



COMPLETION REPORT OF THE ITTO PROJECT

Host Government:

The People's Republic of China

Name of the Executing Agency:

Research Institute of Forest Resource Information Techniques, Chinese Academy of Forestry (CAF)

Title of the ITTO Project or Pre-project:	Development and Demonstration on Scheme of Payment for Environmental Services (PES) Derived from Degraded and Secondary Tropical Production Forests in Hainan Province, China
Project number:	RED-SPD 020/09 Rev. 1 (F)
Starting date of the Project:	1 June 2010
Duration of the Project (month)	18 months
Project costs (US \$):	149, 040 (ITTO)
The ordinal number and type of the Report	Project Completion Report
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The place and date the report was issued:	Beijing, China 10 June 2012

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Executive summary

This project originated from the ITTO Thematic Programme on Reducing Deforestation and Forest Degradation and Enhancing Environmental Services in Tropical Forests (REDDES). Some degraded and secondary tropical production forests (natural production forests, natural commercial forests) in collective area of China were in status of gradually converting to crop-trees (plantations) and degrading in most forest-dependent communities mainly because of lack of scheme of PES, while the degraded and secondary protection forests (natural protection forests, natural non-commercial forests) were in well protection and restoration because of implementing the Scheme of Forest Ecological Benefit Compensation Fund (SFBCF) for non-commercial forests.

The project development objective was to reduce deforestation and forest degradation, enhance environmental services and help improve forest dependent livelihoods in tropics of China. The project specific objective was to strengthen stakeholders' capacity to reduce forest degradation and deforestation of degraded and secondary tropical production forests in Hainan province through implementation of the scheme of PES derived from degraded and secondary tropical production forests.

All outputs and activities were finished, scheduled in the project plan. There are not critical differences between planned and actual project implementation.

Assessment report on environmental services derived from degraded and secondary tropical production forests in demonstrative area based on community and other stakeholders participatory was finished. The scheme of PES derived from degraded and secondary tropical production forests in demonstrative area was developed and implemented successfully.

In additions, one Ph. D candidate graduated and got the degree in June 2012 under the support of the project, the title of dissertation for the degree was "Study on Payments for Environmental Services (PES) of Natural Production Forests—a Case Study of Tropical Natural Production Forests in Hainan Province". 3 relative papers (in Chinese) were published. *A Review on Research and Practices of Payments for Ecological Benefits of Non-Commercial Forests in China* was published in *World Forestry Research* (2011, 24(5): 51~56). *Logistic Modeling Analysis on Compensation for Ecosystem Services of Natural Commercial Forest* was published in *Journal of Beijing Forestry University (Social Sciences)* (2012, 11(1): 63~68). *Structure and Tree Species Diversity of Secondary Forest of Liquidambar formosana in Wuzhishan City, Hainan Province* was published in *Journal of Mountain Science* (2012, 30(3): 276~281). Other papers on PES standards of tropical natural production forests will be published later.

The main content of the PES scheme of natural production forests (degraded and secondary production forests) in project area included the main objectives of the PES scheme, the objects of the PES scheme, the buyers of ES, the sellers of ES, the standard of the PES, the main obligations of the sellers and the main obligation of the buyers etc.

The beneficiaries of the project were villagers, local communities, the forestry research and development institutions, and local governmental departments who have been directly or indirectly

involved in the implementation of the project.

Wuzhishan Forestry Bureau had set up special management organization and related mechanism to take charge of the protection and management of demonstration forests, and guarantee the long-term sustainability after project completion. The local government will extend the PES scheme of tropical natural production forests in project area after finish of the demonstration in Maohui community. The PES scheme of tropical natural production forests may be extend to the whole Hainan province and whole collective areas in China.

The implementation of PES scheme of natural production forests is so urgent and important for preventing the conversion from natural production forests to crop-trees (plantations) and encouraging the sustainable management of natural production forests. The successful implementing of this project will play very important demonstrative roles in tropics and whole collective areas in China.

Sufficient stakeholders participating are very important for implementing PES scheme of natural production forests. The understanding and support of the local villagers are very important to the project implementation. The better communication, the respect to the local custom and culture (especially in the minority communities) and better relationship with local villagers and communities will influence the project implementation. The commitments from local villagers and communities are also so important for implementing the PES scheme of the natural production forests.

1 Project identification

1.1 Context

Hainan province is situated within 18°9' ~ 20°11'N, 108°36' ~ 111°3'E, surrounded by sea at all sides, with an area of 33,920 square kilometers. The topography is high in the middle and low in four sides, with elevation from 0 ~ 1,867 m. The top point is Wuzhi (five fingers) mountain. 70% of the lands are plain, tableland and hills, with 200 ~ 500 m low hills accounting for 20.2%, and mountains of above 500 m accounting for 9.8%.

The annual average sunshine amounts to 2,000 hours, and the annual average temperature is 23 ~ 28 °C. The accumulated annual temperature above 10 °C is 8,300 °C. The extremely lowest temperature is 1.4 ~ 7°C. The season with monthly average temperature above 20 °C lasts for 9 months. Hainan province is rich in rainfall, yet not even either in space or in time. The rainfall concentrates in summer and autumn, rich in eastern part, yet less in western part, with a precipitation of 1,500 ~ 2,000 mm. The soil types in the Island include yellow earth, crimson earth, laterite, fluviogenic soil, alluvial soil and sand around beach. Different topography is distributed and related with their different soil types, temperature, moisture and sun illumination etc.

There are 4,600 species of vegetation with vascular bundle, which belong to 259 families and 1,347 genus. There are 1400 species of conifers and broadleaves, among which 800 species are of arbors, and 458 species are listed for commercially valuable timber. There are 85 tree species of high quality timber value, and 45 precious and rare tree species, among which 32 species are listed as rare and endangered species. There are 600 species of mammal and amphibians, birds and fishes. Forest coverage rate is 60.2%.

The total population of Hainan province was 8,795,600, mainly comprised of nations Han, Li, Miao, Zhuang and Hui. In 2011, the GDP was 38.7 billion US\$, the average GDP per person was 4,400 US\$, the average income per habitant in town was 2,826 US\$, and the average annual income per farmer was 992 US\$. The highway in Hainan province was well developed. The round-Island expressway and the first, second, third level highways form a highway network on the Island.

