Name: Mantang Cai
Affiliation: International Network for Bamboo and Rattan
Address: Branch Box 155, P.O. Box 9799, Beijing, P.R.China 100101
Fax: +86-10-64956983
Email: mtcai@inbar.org.cn

Stream: Forestry

Participation of Farmers, Scientists and Grassroots Government in Rehabilitation of Degraded Forest Land

ABSTRACT

This research dealt with forest resource management issues in south part of China through a joint participation of farmers, grassroots government and scientists. The general methodologies of the research are organized in a logical framework of Participatory Diagnosis, Participatory Design and Participatory Delivery (Tri-PD). Tri-PD was established with the following basic philosophy:

1. *Tri-PD is recognized as a logical framework of thinking rather then a procedure, for organizing project activities.*
2. *The key in Tri-PD is to establish a participatory environment for bottom-up implementation of research activities.*
3. *The central players (or participants) in Tri-PD are farmers, grassroots level government and scientists;*
4. *Tri-PD encourages combination of modern technologies and indigenous knowledge for solutions of facing problems.*
5. *The participatory design of Tri-PD intends to provide options (rather than single "optimal solution") in a form of package (rather than a model one must copy).*
6. *Any experiments and tests in Tri-PD are carried out in on-farm condition.*

It is easily found that the core of successful practice of Tri-PD approach is participation. In the four research sites (Zhejiang, Hunan, Guangxi and Yunnan provinces/region), multidisciplinary field teams were composed of scientists, farmers and grassroots government officials.

Farmers are the center of this participatory practice of natural resource management because they are directly benefited from such a practice. All the final decisions are made by the farmers because they are the owners of the forest land, and they have the right to decide how to use the resources. But in the whole process of decision making for a wise management of their resources, scientists and local government officials helped them in providing

more scientific knowledge (biophysical solutions) as well as policy and information services.

Participation of grassroots government is also very important. As we can understand, we need the participation of the government because we need a better services and favorable policy environment. However, it is not expected to formulate new policies directly from the research project, but it is always possible for a project to produce enough impact for the local government to change their regulations of implementation of policies. This is the major role of the participation of the local grassroots level government.

Scientists, as the essential facilitators in the process, played an important role in setting up systematic diagnostic survey and providing information on technologies that are possible for application in the research areas. The scientists are also good bridges for improved communications between the farmers and the local government.

With the above principles of participation, participatory survey, diagnostic analysis, identification of solutions/options and on-station experimentation were conducted at different research sites. Because the four research sites are all different in both technical issues as well as socioeconomic context, the mechanism of participation, and the role of different partners are different as well. This paper will, based on the case studies in four research sites, discuss on the mechanisms of participation under different situations and analysis of roles of different partners in a participatory research process.

INTRODUCTION

In 1968, Hardin published his famous paper "the Tragedy of Commons". In that paper, Hardin popularized his theory "the tragedy of commons" and assumed that resource degradation is inevitable unless common property is converted into private property or government regulations are instituted. Researches later by Berkes (1986, 1989), Feeny (1990) and others showed that common resources could be well managed from social learning from experiences and collaborative problem-solving approach of the local community. In Hardin's paper, another important point was his "no-technical solution problem" concept. Even it has been approved that commons are not necessarily the tragedy, but the no-technical solution concept is still very useful in supporting today's research in natural resource management.

Forests were managed collectively in South China and are typical common resources compared to those in the North China where forests were managed by the state owned forest farms. China started its economic reform in later 1970's, and the most important step in the rural areas was the allocation of use right of arable land to households. After the successful story in agricultural reform, forestry sector followed the similar approach to agriculture but with less successfulness. It is not necessary to analyze the differences between agricultural land use and forestland use. They are definitely different land use systems that need different policies and management schemes. The actual practice approved that, besides the damages to forests in wars and later the Great-Forward period, forestland reallocation was another disaster of deforestation in China. Serious degradation occurred after the allocation. After

this unsuccessful practice, the government has been looking for solutions, and realized that joint efforts from government, farmers and scientists are badly needed for solutions. A good indicator was a special chapter in China's Forestry Action Plan under China Agenda 21 – Participatory Forestry.

