

Workshop on Payment Schemes for Environmental Services:

**April 22 – 23, 2002, Beijing
CCICED Western China Forest Grasslands Task Force**

Summary of Proceedings

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Workshop on Payment Schemes for Environmental Services: Summary of Proceedings

1. Introduction

On April 22nd and 23rd, 2002, the CCICED Western China Forest Grasslands Task Force co-sponsored a workshop on payment schemes for environmental services. Other co-sponsors were the State Forestry Administration's Department of Policy and Legislation and the Chinese Academy of Science's Center for Chinese Agricultural Policy. Financial Support was provided by the Ford Foundation, World Bank, Canadian International Development Agency, and Australia Center for International Agricultural Research. Technical support was provided by the Washington-based NGO Forest Trends.

The workshop was prepared in response to findings of case studies of the Cropland Conversion and Natural Forest Protection Programs conducted by the Task Force in 2001. These studies identified a number of design and implementation issues that merited further attention, including the targeting and level of payments, monitoring and evaluation of impact, as well as the sustainability of financing. The studies also raised the question of the relationship between these programs and the pilot "Forest Ecological Compensation Fund" under implementation by the State Forestry Administration (SFA). The purposes then of the workshop were to: (1) inform the SFA leadership and related researchers of experiences of other country governments in designing and implementing public payment schemes; (2) introduce them to optional public and private approaches to achieve conservation goals, such as carbon trading, and to generate recommendations for improving public payment schemes in China.

This document summarizes the presentations and ensuing discussions of the workshop and also includes a summary of group sessions held at the meeting to prepare recommendations. Presentations made include both those of Chinese presenters introducing the situation of payments schemes in China and those of international presenters sharing relevant experience from abroad. A fuller treatment of these presentations, namely a paper on each, will be made available at a later date.

2. Opening Speech:

Xue Jiafu, Vice Minister, State Forestry Administration

Following welcoming remarks, Minister Xue discussed the increasing recognition worldwide of the important ecological role played by forests, the measures being taken in China to protect and expand forests, and the nation's Forest Ecological Subsidy Fund. In China, recognition of the public benefits role of forests is reflected in key documents, such as "China's Agenda 21 Forestry Action Plan," "China's Action Plan for the UN Treaty on Combating Desertification," and "National Plan for Ecological Construction," which clearly delineate the nation's principles of developing sustainable forest management. The recent initiation of six major ecological improvement programs also reflects the nation's new approach to forestry.

These programs include: (1) the Natural Forest Protection Program, (2) the Program for Establishing Protection Forest Systems, (3) the Cropland Conversion Program, (4) the Sand Control Program for areas around Beijing, (5) the Program for the Protection of Wild Plants and Animals and for the Establishment of Nature Reserves, and (6) the Program for Establishing Key Timber Production Bases.

At the same time as China has been making large fiscal investments in these programs, it has also established a "Forest Ecological Subsidy Fund." In 2001, the Ministry of Finance and the State Forestry Administration chose 658 counties (or work units) and 24 national-level nature preserves in a total of 11 provinces as pilot sites for use of this fund. The scope of pilot implementation is 200 million mu of key protection forest and special-use forest (one mu equals 0.0667 hectares). The legal designation of 30% of forests as ecological public benefits forest and the corresponding establishment of the Ecological Subsidy Fund, which has been made a part of the national budget, show recognition of the value of public benefit forests and ensure a stable source of funds for forest protection and management.

The above-mentioned programs and policies demonstrate a fundamental shift in Chinese forestry. From now on, strong efforts will be made to resolve problems in funding policy, tax policy, management policy, and other areas. The workshop, given the topics and international experience to be covered, then, should contribute to the improvement of China's forestry policy.

3. Development of China's Ecological Compensation Scheme: Chen Gengchang, Director General, Department of Policy and Legislation, State Forestry Administration

In his presentation, Director General Chen reviewed the background, development, and current implementation situation of the Forest Ecological Compensation Scheme. In terms of background, since the 1980s, as China has gradually moved from a planned to a market economy, the enterprises and individuals that administer the forests have, unfairly, had to bear the costs associated with public benefits from forests. As a result, many locales and enterprises taking part in forest tending and forest protection have become poorer; and tending and protection, in turn, have become more and more lax. There are two options for resolving this problem. One would be to fully incorporate forest enterprises into the state budget, with the state bearing all expenditures of these enterprises and also receiving all income from them. The other option would be for those that run the forests to be compensated for the public benefits provided. In China, only the second option makes sense because of the following factors: (1) the large population involved in China's forest enterprises, (2) the diversified lines of business of most state-owned forestry enterprises, and (3) the other sources of livelihood of most farmers involved in forestry.

The inspiration for China's Ecological Compensation Scheme comes from the tourist site of Qingcheng Mountain of Chengdu Municipality in Sichuan. Poor forest management in the 1970s resulted in crisis for this scenic spot; and the local government decided that 30% of income from entrance tickets would be used for forest protection. The success of this approach came to the attention of the Ministry of Forestry in 1989; and a workshop was held that year in Sichuan to discuss forest

ecological compensation, thus beginning the history of the Scheme. It took four years before agreement was reached within the Ministry in 1992 for formal support of this matter. That year, the Ministry organized ten government departments to research the issues; and, in a meeting held in February of 1993 in Beijing, consensus that a forest ecological compensation scheme should be set up was reached. In 1996, the first proposal for a national scheme was issued by the Ministry of Finance. Based on the Qingcheng model, the plan was to collect a total of 600 million yuan from various sources, such as entrance tickets for scenic and historical sites and hydropower installations. The proposal was sent to the State Council, but Government departments with vested interests downstream who were directly benefiting from forest protection argued that they alone should not have to pay, as the whole nation benefits from ecological services; and the plan was rejected.

The decisive factor in moving the scheme forward was its incorporation into the Forest Law in 1998, when a clause was added to the Law that called for the establishment of a forest ecological compensation fund to be used to support the provision of public benefits by protection forests and special-use forests. In January 2000, an implementation regulation was issued that stated that those running protection and special-use forests have the right to receive forest ecological compensation, including payments for afforestation, protection, tending, and management. The Ministry of Finance then made a proposal for drawing a total of over 5.0 billion yuan annually from twelve different funds to support the scheme, but after this plan was reported up to the State Council in early 2000, it was decided that the money would not be drawn from other funds, but rather that it would be directly allocated from the fiscal budget. With a new proposal in place in May 2000, the scheme finally had a formal source of funding.

In preparation for implementation, work was done in setting the boundaries of protection and special-use forests and signing relevant agreements, with most provinces having now completed this work. On the basis of this work, in 2001, the Ministry of Finance allocated 1.0 billion yuan to be used in ten provinces for pilot implementation. Local governments in Guangdong, Fujian, Zhejiang, and other provinces have allocated similar funds and are also implementing local public benefits forest compensation pilots.

Aside from the aforementioned subsidies, there are now three other channels of fiscal investment for the development and care of public benefits forest in China. These are: (1) afforestation payments and tending and protection payments associated with the Natural Forest Protection Program, now being implemented in 22 provinces and municipalities; (2) grain, seedling, and cash subsidies provided to farmers as a part of the Cropland Conversion Program, which is being implemented in 24 provinces and municipalities;¹ and (3) payments for afforestation and seedlings associated with the Sand Control Program, which is being implemented in five provinces.

¹ According to regulations, 80% of Conversion Program plantings should be ecological forest (usually non-native trees planted for ecological purposes), so that most of the expenses associated with the program may be considered ecological compensation.

Main Points from Discussion:

- Getting non-governmental organizations (e.g. the private sector) to fund ecological services has not yet been very successful in China. Potential sources of funds, such as hydropower companies, have effectively argued that they are not the sole beneficiaries, and thus should not bear the cost. As a result, the State Council has been deterred from adopting direct payment schemes. It could be argued, however, that certain beneficiaries benefit much more than others and should therefore support provision of environmental services.
- The Ecological Compensation Scheme, now used only to support forests, might also be used to support grassland restoration.
- Compensation between regions (e.g. upstream and downstream) is another option, but it would require coordination by the state, rather than direct payment from one area to another.
- The name of the fund has been changed from "Ecological *Compensation* Fund" to "Ecological *Subsidy* Fund" because of the limited amount of financing currently available.

4. Factors to Consider in Choosing Instruments to Promote Environmental Services

Sara Scherr, Senior Policy Analyst, Forest Trends

Dr. Scherr first described the range of instruments available to promote environmental services of forests and then discussed choice of instrument and the advantages and disadvantages of the various options. Historically, the most widely used instruments involve direct government intervention and are public control and management of resources (i.e. land fully under government control) and public regulation of private resource management, such as prohibition or limitations on production. Approaches that are more flexible for individuals, but still involve the government, include pollution permit markets and pricing to "internalize" environmental costs and benefits (e.g. tax benefits for afforestation). Another type of instrument, public payments to producers for services, calls for direct payments to households or other providers of environmental services through subsidies. Support of self-regulation and innovation in resource management by local communities is an additional instrument. Finally, two other instruments, in which the government plays only a secondary role, are private deals for environmental services (e.g. upstream landowners paid by downstream enterprises) and eco-labeling of products, the latter depending on consumer willingness to pay more for products that are produced in an ecologically benign fashion.