The project area is located in Wuzhishan City that lies in the south-central of Hainan Island. The city located at 18° 38' ~ 19° 02' N and 109° 19' ~ 109° 44' E, connecting Baoting County in the south, adjoining with Baisha City in the north, and its east border is Qiongzong County, west border is Ledong County. The total cover area of the city is 1,129 km², accounting for 3.5% of Hainan Island.

The topography is typical mountainous terrain. The average elevation of the city is 316 m. The peak is Wuzhishan Mountain which elevation is 1,867 m. The climate of the city is classified as "tropical rainforest monsoon", which annual average temperature is 22.7 °C (25.9 °C in summer and 17.0 °C in winter) and annual rainfall is 1,772 mm (from 1055.5 mm to 2810.4 mm).

The city consists of 7 towns (Chongshan, Nanshen, Maoyang, Maodao, Fanyang, Shuiman, Changhao and Maodao), with 59 administrative villages, 329 natural villages. There are 5 state-owned units:

Changhao farm, Tongzha forest farm, Maorui forest farm, Wuzhishan national nature reserve and Yinggeling provincial nature reserve. The total population was 114,472 with 37,345 families in 2010. 66.7% of the total population was minorities (mainly minority Li and Miao). The total farmers were 60,108. The GDP of the city in 2010 was 152.5 million US\$, the average GDP per person was 1,923 US\$. The percent of primary, secondary and tertiary industries were 23.3%, 17.3% and 59.4% respectively. The average annual income per habitant in town was 1,749 US\$ and the average annual income per farmer was 578 US\$. There were 13,665 poor farmers (12.9% of the total population) whose annual income per farmer was less than 294 US\$.

The area of planned forest land was 102,015 hectares, accounting for 90.4% of total land area of the city. The forest area was 97,354 hectares, among which the natural forest area was 64,355 hectare. The total forest stock volume was 9.686 million m³. Forest coverage rate of the city was 86.4%. Wuzhishan City was the core area for forest biodiversity protection and the important water conservation area in Hainan province.

This project accords with item 9, item 10, item 14, item 20 and item 26 of the *Constitution of the People's Republic of China* respectively on "reasonable utilization of natural resources and protection of precious animals and vegetation", on "reasonable utilization of land resources", on "extent of advanced technology, raising of labor productivity and economic benefit and improvement of people's living level", on "popularization of scientific and technical knowledge", and on "amelioration of ecological environment and protection of forest". This project also conforms to the *Law of Forest*, the *Law of Land Administration*, the *Law of Environment Protection*, and the *Law of Wild Animal Protection*.

This project conforms to *Forestry action plan of China 21 Century Agenda* and the *Action Plan for the protection of Biodiversity of China*, especially tallies with the *Decisions on Protection of Natural Resources* of the State Council. This project also conforms to the Natural Forest Protection Program (NFPP), the Conversion of Cropland to Forest Program (CCFP), the Wildlife Conservation and Nature Reserves Development Program, the Non-commercial Forest Protection and Construction Program (NFPCP), the Coastal Shelterbelt Protection and Construction Program (CSPCP) and the Forest Industrial Base Development Program with a Focus on Fast-growing and High-yield Timber Plantations (FIBDP) etc.

1.2 Origin and problem

This project originated from the ITTO Thematic Programme on Reducing Deforestation and Forest Degradation and Enhancing Environmental Services in Tropical Forests (REDDES). The general objective of the REDDES was to reduce deforestation and forest degradation, enhance environmental services and help improve forest dependent livelihoods through sustainable management of tropical forests, forest restoration and other related activities.

The degraded and secondary tropical production forests in China played an important role in forest-dependent community development for its access priority. Although Chinese Central Government as well as local governments in tropics had exerted great efforts on tropical forests protection and management, and tropical forests coverage had been increased gradually, deforestation and degradation of the tropical natural production forests were still a problem and the quality of

environmental services derived from them has been reducing in some forest-dependent communities.

The effects of deforestation and forest degradation of tropical production forests included reduced supply of forest products and services, increased CO₂ emissions, loss of biodiversity and reduction of habitat quality, reduced water quality and supply, increased soil erosion, increased vulnerability to climate change and disasters as well as loss of economic development opportunities for local populations and indigenous peoples living in and around forest areas. These effects aggravated poverty; deteriorate livelihoods of indigenous peoples and other groups depending on forests, thereby led to unsustainable economic development.

A number of common underlying causes could be identified which lead to deforestation and degradation of production forest. The most important causes are lack of scheme of PES and persistent poverty among forest-dependent communities. While the degraded and secondary tropical protection forests (non-commercial forests) were in well protection and restoration because of implementing the Scheme of Forest Ecological Benefit Compensation Fund (SFEBCF) for Non-commercial Forests, some degraded and secondary tropical production forests were in status of gradually converting to crop-trees (plantations) and degrading in most forest-dependent communities mainly because of lack of scheme of PES. Lack of assessment on forest environment services and governance weaknesses had led to inappropriate legislation, perverse economic incentives, incoherent policies and institutional inefficiencies which could drive lack of scheme of PES derived from degraded and secondary tropical production forests. The forest environmental services produced were not compensated to forest communities, owners and managers who maintained them because of insufficient forest funds. Persistent poverty among forest-dependent communities, coupled with lack of alternative sources of livelihoods, led to excessive utilization of forest resources causing gradual degradation and deforestation eventually. All these factors deteriorated the reduction of forest environment service.

The key problems for the scheme of PES derived from degraded and secondary tropical production forests in Hainan province were as follows: (1) Lack of assessment on forest environmental services derived from degraded and secondary tropical production forests; (2) Lack of financial incentives to forest environment services; (3) Weakness of participation consciousness in local communities, individuals and other stakeholders; (4) Inadequate policies legislation and institutional framework to degraded and secondary tropical production forests; (5) Lack of desirable approaches and demonstrations; (6) Inadequate capacity to manage PES schemes while local knowledge on forest management was not considered important.