The purpose of this study is to assess and improve the forest resource management using a participatory and integrated technical and socioeconomic approach. This study was carried out in the transitional period from the central planned economy to the socialism market economy in China. In a central planned economy system, many efforts in forest resource management were made to search for technical solutions rather than no-technical solutions that were decided in a very high decision-making level, never come down to the grassroots. However, in the transitional to market economy, there are increasingly non-technical factors that affect forest resource management at grassroots level. Under this circumstance, the study was designed to use an integrated technical and socioeconomic approach, or explore for both technical and non-technical solutions for forest resource management in a participatory/bottom-up approach.

THE RESEARCH METHODOLOGIES AND SITES

Concepts and Philosophy

The general objective of the research is to maximize the sustainable use of scarce resources of the degraded areas for the benefits of rural people through integrated research for the development and application of socially, environmentally and economically sustainable forest production systems in marginal ecosystems of selected regions in China. In order to achieve this broad objective, a participatory methodology was developed based on the previous research experiences in the combination of technical and socioeconomic approaches. This methodology is organized in a logical framework of an integrated approach for participatory research. The framework, Participatory Diagnosis, Participatory Design and Partticipatory Delivery (Tri-PD) was established with the following basic philosophy:

1) Tri-PD is recognized as a logical framework of thinking rather then a procedure, for organizing project activities.
2) The key in Tri-PD is to establish a participatory environment for bottom-up implementation of research activities.
3) The central players (or participants) in Tri-PD are farmers, grassroots level government and scientists;
4) Tri-PD encourages combination of modern technologies and indigenous knowledge for solutions of facing problems.
5) The "design" in Tri-PD provides options (rather than single "optimal solution") in a form of package (comprehensive and integrated).
6) Any experiments and tests in Tri-PD must be carried out in on-farm condition.

Some major concepts and the understanding in Tri-PD are summarized as follows:

Participation: It is intended to establish a participatory environment that farmers, grassroots government and scientists closely work together. Farmers are essential player in the resource management and are the decision-makers. Scientists are contributors of modern knowledge as well as facilitators to bridge farmers with government. Grassroots governments play an

important role in implementation of any government policies. At the same time, they are usually the providers of services (of technology, information, credit, etc.).

Basic needs: Basic needs concept is used in setting up priorities for actions.

Sustainable Development: Sustainable development is usually the ultimate target of any natural resource management project. Besides this common understanding of sustainable development, it is also emphasized to build problem-solving capacity of local communities for sustainable management of resources.

Political Ecology: This is a basic concept used to frame the data collection and analysis, i.e. human-environment relationship within a community (human-ecology) and its social and economic relations with the outside (political economics)

Indigenous Knowledge vs Modern Knowledge: It is encouraged to use results from scientific research (on-station and on-farm) as well as indigenous knowledge from the local community.

Tri-PD Framework and Implementations

The general framework of Tri-PD is given in Figure 1. As stated earlier, Tri-PD is a tool for assisting logical thinking. The relationship between activities is not necessarily sequential in time. Besides the general framework, the core tools used in the project are Participatory Rural Appraisal (PRA) and other participatory /learning tools.

Preparation • Site selection • Organization of project team • Communications	❷ Participatory Design Technical design Economic evaluation & design Social evaluation & design Integration
Participatory Diagnosis • Pre-diagnosis • Planning investigation • Intensive data collection • Diagnostic analysis • Specification of intervention	Participatory Delivery Planning a strategy On-farm testing Refinement of packages Dissemination Monitoring & evaluation Feedback

Figure 1. Tri-PD Framework

Research Sites

There are four research sites in this project, distributed in different ecological zones with various economic development levels. The main concerns in site selection were:

1) to address major types of forest degradation in southern part of China; and
2) to study the different types of participation mechanisms at different levels of economic development.