While people tend to use the instrument with which they are most familiar, clearly a better means of selecting instruments would be to consider a number of key factors, including biophysical features, economic conditions, institutional conditions, political conditions, management complexity, economic costs, and equity, to determine which instruments would be most effective. Biophysical features of ecosystem services might include the relationship between forest cover and water supply (and whether or not that link is well determined). As an example of consideration of economic conditions, it might be important to evaluate what would happen to the effectiveness of the potential instrument if the price of timber were to go up. As an example of

consideration of institutional conditions, it would be important to determine whether municipalities have the legal authority to enter into contracts with water users. In terms of economic costs, the instrument should be as inexpensive as possible. In terms of equity, it is important to note that some of the more draconian measures are not fair to producers, while others give the poor more opportunity to earn a better livelihood.

Review of the advantages and disadvantages of the various instruments indicates that two good opportunities for China in coming years would be to support: (1) self-regulation and innovation by communities and (2) self-organized private deals. The latter may require legal systems for enforcement, but could also be achieved through informal arrangements. As experienced with the development of China's Ecological Compensation Scheme, it has been found that eco-tourists and other users of environmental services are not willing to contribute to general funds. Such users, however, have been found to be willing to pay specific producers for services that benefit them directly. It has even been found that downstream farming communities are in some cases willing to pay upstream farming communities.

In general, more than one policy instrument is almost always needed. No one policy instrument is superior; but, rather, choice of instrument depends on the local situation, including the capacity of both the public and private sectors.

Main Points from Discussion:

- In Costa Rica, it has been found that when local governments are empowered to design and administer payment schemes, willingness to pay for the ecological service increases substantially.
- The public budget is the main channel of funding for environmental services in China, but the funding given often does not fully cover the services provided. International experience has shown that specific funds, with sources of funding clearly linked to those receiving the benefits, are more effective in compensating environmental service providers than general funds.
- In China and other developing countries, there are not enough resources in the government budget to fully support payments for environmental services. In the international arena, bonds and venture capital funds, such as investment funds set up by conservation organizations, are alternative sources of funding.
- Property rights structure (e.g. whether an area is defined as owned by the state or local farmers) is an important factor in the success of a payments system. Property systems are complex; and very few countries have established who owns ecosystem services. Yet, before a payment scheme can be successful, it is very important to confirm that the person paying for ecosystem services will actually receive these services and that the party being paid actually has the right to receive payments.

5. The U.S. Experience with Land Retirement for Natural Resource Conservation

Ralph Heimlich, Economic Research Service, U.S. Department of Agriculture

Dr. Heimlich reviewed the background of U.S. land retirement programs, introduced the status of one of these programs (the Conservation Reserve Program), and discussed lessons learned and costs and benefits. The motivation behind the U.S. programs has certain parallels with the situation of China. In the 1920s and 1930s, there were catastrophic floods in the U.S. and dust storms in the Great Plains ("the Dust Bowl"). On the other hand, in contrast to China, private property rights in the U.S. are very strong and farmers are a very strong political power, creating conditions where farmland owners have unquestionable right to decide their land use and the Government cannot require conversion to trees or other changes in land use. For these reasons, all programs must be voluntary, and the Government must pay farmers to change land use. Land retirement programs have been in place since the 1930s; and only during two brief periods (after World War II and in the 1980s) was there not land retired. The program has tended to grow during periods of low agricultural prices, so that it also has social benefits.

There are five different land retirement programs; and most are either long-term (with 10 to 15 year contracts). Annual rental payments are given to farmers for voluntary retirement of cropland. The government puts this money aside up front, at the beginning of the contract. The government shares the cost (providing 50 to 75%) for establishing cover and carrying out conservation practices on this land with farmers. The programs have certain eligibility requirements, such as land having been planted with crops in two of the last five years, and environmental requirements, such as high erosion indices, being cropped wetland, or being located in a state conservation priority area.

The Conservation Reserve Program (CRP) currently has 13.6 million hectares, or 10% of the nation's cropland base, enrolled. It is a large program with over 560,000 contracts and over 370,000 farmers (about 18% of all farmers) involved. The retired land is located mainly in the northern and central plains, with some in the humid east. The average amount paid annually by the government for rental of land to be retired in this program is US\$1.5 billion, with an average rental cost of US\$116 per hectare. In terms of cover, 60% of CRP acreage is planted with grasses, 16% is planted with trees or woody vegetation for wildlife, and 5% is wetland restoration.

Four major lessons learned have to do with (1) targeting, (2) choosing the appropriate rent, (3) setting the contract term, and (4) slippage. From the 1930s to the 1960s, the program did not address targeting. Now, however, land to be included in the program is chosen based on an "Environmental Benefits Index," which gives points for various factors ranging from erosion and water quality to costs. In terms of rent, an important lesson learned is that setting a single rental rate will result in those with less valuable land get excessive benefits and those with more valuable land being unwilling to participate. Thus, rental rates are now adjusted from a median based on compensating the farm operator for the lost opportunity of cropping the land. In terms of setting the contract term, for those lands that are being rented over and over again, long-term rental and even purchase may be the most efficient options. "Slippage" refers to the problem of a farmer retiring some land as a part of the program but bringing new land into production to compensate. Thus, the CRP has special provisions to keep participants from bringing new land into production.

Overall, it is believed that the program has a positive cost-benefit ratio; and program implementers focus their efforts on choosing the right parcels of land to achieve the greatest benefits. Landowners benefit mainly through rents. Aside from achieving the desired environmental improvements, the government benefits through not having to pay crop subsidies on the retired land. The CRP also causes the prices of crops to go up, so that subsidies go down. Non-farm consumers benefit in areas such as wildlife preservation, but must pay higher prices for food.

Main Points from Discussion:

- In comparing the U.S. program to China's Land Conversion Program, it is important to note that the rights of farmers are very clear in the U.S. and also that it was 30 years before the U.S. program started to implement targeting and monitoring.
- Given that the U.S. is a food surplus country and that China is a food deficit country, it will be important for the Chinese program to promote conservation approaches that meet environmental goals but also continue to produce food – as is possible with agroforestry systems.
- While it is true that the CRP has a distorting impact on trade, this is not considered a problem in terms of WTO, because the program reduces exports.
- One reason the CRP uses limited-term contracts is that this maintains flexibility to respond to the market (e.g. taking more land out of production when prices are low).
- In the CRP, the species of grass or trees to be planted is the landowner's option. Landowners, however, make their choice recognizing that it will affect their chances to take part in the program, which is highly competitive. The Government only accepts one out of every two or three applications. Choice of cover is taken into account in the program's environmental benefits assessment, which is used in determining whether land will be chosen for the program. The system of scoring is made public, so that farmers can make strategic choices. If a farmer plans to introduce grass for forage, fewer points will be given in the assessment than for natural grass. If trees are planted in areas appropriate to trees, the farmer will have more chances of being accepted into the program.
- While their land is still under CRP contract, farmers are not allowed to use the grass planted for grazing. It is hoped that the farmers will maintain the cover and not re-crop after the contract expires, but they are not obligated to do so. For farmers receiving agricultural subsidies, however, there are some requirements related to limiting soil erosion in cases for which retired land is brought back into agriculture.
- In terms of indicators for the CRP, point values for environmental benefits are determined at the national level, but points for what is planted are determined locally by the state through a system of soil conservation technical experts down to the county level.
- In terms of targeting different regions, the CRP has geographical targeting on a broad basis for priority conservation areas. On a more local basis, however, there is less specific targeting. For a small watershed, for example, there is not upstream versus downstream specification.

6. Local Experience with the Ecological Compensation Scheme in Guangdong Province

Qu Jiashu, Director, Policy and Legislation Department, Guangdong Forestry Bureau

Mr. Qu first introduced the setting up of regulations for the Ecological Compensation Scheme in Guangdong and then reviewed experience with implementation in the province and plans for the future. Guangdong Province's Forest Ecological Compensation Scheme was formally established in 1998 with issuance of a special document by the provincial government. As background, after provincial wasteland afforestation objectives were achieved in 1993, garnering national recognition, Guangdong separated its forests into ecological public benefit forest and commodity forest in 1994, adopting relevant management measures for each. Regulations set that year called for the development of an ecological compensation scheme, but it then took nearly five years and ten sets of revisions before the aforementioned 1998 document was issued, with the delay being caused mainly by insufficient allocation of resources. Originally, the plan was for funding to come from fees on water, hydropower, forest scenic site entrance tickets, and timber enterprises, but this turned out to be difficult to organize, with high transaction costs. In the end, it was decided to use government funding to support the scheme.

In 1999, the scheme was first implemented, targeting 51.02 million mu of provincial-level public benefits forest with provincial funding. In 1999, the funding standard was 2.5 yuan per mu, but this has now been raised to 4.0 yuan per mu. Over the three years from 1999 to 2001, the total amount of compensation delivered was 532 million yuan. Regulations call for funding of afforestation, protection, and management of public benefits forest to become a part of the provincial budget and consist of the following four components: (1) not less than 30% of the total annual fiscal funding for forestry from all levels of government; (2) not less than 25% of the funds annually allocated for biological control of soil erosion in the watersheds of the Dong, Bei, and Han Rivers; (3) ten million yuan from fees on water from the Dongshen Water Supply Plant; (4) funds for afforestation work in the watersheds of the Dong, Xi, Bei, and Han Rivers.

