated development of animal husbandry and agriculture.

In the Yantong and Xiangshang Mountain areas, there is potential for processing animal products. In the Liupan Mountain areas there is potential for processing forestry products. In the Qingshuihe, Honghe, and Ruhe valley areas there is potential for combining industry and sideline production.

The Northern Shaanxi Plateau Region

Thirty of the 40 counties in the area are poor counties. Emphases should include water and soil conservation, windbreaks and sand control, biomass development, and improving the environment for agriculture.

The Luliang Mountain Region of the Western Shaanxi Plateau

Twenty-four of the 27 counties in the area are poor. Emphases should be on forestry and the development of forest-based industries, soil conservation and checkdams, and afforestation.

2. The Border Area between the Eastern Plains and Western Mountains

One hundred and seventy-seven of China's poor counties are concentrated here -in the Bashang Plateau and the Taihang, Qinling, Daba, and Wuling mountain areas.

The distinguishing characteristics and advantages of the area relate to its varied topography and climate types. There are steep mountain areas with deep gullies, basins, valleys, and foothills which connect with eastern China's great plains.

From east to west there is a change from a humid/semi-humid climate to a semi-arid or arid one. From north to south there is a temperature transition. The altitude and humidity axes intersect near the Tongbai mountains in Henan Province. The regional diversity caused by such transitions provides sharper distinctions from east to west than along the north-south axis.

Because of the wide range of natural conditions, land in this area is suitable for many purposes. Measures should be taken which take into account each sub-region's special combination of resources and manpower. Development of mining, industry, and a diversified economy is possible, along with forestry, animal husbandry, and farming.

The major problems associated with poverty in this area include the following.

The Frequency of Natural Disasters

Sudden flooding, earthquakes, and frequent widespread and prolonged droughts are more typical of this region than in most of the rest of China. There was extensive flooding of the Changjiang River in 1854 on a catastrophic scale, in the Taihang mountains in 1963, and in the western Henan mountains in 1975. There were disastrous earthquakes in Xingtai in 1966 and in Tangshan in 1976.

High Prevalence of Endemic Disease

The area is particularly known for Keshan, Kaschin-Beck and thyroid diseases. In 21 counties more than three endemic diseases are prevalent. The incidence of endemic disease in this region accounts for more than 86 per cent of the country's estimated case total of such diseases.

Inappropriate Use of Resources

Mismanaged reclamation, wanton felling of trees, and environmental degradation associated with mining development are common problems. The integration of farming with forestry and animal husbandry has not been handled properly.

Integrated Harnessing of Mountains and Rivers

Four of China's large rivers (the Changjiang, Huanghe, Huaihe, and Haihe rivers) flow across the mountains of this area. Water control has traditionally ignored the exploitation of land. Irrigation projects have been blocked or washed away threatening lower river reaches. Twenty-nine large and medium-sized reservoirs in the Haihe Basin can be considered dangerous, because these are mostly located in the Taihang and Yanshan mountain areas.

Even though the area is suitable for many activities, forestry accounts for only 8.5 per cent of the gross value of rural output, animal husbandry accounts for 22 per cent, and rural industry and sideline production account for 9.3 per cent -- totalling about 40 per cent. This does not match the potential of an area featuring mountains, forest, grassland and abundant mineral resources.

The following are some of the important measures that need to be taken in developing the area.

Afforestation and Harnessing of Mountains and Rivers. Both biological and engineering methods should be applied to harnessing mountains and rivers together. Water and soil conservation should be increased through afforestation.

Readjustment of Industrial Structure. Contradictions in the way farming, forestry, and animal husbandry are carried out must be eliminated. Key measures should be carried out in controlling the destruction of forests and grassland; expanding high and stable yield crops; increasing self-sufficiency in food production; and providing a rational arrangement for production in the farming, forestry, and animal husbandry sectors.

Development of a Commodity Economy.

Rationalise Settlements. In general the region is near existing railways or highways. What is important is to improve accessibility. Residences far from roads may have to be relocated nearer to transportation facilities.

Four sub-patterns can be used to describe the east-west border area, and specific measures can be identified for developing each sub-region.

The Northern Hebei (Bashang) Plateau Region

The area includes 16 poor counties. The emphases here should be on developing animal husbandry and a comprehensive pastoral economy together with forest protection and conservation.