Based these criteria, research sites were selected at 4 different provinces/region, i.e. Zhejiang, Hunan, Yunnan and Guangxi. In each province/region, 1 - 2 villages were further identified as research settings. Table 1 compares the research sites in terms of economic development level and representatives in ecosystems.

Table 1. Basic Information of the Research Sites

Research Site	**Zhejiang**	**Hunan**	**Guangxi**	**Yunnan**
Name of Villages	Hongqiao/Chenjiakan/Shangfeng	Tongxi	Sanxing	Shiliu
Per Capita Annual Income (Yuan)	2,700	1,200	1,000	700
Concerned Ecosystem	Intensive managed bamboo plantations for shoot	Chinese fir plantations	Secondary broad-leaved forests (previously managed for charcoal production)	Sloping farming

RESULTS AND ANALYSIS

Zhejiang Site

In this research site, one of the major activities in forestland use is intensive management of high-yielding bamboo plantation for shoot production. It was quite successful and was one of the most important sources of income for the local farmers.

Local farmers cultivate a special bamboo species locally called Lei Bamboo (*Philostachys praecox* C.D. Chu et C.S.Chao). This is a very good species for bamboo shoot production. Under traditional management, bamboo shoots were harvested in spring (March). The local forest station developed a special technology of covering the ground with rice straws or rice husk in early winter, that increases the soil temperature and the bamboo shoots can be harvested about 1 – 2 months earlier, right before the Chinese New Year. The early harvested bamboo shoots can be sold at a very good price that is about 10 times of the normal price.

However, after several years of application of this technology, degradation occurred in bamboo plantations. The major problems are pest and disease, decay of root systems; etc. and the productivity is lower and lower. These are the problems in terms of bamboo plantation itself, or more in technical side. At the same time, there are non-technical problems as well. Due to the rapid expansion of such plantations, the total supply increased rapidly, and farmers started to worry about the market problems.

In this case, farmers, local government and scientists worked together for better solutions of bamboo plantation degradation problems. Major measures included:

Improvement of technology: This is a good joint work for scientists and farmers to incorporate modern knowledge and indigenous knowledge toward technical solutions. All activities are carried out on-farm.

Training: As the on-farm research is carried out on selected farms, newly invented technologies are transferred to other farmers through different training programs. Both scientists and the selected farmers are resource persons for the training. The local government is the organizer of different training programs.

Community organizations: With the help of the local government, local farmers are working together and community organizations were formulated. In the community organization, farmers share with each other their information and experiences, as well as work together in marketing of the products and other aspects that need collective efforts.

Hunan Site

This research site was one of the most famous centers for Chinese fir based timber production. Severe degradation in continuous management of Chinese fir has been observed in many years. Surveys were carried out on both biophysical and socioeconomic aspects to diagnose the causes of this severe degradation of plantation management. The survey results showed that:

1) Traditionally Chinese fir plantations were managed continuous for generations without degradation. But special management schemes were used, mainly agroforestry (intercropping with Tong oil trees) and enough fellow between generations. The current systems are all in monoculture without fellow between generations. This obviously showed that continuous management of Chinese fir plantations without appropriate management schemes is key technical problems that caused degradation of Chinese fir plantations.
2) Comparison surveys in management system were also carried out in the neighbor counties where different practices in management were used. In Suiling County, all the forests are still managed collectively and controlled by the local government. In Suiling County, forest resources are well protected and seldom degraded. But the direct benefits are limited to the farmers. In Jingxian County, Chinese fir plantations were distributed to individual households for management at the beginning, and such system was changed to community management afterwards through shareholding management arrangement. In this system, the local government issued appropriate policies to support such a new management system. In Jingxian County, forest resources have been improved gradually.