2 Project objectives and implementation strategy

Project objectives

Some degraded and secondary tropical production forests in collective area of China were in status of gradually converting to crop-trees (plantations) and degrading in most forest-dependent communities mainly because of lack of scheme of PES, while the degraded and secondary protection forests (non-commercial forests) were in well protection and restoration because of implementing the Scheme of Forest Ecological Benefit Compensation Fund (SFEBCF) for non-commercial forests.

Project development objective was to reduce deforestation and forest degradation, enhance environmental services and helped improve forest dependent livelihoods in tropics of China.

Project specific objective was to strengthen stakeholders' capacity to reduce forest degradation and deforestation of degraded and secondary tropical production forests in Hainan province through implementation of the scheme of PES derived from degraded and secondary tropical production forests.

Implementation strategy

The project worked collaboratively with all stakeholders directly or indirectly interested in the scheme of PES derived from degraded and secondary tropical production forests in Wuzhishan city of Hainan province. Using a participatory approach, it would help interested groups to participate equally in the development and implementation on scheme of PES derived from degraded and secondary tropical production forests in demonstrative area. The development of PES scheme would take into account the need to advance one step at a time, helping to raise awareness, change perceptions, analyze problems, and identify appropriate PES scheme. The following steps would be taken to implement this participatory development approach.

Assessment report: Participatory investigation on biophysical, socioeconomic and ecological factors and inventory on degraded and secondary tropical forests in demonstrative area would be undertaken after one typical forest community (village) was chosen as demonstrative area. Based on community and other stakeholders participatory, environmental services derived from degraded and secondary tropical production forests in demonstrative area would be assessed to get the assessment report. Meanwhile, the investigation and inventory would help different stakeholders to improve the awareness and knowledge of forest environmental services.

Draft PES scheme: relevant international literature and cases on PES schemes derived from production and protection forests and on Scheme of Forest Ecological Benefit Compensation Fund (SFEBCF) for non-commercial forests would be collected and analyzed. Participatory workshop would be held among villagers, community and other stakeholders to develop draft PES scheme for degraded and secondary tropical production forests in demonstrative area. Special attention would be given to possible conflicting interests among different stakeholders. In order to balance the conflict, the community would be divided into subgroups on the basis of how they would be affected by the PES scheme.

PES scheme: participatory discussion and consultation would be undertaken to optimize and identify the PES scheme for degraded and secondary tropical production forests in demonstrative area.

Implement the PES scheme: PES scheme would be implemented by all stakeholders, especially local villagers, under the guidance of TTO FLR Manual and Guidelines on tropical production forests. The participation implementation would improve the capacity of foresters and local villagers to reduce deforestation and to restore degraded forest, helping to sustainable forest management in demonstrative area.

3 Project performance (Project elements planned and implemented)

Specific objective

The specific objective of the project was achieved. The stakeholders' capacity to reduce forest degradation and deforestation of degraded and secondary tropical production forests in project area through implementation of the scheme of PES derived from degraded and secondary tropical production forests in demonstration area was significantly strengthened.

Outputs

All outputs were finished, scheduled in the project plan.

Assessment report on environmental services derived from degraded and secondary tropical production forests in demonstrative area based on community and other stakeholders participatory was finished (Output 1). The scheme of PES derived from degraded and secondary tropical production forests in demonstrative area was developed and implemented (Output 2). Project completion and technical report were finished (Output 3).

In additions, one Ph. D candidate has graduated and got the degree in June 2012 under the support of this project, the title of dissertation for the degree is "Study on Payments for Environmental Services (PES) of Natural Production Forests—a Case Study of Tropical Natural Production Forests in Hainan Province".

3 relative papers (in Chinese) were published. *A Review on Research and Practices of Payments for Ecological Benefits of Non-Commercial Forests in China* was published in *World Forestry Research* (2011, 24(5): 51~56). *Logistic Modeling Analysis on Compensation for Ecosystem Services of Natural Commercial Forest* was published in *Journal of Beijing Forestry University (Social Sciences)* (2012, 11(1): 63~68). *Structure and Tree Species Diversity of Secondary Forest of Liquidambar formosana in Wuzhishan City, Hainan Province* was published in *Journal of Mountain Science* (2012, 30(3): 276~281). Other papers on PES standards of tropical natural production forests will be published later.

Activities

All activities were finished, scheduled in the project plan.

After discussed with local government and forest bureau and field visited in the project area, Maohui community (Maohui village) of Maoyang Town in Wuzhishan City was chosen as demonstrative area (Activity 1.1). The basic biophysical, socioeconomic and ecological factors in Maohui community (demonstrative area) were investigated and analyzed (Activity 1.2). An inventory on degraded and secondary tropical forests in Maohui community (demonstrative area) was conducted based on community participatory (Activity 1.3). The environmental services derived from production secondary forests in Maohui community (demonstrative area) were assessed based on community and other stakeholders participatory. Assessment report on environmental services derived from production

secondary forests in Maohui community (demonstrative area) was developed (Activity 1.4).

The relevant international literature and cases on scheme of PES derived from production and protection forests were collected and analyzed (Activity 2.1). The relevant national literature and cases on Scheme of Forest Ecological Benefit Compensation Fund (SFEBCF) for non-commercial forests provided by central and local government were collected and analyzed (Activity 2.2). The workshop on scheme of PES derived from degraded and secondary tropical production forests in project area was held (Activity 2.3). Draft scheme of PES from production secondary forests in Maohui community (demonstrative area) was developed based on community and other stakeholders participatory (Activity 2.4). The scheme of PES derived from production secondary forests in Maohui community (demonstrative area) based on community and other stakeholders participatory was discussed, consulted, optimized and identified (Activity 2.5). The scheme of PES derived from degraded and secondary tropical production forests in demonstrative area was implemented (Activity 2.6). Policy suggestions on scheme of PES derived from degraded and secondary tropical production forests to local governments was developed (Activity 2.7).

