Achieving Sustainable Development in Poverty-Stricken Mountainous Areas in Rural China: Issues and Countermeasures

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Abstract:

Despite efforts by the Chinese government to reduce rural poverty in recent decades, the extent of poverty in many mountainous areas of rural China is still high. To survive, rural residents in these areas are often forced to over-exploit the already stretched natural resources; the end result being serious degradation of the natural environment. This lowers productivity and rural incomes, which exacerbates the problem. This paper discusses a variety of factors that contribute to this poverty cycle in China's mountainous areas and explores countermeasures that may help break the cycle while encouraging sustainable development.

Key words:

Regional sustainable development
Poor mountainous areas
Rural poverty of China
'Integrated Regional Management'
'Regional United Entity'

1 Introduction

In recent years, China – the world's most populous nation – has enjoyed remarkable economic growth and the living standard of many Chinese people has been growing significantly. Yet these economic gains have not been spreading across all people, especially the poorest people living in poor mountainous areas.

There exists significant gap between rich and poor in China, which appear two gaps: between the inland (poorer) regions and the eastern seaboard[1]; and between rural and urban areas. Those living in poor rural mountainous areas are amongst the most disadvantaged people in China. Not only does this burden the poor, but it also places additional pressures on the environment, making the goal of sustainable development even harder to achieve.

World wide, the issue of poverty and development had been of central concern to governments and non-government organizations for many decades - especially since World War II. Traditionally, much literature has focused on issues associated with (a) the measurement and analysis of poverty and inequality, and (b) national and international development and cooperation and related issues. The issue of poverty and sustainable development in mountainous areas is a relatively recent addition – coming to the fore in the last 30 years. This has arisen because of sustained observable differences in rates of economic development between mountainous areas and other regions – and it was noted that a vicious circle of poverty and ecological degradation of poverty-stricken mountainous areas was becoming a prevalent worldwide phenomenon. In 1973, UNESCO set the 'effects of human activities on mountain eco-system' as the most important projects of the *Man and the Biosphere Programme in mountain areas;* and in 1992, 'Managing Fragile Ecosystems: Sustainable Mountain Development' was included as a separate chapter (Chapter 13) in *Agenda 21*.

Within China, much of the research focuses on rural poverty, rural and urban differences, and provincial or multi-provincial sustainable development. But relatively little research exists on sustainable development and poverty of mountainous rural areas. Some comprehensive research has been done by the Chinese Academy of Sciences– although much of this work concentrates on the mountainous areas of western China. Two fundamental works in the field of Chinese mountainous area development include: Chen Guojie et al (Chinese Academy of Sciences, 2004); and Yan Ruizhen and Wang Yuan (Renmin University of China, 1992). The former is a nationwide comprehensive research on the conditions and prospects of the development of mountainous areas; the latter concentrates on rural

[1] Eastern seaboard provinces account for 70% of GDP and 90% of imports and exports in China in 2003.

poverty and economic development of mountainous areas mainly by using case study on Taihang mountainous area. Both of these works include data relevant to specific administrative regions (mountainous counties) with correlate with but do not necessarily coincide exactly with geographically defined mountainous areas[2].

This paper follows those examples, using the term 'mountainous areas' to refer to mountains, uplands and plateaus in rural China, as defined by Chen Guojie et al. Using both secondary data and information from a first-hand investigation in the Taihang mountainous area, this paper describes key characteristics of poverty and the poverty-environmental degradation cycle in China's mountainous rural areas. It analyses some of the factors that contribute to the cycle and then puts forward a model of 'Integrated Regional Management' which aims to break it, thereby contributing to the long-term sustainable development of these poor mountainous regions.

2 Poverty in Mountainous Areas of Rural China

As shown in Table 1, much of China could be termed 'mountainous' – with vast tracks of land at more than 3000 metres above sea level.