The Taihang Mountain Region

The poor area includes 41 of 75 counties in the Taihang mountain region. The emphases should be on forestry, horticulture, and water and soil conservation.

The Qinling and Daba Mountain Region

The poor area includes 73 of 87 counties bordering Sichuan, Shaanxi, Hubei, and Henan provinces. The emphasis should be on developing a diversified economy based mainly on mountain resources.

The Wuling Mountain Region

The area has 47 poor counties bordering Sichuan, Hubei, Hunan, and Guizhou provinces. The major nationality groups are the *Tujia*, *Miao*, *Dong*, and *Yao*. Emphasis should be placed on integrated development of forestry and animal husbandry. Tourism also has prospects in this area.

3. The Karst Mountain Areas of Southwest China

The Karst mountainous regions of southwest China are bounded by the Hengduan Mountains to the west, the Jiuwan Great Mountains to the east, the Wumeng Mountains to the north, and the southern Yunnan Mountains to the south. There are 126 impoverished counties in Yunnan, Guizhou, Sichuan, and Guangxi provinces. Broadly speaking, this area covers the Yunnan-Guizhou Plateau and its edges. The population is 39.43 million, of which 50-95 per cent are of minority nationalities.

Plateaux and mountains make up 95 per cent of the land, mostly between 500 and 2,500 metres above sea level, but reaching over 4,000 metres at high elevations. There are numerous small and large upland plains and valleys where much of the arable land is concentrated. Only about 10 per cent of the total land area is cultivated. Altitude variations provide a diversified environment for livestock and agriculture.

The entire area is humid subtropical, with a mean annual precipitation of from 800-2,000mm. Favourable warm winters allow for a long growing period. Two annual harvests of rice and wheat are common, except at the highest elevations. Major crops include rice, rapeseed, peanuts, tobacco, and sugarcane. The cash crops are rubber and coffee.

As one of the three major forest areas in China, this region is an important base for timber and economic trees. China fir, Yunnan pine, tea, orange, tung oil, lacquer trees, shellac, and *mao* bamboo trees are examples. Local products, such as medicinal herbs, are also important, as well as animal products from oxen, hogs, and goats.

Five major rivers (Xijiang, Jinshu, Lancang, Nujiang, and Yuanjiang) descend from the mountains. This area has two thirds of China's total hydro-potential. However, less than two per cent of the waterpower potential has been tapped.

Mineral resources are abundant. The area is a non-ferrous metal region par excellence but also has some ferrous minerals. The area ranks first in copper, lead, zinc, mercury, aluminium, and titanium reserves. The Lanping lead-zinc reserve is among the top ten in the world. The Xinwen-Qingzhen aluminum reserve in Guizhou and the Nandan tin mine in Guangxi are the largest of their types in China. Iron ore, manganese, and phosphorous are other important minerals.

In spite of these resources there are major problems causing poverty in this area and these are summarised below.

A Poor Ecological Environment

The karst topography, sparse vegetation, rocky thin surface soil, and severe soil erosion problems result in a degraded environment.

Isolation and Inaccessibility

Because of huge mountains and deep ravines, the area is secluded. Rail, road; and air transportation are all undeveloped. Few of the rivers are open to navigation. In southern Yunnan alone there are 2,005 impoverished villages, only 47 per cent are connected by roads and 42 per cent have electricity.

Sixty to 70 per cent of villages in the Hengduan mountain area are reachable by road. Only 50 per cent of the administrative villages in northwestern Guangxi are accessible.

Undeveloped Social Structure

These remote areas suffer from low productivity, slash-and-burn cultivation, diversified land ownership, a mixed fishing-hunting-gathering-farming-handicraft-commodity production system, and undeveloped lines of trade. Food from gathering can exceed 50 per cent of a household's food supplies in some areas, and poor families can be short of food for five to eight months a year. Grain yield is only 100-200 *jin* per *mu*.

Farming is the basis of the area's economic structure even though forestry and animal husbandry ought to be emphasised in a mountainous region. Sideline and industrial production are low. Very poor families may own less than 50 *yuan* of property value.

Disease

Many endemic diseases, including leprosy, are prevalent. Household sanitation is a major problem.

In light of the abundant resources and some favourable climatic conditions mentioned earlier, we have listed some of the possible measures for developing this area.