The main content of the PES scheme of natural production forests (degraded and secondary production forests) in project area were as follows: (1) The main objectives of the PES scheme were to prevent the conversion from natural production forests to crop-trees (plantations) and to improve the quality of the natural production forests by sustainable management. (2) The objects of the PES scheme were the collective natural production forests (degraded and secondary production forests). (3) The buyers of ES derived from natural production forests were the local government. (4) The sellers of ES derived from natural production forests were the owners of natural production forests which may be the individuals (villagers) or the collective organizations (e. g. villagers groups, villages etc.). (5) The standard of the PES of natural production forests was 300 RMB/hm² in 2012. 70% of the fund should be paid to the individuals (villagers) and 30% of the fund kept in the villagers group (community) when the owner of natural production forests was the villagers group. If the owner of natural production forests was the villagers (individuals), 100% of the fund should be paid to the villagers (individuals). The standard of the PES of natural production forests should be gradually increased with the development of regional economy and the quality improvement of the natural production forests. (6) The main obligations of the sellers were to insure that the ownership of the natural production forests would not be changed, the area of the natural production forests would not be reduced and the quality of the natural production forests would not be declined. The main obligation of the buyers should provided the PES fund every year in due standard.

The PES scheme of natural production forests was successfully implemented in Maohui community (demonstrative area) in 2011 and 2012. The photos of on-the-spot meeting for PES scheme implementation are attached in Annex 3 (2011) and Annex 4 (2012).

The starting date of project was 1 June 2010 and the planned duration was 18 months. The realized duration was 21 months (on 10 March 2012) because the third installment of ITTO fund was received on 1 December 2011 (scheduled on August 2011).

The total amount of expenditures was 130,064 US\$ (ITTO contribution) and the planned total input was 128,000 US\$ (ITTO contribution).

4 Project outcome, target beneficiaries involvement

Extent to which the project specific objective was achieved

The project specific objective was successfully achieved in the project area. The local government will extend the PES scheme of tropical natural production forests in project area after finish of the demonstration in Maohui community. The stakeholders' capacity to reduce forest degradation and deforestation of degraded and secondary tropical production forests in project area through implementation of the PES scheme of tropical natural production forests in demonstration area was significantly strengthened.

Situation existing at project completion as compared to the pre-project situation

The situation existing at project completion as compared to the pre-project situation is as follows:

- (1) Decision-makers, local communities, individuals and other stakeholders in project area have gotten a deeper understanding and awareness of degraded and secondary tropical production forests and their environmental services;
- (2) Forest degradation and deforestation of degraded and secondary tropical production forests in project have been reduced significantly;
- (3) Quality and sustainability of degraded and secondary tropical production forests have been improved;
- (4) Income of villagers and community from PES of natural production forests in project area has been improved obviously;
- (5) The capacities to develop and implement policies and incentive mechanisms to support forest communities in improving their livelihoods and forest environmental services have been improved obviously;
- (6) The understanding and awareness of public participation and mechanism for different stakeholders participating PES scheme in project area have been significantly improved.

Target beneficiaries involvement

In general, the beneficiaries of the project were villagers, local communities, the forestry research and development institutions, and local governmental departments who had been directly or indirectly involved in the implementation of the project. Specifically, these beneficiaries include:

The project staff, most of them were from Chinese Academy of Forestry, Wuzhishan Forestry Bureau and Hainan Forestry Department, were beneficiaries of the project. They could get their work experiences for developing and implementing PES scheme of tropical natural production forests.

Local villagers, indigenous groups and communities in demonstration area had benefited from the project directly because the project helped them to get the PES from tropical natural production forests.

Local forestry agencies and other governmental departments that were responsible for management of

degraded and secondary production forest have been directly conducted the fieldwork of the project. They can get experience on how to developing and implementing PES scheme of tropical natural production forests.

Other stakeholders (Civil society organizations, private sectors, donors and the international organizations etc.) will benefit from improved capacity to participate in policy development and strengthen capability to support forest communities in improving their livelihoods and ecosystem services.

Project sustainability after project completion

Wuzhishan Forestry Bureau has set up special management organization and related mechanism to take charge of the protection and management of demonstration forests, and guarantee the long-term sustainability after project completion.

The local government will extend the PES scheme of tropical natural production forests in project area after finish of the demonstration in Maohui community. The PES scheme of tropical natural production forests may be extend to the whole Hainan province and whole collective areas in China.

5 Assessment and analysis

PES scheme of tropical natural production forests should be an important and effective incentive mechanism to reduce deforestation and forest degradation, enhance environmental services and help improve forest dependent livelihoods in tropics of China. Although there was PES scheme for protection forests (the Scheme of Forest Ecological Benefit Compensation Fund (SFEBCF) for Non-commercial Forests), it was lack of PES scheme of natural production forests to prevent them to convert to crop-trees (plantations) gradually. During the project formulation process, stakeholder identification and sufficient stakeholders participating were very important. Local villagers, local communities (villager groups), local forestry agencies, local governments, donors, private sectors and project staff etc. were the stakeholders in the project.

The 6 project problems analysis (lack of assessment on forest environmental services, lack of financial incentives, weakness of participation consciousness, inadequate policies legislation and institutional framework, lack of desirable approaches and demonstrations, and inadequate capacity to manage PES schemes) was appropriate and correct. It would be helpful to develop the measures (activities), outputs and objectives appropriately. The project development and specific objectives was also appropriate and correct, and was compliance with scope and objectives of ITTO REDDES programme. The implementation strategy (from assessment report, draft PES scheme, formal PES scheme to implementation of the PES scheme in demonstration area) based on stakeholders participatory was proved appropriately and correctly.

There are not critical differences between planned and actual project implementation.

It took about one year to consider the frame of the project during project formulation. The Executing Agency, Research Institute of Forest Resources Information Techniques, Chinese Academy of Forestry (CAF), has adequate resources used for project formulation. There are 4 ITTO projects applied and executed by the institute. In addition, Hainan Forestry Department, Wuzhishan Forestry Bureau and other local forestry agencies provided large amount of basic data for this project. The ITTO Expert Panel also has given some useful recommendations for the project proposal modification.

There is no significant gap between the inputs (both ITTO and Chinese government) and project requirement for fund, the input was able to keep the project going normally and smoothly.