Table 1. China's Mountainous Areas and Corresponding Altitudes
(Source: Chen Guojie et al: 2004**)**

Height Above Sea Level	Total Area(Km^2)	Ratio to the Country Area (%)
>500m	7,183,000	74.8
Minus >500m Basins	6,662,400	69.4
>1000m	5,558,000	57.9
>3000m	2,483,000	25.9

Since the beginning of 1980s, there have been many anti-poverty campaigns throughout rural China. Specific examples include: the 'Production Responsibility System' in the beginning of 1980s; 'Food for Work' programs and other key infrastructure projects; 'Poverty Alleviation' programs by government and NGOs; national education support projects; and both free compulsory education[3] for the 592 poorest counties and the nationwide cancellation of agricultural taxation from 2006 onwards. As a result, both farmers' income and rural conditions have improved greatly. However, mountainous poverty has become more prominent than before.

In the middle of 1980s, Chinese government lined out 18 poorest zones, all of them were mountain areas and plateaus. In the middle of 1990's, Chinese government

[2] Few – if any – countries collect data for geographic regions that coincide with biophysical boundaries; most data is collected for administrative units.
[3] Exempt from any fees including textbooks and incidental fees, and subsidies for boarding students.

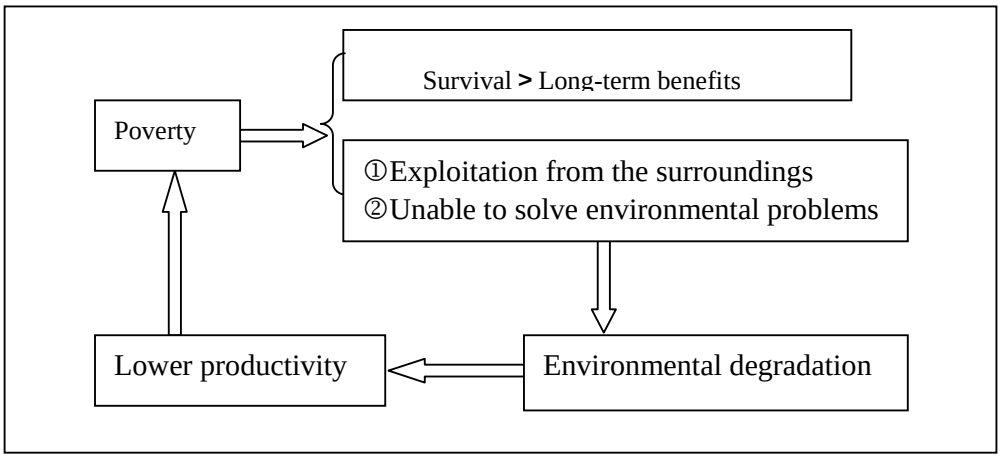
identified 592 State-Level supporting Counties as the poorest in China: 86% of these were in mountainous areas. In 2003, more than 70% of the poorest rural people in China were in mountainous areas (Li, 2004). According to the investigation of the State Council Leading Group Office of Poverty Alleviation and Development, 76% of the continuously poorest rural households are living in mountainous areas (www.cpad.gov.cn, 2005).

In short, most of China's poorest people are now concentrated in the mountainous areas – an observation which accords with a phenomenon identified by Pearce (1993:272), whereby "the poorest of the poor thus occupy the least resilient, most threatened environmental areas of the world".

3 The 'Poverty-Environmental Degradation' Cycle

Like other parts of the world, it seems that in China, poverty and environmental degradation often co-exist and interact, in mountainous areas (no matter whether in Eastern, Middle or Western China). Figure 1 presents a stylized picture of the poverty/degradation interaction as a vicious circle: poverty drives people to place personal survival above longer-term social and ecological goals, thus exploiting the surroundings, and failing to deal with environmental problems. This leads to environmental degradation, which lowers productivity, thereby contributing to even more poverty.