Water and Soil Management. In accordance with the karst area characteristics, measures to prevent irrigation leakages and to retain rain water are needed. Building small and medium-sized reservoirs and dams that are integrated with small power stations, developing spray irrigation, and generating electricity are recommended.

Change in Land Use. The area is most suitable for forestry and animal husbandry. Steep slopes which have been cultivated should be returned to forest and grassland, and forest destruction through land reclamation should be stopped. Lowland hills should develop economic trees such as orange, tea, tung oil, lacquer, and shellac trees. Low valleys should emphasise grain and economic crops. Sideline production and industrial activities need to be developed as well.

Advanced Education and Technology. The unity and equality of nationalities should be strengthened, scientific and technological education advanced, and funds provided for development. Gradually old ideas and customs may be replaced by more modern ones.

Five sub-patterns can be recognised in this region.

The Wumeng Mountain Region

The area includes 36 impoverished counties on the borders of Yunnan, Guizhou, and Sichuan provinces which are inhabited by the *Han*, *Yi*, *Miao*, *Buyi*, *Hui*, and *Shui* minority nationalities. Topography and climate are varied. Seventy per cent of the area is karst mountain or plateaux. There are abundant land resources and well-developed animal husbandry, but drought and water shortage, as well as serious soil erosion, are the real problems in the mountains. Emphasis should be in developing "three-dimensional agriculture", using the advantages of a varied mountain terrain and the integrated development of farming, forestry, and animal husbandry. The scope for developing economic trees, medicinal herbs, and special local products is immense.

The Jiuwan Mountain Region

The area includes 17 impoverished counties on the border of Guizhou and Guangxi provinces. The *Miao* (the majority group), *Zhaang*, *Han*, *Yao*, and *Jingpuo* nationalities live here. Emphasis should be on developing forestry, especially economic trees such as tea oil, tung-oil, China fir, and pine. Integrated development of forestry, farming, and animal husbandry can be the basis for a diversified economy.

The Northwestern Guangxi Mountain Region

The area covers 41 impoverished counties located in the transitional area between the Yunnan-Guizhou Plateau and the Guangxi Basin. The *Zhuang* (the major group), *Yao*, and *Han* nationalities live here. With self-sufficiency, or surplus grain production, as the basic goal, the area should receive emphasis in developing forestry, horticulture, economic crops, and special local products.

The Southern Yunnan Region

The area includes 19 impoverished counties, mainly inhabited by over 20 minority nationality groups. With self-sufficiency in grain as the basic goal, cultivation of tropical crops such as rubber, coffee, bananas, and pineapple; raising the production level of forestry; and animal husbandry should be emphasised.

The Hengduan Mountain Region

The area includes 13 impoverished counties in the middle and southern Hengduan Mountains in western Yunnan, inhabited largely by minority nationalities some of whom are Tibetans, *Yi*, *Nu*, *Dulong*, or *Lisu*. The emphases for development should be on increasing self-sufficiency in grain production; rationally exploiting forest and grassland resources; and raising production of forest, animal, and local products such as medicinal herbs.

4. The Hills and Mountains in Eastern China

This area occupies 162 poor counties, most of which are old revolutionary bases. It is bounded by the Huanghe River in the north and the Beijing-Guangzhou railway in the west. The region covers the Yimeng Mountains in middle and southern Shandong, the Dabie Mountains along the border of the Hubei, Henan, and Anhui provinces, the Jinggang Mountains on the border of the Hunan and Jiangxi provinces, the Wuyi Mountains on the border of the Jiangxi, Fujian, and Guangdong provinces, and some of the mountain areas on the southeast coast in Fujian and Guangdong.

The southeast monsoon climate is typical of the area. Winters are cold and dry. In general the climate is favourable for agricultural production. There is abundant groundwater (average flow depth 200-1,200mm), acidic soil, and predominantly forest flora. Except for the Yimeng Mountains, the annual temperature is around 15-20°C and the mean annual precipitation range is from 1,000-2,000mm. The generally mountainous terrain is characterised by elevations from 500-1,000 metres above sea level -- the highest peak of the Luoxiao mountains reaches 2,120 metres.

There are regional variations in climatic conditions. Farming is intensive, since there are very limited flat areas. The per capita arable land is about one *mu*. Arable land, mainly paddy land, makes up 15-20 per cent of the total area.