Implementation has included delineating the boundaries of ecological public benefits forest, signing forest management contracts, and supplementation of provincial funding with local funding. In 1999, the total area of ecological public benefits forest in the province was determined to be 51.029 million mu, or 19.5% of the province's area and 32.7% of its forest use land. In most cases, contracts have been signed directly with the forest operators, but there have also been cases of rental, contracting out, establishment of share system forestry centers, etc. Guangzhou Municipality has supplemented the provincial funding in key areas to provide a standard of twelve yuan per mu; and other locales have also taken a variety of measures to supplement the funding when needed. Some counties in Shaoguan Municipality, for example, are raising funds from fees on water, electricity, and coal.

As a part of the program, indicators of forest function have been set up and targets have been developed. Namely, ecological benefits forest has been divided into first level, second level, and third level, depending on quality; and targets have been set for 2005 and 2010 to increase the proportion of first and second level and lower that of

third level. The main means of achieving these targets will be the "Four Rivers" Project for establishing public benefits forest.

Problems encountered in implementation include difficulty in quantifying ecological benefits, the low level of compensation, and difficulty in compensating different forest areas according to different levels of ecological function. Although the level of compensation has been raised from 2.5 yuan per mu to four yuan per mu, it is still perhaps only one-tenth of what it should be. Plans for the future, in addition to calling for the establishment of a high-quality ecological forest system and strengthening of accounting and management, call for raising the funding standard to 30 yuan per mu.

Main Points from Discussion:

- Forests in China are divided into national level, provincial level, and municipal or county level. Compensation by the state versus the province, then, is according to these divisions.
- Because northern Guangdong is a water retention area and there are some ecologically-motivated restrictions on development, the people in the region hope those in the south of the province, who benefit, will compensate them. Such a region-to-region compensation scheme might best be handled by taxation at the national level.
- When the forests are owned by either individual farmers or collectives, the rationale and means of compensation are straightforward. The rationale and means of compensating the employees of public forest enterprises is less clear.
- In Fujian, there is a problem of the forest of the poorest quality, rather than that with the best ecological function, being selected for compensation. In Guangdong, there is a similar problem in that there is a tendency to select the best land for commercial forest. The provincial forestry bureau, however, focuses its efforts on selecting that land in the headwaters of rivers.

7. Local Experience with the Ecological Compensation Scheme in Anhui Province

Liu Yongchun, Vice Director, Anhui Forestry Bureau

Anhui Province is one of the eleven provinces selected to be a part of pilot implementation of the state's Ecological Subsidy Fund. Mr. Liu discussed designation and definition of forest types, implementation of the program at the local level, and problems encountered. In terms of designation of forest types, in 2000, the State Forestry Administration chose the province's Huangshan Municipality as a national pilot in terms of running forests according to forest type. After over one year of work, in July 2001, the entire province's forests had been classified and delineated according to forest type. The result was that 26.53 million mu (41.8% of forest use land) was designated as commercial forest. A total of 36.90 million mu (52.8% of forest use land) was designated as public benefits forest, of which 20.85 million mu (56.5% of the total public benefits forest area) was designated national-level public benefits forest. Anhui Province was the first in the nation to complete its forest designation work and report up to the national level. In October 2001, the State Forestry Commission contracted East China Forest Surveying Institute to carry out an

inspection of this work; and the institute found that the work fully met national standards.

In terms of implementation of the compensation scheme, the state called for the area of pilot implementation in Anhui in 2001 to be 12.00 million mu and the annual subsidy to be 60.00 million yuan. Of the funds provided, 70% was to be directly allocated to county-level institutions and operators, with the other 30% allocated on a project basis. Within Anhui, the county of Qingyang was chosen as a demo site for implementation. Based on experience in Qingyang, the Anhui Forestry Bureau issued a series of documents with regulations for implementing the pilot program. The province also required that special accounts be set up for the Compensation Fund at the provincial, municipal, and county levels to ensure that funds are used only for the designated purpose. Two types of contracts were signed with the operators of forests: one regarding the delineation of public benefits forest and the other regarding forest management responsibilities. A dual supervision method was used, with reporting up to both the provincial forestry bureau and the provincial bureau of finance, to ensure that funds were appropriately distributed.

Problems encountered include low compensation standards, management costs, and negative impacts on state-owned forest enterprises. The state has set a compensation standard of five yuan per mu, but this is much less than the full value of the ecological and social benefits. Currently, experts are carrying out work on measuring the real value of the benefits and have proposed new methods for assessing benefits and new compensation standards. It is thought that the standard should be appropriately raised for those forest areas that provide a high level of benefits, given their location and/or quality. The opportunity costs of forest operators should also be considered. Work also needs to be done in developing an effective management and supervision system for the program. Currently, the state does not provide any funding for management of the Ecological Subsidy Fund, so that the costs must be borne by forestry departments at all levels. Finally, the designation of large parts of the land under the control state-owned forestry enterprises as public benefits forest will have a negative impact on these units, which were mostly established in the 1950s and 1960s and depend on timber production for income. In implementing reforms in forest designation, the long-term development of these enterprises must be considered, with perhaps the policies of the NFPP for key state-owned forest districts being used as reference. With preferential policies, these enterprises could be supported in developing lines of business in other sectors or encouraging staff to enter new specialties themselves.

Main Points from Discussion:

- Taxes and fees on forest production remain high and reduction of these fees would be another means of achieving some of the goals of the Ecological Compensation Scheme. Anhui is also a pilot province for rural tax reform; and taxes on many types of forest products have already been reduced. Authority for such reductions lies at the central level.
- While two categories of forest (economic and ecological) have been emphasized, in Canada, there is a third type: "low production forest." In this type of forest, poor people are allowed to harvest some, but on a limited scale and in a careful fashion. This is an important concept for poverty alleviation and, indeed, in China, "ecological forests" are divided into two types: (1) high priority

conservation, in which no cutting is allowed, and (2) general conservation, in which limited logging is allowed.

- Of the 60 million yuan in central government funds for the program in Anhui, 42 million yuan is to be given to the operators. Of this, 60% has already been delivered; and the rest should be distributed by the end of April. The amount to be delivered has been made public to ensure transparency. The remaining 30% of central funds will be used for specific projects, such as pesticide projects, etc.
- In terms of whether local farmers see the ecological benefits of forests as benefiting themselves, in Anhui, those that have suffered from flooding do see the benefits for themselves. In some natural forest areas, local people have, without compensation, not been allowed to log, so they are now of course glad to be compensated with three to five yuan per mu.
- One suggestion for raising the compensation level would be to focus limited funds on the most fragile areas in order to get the highest benefit.
- While funding for the Ecological Compensation Scheme at 1.0 billion yuan annually is limited, if other channels for supporting ecological forests are considered (e.g. the Natural Forest Protection Program, the Cropland Conversion Program, and the Sand Control Program), total annual funding for compensation of those operating public benefits forest is really more like 30 billion yuan.

8. Market-Based Innovations for Environmental Conservation in Brazil

Mario Monzoni, Director, Friends of the Earth Brazil (presentation given by Andy White, Director of Policy and Market Analysis, Forest Trends)

Unfortunately, Mr. Monzoni was not able to attend the conference, but prepared and sent a presentation anyway. Mr. White gave his presentation in his stead. After providing some brief background information, Mr. White reviewed three market-based innovations for environmental conservation in Brazil and described the advantages of each. He closed with mention of some non-governmental activities underway in the country. Brazil is home to the Amazon, the largest intact forest in the world. While the government has tried to control conversion of the forest by laws and regulations, these measures have not been effective; and there has been large-scale deforestation. As a result, there has been a shift from command and control measures to market-based initiatives.

One such initiative is the Private Natural Heritage Reserve (RPPN). This program, for which a law was enacted in 1996, allows for privately owned land, based on the willingness of the owner, to become permanent national heritage areas, with maintenance of private status. The landowners sign agreements for maintaining the environmental attributes of the land and then benefit from the following: (1) exemption from rural taxes, (2) priority consideration as candidates for financial subsidies through a national-level environmental initiative; and (3) preferential access to credit for agricultural activities on land not included in the program. The government is able to ensure sustained protection of the land, while not buying it outright. To date, over 100 private National Heritage Reserves have been created covering 250,000 ha of land.

A second initiative in Brazil is the Ecological Value Added Tax (ICMS Ecologico) by which 25% of the tax on sale of goods and services is reallocated to local governments through a scheme that rewards them for environmental work, such as the establishment of protected areas. The program is now operative in six Brazilian states. When municipalities receive these funds, they do not have to spend the money on conservation, but rather, as the program operates more as a reward system, can use the funding on their most urgent priorities (e.g. bridge building). This is one reason that politicians outside of the environmental departments support the program. The program has led to an increase in the size and number of protected areas and other environmental improvements. It has also led to public participation in the environmental debate, as municipal environmental agendas are introduced, and to greater fiscal justice.

A third market-based initiative in Brazil is the Legal Reserve Tradable Rights Scheme, which is a new proposal now before the Brazilian Congress. This scheme would add greater flexibility to the current rule that 80% of every private forest holding remain in natural forest. As currently implemented, most farmers in areas where agriculture has high productivity break the rule by clearing more than 20% of the land, while in areas with low agricultural productivity, the rule may be abided by. The current proposal would enable landowners in low productivity areas, where the environmental cost of deforestation may be high, to sell their rights to clear a portion of the land to those in high productivity areas, who would prefer to pay to be able to clear more than 20% of the land.