Figure 1. The 'Poverty-Environmental Degradation' Cycle



To some extent, this poverty cycle seems to be inevitable in the poor mountainous areas of China. Many communities in that area operate as subsistence economies, and individuals within them have little alternative but to exploit their surroundings. For example, some mountain people cultivate sloping fields for grain, which

accelerates soil erosion and the frequency of natural disasters. Some mines are neither monitored nor controlled, and over-grazing is not uncommon. The resultant environmental problems (landslides, desertification, sand storms, and air and water pollution) lower land and thus agricultural productivity.

Importantly, this does not just affect those in the mountainous areas. Compared to other rural areas, the mountainous areas contain many forests and rivers – the lands serving as environmental filters. The actions of those living in the mountainous areas thus affect those who live downstream. Paradoxically, a relatively large share of environmental responsibility falls not upon those on the plains who are relatively well-off financially upon the poorest of the poor in the mountains.

In short, it seems that many mountainous areas of China may be involved in a vicious circle of 'poverty, reclamation and yet more poverty'. Yet this destructive relationship between poverty and environmental degradation may not necessarily be inevitable. As argued by Pearce and Warford (1993: 274), "The existence of poverty does not mean that environmental degradation will necessarily follow….[it] depends on the coping strategies of the poor, and these depend, in turn, on the availability of options, cultural factors, and policies of local and national governments."

As discussed earlier, the Chinese government has devoted considerable resources towards poverty alleviation. It has also been paying close attention to environmental conservation and construction – particularly since deciding to implement its Sustainable Development Strategy in 1992. So far, the trends towards environmental degradation have slowed – as is partially evidenced by the increase in the rate of forest coverage – up from 13.63% in 1992 to 18.21% in 2003[4].

The intent of many of the projects that focus on ecological conservation and construction is the double-outcome of improving the environment and alleviating poverty. However, except for very few areas, environmental improvement has not provided farmers with a better living, and the future has become less secure for some people because of land loss and restricted mountain access. Moreover, in some cases the direct environmental effect of these ecological projects has not been beneficial too. Many local officials and farmers have positive attitudes to the project of re-forestation according to the investigation of the Rural Investigating Brigade of Sichuan Province in 2002[5]. But as the lower local officials focused on achieving high visual effect that was easy for officials to inspect, so that they implemented re-afforestation on better quality land such as near waterways, low uplands and other easy traffic areas, which caused resistance from some farmers. There are also differences of opinion between local governments and farmers about the types of plants between trees that should be

[4] *1992 Report for China Environmental Status, 2004 Report for China Environmental Status*, www.sepa.gov.cn, 2002-11-15, 2005-06-02.

[5] within 200 farmers, there are 161 (80.5%) that support Re-afforestation, 21 (10.5%) think it is indifferent and 18 (9%) do not want re-afforestation.

planted, about land use rights, and unfair policies etc. – all of which negatively influence the environmental effect of the programs.

Yet to some extent, these policies are 'one stone for two birds' mechanisms: they attempt to conserve the environment and alleviate poverty of mountain people without explicitly recognizing the fact that the two issues are inter-related in a vicious cycle. Those interested in developing policies capable of breaking this vicious cycle could thus benefit from learning more about factors that influence it – as discussed in the sections below.

4 Factors Influencing the 'Poverty-Environmental Degradation' Cycle

4.1 Lack of Social Capacity

The top right hand corner of Figure 1 highlights the fact that those living in poverty cannot afford the luxury of working towards environmental improvements: they may generate long-term benefits, but the short-run costs are insurmountable. Instead, they may be forced to exploit their surroundings. Sadly, they may not have the capacity to do so in a manner that mitigates environmental problems, and lack of 'capacity' is a significant problem in rural mountainous areas of China.