The area is a major supplier of coal, copper, aluminum, zinc, tungsten, and molybdenum for China. It is an important forest area in China as well, with tropical rain forest; subtropical, broadleaved evergreen forest; pine-fir needle-leaved forest; and warm temperate, broadleaved deciduous forest. It is rich in economic trees and special local products such as tea, tea-oil, orange, *mao* bamboo, bamboo shoots, and a variety of medicinal herbs.

Major problems to be overcome include the following.

Climatic Conditions

Drought, flooding, waterlogging, and low temperatures with continuous rainfall affect local agriculture. There is an 80 per cent probability of drought. There is a northern spring drought, a central summer-autumn drought, and a southern winter-spring drought. Waterlogging occurs on average once every two or three years. This unfavourable situation is most serious in the coastal mountain and hill regions of the Fujian and Guangdong provinces where typhoons are frequent from February to April, causing stem rot or death of sprouts.

Poor Soil

The soil is low in organic matter with some clay accumulation and a low base supply, leading to low and unstable crop yields. The red soil in the Jiangnan hills is an example of this.

Inappropriate Use of Resources

Some resources have been seriously reduced because of irrational exploitation. For instance, while concentrating on farming, forests have been felled in order to extend agricultural land. Consequently soil erosion is a big problem.

In light of the above conditions, the emphasis in development should be on the following.

Lay Stress on Both Farming and Forestry. Farming should be developed along with forestry, animal husbandry, sideline production, fisheries, mining, and other industries. Self-sufficiency or partial self-sufficiency in grain should be accomplished along with diversification of the economy.

Manage Rivers, Mountains, and Fields Comprehensively. Firstly, trees should be planted widely, for timber and for water conservation, in remote mountain regions. Secondly, fields should be terraced to control soil erosion. Thirdly, a major project should be developed to expand irrigated land. Fourthly, poor red soil should be improved with fertiliser and green manure crops. Fifthly, a proper system of crop rotation must be observed.

Establish Commodity Production Bases. Specialisations in commodity production, according to local resources, should be promoted. Timber production bases should be located in regions such as the Wuyi Mountains bordering the Fujian, Jiangxi, and Guangdong provinces and the southern Jiangxi Mountains. Tea production bases can be established in the well-known traditional tea growing areas. Orange production bases can be in the southern Jiangxi and eastern Guangdong Mountains which have long planted orange trees. Other possible production bases could be tea oil, *mao* bamboo, bamboo shoots, and medicinal herbs.

Develop Mountain Transportation. A commodity economy cannot develop without an adequate transportation system. Services, as well as transportation, need to be well developed. These will also help in the growth of tourism.

The hills and mountains of eastern China can be divided into four sub-regions.

The Yimeng Mountain Region

The area includes 14 impoverished counties (which are also old revolutionary bases) out of 20 in the region. Development efforts here should concentrate on forestry and water and soil conservation; and in developing a diversified economy.

The Dabie Mountain Region

The area includes 44 impoverished counties. Emphases for development should be on utilising and conserving mountain resources, controlling soil erosion, and developing forestry.

The area includes 59 impoverished counties out of 68, located in the red soil hills of Hunan and Jiangxi. Most are old revolutionary bases. These areas have significant development potentials. The development emphasis should focus on comprehensive management of red hills, improving yields, and developing forestry and economic crops.

The Hill and Mountain Regions in Fujian and Guangdong

The area includes 49 impoverished counties in the coastal southeastern mountains of China. Integrated forestry and farming and horticulture need to be promoted.

5. The Qinghai-Tibetan Plateau

The Qinghai-Tibetan Plateau is the "roof of the world" and encompasses a vast area and high terrain. It covers all of Tibet, most of Qinghai, and some parts of Sichuan, Gansu, and Yunnan. There are 96 impoverished counties -- 77 in Tibet and 19 in Qinghai.

Characteristics of the Region

The region is characterised by a harsh ecological environment and frigid climate, as well as insular location from the more developed coastal China. This gargantuan plateau is composed of a series of imposing mountains ranging from 3,000-6,000 metres above sea level (covering more than 90 per cent of the area), table lands of from 3,000-5,500 metres, and numerous basins and valleys.

Suitability for Animal Husbandry

Where elevations are above 4,500 metres, the average temperature in the hottest month is only 3°-6°C. There is no human habitation above 5,000 metres. In the high regions there is no frost-free period, making conditions difficult for crop maturation. Therefore these areas are only suitable for animal husbandry. However, the plateau is well known for its abundant energy and an intense solar radiation of 60-70 per cent. The daily temperature range is from 14-16°C.