Aside from the three initiatives discussed above, there are also some non-governmental market-based initiatives taking place in Brazil. "Pro-Ambiente," for example, is a private environmental fund financed by large corporations and environmental groups that compensates landholders for provision of environmental services. Through another initiative, which was organized by the NGO Friends of Earth, buyers groups have committed to buying only FSC certified wood. Finally, private watershed consortiums are emerging in which downstream users (such as water bottling plants and breweries) finance forest conservation upstream.

9. The Use of Market Instruments for Environmental Services in Costa Rica

Luis Gamez, Advisor, Ministry of Environment, Costa Rica

Mr. Gamez reviewed the measures that have been taken in Costa Rica to reverse deforestation trends and provide payments for environmental services. As background, he noted that Costa Rica is a small country that underwent serious deforestation from the 1940s up until 1990. Almost one quarter of the country's area is now committed to conservation purposes through national protection areas. While Costa Rica has done well, then, from the perspective of public lands, the real worry at present is conservation on privately owned land. To remedy the situation, the nation's new Forest Law has called for economic compensation for provision of environmental services, recognizing four kinds of such services: water resource conservation, scenic beauty, ecosystem protection, and carbon sequestration.

The main source of funding for the Costa Rican government's ecological compensation fund is a tax on fossil fuels; and the main use of the fund is forest conservation. Other sources of funding include payments by hydroelectric companies and voluntary carbon emissions mitigation purchases by countries such as Norway and the Netherlands. Institutionally, the fossil fuel tax is made to the Ministry of Finance and is put, with other sources of funding, into a "National Forestry Financing Fund," from which monies are eventually paid to landowners. Levels of payment are determined based on the opportunity costs for land use. Given that the main competition of forest conservation is cattle raising, the compensation must generally be greater than the cost of renting the land for grazing. Compensation to each landowner is made in a single payment distributed over five years, which is the duration of the contract. In terms of contract type, for the five-year period ending in 2001, US\$210 million was made for forest conservation, US\$327 million was made for sustainable forest management, and US\$537 million was made for reforestation. In order to promote broad participation, limitations were put on the area per landowner that could be eligible for the program, with a maximum of 300 ha per individual. For the five-year period, there were a total of 4,461 contracts, covering over 283,000 ha.

In terms of results, there has been high demand for participation in the program, deforestation has been reduced, and forest cover on private land has increased. The program has encountered some obstacles, including financial bottlenecks, evaluation and targeting problems, and understaffing for monitoring. In terms of financial bottlenecks, only one third of the dedicated fuel tax revenues are allocated each year. In terms of evaluation and targeting, there has been competition between conservation and forestry sector goals, as well as limited participation possibilities and transaction costs.

In addition to the government program, there are some private schemes that coexist with and are complementary to it. The private schemes are mainly applied to watershed management, providing compensation for people in the upper parts of watersheds. An example is an added tariff on water fees charged by public utilities and transferred to providers of environmental services. The fees have a low financial impact on the end user, but high benefits. From experience, it has been found that such private payment schemes are highly complementary to the public scheme discussed above.

Main Points from Discussion:

- Although, as indicated in the presentation, private schemes can be complementary to public schemes, local level initiatives (such as a surcharge added by the local water utility) have actually been discouraged by the central government of Costa Rica. The central government program has acted as a sort of monopoly and has tried to institute the requirement that all ecosystem payments go through it. This move has been challenged by local governments, who are legally independent.

10. A Proposed National Carbon Framework for Forest Carbon Markets

Gary Bull, Professor, University of British Columbia

Professor Bull described the various institutions that might be required to support a national carbon trading framework and also reviewed the steps in design and implementation of a forest carbon project. Professor Bull's work draws from actual experience over the past three years with market players and intermediaries (e.g. insurance companies and accounting firms) in developing forest carbon projects in Canada. Research has shown that forest carbon sinks are actually a cheaper alternative to other means of emissions reduction. Currently, however, the markets for carbon are mostly gray markets, as the international regulatory structure (the Kyoto Protocol) has not yet been ratified.

In terms of the potential market, the potential buyers of carbon credits are utility companies, oil and gas companies, and any other firms involved in fossil fuel related businesses. The potential sellers of carbon credits include forest growers, who would be responsible for implementing and managing forest carbon sink projects. While the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) has not yet been ratified, market players are already entering the market and financing forest carbon projects, and governments are beginning to meet its many institutional requirements.

Mr. Bull explained how to meet these institutional requirements and establish a framework for forest carbon trading in a country. One particular requirement in the Protocol is for countries to establish a national carbon accounting system and a registry. In the framework proposed in the presentation, a "national carbon office" would have responsibility for conducting a broad forest inventory and maintaining the national carbon registry for the reporting of emissions reductions. Other entities in the proposed framework, besides the national carbon office and the forest grower, are the risk management agency, verification agent, and emissions clearinghouse. Risk management agencies would be responsible for assessing the risks of the projects and providing protection against fire, insects, disease, and other risks. Currently, insurance companies have shown substantial interest in playing this role. The verification agent would have the function of conducting independent audits of projects and would serve the function of ensuring to buyers that their purchases meet agreed upon specifications. Finally, the clearinghouse would interface with registry data, tracking carbon transactions and conducting on-line trade of carbon.

Although the institutional framework described above is not yet in place in most countries, there are many forest carbon 'projects' underway in the world – financed by private companies. These projects allow all parties (private sector buyers, forest owners, and governments) to gain experience in the market while they are developing the institutional framework. The steps to develop forest carbon projects are: (1) develop a project proposal, (2) make preliminary carbon yield projections, (3) define and measure the "business as usual" baseline (with 1990 as the base year), (4) conduct project evaluation and registration, and (5) locate a suitable partner. In terms of project implementation, the suggested steps are: (1) establish and manage the forest carbon project, (2) design a sampling system, (3) conduct a forest carbon inventory, and (4) submit forest inventory data to the registry and schedule independent verification.

Main Points from Discussion:

- In terms of what type of forest project might be eligible for carbon trading, afforestation projects conducted after 1990 (the baseline year designated in the Kyoto Protocol) might find a buyer. The extra carbon stored in such projects since 1990 would be eligible for carbon credits. More intensive management of forests (such as fire suppression and fertilization that increase the biomass storage in forestland) would also be eligible. Finally, carbon conservation (i.e. demonstrating that forest would have otherwise been harvested) and switching of energy sources (e.g. forest products companies switching to cogeneration or switches from fossil fuels to biofuels) might also be eligible.
- The ownership of carbon credits may become contentious when these suddenly become very valuable. Given the complexity of the issues, poor upland communities may be at risk in protecting their interests. Experience to date with forest carbon trading work has show that the only cases in which there is no dispute on land ownership are those of small, private landowners. Thus, buyers are most willing to purchase credits from these.
- There are already multiple carbon trading centers in the world. In North America, there are three major trading houses, one in Winnipeg, Canada, one in Chicago, U.S.A., and one in Monterey, Mexico. There are also others, such as the online trading house CO2.com. Given this multiplicity, all of these organizations will have to coordinate with government to ensure that carbon is not double-traded.
- Interestingly, the motivation for carbon trading in Canada comes more from local governments than from the national level. Canada sells much of its energy to the U.S., and twelve U.S. states have already put caps on carbon emissions and are beginning to establish carbon markets. Large energy companies all have risk management strategies and, given the situation, many of these are looking to buy carbon offsets, which in theory could be purchased from China.

11. Reflections on China's Forest Ecological Compensation Fund

Sun Changjin, Director, Research Center for Environmental and Ecological Economics, Chinese Academy of Social Sciences

Dr. Sun presented results of research on pilot implementation of the Forest Ecological Compensation Fund, providing information on the implementation situation and identifying key issues regarding the program's effectiveness. As background, he emphasized that the program is not yet in its full operational stage and also that development of the program has been a decade-long process. As currently implemented, the program focuses on the protection and management of protection forest and special use forest, with funds supporting the functions of ranging, fire prevention, insect prevention, and monitoring of resources. It is not a real compensation scheme in that subsidies do not cover the opportunity costs of operators of the forest. In theory, the beneficiaries of subsidies should be organizations, collectives, and individuals who manage key protection forests and special-use forests designated by the state, but in practice it is sometimes hard to identify these. Pilot implementation covers 685 counties (or enterprises) and 24 national-level nature reserves in eleven provinces, including Hebei, Heilongjiang, Fujian, Shandong, Liaoning, Anhui, Jiangxi, Hunan, Guangxi, and Xinjiang.

An assessment of the effectiveness of the program would be difficult, given the lack of clear assessment criteria and the short time during which the program has been in

place. Research, however, has revealed some problem areas. First, there are concerns that the annual subsidy of five yuan per mu is too low; and a higher rate of ten yuan per mu has been proposed. In addition, there is also a problem of uncertainty among target beneficiaries regarding the length of the program and nature of the subsidy. Landowners that are compensated also lack a good understanding of what is required of them; and farmers who own forests are not clear on their rights. For state-owned forest enterprises, the question arises of whether adequate operational financing from the state might lead to more effective forest management than the subsidies provided by the program. In terms of monitoring and evaluation, the program lacks objectively measurable environmental indicators. Finally, given the difficulty of collecting revenues from beneficiaries, the program has moved away from the original principle of "whoever benefits pays."