A survey to the 97 villagers in the Taihang Mountainous area asked respondents to consider the question "Do you agree that your living situation is determined by Fate?" (Jia, 1999). Thirty-two responded in the affirmative (33%)[6], providing some evidence for fatalism in some mountainous areas. This philosophy is popular in mountainous areas, even amongst community leaders, and has been for generations. The locals are used to having to endure much hardship and some seek help from wizards / witches or fortunetellers whenever they have problems.

At least some of this might be attributable to the fact that mountain people tend to have less education and fewer economic opportunities than those in the plains – factors that are often linked to poverty. More specifically, pervasive poverty with no social security tends to encourage large families (Becker and Lewis, 1973), few of which can afford to educate their children. As shown in Table 2, the rate of graduation from primary schools in rural areas is generally high – reflecting the compulsory nature of education. Nonetheless, it is lower for mountainous areas than for those in the plains – particularly for middle schools.

[6] 19 (20%) are not sure.

Table 2. Rates of Graduation: Primary and Middle Schools in the Mountainous and on the Plains

(**Source:** Statistics of Shijiazhuang Educational Bureau of Hebei Province**)**

Counties of Rural Shijiazhuang	Rate of Graduation from primary school (%)	Rate of Graduation from middle school (%)
Mountainous Average	98.15	42.0
Plain Average	98.88	48.9
Differences	-0.73	-6.9

Another investigation to Longnan region of Gansu Province conducted by Rural Investigating Brigade of Gansu Province in March of 2004 shows the similar fact that, the illiterate people account for 31% of the population of Dangchang County; in Dacun village, as high as 45.2% except for children before school age.

Those that do progress to higher levels of education often leave the mountains. Those that remain, are thus likely to have relatively low levels of education, and are therefore less likely to earn high incomes, thereby remaining in poverty 'trap'. Their continued poverty may also lead to other social problems, which themselves exacerbate the situation. In short, mountain poverty is not a single problem, but has a close relation to various interrelated problems. None of these problems are easily overcome, and none would necessarily disappear if poverty, alone, were eradicated.

4.2 Remoteness, Isolation and Lack of Infrastructure

In China, the poor mountainous areas are usually on the edge of economic zones, the centres of which have weak financial links to the hinterland. The areas are also generally geographically remote and communication with the 'outside' world is often difficult. The regions have fewer human resources competent for external communication. This increases the isolation of mountainous communities, increasing the uncertainty and risk associated with those wishing to access the market.

Despite recent increases in government investment, infrastructure in mountainous areas is still inadequate. Generally, the mountainous areas are far away from cities, their terrain is undulating and multiform, and the land is stony and hard. So that to build infrastructures in mountainous areas is more costly than in the plains. This is evidenced in Table 3, which compares the cost of different types of farm facilities in a mountainous county with those in a plain county in Hebei Province.

Table 3. The Cost of Farm Facilities: in the Mountainous and on the Plains in the Hebei Province

(**Source**: the 2005 budget forms of the Ecological Comprehensive Program of Zanhuang County and Gaocheng County, US$1=RMB8)

ITERMS	Mountainous County	Plain County	**Ratio**
Building farming road (US$/Km)	8062.5	4812.5	**1.7:1**
Spanning farming wires (US$/Km)	13654	2787.5	**4.9:1**
Digging well ′80m (US$/per well)	4037.5	1375	**2.9:1**

Note: Zanhuang County is located in Taihang Mountainous area and Gaocheng County is in Hebei Plain in Heibei Province.

As Table 3 shows that, it costs almost twice as much (per kilometer) to build a road in mountainous areas than in the plains; nearly 3 times as much to dig a well; and the spanning cost of farm wiring is nearly 5 times as much in the mountainous areas as in the plains. Therefore, the same amount of government expenditure will thus create fewer infrastructures in mountainous areas than in plain areas, which perhaps explaining at least some of the differences in the overall availability of infrastructure in these areas.

The lack of educational facilities-as one aspect of infrastructures in mountainous areas-is shown in Table 4 and 5. Both of the ratio of professional teachers and the value of teaching equipment available in primary and middle schools of mountainous areas are less than on the plains.