The project staff, most of them were from Chinese Academy of Forestry, Wuzhishan Forestry Bureau and Hainan Forestry Department, were beneficiaries of the project. They could get their work experiences for developing and implementing PES scheme of tropical natural production forests. Local villagers, indigenous groups and communities in demonstration area had benefited from the project directly because the project helped them to get the PES from tropical natural production forests. Local forestry agencies and other governmental departments that were responsible for management of degraded and secondary production forest had been directly conducted the fieldwork of the project. They could get experience on how to developing and implementing PES scheme of tropical natural production forests. Other stakeholders (Civil society organizations, private sectors, donors and the international organizations etc.) will benefit from improved capacity to participate in policy development

and strengthen capability to support forest communities in improving their livelihoods and ecosystem services.

Wuzhishan Forestry Bureau had set up special management organization and related mechanism to take charge of the protection and management of demonstration forests, and guarantee the long-term sustainability after project completion. The local government will extend the PES scheme of tropical natural production forests in project area after finish of the demonstration in Maohui community. The PES scheme of tropical natural production forests may be extend to the whole Hainan province and whole collective areas in China.

Villagers of the demonstration area (Maohui community) had better understanding of the important role of the natural production forests. They committed that the ownership of the natural production forests would not be changed, the area of the natural production forests would not be reduced and the quality of the natural production forests would not be declined after implementing the PES scheme of the natural production forests.

It was essential that the roles and responsibilities of the institutions involved in the project implementation were clearly defined and documented by subcontracts in the beginning and during the implementing of the project.

6 Lessons learned

The project problems analysis (problem tree) and the objects analysis (object tree) are the key analysis for achieving the Specific Objective contributing to the Development Object. The stakeholder identification and participation are the basic of the project.

The cooperation between the relevant parties interested in project is critical to the project's success. Project work meetings between the relevant parties interested in the project should be held periodically and any problems should be resolved as soon as they are occurred.

Field survey, assessment report, draft plan, formal plan, implementation of the formal plan and stakeholder participation etc. are important steps and elements for the implementation strategy.

The variations should be timely identified and adjusted by project work meetings. Activities which exceed the scope of project plan but are in line with project objectives and do not take extra fund may be encouraged. The project progress should be examined in project work meeting. The expected time for output to be achieved should be adjusted according to the actual situation sometimes.

Special management organization and related mechanism to take charge of the protection and management of demonstration forests, and guarantee the long-term sustainability after project completion should be set up. Better understanding and commitments of local villagers and communities are so important for the project sustainability after completion.

A set of project organizational systems and management regulations should be established. Various activities of output of the project should be assigned to project members with duty-bound responsibility respectively. All activities cooperated among project staff should be arranged in unison by project director. The Project Technical Committee meetings, workshops and project work meetings for project members and relevant parties should be organized periodically during the implementation of the project.

It is essential that the roles and responsibilities of the institutions involved in the project implementation are clearly defined and documented by subcontracts in the beginning and during the implementing of the project.

A special system should be set up to keep project files and documents. The relative documents and information of the project in different stages are added and presented in the system.

Monitoring and evaluating mechanism should be carried out effectively by the project. The project implementation should be inspected and guided by the Project Technical Committee every year. A project progress report should be submitted to ITTO every six months.

The understanding and support of the local villagers are very important to the project implementation. The better communication, the respect to the local custom and culture (especially in the minority communities) and better relationship with local villagers and communities may be the external factors that influenced the project implementation.

7 Conclusions and recommendations

All project activities and outputs were finished, scheduled in the project plan. The specific objective of the project was achieved. The stakeholders' capacity to reduce forest degradation and deforestation of degraded and secondary tropical production forests in project area through implementation of the scheme of PES derived from degraded and secondary tropical production forests in demonstration area was significantly strengthened.

The main content of the PES scheme of natural production forests (degraded and secondary production forests) in project area were as follows: (1) The main objectives of the PES scheme were to prevent the conversion from natural production forests to crop-trees (plantations) and to improve the quality of the natural production forests by sustainable management. (2) The objects of the PES scheme were the collective natural production forests (degraded and secondary production forests). (3) The buyers of ES derived from natural production forests were the local government. (4) The sellers of ES derived from natural production forests were the owners of natural production forests which may be the individuals (villagers) or the collective organizations (e. g. villagers groups, villages etc.). (5) The standard of the PES of natural production forests was 300 RMB/hm² in 2012. 70% of the fund should be paid to the individuals (villagers) and 30% of the fund kept in the villagers group (community) when the owner of natural production forests was the villagers group. If the owner of natural production forests was the villagers (individuals), 100% of the fund should be paid to the villagers (individuals). The standard of the PES of natural production forests should be gradually increased with the development of regional economy and the quality improvement of the natural production forests. (6) The main obligations of the sellers were to insure that the ownership of the natural production forests would not be changed, the area of the natural production forests would not be reduced and the quality of the natural production forests would not be declined. The main obligation of the buyers (local government) should provided the PES funds every year in due standard.

In additions, one Ph. D candidate has graduated and got the degree in June 2012 under the support of this project, the title of dissertation for the degree is "Study on Payments for Environmental Services (PES) of Natural Production Forests—a Case Study of Tropical Natural Production Forests in Hainan Province". 3 relative papers (in Chinese) were published. *A Review on Research and Practices of Payments for Ecological Benefits of Non-Commercial Forests in China* was published in *World Forestry Research* (2011, 24(5): 51~56). *Logistic Modeling Analysis on Compensation for Ecosystem Services of Natural Commercial Forest* was published in *Journal of Beijing Forestry University (Social Sciences)* (2012, 11(1): 63~68). *Structure and Tree Species Diversity of Secondary Forest of Liquidambar formosana in Wuzhishan City, Hainan Province* was published in *Journal of Mountain Science* (2012, 30(3): 276~281). Other papers on PES standards of tropical natural production forests will be published later.

The implementation of PES scheme of natural production forests is so urgent and important for preventing the conversion from natural production forests to crop-trees (plantations) and encouraging the sustainable management of natural production forests. The successful implementing of this project will play very important demonstrative roles in tropics and whole collective areas in China.