Vast grasslands account for 60 per cent of the area. Excellent grassland exists on the eastern plateau and in the southeastern semi-humid areas. In the northwest there are semi-arid prairie grasslands and arid desert. The forest area of the southeast and southern plateau region is the second largest in China.

Yak, Tibetan sheep, and goats are the three main livestock species. Highland barley, oats, wheat, potatoes, and other cold-resistant crops are grown. The dominant trees are dragon spruce and fir.

Sixty-five per cent of the total population are Tibetans. Other nationalities are the *Han*, *Hui*, *Meng*, and *Sala*. Though the area has had increasing contact with mainland China, it remains isolated and backwards in many respects. Fifty to sixty per cent of the population are illiterate. Energy resources have not been sufficiently developed.

According to the conditions stated above, major management efforts should be concentrated on the following areas.

Emphasise Animal Husbandry. Natural and man-made grasslands should be utilised to develop yak, Tibetan sheep, and goat livestock production. Special attention should be paid not to disrupt the ecological balance.

Plan Forest Exploitation and Utilisation. Priority should be given to lumbering mature trees, fir trees in the hills, and protecting water in the valleys.

Construct High and Stable Yield Farmland. Valleys and stream areas should be taken advantage of fully and grain self-sufficiency should be raised.

Make Use of Solar and Geothermal Energy.

Develop Local Mining.

Enhance Literacy, Education, and Skill Training.

Two sub-regions can be identified in the Qinghai-Tibetan Plateau region.

The High-Altitude Mountain Region in Tibet

The area includes all of Tibet. Emphases should be on developing animal husbandry, forestry and local industry, and family sideline production, in addition to striving for self-sufficiency in grain production.

The Qinghai Plateau Region

The area includes 37 counties in Qinghai Province, 19 of which are impoverished. Emphases should be on developing animal husbandry, utilising natural grassland; combining farming with forestry and animal husbandry; and improving agricultural production in the valleys.

6. The Meng-Xin Arid Area

This area is composed of the Inner Mongolia Plateau and the Xinjiang Basin, with 48 impoverished counties in southeastern Inner Mongolia and 27 in western Xinjiang. The natural and economic features are similar throughout the general area.

Characteristics of the Region

The region is abundant in energy, land, and mineral resources. High summer temperatures and wide daily temperature ranges are characteristic of the region and are favourable for good harvests under well-irrigated conditions. Mineral resources include coal, oil, copper, plaster, stone, and limestone.

The main problems relate to sparse, uneven rainfall and consequent drought, lack of forests and trees, frequent sandstorms, and poor maintenance of fields.

Considering the above problems, attention should be given to the following areas.

Rationally Exploiting and Using Water Resources. Rational exploitation includes digging for underground water, blocking groundwater, and transferring melted snow to drinking water supplies. Industrial use and irrigation use also need to be managed.

Developing and Protecting Grassland. Man-made grassland can be developed (sowing by plane) and existing grassland can be protected, recovered, or improved. Over-grazing should be prevented.

Recovering Farmland. Soil improvement is needed as well as capital construction for farming.

Developing Forests. Conservation forests for sandstorm prevention or water conservation should be established. Economic and fruit trees should be planted. Ecological improvement activities can also enhance income.

Developing a Diversified Economy, Local Industry, and Mining. Township industry and family sideline production can focus on special local products such as processed animal products or minority nationality handicrafts and traditional items.

Enhancing Scientific and Technological Exchanges. To support hinterland-heartland exchanges in science, technology, and local talent, special policies should be adopted to absorb costs, etc.

The Meng-Xin Arid Area can be divided into two sub-regions.

The Sandy Region on the Southeastern Edges of the Inner Mongolian Plateau

The area has 51 impoverished counties and includes the Nuluerhu Mountains, one of the 18 poverty regions identified by the Central Government. Emphasis for development should be on promoting animal husbandry, combined with farming.

The Arid Region in Western Xinjiang

The area has 27 impoverished counties with a semi-desert grassland and oasis economy. Development should emphasise farming, combined with horticulture, forestry, and animal husbandry. Creation of shelter forests should be a priority activity in this sub-region.