Main Points from Discussion:

- Given funding limitations, increased funds could be sought through ecological taxes and multiple channels, such as transfers from the lower reaches to the upper reaches of watersheds.
- Transaction costs should be taken into consideration in improving the program.
- Farmers might change their behavior and ask for more compensation were they to realize that they are to be compensated for the real cost of environmental benefits, which is higher than the current five yuan per mu compensation.
- There are currently five categories of forest in China: (1) timber forest, (2) forest for retaining and storing water, (3) forest for special purposes such as biodiversity and military defense, (4) economic forest (e.g. forest bearing fruit and industrial use products), and (5) fuel wood forest. In terms of ecological compensation, however, each of these five categories can be classified as either ecological benefits forest or commercial use forest. Regulations are in place to keep the categorization of forest stable. For example, if a party changes ecological forest into commercial forest, they will face a penalty of three times the revenues gained from the commercial activity.
- Global experience indicates that no government will ever be able to generate enough money to fully compensate land owners for environmental services. In addition, regulations do not always work, with it being particularly difficult to regulate small holders. Given the lack of funds and the goal of encouraging productive land use that is environmentally sound, the best, and 'least-cost' approach should be to first remove policies that discourage forestry, especially forestry by small holders. In most countries, forestry is not competitive with agriculture because there are all sorts of taxes and fees on commercial forestry, and small-scale forestry is not competitive with large operations because large operations are usually heavily subsidized. Ecological compensation is a positive movement, but should not distract from the more fundamental, and structural constraints undermining sustained forest conservation.
- With regard to terminology, it may be helpful to avoid referring to environmental payments as "taxes" or "subsidies," because the benefit is actually a service being delivered by good conservation.

12. Description of the Cropland Conversion Program

Liu Shuren, Deputy Director, Cropland Conversion Program Office, State Forestry Administration

Mr. Liu provided a review of the objectives, key policy measures, and results to date of the Cropland Conversion Program. As currently established, the Cropland Conversion Program has three major objectives. The first objective is to improve the ecological environment, achieving a final solution to flooding problems in the Yangtze and Yellow Rivers and preventing desertification. Currently, 37.5% of China's land area suffers from soil erosion; and 18.2% suffers from desertification. The great extent of these problems is thought to be a result of the destruction of forest and grassland through land reclamation for agriculture. Currently, there are 91 million mu of cropland in China on slopes of over 25 degrees; and 70% of this is concentrated in the nation's western areas. Of the over two billion tons of silt that enter the Yangtze and Yellow Rivers annually, it is thought that about two-thirds comes from sloping cropland. The second objective of the program is to adjust the agricultural production structure, promote local economies, and alleviate rural poverty. Finally, the third objective of the program is to stimulate domestic demand and promote the healthy development of the economy.

Although the idea of cropland conversion has a long history in China, large-scale implementation has not been previously pursued because the necessary conditions were not fully in place. Now, for example, there is a surplus of grain in the nation that can be used to support the subsidy program. In terms of grain production, incidentally, the productivity of sloping cropland is low, so that the program is not expected to have a major impact on output. In addition, improvements in prime cropland should make up for any reductions in production that occur.

The main components of implementation include a grain subsidy, a cash subsidy, and a seedling subsidy. The standard for the grain subsidy is 150 kg of grain per mu converted in the Yangtze Watershed and 100 kg of grain per mu converted in the Yellow River Watershed. The duration of this subsidy is to be eight years for ecological forest (primarily fast-growing hardwoods), with, depending on the specific situation, possible continuation beyond this period. Economic forest (primarily fruit trees) planted on converted cropland is to be subsidized for five years; and grass, for two years. Farmers whose land has a higher productivity than the subsidy offered will not be forced to convert. Funding for the grain subsidy will be provided by the central government, with transport funding provided by local governments. The standard for the cash subsidy is 20 yuan per mu converted. It will be provided for the same period of time as the grain subsidy and will be provided by the central government. The seedling subsidy of 50 yuan per mu will be provided for both converted cropland and wasteland that is afforested.

Other aspects of implementation include subsidies for preparatory work and technical support, adjustments to the agricultural tax, extension of land contract periods, an inspection-based subsidy delivery system, required proportions between ecological and economic trees, seedling management, and varied measures for promoting conversion. Funding for preparatory work and technical support is to be provided by the state in a set proportion to the "basic construction" investment it provides for the program. Regarding collection of the agricultural tax, the tax will be deducted from

the grain subsidy for converted land, but will not be collected after the subsidy period ends. The contract period for converted land will be extended from the typical 30 years for agricultural land to 50 years. As for subsidy delivery, farmers will be able to retrieve subsidies after converted land passes inspection standards. In terms of types of plantings, the required proportion of ecological forests will be around 80%, with economic forests making up around 20%. In terms of seedling management, the quality of seedlings on the market will be controlled by inspections carried out by forestry departments. Raising the survival rate of tree seedlings is generally regarded as one of the key problems of all planting activities. Finally, in terms of varied measures for conversion, specialized households, social groups, and enterprises may be contracted to handle conversion work.

The cropland conversion program has already resulted in ecological, economic, and social benefits. Since the program was first implemented in Sichuan, Shaanxi, and Gansu in 1999 up until the end of 2001, a total of 33.928 million mu of land was converted with a state investment of nearly eight billion yuan. Currently, the program is being implemented in 24 provinces (or state-administered municipalities) and in a total of 1,500 counties. After three years of pilot implementation, clear results have been achieved. Forest and grass cover in implementation areas has increased over these three years by 0.6%; and there has been a reduction in soil erosion from sloping and sandy cropland. Over 16 million farmers have received subsidies through the program. After three years of implementation, structural changes are already beginning to be seen in local agricultural economies. Achievements have already been made in improving prime cropland and in developing animal husbandry, green food products, forest tourism, and economic trees.

Main Points from Discussion:

- Fieldwork in the upper reaches of the Yangtze indicates that farmers find the five to eight year subsidy period to be too short. Policy requires 80% of the plantings to be ecological, because the main goal of the program is ecological improvement. There is, however, some scope for changing these proportions on a small scale at the provincial and county levels.
- The compensation period is tentative and will be changed based on the real situation, taking into consideration the type of trees planted. The government is flexible with regard to the tree species and planting methods chosen.
- In other places in the world, it has been found that conversion to trees is not the only way of achieving low erosion. In particular, mixing crops with trees (agroforestry) has been found to be effective in reducing erosion while maintaining food production. In China, in addition to cropland conversion, terracing is used to reduce erosion, while at the same time increasing production.
- In terms of the market, while economic trees may seem attractive, the government realizes that oversupply from these could cause market problems. In this regard, the requirement for 80% ecological trees is also reasonable.
- Research from around the world is indicating that most erosion is not from agriculture, but rather from engineering work, such as road construction, pipeline construction, and urban development. In China, these other factors are important as well, but estimates used by the State Forestry Administration indicate that two-thirds of the sediment entering the Yangtze and Yellow Rivers is from sloping cropland.

- In northwestern China, the main natural vegetative species are grasses, so that conversion to grass is important. Water shortages in the northwest also make grass preferable to trees in some cases. The term "grass" has been removed from the official name of the program, which is now "Conversion of Cropland to Forests." Despite the terminology, conversion can include plantings other than trees. The State Forestry Administration does encourage tree planting, because it has greater benefits than grass planting. Grass, however, is still included in the program and the term "afforestation" is used to refer to the planting of forest, grass, and shrubs. In addition, it should be noted that the Cropland Conversion Program is only one part of the nation's "ecological construction" work and that the central government encourages local governments to combine this program with other programs.
- In some places (e.g. Ningxia) it has been found that farmers participating in the program already have enough grain. Thus, an option might be to provide needed items (e.g. coal) in place of the grain subsidy.
- In Inner Mongolia, low rainfall makes it difficult for the program's required density of tree plantings to be achieved. The State Forestry Administration is aware of this problem and is considering changing the requirements. As for natural generation, however, although this can be an effective means of ecological recovery, given the large investment provided by the state and the desire to achieve results in a short period of time, this is not included in the program.

13. Institutional Arrangements, Contracts, and Monitoring and Evaluation in Costa Rica

Luis Gamez, Advisor, Ministry of Environment, Costa Rica

Mr. Gamez first elaborated on his prior presentation, describing the nature of institutional arrangements and contracts for payments for environmental services in Costa Rica. He then addressed the issues of monitoring and evaluation. In terms of institutions, it is important that the Ministry of Finance controls fuel tax revenues, so that control of funds is separated from the executing agencies, namely the Ministry of Environment and Ministry of Forestry. With different departments involved, however, coordination is important. In terms of contracts, payment is made in exchange for a particular land use. The contract period is five years; and Costa Rica is currently facing renewal of contracts for its payments program. In order to have a contract, one must be a landowner, but this requirement is currently under debate. If the landowner sells property to someone else, obligations are passed on to the new owner. As previously mentioned, the program limits contracts to a maximum of 300 ha per participant to broaden participation. The program also allows small farmers to group together and negotiate as a block to lower transaction costs. Indigenous peoples also receive priority in the granting of contracts.