Sufficient stakeholders participating are very important for implementing PES scheme of natural production forests. The understanding and support of the local villagers are very important to the project implementation. The better communication, the respect to the local custom and culture (especially in the minority communities) and better relationship with local villagers and communities will influence the project implementation. The commitments from local villagers and communities are also so important for implementing the PES scheme of the natural production forests.

The PES scheme of natural production forests in demonstrative area of this project may be extend to the tropics and whole collective areas in China. The difference should be the PES standards (mainly based on opportunity cost) in different area and different forests types only.

Responsible for the Report

Name: Huang Qinglin

 (signature)

Position held: Project Director

Date: 28 May 2012

Annex 1 Project financial statement

Project financial statement (ITTO Contribution, in US dollar)

Project No. RED-SPD 020/09 Rev. 1 (F)

Period ending on: 10 Mar 2012

Project Title: Development and Demonstration on Scheme of Payment for Environmental Services (PES) Derived from Degraded and Secondary Tropical Production Forests in Hainan Province, China

Component	Original Amount (A)	Expenditures To-date			Available Funds (E) { A - D }
		Accrued (B)	Expended (C)	Total (D) { B + C }	
I. Funds managed by Executing Agency					
10. Project Personnel					
11. National Experts (long term)	0	0	0	0	0
11.1 Project Coordinator	0	0	0	0	0
11.2 Forester 1	0	0	0	0	0
11.3 Market/industry expert etc.	0	0	0	0	0
11.4 Administrator	0	0	0	0	0
12. Other Personnel	25,000	0	24,916	24,916	84
12.1 Assistant 1	7,000	0	6,618	6,618	382
12.2 Assistant 2	6,000	0	5,761	5,761	239
12.3 Other labor	12,000	0	12,537	12,537	-537
13. National Consultant(s) (short term)	0	0	0	0	0
13.1 Consultant 1	0	0	0	0	0
13.2 Consultant 2	0	0	0	0	0
14. International Consultant(s)	0	0	0	0	0
14.1 Forest Inventory Expert	0	0	0	0	0
14.2 Consultant 2	0	0	0	0	0
15. Fellowship and Training	0	0	0	0	0
15.1 Training 1	0	0	0	0	0
15.2 Training 2	0	0	0	0	0
19. Component Total	25,000	0	24,916	24,916	84
20. Sub-contracts					
21. Sub-contract (Implementing PES Scheme)	30,000	0	29,029	29,029	971
22. Sub-contract (Mapping and Publishing)	10,000	0	10,695	10,695	-695
29. Component Total:	40,000	0	39,724	39,724	276
30. Travel					
31. Daily Subsistence Allowance	23,000	0	23,619	23,619	-1,619
31.1 National Expert(s)/ Consultant(s)	15,000	0	14,646	14,646	354

	31.2 International Consultant(s)	0	0	0	0	0
	31.3 Others	8,000	0	8,973	8,973	-973
32.	International Travel	6,000	0	5,454	5,454	546
	32.1 National Expert(s)/ Consultant(s)	6,000	0	5,454	5,454	546
	32.2 International Consultant(s)	0	0	0	0	0
	32.3 Others	0	0	0	0	0
33.	Local Transport Costs	11,000	0	13,013	13,013	-2,013
	32.1 National Expert(s)/ Consultant(s)	9,000	0	8,768	8,768	232
	32.2 International Consultant(s)	0	0	0	0	0
	32.3 Others	2,000	0	4,245	4,245	-2,245
39.	Component Total:	40,000	0	42,086	42,086	-2,086
40.	Capital Items					
41.	Premises	0	0	0	0	0
42.	Land	0	0	0	0	0
43.	Vehicle	0	0	0	0	0
44.	Capital Equipment	15,000	0	15,068	15,068	-68
	44.1 Computer Equipment	9,000	0	8,764	8,764	236
	44.2 Forestry Equipment	6,000	0	6,304	6,304	-304
	44.3 Others	0	0	0	0	0
49.	Component Total:	15,000	0	15,068	15,068	-68
50.	Consumable Items					
51.	Raw Materials	0	0	0	0	0
52.	Spare	0	0	0	0	0
53.	Utilities	0	0	0	0	0
54.	Office Supplies	0	0	0	0	0
59.	Component Total:	0	0	0	0	0
60.	Miscellaneous					
61.	Sundry	7,000	0	7,661	7,661	-661
62.	Auditing Costs	1,000	0	609	609	391
63.	Contingencies	0	0	0	0	0
69.	Component Total	8,000	0	8,270	8,270	-270
70.	National Management Costs					
71.	Executing Agency Management Costs	0	0	0	0	0
72.	Focal Point Monitoring	0	0	0	0	0
79.	Component Total	0	0	0	0	0
	Sub-Total:	128,000	0	130,064	130,064	-2,064
	100. GRAND TOTAL:	149,040	-	-	-	-

Note: Amounts in U.S. dollars are converted from the local currency using the average rate of exchange between 18 June 2010 and 15 December 2011. The average exchange rate was 6.5634 RMB/US\$ in this period (39,988 US\$ in 6.8154 RMB/US\$ in 18 June 2010, 49,988 US\$ in 6.5163 RMB/US\$ in 20 April 2011 and 37,988 US\$ in 6.3602 RMB/US\$ in 15 December 2012).