In Hunan Site, following measures were proposed after participatory diagnosis and design, and implemented jointly by local farmers, government and scientists:

To introduce new technologies into Chinese fir plantations: Due to the pressure from population expansion, it is not possible to have enough fellow between generations when managing Chinese fir plantations. Agroforestry technology was introduced into Chinese fir plantation management system. The key agroforestry technology is intercropping of different crops into the young plantations to improve the soil as well as get short-term income for the farmers. Scientists and farmers are closely work together at on-farm scale to test the technology.

Replacement of new species: For the soil that not suitable for Chinese fir production, new species, mostly the short-term economic plants, were introduced to replace Chinese fir. As cost for establishing plantations of economic plants is very high, a joint management system

was used. Local government provided financial support, and local farmers provided their land and labors, while scientists provided strong technical support as well as facilitated the whole process of joint management. The benefits from managing the economic plantations will be shared among farmers and government.

Joint management of plantation forests: To overcome difficulties in individual management of plantations, government helped the farmers to organize a community management schemes so called the shareholding forest management system.

Guangxi Site

It was an important charcoal production area with good market in Zhujiang River Delta and Hong Kong. As the development of commercial energy, the charcoal markets shrinkage occurred. Most of the broadleaf forests became badly degraded due to poor management. The major degraded forests are poorly managed secondary broadleaf forests in Guangxi Site. All the degraded secondary forests were distributed to individual households for management. The farmers collect their firewood for their own consumption as well as small quantity for local market. In order to increase the productivity of degraded secondary forests, a small watershed was selected to setup watershed management system. After extensive discussion among farmers, government and scientists, a design was worked out, and new plantations of economic plants were established. But the newly established plantations were poorly managed and badly protected. After examining the process of the design and implementation, it was found that the design was a mainly scientists' work of technical design. The management regulations and benefit distribution were not clearly defined. Great support was obtained from the County Government, but the involvement of the township government (real grassroots) was limited.

Yunnan Site

The research site in Yunnan is located at a very remote mountainous area. The major problem is soil erosion on steep slopes. In this site, scientists and local farmers closely worked together to cauterize their lands according the degree of erosion. For these different category of land, various measures of erosion control were worked out and implemented. The local government's participation is very limited.

CONCLUSIONS

From the above results and analysis, the major conclusions of the research can be summarized as follows:

1) In most cases, forests can be better managed at appropriate scale of joint management, or forests are typical common resources that need to be managed in a participatory environment in which people share with each other the resources and experiences for mutual goals of management;
2) Farmers are the core in designing a forest management system (technical design as well as socioeconomic considerations) because they are direct beneficiaries. The designed options can be well implemented only under the conditions that farmers have the technical skills and understand that certain economic profits will be generated from such a system. A

good option at the point of view of scientists may not work well unless that is accepted by farmers' own judgement.

3) In common resource management practices, scientists always play dual functions, technical support and bridging between government and farmers. In a common resource management project, there is economic conflict between farmers and government because they are both beneficiaries of common resource management projects. Under this circumstance, scientists can play an important role in facilitating the dialogue between farmers and government.
4) Because government's participation in common resource management project is usually economic incentive-oriented decision, they may performed differently in participating in a common resource management project given that they are at different economic development levels. In a well-developed area, the government may mainly provide good services and not directly involved in the economic relationship. Their goal of providing services is to promote local economy and contribute to the overall GNP of the area. At the mid-level development area, the government may directly involve in the common resource management, and the government may become a partner of the farmers in a common resource management project. While in the less developed areas, due to lack of economic-incentive, local government's participation is usually limited.

REFERENCES

Berkes, Fikret (1986) "Local Level Management and the Commons Problem; a comparative study of Turkish Fisheries," *Marine Policy*, July 215-229.

Berkes, F.D. Feeny, B.J. McCay, and J.M. Acheson (1989) "The Benefits of the Commons," *Nature* 340:91-93.

Feeny, D. Berkes, Fikret Berkes, Bonnie J. McCay, and James M. Acheson (1990) "The Tragedy of the Commons: Twenty-Two Years Later," *Human Ecology* 18(1):1-15.

Hardin, Garrett (1968) "Tragedy of the Commons," 162 *Science* 1243-1248.