The program does not have a formal monitoring system at present. Forest inventories will be important to the development of a monitoring system; and Costa Rica has made efforts in this area. It will also be important to generate geographic information system (GIS) data through satellite imaging in order to monitor impact. Another challenge, however, will be to coordinate the activities of different entities, such as the Ministry of Finance and the Ministry of Environment, which currently operate in a

fragmented way. A US\$32 million World Bank and Global Environmental Facility project called the "Ecomarkets Project" will address institutional strengthening.

Costa Rica will need more systematic data and information management systems to carry out evaluation; and the World Bank project will address this as well. It will be important not only to evaluate the impact on forest cover, but also the social impacts of the program.

Main Points from Discussion:

- Lack of funding is a major constraint on the development of a monitoring and evaluation system for Costa Rica's payments program. Given that only one-third of the available resources are actually being used for the program, the institutional strengthening project sponsored by the World Bank should help with this problem.
- In terms of which organization should handle monitoring, for the Costa Rican case, it is thought that those in charge of supervision in the field should also develop monitoring indicators.

14. Evaluating Bids in the U.S. Conservation Reserve Program **Ralph Heimlich, Economic Research Service, U.S. Department of Agriculture**

Farmer demand for participating in the Conservation Reserve Program far exceeds the supply of government funds for the Program. There are only enough funds to allow about one-third to one-half of all farmers who would like to participate enroll in the Program. This makes participation very competitive. Farmers who would like to participate prepare 'bids' describing the conservation work that they would undertake, and the government evaluates these proposals in terms of their environmental impact. This process of evaluating bids is a critical component of Program implementation.

Mr. Heimlich described the bid process associated with the program and the Environmental Benefits Index (EBI), which is used to evaluate bids. In terms of the bid process, there are general signup periods, during which landowners or operators submit a bid indicating which land they would retire and the proposed rental rate. Bids are then evaluated at the local level based on the EBI and the Soil Adjusted Rental Rate (SRR). After local evaluation, bids are sent to Washington, D.C. for final evaluation. While policy is set at the national level, evaluation is organized at the state level.

The EBI is composed of seven factors with the range of points potentially assigned as follows: (1) Wildlife Factor (0 to 100 points), (2) Water Quality Factor (0 to 100 points), (3) Erosion Factor (0 to 100 points), (4) Enduring Benefits Factor (0 to 50 points), (5) Air Quality Factor (0 to 35 points), (6) State or National Conservation Priority Area Factor (0 to 25 points), and (7) Cost Factor. Many of these factors are broken into sub-factors for assignment of points. The Wildlife Factor, for example, includes sub-factors such as the vegetative cover chosen (e.g. native grasses, hardwood species, etc.) being beneficial to wildlife (0 to 50 points) and an endangered species sub-factor. The Erosion Factor takes the inherent potential for land to erode as a result of either wind or water into consideration and is measured using an Erodibility Index. The index includes various factors, such as a rainfall factor, soil

texture factor, slope factor, etc. Points for the Enduring Benefits Factor are given mainly to individuals that plan to plant trees. This is because experience has shown that up to 70% of those planting trees in previous terms kept these in place after the expiration of the rental period, while those planting grass tended to plow the land when the price of agricultural products went up. Points are assigned for the State or National Conservation Priority Area Factor for plots of land in those geographic areas on which the government has decided to focus. In terms of the Cost Factor, those that bid at a lower rental rate receive more points. The SRR, however, takes the productivity of land into consideration in the evaluation of rental rates.

Main Points from Discussion:

- While it may seem problematic that the CRP uses a point system based on several factors in that land that is very strong in only one area (e.g. wildlife) would be ruled out, in practice many of the factors are interrelated, so that plots that score higher in one area also do well in others. It is true, however, that the parcels that do the best are those that are strong in all areas.
- Much of the analysis that has been done on the CRP has come from government agencies, including the General Accounting Office (GAO) and the Department of Agriculture (DOA). Some studies have been done by university researchers, but these tend to be localized.

15. Payments for Environmental Services and Poor Rural Communities: Experiences and Lessons

Herman Rosa, PRISMA (El Salvador-based NGO)

Mr. Rosa presented a number of case studies on payments for environmental services provided by poor rural communities. He then summarized the lessons to be learned from these cases.

In Acre, Brazil, rubber-tappers are paid for their role as forest stewards. Acre has a one million ha extractive reserve, with an "extractive reserve" being defined as an official protected area where the rights of extractors to exploit rubber stands in a way that maintains the forest are formally recognized. Previous to the establishment of extractive reserves in Brazil in the 1990s, rubber-tappers had long resisted pressure on the forests from cattle ranchers and loggers, acting as forest stewards to guarantee the provision of environmental services. In Acre, under a 1998 law, rubber-tappers receive a subsidy equivalent to US\$0.20 per kilogram of rubber collected. In 2001, 3,000 tons of rubber were produced in the reserve by 4,000 families who received a total of US\$600,000 in payments. Because more of the rubber went through legal channels, the state also benefited, with 70% of the subsidy being returned through taxes. Benefits for the community included the return to the forest of 1,000 families living in miserable conditions in cities and the strengthening of social organization through producer associations.

In 1981 in Uzachi, Oaxaca, Mexico, communities regained control of their own collective forests from a government-sponsored paper company that had been granted a 25-year concession by the government. They initiated a process of strengthening community forestry, so that forestry has become a main source of income. In 1989, four indigenous communities formed a union and developed plans for agricultural

activities, certified forest management, and environmental services provision (biodiversity protection, bioprospecting, and carbon sequestration). In 1995, under a bioprospecting contract with Sandozi-Novartis, the union obtained a microbiology laboratory and payments for services promoting the development of new medicinal products. The group also produces local fungi with medicinal, food, and industrial applications.

The benefits of traditional agro-ecosystem practices in El Salvador suggest the importance of looking beyond the forest. Some complex ecosystems, such as those associated with coffee plantations in the country, may provide better environmental services than monoculture forest. In the case of coffee plantations in El Salvador, it has been found that small producers tend to have more trees and greater tree diversity per ha than the larger farms, because they seek other benefits (e.g. fuel wood, fruits, etc.).

When stringent new laws were drafted in 1990 in New York to control dairy farming, roads, and new developments in the Catskill and Delaware Watersheds, which provide water to New York City, there was strong opposition from watershed farming communities. After intense negotiations, a Watershed Agricultural Program was adopted in 1991 to fund infrastructure and other assistance for watershed farms that participated on a voluntary basis in the program by providing environmental services.

In Austria, mountain farming represents 36% of agricultural and forestry holdings. Cultivated landscapes are vital to the nation's tourism industry and also for preventing erosion, avalanches, and mudslides. Over 20 years ago, the Mountain Farmers Special Program was established to encourage continuation of mountain farming through direct payment mechanisms that seek to maintain the incomes of mountain farmers.

Several lessons emerge from the above cases. First, as in the case from Brazil, it can be seen that expansion and defense of the access and use of natural resources by communities can be an important means of insuring provision of environmental services. Schemes that target communities can be both environmentally efficient and socially equitable, while those that target individuals may achieve environmental goals, but result in greater inequity. As illustrated by the case of coffee plantations in El Salvador, sustainable agro-ecosystem practices should be rewarded, as complex small-scale agro-ecosystems can be a more important source of environmental services than large-scale monocultures, including forest monocultures. Another lesson is that the social organization of communities should be strengthened. As in the case of Oaxaca, Mexico, social organization can diffuse and sustain practices that expand the supply of environmental services. Other lessons include the need to develop supporting institutions, such as those carrying out research, training, technical assistance, monitoring, certification, fund management, etc. On the other hand, it is important to ensure that supporting institutions are not insensitive to the knowledge and preferences of the community. Finally, a last lesson is that payment schemes designed through participation by the communities themselves may be more successful in achieving both environmental and social goals than those schemes designed without such participation.

16. Capturing the Value of Forest Carbon for Local Livelihoods

Sara Scherr, Senior Policy Analyst, Forest Trends

Dr. Scherr discussed opportunities for rural people to benefit from carbon trading, first providing some background information. Data on the amount of carbon stored and sequestered by different types of land cover shows a greater than 30 times difference between primary forest (the best cover for carbon storage) and crops, pastures, and grasslands. In densely populated areas, however, the best opportunities for carbon trading probably lie with cover types such as agro-forestry systems, which have medium sequestration levels. The Clean Development Mechanism (CDM) under the UNFCCC's Kyoto Protocol provides an opportunity for payment for sequestered carbon that would have otherwise been released. Developed countries may be interested in buying carbon offsets from developing countries. The CDM, for which regulations are now being formulated, requires that carbon offsets are greater than the "business as usual" case. It is estimated that between 20 and 25% of carbon emissions globally come from land use change; and CDM forest projects are considered a promising area. China could potentially be selling carbon offsets to international markets for the 2008 – 2012 period, which is designated as the first commitment period for emissions reductions by the developed countries. As China has undertaken large-scale afforestation since 1990, the base year to be used in calculating offsets, the benefits could be substantial.