Project financial statement (Chinese Government Contribution, in US dollar)

Project No. RED-SPD 020/09 Rev. 1 (F)

Period ending on: 10 Mar 2012

Project Title: Development and Demonstration on Scheme of Payment for Environmental Services (PES) Derived from Degraded and Secondary Tropical Production Forests in Hainan Province, China

Component	Original Amount (A)	Expenditures To-date			Available Funds (E) { A - D }
		Accrued (B)	Expended (C)	Total (D) { B + C }	
I. Funds managed by Executing Agency					
10. Project Personnel					
11. National Experts (long term)	10,000	0	9,497	9,497	503
11.1 Project Coordinator	6,000	0	5,643	5,643	357
11.2 Forester 1	4,000	0	3,854	3,854	146
11.3 Market/industry expert etc.	0	0	0	0	0
11.4 Administrator	0	0	0	0	0
12. Other Personnel	0	0	0	0	0
12.1 Assistant 1	0	0	0	0	0
12.2 Assistant 2	0	0	0	0	0
12.3 Other labor	0	0	0	0	0
13. National Consultant(s) (short term)	0	0	0	0	0
13.1 Consultant 1	0	0	0	0	0
13.2 Consultant 2	0	0	0	0	0
14. International Consultant(s)	0	0	0	0	0
14.1 Forest Inventory Expert	0	0	0	0	0
14.2 Consultant 2	0	0	0	0	0
15. Fellowship and Training	0	0	0	0	0
15.1 Training 1	0	0	0	0	0
15.2 Training 2	0	0	0	0	0
19. Component Total	10,000	0	9,497	9,497	503
20. Sub-contracts					
21. Sub-contract (Implementing PES Scheme)	0	0	0	0	0
22. Sub-contract (Mapping and Publishing)	0	0	0	0	0
29. Component Total:	0	0	0	0	0
30. Travel					
31. Daily Subsistence Allowance	0	0	0	0	0
31.1 National Expert(s)/ Consultant(s)	0	0	0	0	0
31.2 International Consultant(s)	0	0	0	0	0
31.3 Others	0	0	0	0	0

32.	International Travel	0	0	0	0	0
32.1	National Expert(s)/ Consultant(s)	0	0	0	0	0
32.2	International Consultant(s)	0	0	0	0	0
32.3	Others	0	0	0	0	0
33.	Local Transport Costs	0	0	0	0	0
32.1	National Expert(s)/ Consultant(s)	0	0	0	0	0
32.2	International Consultant(s)	0	0	0	0	0
32.3	Others	0	0	0	0	0
39.	Component Total:	0	0	0	0	0
40.	Capital Items					
41.	Premises	0	0	0	0	0
42.	Land	0	0	0	0	0
43.	Vehicle	0	0	0	0	0
44.	Capital Equipment	0	0	0	0	0
44.1	Computer Equipment	0	0	0	0	0
44.2	Forestry Equipment	0	0	0	0	0
44.3	Others					
49.	Component Total:	0	0	0	0	0
50.	Consumable Items					
51.	Raw Materials	5,000	0	4,988	4,988	12
52.	Spare	5,000	0	4,988	4,988	12
53.	Utilities	5,000	0	4,988	4,988	12
54.	Office Supplies	5,000	0	4,988	4,988	12
59.	Component Total:	20,000	0	19,952	19,952	48
60.	Miscellaneous					
61.	Sundry	0	0	0	0	0
62.	Auditing Costs	0	0	0	0	0
63.	Contingencies	0	0	0	0	0
69.	Component Total	0	0	0	0	0
70.	National Management Costs					
71.	Executing Agency Management Costs	24,000	0	25,152	25,152	-1,152
72.	Focal Point Monitoring	0	0	0	0	0
79.	Component Total	24,000	0	23,152	25,152	-1,152
Sub-Total:		54,000	0	54,601	54,601	-601
100. GRAND TOTAL:		54,000	0	54,601	54,601	-601

Note: Amounts in U.S. dollars are converted from the local currency using the average rate of exchange between 18 June 2010 and 15 December 2011. The average exchange rate was 6.5634 RMB/US\$ in this period (39,988 US\$ in 6.8154 RMB/US\$ in 18 June 2010, 49,988 US\$ in 6.5163 RMB/US\$ in 20 April 2011 and 37,988 US\$ in 6.3602 RMB/US\$ in 15 December 2012).

Annex 2 Project cash flow statement

Project cash flow statement (ITTO Contribution)

Project No. RED-SPD 020/09 Rev. 1 (F)

Period ending on: 10 Mar 2012

Project Title: Development and Demonstration on Scheme of Payment for Environmental Services (PES) Derived from Degraded and Secondary Tropical Production Forests in Hainan Province, China

Component	Reference	Date	Amount in US\$	Local Currency
A. Funds received from ITTO:				
1. First installment	G01014710 01001	2010/05/27	39,988	262,457
2. Second Installment	G01107416 49301	2011/03/16	49,988	328,091
3. Third installment	G01133515 13001	2011/12/01	37,988	249,331
Remittance charge by CITYBANK N. A. of US (3 times)			36	236
Total Funds Received:			128,000	840,115
B. Expenditures by Executing Agency:				
10. Project Personnel				
11. National Experts (long term)			0	0
11.1 Project Coordinator			0	0
11.2 Forester 1			0	0
11.3 Market/industry expert etc.			0	0
11.4 Administrator			0	0
12. Other Labor			24,916	163,534
12.1 Assistant 1			6,618	43,437
12.2 Assistant 2			5,761	37,812
12.3 Other labor			12,537	82,285
13. National Consultant(s) (short term)			0	0
13.1 Consultant 1			0	0
13.2 Consultant 2			0	0
14. International Consultant(s)			0	0
14.1 Forest Inventory Expert			0	0
14.2 Consultant 2			0	0
15. Fellowship and Training			0	0
15.1 Training 1			0	0
15.2 Training 2			0	0
19. Component Total			24,916	163,534
20. Sub-contracts				
21. Sub-contract (Implementing PES Scheme)			29,029	190,529
22. Sub-contract (Mapping and Publishing)			10,695	70,196
29. Component Total:			39,724	260,725
30. Travel				
31. Daily Subsistence			23,619	155,021