Table 4. Available Infrastructure in Primary Schools: in the Mountains and on the Plains in Shijiazhuang City

(**Source**: Statistics of Shijiazhuang Educational Bureau of Hebei Province)

Counties of Rural Shijiazhuang	Ratio of Technical and Higher Fulltime Teachers (%)	Value of Teaching Equipments per Student (￥)
Mountainous Average	57.47	296.95
Plain Average	63.23	471.51
Differences	-5.76	-174.56

Table 5. Available Infrastructure in Middle Schools: in the Mountains and on the Plains in Shijiazhuang City

(**Source**: Statistics of Shijiazhuang Educational Bureau of Hebei Province)

Counties of Rural Shijiazhuang	Ratio of Bachelor and Higher Fulltime Teachers (%)	Value of Teaching Equipments per Student (￥)
Mountainous Average	32.89	519.68
Plain Average	36.27	562.29
Differences	-3.38	-42.61

The mountainous areas have not only less (and more costly) infrastructure, but also lower worker productivity than other areas – if only because the distances to market from remote mountainous areas are generally large. This further raises production costs, lowers profit margins and thus reduces the incentives for firms to locate in these regions. The poverty cycle continues.

4.3 'Misuse' of Resources

Many of the poor mountainous areas of China have a multiform terrain, with vertical vegetation distribution. Ploughable land comprises less than 1/4 of mountainous area, and this is generally separated and fragmented. The climate is extreme with big differences of temperature between day and night.

When contrasted with the plains, which has more ploughable land, and less extreme climates, it is evident that those in the mountainous regions do not have an absolute advantage in traditional crops. Indeed, the mountainous regions may not even have a comparative advantage in that type of production. In short, those living in these areas could be better off if they were to use cease planting 'traditional' crops, instead using the land to grow that which it is more suited to[7]. Whilst those living in these regions continue to try and grow plants that are ill-suited to the environment, productivity will inevitably remain low. This will continue to contribute to the poverty cycle.

4.4 Lack of Market Development

Most communities in the mountainous areas in China still operate as subsistence

[7] The Zhangye Region of Gansu Province provides an exemplary case-study. In that area, there are many natural plants rooted on sands in barren deserts. However, for centuries local people have cultivated pasture and up-rooted plants for firewood – leading to the degradation of sand plants and medicine herbs as well. Since 1983, this region was identified for special consideration by government. The area is now developing sand plants, which has accomplished not only high plant coverage rate, local incomes and the hope of sustainable development. (www.xujingchun.com, 1997-06-20).

economies with production organized as a household unit. There are few commercial transactions in the deep mountain areas because of the long distances, unfamiliarity with the market, relatively high admission fees to farmers, and/or traditional attitudes to business. Most peddlers or businessmen, who function in high altitude mountainous areas, are from communities closer to the plains.

The main form of commercial transaction is that of transport. In remote villages, those transporting goods from outside the region use bells or loud calls to attract customers. Businessmen who have a good relationship with the village leaders may even be able to provide villagers of advance warning of their arrival, so that transactions can be done in half a day. The group of people who do this type of work, changes frequently: people can choose to work or not, according to their own inclination, and they are not generally required to obtain permits to operate. However, businessmen commonly sustain losses because of spoiling of primary products in transit or market change.

There is little other commercial activity in these areas although some towns and larger villages have semi-permanent markets – normally held once every 3-5 days. Some commodities that are required on a daily basis are also available in little shops by the roadside, but these regions are best characterized by their lack of formal markets, making it difficult for residents to use the market to help break out of the poverty cycle.

Furthermore, few regulations, little official monitoring of activities and a lower overall education level of those in remote mountainous areas, makes it relatively easy for unscrupulous businesses to dump fake, inferior, and out-of-date products (false pesticides and chemical fertilizers, fake seeds, low quality goods etc.) in the remote countryside. This contributes to general problem, lowering productivity, raising costs and increasing poverty.