Possible types of CDM forest projects include reforestation through: (1) large-scale industrial pulp or timber plantations, (2) forest regeneration and rehabilitation, (3) agro-forests and improved forest fallows, and (4) agro-forestry and community forest plantations. Averted deforestation, such as natural forest protection, is another potential type of CDM project, though this has not yet been approved. Evidence from about 20 pilot sites around the world indicates that larger systems provided a cheaper source of carbon. Smaller systems, such as agro-forestry and community forestry, however, are still in the range of feasibility and may provide additional benefits to local people.

Carbon trading could be a source of both benefits and risks for local people. Carbon trading projects could serve both to increase income and to rehabilitate degraded land and forest. Improved environmental services might be provided and local skills and institutions enhanced. Risks include the loss of rights to use the land and benefit from its products or environmental services. Experience with biodiversity reserves has shown that poor people are often pushed aside by the more powerful once it becomes clear that their resources are of significant financial value. Other risks include loss of land ownership rights, loss of employment, and difficulties competing with projects involving large-scale operators.

A number of measures might be taken to ensure that the value of carbon is captured for local livelihoods. National policy can enhance livelihood benefits by putting key institutions in place and securing forest ownership and access rights for local people. CDM projects should be designed to enhance local livelihoods as well. For example, strong local participation should be ensured; and the most suitable compensation

mechanism for a given location should be selected. Finally, the costs of community projects might be reduced by means such as cost-sharing (e.g. with biodiversity conservation and water supply) or "bubble projects" (i.e. projects over a large area for which the sources of carbon sinks may change with time).

17. Discussion

Hein Mallee, Program Officer, Ford Foundation

Dr. Mallee discussed the two preceding presentations and also commented on community issues with regard to the case of China. Mr. Rosa's presentation raises the question of how the cases presented came to take the rights and interests of communities into account. It is important to design programs to reflect community rights and interests, rather than seeking to involve them only at the last minute. In terms of the lessons presented by Mr. Rosa, a very important one is that of looking beyond the forest. Many large environmental projects are focused solely on the forest and fail to consider interactions with agriculture and animal husbandry and grasslands.

Dr. Scherr's presentation reveals the high degree of complexity of the processes involved in carbon trading and raises the question of how a mountain community could understand the issues well enough to protect its interests. While the potential financial benefits of carbon trading are large, this means that more powerful stakeholders may try to take control.

In China, the Cropland Conversion Program is a positive step since it is very community-focused and is the first policy on such a large-scale that provides compensation to individuals. The Natural Forest Protection Program, on the other hand, has often not reflected community rights and responded to community interests. While the Program was designed to address problems in the state-owned sector, in Sichuan and Yunnan, the logging ban has been arbitrarily extended to collective forests without compensating those owners. This unfairly undermines incentives for these communities to maintain their forests and manage them sustainably. An importation question is how to adjust the NFPP to more fairly respond to collective forest owner's legal rights.

Finally, while the government's very strong efforts in environmental protection have had some positive impacts, the rationale and objectives have been somewhat misplaced. The whole discussion has focused on uplands and poor people that live there as the cause of environmental problems. Yet it is known that there are other, often more important, causes of environmental problems. In the case of erosion, road building is an enormous cause of sedimentation. While there are regulations to reduce the impact, these are not always adhered to. At the same time as the Conversion Program is implemented, then, a less biased analysis of causes should also be made and steps should be taken to address those other causes of environmental degradation.

Main Points from Discussion:

- In terms of getting the community involved, it is important to understand how the community views the landscape in contrast to other players. To a water company,

for example, a watershed is just a source of water, while it is much more to farmers.

- The complexity of carbon trading makes it is important for both government and community representatives to be well-educated on the issues. Experience in Latin America has shown that some leaders of indigenous organizations have been trained in forest carbon issues.
- Looking at the landscape as an integrated unit is a significant challenge, because people tend to work in more narrow disciplines, such as agriculture and forestry. It is clear, however, that a more holistic approach is needed.
- In terms of the interface between agriculture and environmental services, too many models are taken from the U.S. and Latin America, where population densities are low, so that there is a perception that people can be separated from the environment. Research has shown, however, that in most of the world important ecosystems cannot be separated from people. For this reason, China should continue to privilege conservation approaches that also produce income – such as agroforestry and sustainable forest management. In addition, many of the most important environmental problems in the world are occurring in key breadbasket areas where agriculture is very intensive, rather than in marginal areas.
- In some cases, there are policies that have negative impacts on farmers, while subsidies are then provided to boost their livelihoods. A first action to be taken by policy-makers should be to review whether there is something they should stop doing. Often, permit processes and rules and regulations are not streamlined.
- In terms of tenure, secure access and management control are crucial, but the exact form of these is less important. Because natural resource issues are landscape scale and not individual plot scale, it is important for people to work together to solve problems. In this regard, collective tenure schemes may be more effective than individual ones.
- Payments for environmental services are made to compensate for opportunity cost rather than the real environmental service. The problem is that there is no mechanism for evaluating the true cost of environmental services.
- While the costs of community management may seem high, the cost of losing traditional practices can be even higher in environmental terms. An example of this would be the impact if the terracing systems in Japan or China were to break down.
- Basic economic principles would suggest that the highest benefit results be pursued through the lowest cost measures. An important example of this is natural regeneration as opposed to planting of trees. In humid areas, in particular, natural generation can have, say, only five percent the cost of tree planting.
- In terms of low cost approaches, for monitoring and evaluation, the knowledge of local people in the community about their environment could be a cheap alternative to geographic information systems.

18. Group Discussions and Conclusions

On the afternoon of the second day, workshop attendees were divided into two groups to hold discussions and generate conclusions. Both groups centered discussions on improving the existing public payment schemes (e.g. covering issues of goal-setting and targets, compensation levels, operational mechanisms, funding, monitoring and evaluation, participation, etc.) and exploring alternative financing mechanisms for environmental services. Following the group sessions the moderators of each group presented conclusions and recommendations. A summary of each group session is given in outline form below. The main points and recommendations presented by the group moderators in the closing session of the workshop are designated by underlining.

Group I: Comments, Suggestions, and Conclusions Moderated by Zuo Ting, Chinese Academy of Agriculture

I. Goal-setting for the current Ecological Compensation Scheme

A. Inclusion of grasslands in the Ecological Compensation Scheme is an issue requiring further consideration. One participant suggested that, in addition to forests, other fragile ecosystems should be included in the scope of the Ecological Compensation Scheme and that grasslands be included in the pilot program. Another participant pointed out that ecological restoration of exposed land requires recovery of grass first, before recovery of forest.

B. Issues related to prioritization of target forest for the Ecological Compensation Scheme include the high proportion and broad definition of ecological forest, possible overlap with other programs, and priority ownership types. One participant commented that the proportion of forest defined as ecological forest and thereby covered by the Ecological Compensation Scheme is too high and that it would be better to focus more narrowly on the ecological forest that is truly of significance. Others noted that the scheme overlaps with other projects and funding, such as that for nature reserves. Finally, one participant suggested that priority for the scheme's funding be put on community ecological forest, while another indicated that the proportion of compensation targeted at state-owned and collective forest is too high and that there should be more consideration of private forest.

C. During the pilot phase of the Ecological Compensation Scheme, more emphasis should be put on developing innovations for the scheme than on achieving ecological goals. Diverse experimentation should be allowed so that broad experience can be gained.

II. Compensation Level

A. An important issue is whether the basis of ecological compensation should be the opportunity cost or the environmental benefits provided. Most participants suggested that the compensation be based on environmental

benefits, though one indicated that compensation should be based on opportunity cost, as benefits are too difficult to measure.

B. The current compensation level should be increased.

C. The compensation level should not be uniform over the entire country with no consideration of regional and other differences. Rather, it should be based on the characteristics of different forest stands. Some participants suggested the development of an indicator system that takes regional differences into account. Several participants suggested that local compensation standards be set by participation of local people in a bidding system. Finally, it should be noted that the current compensation scheme lacks sensitivity to type of land tenure.

III. Compensation Mechanism and Allocation and Source of Funds

A. Problems with the current compensation mechanism include the involvement of too many administrative levels, distortion of compensation targets, loss of information, and waste of money and other resources. To address these problems, unnecessary intermediaries should be eliminated; and local governments and local people should be encouraged to participate in the running of the program.

B. The current compensation mechanism is fully governmental, with participation required and promoted by the government in a command-and-control fashion with very high transaction costs. It is suggested that more work be done to introduce market mechanisms into the program.

C. Allocation of funds should not simply be a distribution of money and goods, but rather must be integrated with the rights to the money and goods. Thus, it will be important to integrate responsibility, rights, and benefits in the program.

D. Currently, the main use of program funds is forest management and protection, so that there is little benefit for rural people. To provide greater benefits to rural people, the compensation funds might be used for a rewards system, NGO participation, technical extension, and training.

E. Alternative sources of funding for ecological compensation include: (1) preferential government policies, (2) compensation from downstream parties for upstream environmental protection efforts, and (3) tourism resources. As for the last of these, China might learn from the case of Costa Rica in which local hotels charge tourists a small extra fee that finances the local environmental payments system.

F. Some participants raised the issue of whether compensation with money only is really the best mechanism for achieving forest-related goals.

IV. Monitoring and Evaluation

A. A national monitoring and evaluation system for the program should be set up as soon as possible.

B. Better use should be made of GIS and other data.

C. Monitoring should include an indicator for threats from pressure on the environment by the local community.

V. Participation

A. The forest management and protection required at pilot sites should not be defined simply as fencing, but rather the mutually beneficial relationship between the program and the local community should be promoted.