	Allowance			
	31.1 National Expert(s)/ Consultant(s)		14,646	96,128
	31.2 International Consultant(s)		0	0
	31.3 Others		8,973	58,893
32.	International Travel		5,454	35,797
	32.1 National Expert(s)/ Consultant(s)		5,454	35,797
	32.2 International Consultant(s)		0	0
	32.3 Others		0	0
33.	Local Transport Costs		13,013	85,410
	32.1 National Expert(s)/ Consultant(s)		8,768	57,548
	32.2 International Consultant(s)		0	0
	32.3 Others		4,245	27,862
39.	Component Total:		42,086	276,227
40.	Capital Items			
41.	Premises		0	0
42.	Land		0	0
43.	Vehicle		0	0
44.	Capital Equipment		15,068	98,897
	44.1 Computer Equipment		8,764	57,521
	44.2 Forestry Equipment		6,304	41,376
	44.3 Others		0	0
49.	Component Total:		15,068	98,897
50.	Consumable Items			
51.	Raw Materials		0	0
52.	Spare		0	0
53.	Utilities		0	0
54.	Office Supplies		0	0
59.	Component Total:		0	0
60.	Miscellaneous			
61.	Sundry		7,661	50,282
62.	Auditing Costs		609	3,997
63.	Contingencies		0	0
69.	Component Total		8,270	54,279
70.	National Management Costs			
71.	Executing Agency Management Costs		0	0
72.	Focal Point Monitoring		0	0
79.	Component Total		0	0
Total Expenditures To-date:			130,064	853,662
Remaining Balance of Funds (A-B):			-2,064	-13,547

Note: Amounts in U.S. dollars are converted from the local currency using the average rate of exchange between 18 June 2010 and 15 December 2011. The average exchange rate was 6.5634 RMB/US\$ in this period (39,988 US\$ in 6.8154 RMB/US\$ in 18 June 2010, 49,988 US\$ in 6.5163 RMB/US\$ in 20 April 2011 and 37,988 US\$ in 6.3602 RMB/US\$ in 15 December 2012).

ANNEX 3 On-the-spot Meeting of PES Scheme for Collective Natural Production Forests in Demonstrative Area (Maohui Community) of Wuzhishan City of Hainan Province in 2011



A panorama of the on-the-spot Meeting



Representatives of main stakeholders (villagers, Maohui community, Government of Maodao Town, Wuzhishan Forestry Bureau, members of ITTO RED-SPD 020/09 Rev. 1 (F) Project)



Check for the area of natural production forests, population and payment of each family



Check for the area of natural production forests, population and payment of each family



Check for the location and area of natural production forests of each family



Check for the location and area of natural production forests of each family



Speeches of representatives of main stakeholders



Speeches of representatives of main stakeholders



Representatives' signatures on the contracts between Wuzhishan Forestry bureau and Maohui community (43 families)



Representatives' signatures on the contracts between Wuzhishan Forestry bureau and Maohui community (43 families)



Signatures and draw money (43 families, 194 villagers)



Waiting for signatures and draw money (43 families, 194 villagers)

ANNEX 4 On-the-spot Meeting of PES Scheme for Collective Natural Production Forests in Demonstrative Area (Maohui Community) of Wuzhishan City of Hainan Province in 2012



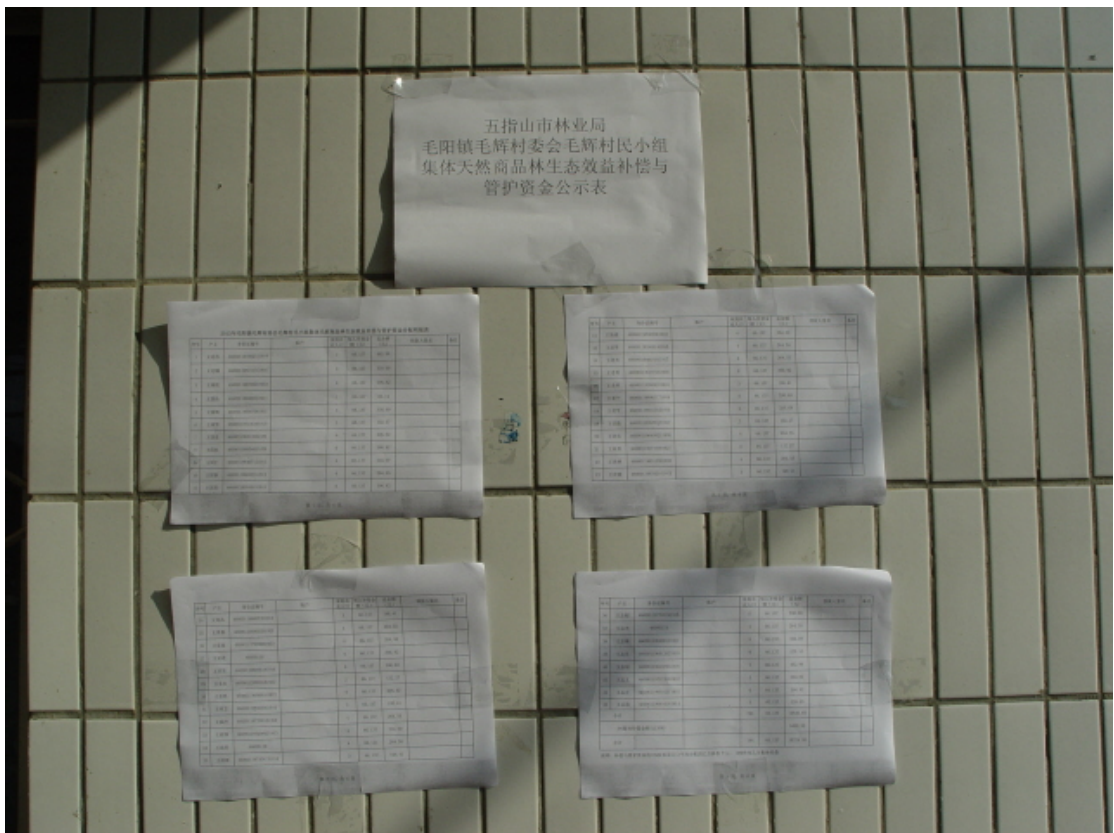
A panorama of the on-the-spot Meeting



Representatives of main stakeholders (villagers, Maohui community, Government of Maodao Town, Wuzhishan Forestry Bureau, members of ITTO RED-SPD 020/09 Rev. 1 (F) Project)



Check for the area of natural production forests, population and payment of each family



Check for the area of natural production forests, population and payment of each family



Speeches of representatives of main stakeholders



Speeches of representatives of main stakeholders



Signatures and draw money (44 families, 196 villagers)



Signatures and draw money (44 families, 196 villagers)



Signatures and draw money (44 families, 196 villagers)



Waiting for signatures and draw money (44 families, 196 villagers)