4.5 Government Failure

In China, the Government intervenes in rural economies mainly by allotting and managing projects and funds. The many different government sectors that provide projects and funding to these areas include: the Development & Reform Commission, Finance, Poverty Alleviation and Development, Agriculture, Water Resources, Forestry, and Education. Each sector has a channel with which to transfer funds from the Ministry to local counties.

The effect of governmental intervention is decided by the financial capacity of Government on the one hand, and on the other hand, the capabilities of administrative and economic management of the local government. The morality and professional integrity of administration personnel are major restrictive factors as well. Although the total amount of financial investment in rural areas has been growing, these latter

aspects need more attention. Generally speaking, the capability and standard of administrative and economic management of the government decreases from top to lower levels. In the mountainous areas of China, the administrative capabilities of county, town, and village leaders are almost certainly less than those of leaders in less remote regions.

4.5.1 Inefficient Usage of Finances

Under the current administration system, the officials of local government and its functional sectors must manage operating funds but are not responsible for efficiency. The funding that each local official aquires from higher levels of government is often treated as a proof of achievement, and inevitably, some officials struggle to obtain more projects and funds. Therefore, financial funds do not always go to the poorest areas, rather to regions whose officials have the most powerful voice.

Even when funds are available, problems still occur. There is not always enough local finance to match funds from central government – particularly when an area attracts large amounts of funds from several sources simultaneously – and much money 'leaks' out of a fund as it flows from the central government to the mountainous regions. The implementation of projects is often of low quality and examples of work that is half-done work, 'surface work'[8] or Jerry-built[9] are common. Furthermore, local governments accumulate heavy debt due to things such as 'Repetition Construction' and lavish expense accounts. A good part of this debt is bourne by the local residents who are not always paid for their work, goods or services. Consequently, one cannot assume that these projects generate a net economic benefit to the remote mountain communities.

4.5.2 Lack of 'Capacity' of Local Government Officials

As noted earlier, with generally low levels of education, and few economic opportunities, many of the local residents in mountainous regions lack 'capacity'. This is also true of local government officials in these areas: their official status does not automatically endow them with knowledge of markets and management. Some officials not only lack 'capacity' but also seek to promote their own interests rather than the interests of local farmers and/or the wider community. As argued earlier, one cannot therefore assume that the net benefits of projects in mountainous areas will be positive, as evidenced by the comment of a bankrupt mountain land contractor who claimed that he would have succeeded if he had NOT had 'support' from the government (Han, 2004).

[8] It seems to be finished, but omit the core work that is the most expensive and most important part.
[9] The work has been done and can be put into use, but with less quantity or/and low quality.

4.5.3 Regionalism and Lack of Inter-regional Cooperation

Different regions are frequently endowed with different factors. One therefore expects different regions to have different strengths. If a region specializes in the production of that in which it has a comparative advantage and trades with another region that is also specializing in production, then both regions may gain. Mutual dependence and cooperation thus allows areas to benefit each other. Even though there exists a diversity of natural resources in mountainous areas, the economic structures of administrative regions are almost the same. Rather than encouraging specialization, trade and mutual dependence, this form of regionalism serves to create more competition and less dependence among regions, to the detriment of all.

4.6 Conclusion

The foregoing discussion identifies several factors that influence and contribute to the 'poverty-environmental degradation' cycle. Although these factors are discussed separately, many are inter-related. For example, when local governments use finances inefficiently, regions are likely to have less public infrastructure than when finances are used efficiently. Similarly, regional resources are more likely to be 'misused' if residents are poorly educated and local government officials have little management ability. And lack of infrastructure, education and management abilities make it difficult for local farmers to develop markets. The problems are simply too complex for existing institutions to cope. Other directions/policies may be required. One such idea – that of Integrated Regional Management, is presented below.