B. As currently implemented, the pilot program is mainly a government initiative without the participation of local people and the local community. In order to achieve greater participation, mechanisms can be established to ensure that responsibility for forest protection and management is assigned to specific organizations and persons. To the greatest extent possible, local people could be employed as forest stewards.

C. Local governments are relatively passive in program implementation, because they are not given flexibility. The central government should support the involvement of the local government and local people in planning for the program and give localities a certain degree of power to adjust the program to the local situation.

D. The program as implemented does not bring the function of NGOs into play.

E. The state should do more, as suggested above, to adopt market instruments. This could serve to spark the initiative of forest operators, thus reducing costs.

F. Some participants suggested that, for large-scale ecological forest areas, it would be more efficient for the state to purchase the land outright, rather than to compensate private individuals for small-scale management.

VI. Conclusions and Suggestions Regarding Program Effectiveness

A. The program is still in the pilot phase and is still unstable. There is a need for more experimentation and collection of more data.

B. While the program goals as originally designed are good, price and cost problems may result in poor implementation results, such as over-logging. Reduction of the forestry production tax could contribute to the resolution of this problem.

C. Because this is solely a government initiative, there are large transaction costs and a resulting separation of the right to funds and the responsibility of

operation. Greater use of market instruments will stimulate local participation and initiative.

D. Subdivision of forest operation work still needs to be carried out. Therefore, forest classification work should be sped up.

E. More use should be made of indigenous tree species in afforestation work.

F. The relationship between the Ecological Compensation Program and other programs should be clarified.

Group II: Comments, Suggestions, and Conclusions

Moderated by Xu Jintao, Deputy Director, Center for Chinese Agricultural Policy, Chinese Academy of Sciences

I. Goal-setting

A. One participant commented that the main objective of the Ecological Compensation Fund is to improve the ecological environment. This relates not only to forestry problems, but also to water and soil problems. The current pilot focuses exclusively on forests.

II. Operational Mechanisms

A. A participant suggested that more case studies on the Ecological Compensation Program be carried out. The central government could carry out pilots of different types in selected counties in order to identify the best implementation mechanisms.

B. Currently, the main executor of the program is the government; and there has, as a result, been a tendency for all assignments to be apportioned by the government. One participant suggested that the government provide guidance for the Forest Ecological Compensation Scheme, but move from direct to indirect involvement.

C. Market instruments should be introduced, with experiments involving market mechanisms being used in the pilot Compensation Program. The problem of market failure, however, should also be addressed.

D. Alternative channels of funding for the program should be increased; and operational efficiency should be enhanced. One participant suggested that, in terms of efficiency of project management, it is particularly important to raise the capacity of rural grassroots personnel.

E. Several participants suggested that the process of compensation delivery be simplified. Some suggested that the central government provide compensation funding directly to the county level. In order to reduce transaction costs, compensation payments to the local level should be combined with tax exemption for the local (county) government.

F. Some participants suggested that the state allocate a portion of funds to purchase forests voluntarily cultivated by rural people.

G. It was noted that there are some good examples in China of successful eco-migration projects, such as those in Shanghai and Guangdong. More work should be done on how to improve implementation of such projects.

H. Some participants suggested that it might be possible to set up farmers' associations and to allocate compensation funds to these associations rather than to forestry bureaus. Forestry bureaus or forest survey institutes, meanwhile, could serve as third-party supervisors. The reason for setting up farmers' associations is that Chinese farmers are dispersed widely and lack information. Other participants, however, noted that, as an endogenous element, farmers' organizations may be operationally even less efficient than government. Thus, while the idea merits further experimentation, farmers' associations could not be a substitute for government in the near future.

III. Compensation Level

A. The current compensation standards for the program are too simple.

B. It is suggested that a mechanism for competition be introduced, such as competitive bidding. This would cause compensation levels to become equivalent to the participants' marginal costs. One participant noted that regional differences between the southern and northern parts of China are large and that the opportunity cost may be higher in South China.

C. The compensation standard should be set using all kinds of social, economic, and environmental criteria systems.

IV. Funding

A. Diversified channels of funding for the Compensation Scheme should be explored.

B. It is suggested that a national market for trading forest rights be established. (This would be related to carbon trading and require technical work in estimating the amount of carbon sequestered by various tree types.) Some participants suggested that, in general, more attention be paid to carbon markets and carbon trade.

C. Some participants suggested that special tax schemes could also provide alternative sources of funding. For example, a forest ecological tax might be established; and those that plant trees could be exempted from tax payments.

D. One participant suggested that eco-lotteries be held as a source of funding.

E. Another participant suggested that the state encourage donations from individuals and associations.

V. Monitoring and Evaluation

- A. Monitoring and evaluation work is very important to the program and should be strengthened. Some participants suggested establishing a national level monitoring system.
- B. Monitoring and evaluation work should be handled by a third party that is independent of the departments executing the program. It was noted that forestry departments should not participate in evaluation of their own work.
- C. More work should be done in harnessing the strengths of society for monitoring and evaluation of the program.
- D. Several participants commented that the current inspection system of forestry departments is costly and that the efficiency of the supervision system is low. There is a need to reduce inspection costs and establish an objective set of evaluation and inspection systems.
- E. Some participants commented that evaluation of actual operation is not necessary, but that evaluation of the program's results is what is needed.

VI. Commercialization of Environmental Services

- A. Commercialization of environmental services is a very complex process; and forestry departments should be aware of this complexity. Despite the difficulties, good opportunities, in areas such as carbon trading, exist. Thus, it is recommended that forestry departments do some forward-looking research and collect useful information. In particular, China's forestry departments should grasp the opportunity and challenge presented by new systems such as carbon trading.

VII. Ecological Improvement and Poverty Alleviation

- A. In contrast to developed countries, subsistence is still a significant problem in China. Thus, ecological improvement efforts should be integrated with poverty alleviation and local development.
- B. Local communities should be encouraged to participate in the management of ecological projects.

19. Concluding Remarks

Chen Genchang, Director General, Department of Policy and Legislation, State Forestry Administration

In his concluding remarks, Director General Chen first thanked the organizers for the workshop. He then summarized what he saw as the benefits and implications of the workshop and reviewed issues with regard to the Ecological Compensation Scheme that require further research.

The workshop provided an opportunity to bring together domestic and international experts for exchange of experience and opinion. Many good suggestions for implementation of the Compensation Scheme were made; and future topics for research identified. Of particular interest to Director General Chen, the workshop provided an opportunity to understand the implementation situation of the program at the local level in China and to understand progress and trends in other countries. Especially inspiring were the introductions of the Environmental Benefits Index evaluation of the U.S., Brazil's ecological tax, the use of market instruments in Costa Rica, and carbon trading. Of these, carbon trading has particularly profound implications. It can make intangible ecological benefits tangible and also shows that the government can make use of market measures in implementation.

Areas identified as requiring further research for the improvement of China's Ecological Compensation Scheme include issues of scope, targets and goals, necessity, and funding. In terms of scope, it is clear that ecological compensation is not just an issue of compensation for forests and not just a problem to be handled by forestry departments. In the case of China, however, forestry plays a central and key role in terms of the ecological environment. In setting targets, it must be realized that China is a country that is short of forest resources and that has many natural disasters, so that it is more strict in its forest protection. In the first stage of China's Ecological Compensation Scheme, the goal is to compensate those that provide ecological benefits for their losses. From the perspective of agriculture, this type of compensation scheme has the characteristics of poverty alleviation and is welcomed by rural people. In terms of the necessity of ecological compensation, it is generally agreed that: (1) a good environment will only come at a cost, (2) those that provide services should be compensated, and (3) ecological compensation is already a part of China's legal system. In terms of funding, or who is providing the compensation, in China the source of funds is direct fiscal allocation (financed by government bonds), but there is a question of whether this source will remain stable in the long term. Other sources of funding discussed were Brazil's ecological tax and carbon trading.

Other issues requiring further research include that of who should receive compensation, level of compensation, and monitoring and evaluation. In terms of the beneficiary of compensation, it should be noted that, in the case of China, forests are divided into state-owned, collective, and private. The owner of state-owned forests is the state, which is not a target of compensation. The ownership of collective forests is relatively complex, with the owner and the operator being different and the latter being the target of compensation. Private forest is owned and operated by the individual, who is also the target of compensation. In terms of the level of compensation, China is currently basing compensation on opportunity cost, but implementation is not flexible enough. In terms of the five programs discussed, each has a different compensation level, with that of the Cropland Conversion Program being the highest. The lack of flexibility is reflected in the lack of variation of compensation with region. Although there are two different compensation levels for North and South China in the Conversion Program, there is a need to introduce market mechanisms (such as carbon trading) to achieve greater variation. In terms of monitoring and evaluation, there are currently three levels of inspection: (1) that organized by the county, (2) regular inspections at the grassroots, and (3) inspection at selected locations by the state. Because administrative measures are used, transaction costs are high and market mechanisms might be considered as an alternative.

Monitoring of the ecological forest itself and of other ecological benefits should be carried out. It is suggested that evaluation be carried out from two perspectives, that of area and that of quality. Forest should be divided according to different quality levels, with periodic inspections and reclassifications. (In this regard, Guangdong has done well.)