5 The Counter-measure: Integrated Regional Management

As discussed earlier, most of those problems are so inter-related and complicated so that the implementation of current policies could not break poverty-environmental degradation cycle. And neither the mountainous people themselves, nor the leading companies or specialized producers, nor the local governments have been able to find a long-standing solution. The poor mountainous areas lack the essential conditions and momentum of development, which further slows development.

To be more specific, we can draw some conclusions from the former analysis: ① In the mountainous areas of China, a key factor that contributes to the vicious cycle is the lack of 'capacity' of local people in the current natural and social economic conditions; ② Existing institutional arrangements do little to alleviate this problem and; ③ Local governments are ill-equipped for regional economic management. In fact, in mountainous areas, above all, there is a lack of an organization that could lead, organize and manage the local resources of the whole region, which has a sense of responsibility for the people, with strategic vision and the ability of economic

management. What is proposed here, therefore, is a different approach – that of Integrated Regional Management in poor mountainous areas.

Here it is suggested that the economic function of current administrative systems in mountainous regions (more specifically, regions that are rural, mountainous, and poor) should be weakened. Instead, funding that is currently used to promote regional economic development and/or environmental conservation would go directly to an executive body – termed the Regional United Entity (RUE), which would be directly responsible to the provincial government. The main goal of the RUE would be to ensure the regional sustainable development of a single mountainous area, with two specific targets: to maximize the integrated (ecological, economic and social) benefits of the whole region; and to promote self-sufficiency and self-development of regional farmers.

In any given region, the actual implementing body would be a productive unit, such as a company or farmer, hence RUE's major task would be to support and promote existing companies and farmers. The RUE would also: carry out some of the policy functions of local government; lead companies and farmers of the whole region to join the market and share market profit on the basis of integrating and mobilizing the local resources, hatch and strengthen farmers' enterprises, and filter market risk. Those charged with coordinating the 'Integrated Regional Management' system would be directed to place the highest priority on ecological services since they form the base of regional sustainable development. Ecological construction and conservation would thus be at the heart of regional planning; economic activities would be directed to complement rather than compete with those goals. In addition, 'green' factors (knowledge, experience, technology etc.) would be employed utmost in mountainous areas.

In densely populated, highly complex market economies, such a system could be administratively difficult to manage. But in the remote, mountainous regions of China where markets are not fully developed, a fully integrated management system could be used to great advantage. It could carry out comprehensive management for poor mountainous areas, including integrated regional planning, regional market orientation, and infrastructure construction. It could hatch and strengthen farmer's enterprises, lead farmers to participate in the market, operate bulk farm produce transactions, protect and develop special or precious resources of mountainous area, ecological conservation and construction, and carry forward the traditional culture of folk customs. Moreover, a fully integrated system could make governmental audits more convenient in mountainous rural areas.

6 Concluding Comments

Those living in the rural mountainous areas of China share the twin burdens of poverty and environmental degradation – two burdens that are currently locked in vicious circle that existing institutional arrangements do not seem to be able to break. This paper identifies many complex, interrelated factors that contribute to and exacerbate the cycle, the almost inevitable conclusion being that simple single-focus policies and institutions cannot hope to manage. Instead, policy makers should consider a new approach: that of Integrated Regional Management.

Such a system could help those in mountainous area move from the current subsistence economies into a market economy. It might even help to curtail local protectionism and reduce inefficiencies generated by using separate regional administrative bodies. This model could make more funds available to help alter conditions that contribute to poverty (rather than simply dealing with its symptoms), thereby promoting the sustainable development of mountainous areas.

Those points aside, Integrated Regional Management is a complex, untried idea that may meet strong resistance from vested interest groups and the RUE is a new institutional concept. There is no previous precedent, so we need to "cross the river by touching stones". But go forward we should, for the existing systems are serving neither the poor nor the environment. To quote an old saying:

"Change if you are poor; if you change, there will be a way to go forward."

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