



United Nations Development Programme
Global Environment Facility Small Grants Programme

**Participatory Integrated Management Capacity Building on
Land Degradation in the Three Gorges Dam Region**

The project brochure



Chongqing Ecology Association

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1 GEF Small Grants Programme

The Global Environment Facility (GEF) Small Grants Programme (SGP) was established in 1992. SGP aims to deliver global environmental benefits in the GEF focal areas, including biodiversity conservation, climate change mitigation, protection of international waters, prevention of land degradation, and elimination of persistent organic pollutants and chemicals of global concern through community-based approaches. SGP has supported more than 14500 projects in 126 countries.

SGP is a unique programme that contributes to solve some of the world's most pressing environmental problems while ensuring sustainable livelihoods through a successful, country-driven, grassroots approach.

2 The Project Background

China is one of the countries facing most serious land degradation in the world. The southwest part of China is a typical area being affected by severe land degradation partly due to dense population and widely distributed karst landforms. Under intensive human disturbance, degradation tendency of the vulnerable ecological and geological environment becomes more and more obvious, especially in the Three Gorges Reservoir Region of the Yangtze River, where the representative characteristic in land degradation is remarkable. Upon implementation of the Three Gorges Dam Project (TGDP), many farmlands were submerged, massive immigrants were relocated locally, competition for land use was intensified, the already overburdened Three Gorges area was further exploited, and acceleration of land degradation was of significance. Not only industrial and agricultural production is negatively affected in the Yangtze River valley, but also local people's livelihoods. Thus, it is an important task for us to carry out sustainable community-based integrated landuse management, to effectively curb the trend of community land degradation, and to rehabilitate degraded land in a relatively short time period. In the meantime, how to effectively improve local people's livelihoods and their living conditions is another important agenda. In addition, climate change closely relates with land degradation. While effectively solving the issues of abovementioned land degradation and local livelihoods, another pressing need might be in building local people's capacity of both adapting to and mitigating climate change. So, it is not only profound but also urgent in terms of strengthening the local people's capacity, improving their production skills, carrying out sustainable landuse management, and establishing an environment-friendly community.

Chongqing Ecology Association, established in November 1998, is a non-governmental organization composed of ecologists in Chongqing. The aims were to provide a communication

platform, promote academic exchanges, raise peoples' ecological awareness, and accelerate eco-environmental development in Chongqing Municipality. The Association has approximately 1000 members, who are respectively from sectors of scientific research, education, management, production and relevant specialties. Regular membership and academic conference is held every two years, which has greatly facilitated research development in ecology and related subjects in Chongqing Municipality. Moreover, science-popularization lectures and sci-tech consultative services are carried out from time to time. Up to now, more than 150 projects have been fulfilled that made significant contributions to ecological knowledge popularization and governmental decision-making in Chongqing Municipality.

Chongqing Ecology Association has been dedicating to research on and solution to eco-environmental problems in Chongqing and Southwest part of China since its establishment. Members of the Association take on strong capabilities both in theory and practice in terms of biodiversity conservation, land use and management, organic pollutants control and global climate change. A good partnership with communities has been established through long-term ecological know-how training and related consultative services. Furthermore, the Association often offers consultative services in relation to ecological development to local governmental organizations (including forestry, agriculture, water conservancy, etc.), and has achieved a good collaborative relationship with them.

The project is executed by Chongqing Ecology Association, of which the scientific research strengths and good partnerships with governments have laid solid foundations for smooth implementation of this project.

3 The Project Target Area

The Project's target area is located in Gonghe Village, Shibao Township, Zhong County, Chongqing Municipality, with 32 km distance away from the downtown of Zhong County, and 3 km distance away from Shibao Township. Located in 108°06' East longitude and 30°36' North latitude, Gonghe Village has an elevation of 110~889 m a.s.l., belonging to a topography of shallow hill with level ground, narrow canyon with deep hill, and middle-level hill with slope lands. The Village is adjacent to the Yangtze River, covering a total area of 241.6 ha. There are a total of 483 households and 1851 people, of whom 956 are males and 895 females, mainly distributed at low elevation areas. In 2010, the average per capita income was 1830 RMB, sourced from agriculture farming and animal husbandry.

The Project's target area belongs to subtropical monsoon climate, with four distinct seasons including Spring, Summer, Autumn and Winter. Plenty of sunlight along with average annual rainfall of 1200 millimeters brings a rainy season from May to September. The average temperature is

19.2 °C, with an extreme maximum temperature of 42°C and the coldest month average temperature of 4.7°C. There are about 320 days frost-free. Such kind of climatic conditions are appropriate to grow a variety of crops, such as rice, wheat, corn, sweet potato, and vegetables, and so on. The surplus crops are harvested to raise poultry and pigs by most of the farmers. Gonghe Village owns 144.2 ha forest, with a forest coverage rate of 59.7%, in contrast to only 58.73 ha arable land available. Annual cultivation areas of crops could be up to 86.4 ha, of which paddy rice has 51.53 ha, wheat 23.47 ha, corn 4.73 ha, and vegetables 6.67 ha. Tillage measures adopted by local farmers are of their free choices, such as plantation along with slopes, burning plenty of litters and even trashes in the field, overuse of fertilizer, etc. These farmers are pretty much lack of awareness in biodiversity conservation, climate change, and sustainable alternative livelihoods. There are 28 lakes, with freshwater storage capacity of 1400 cubic meters, which can meet 6.67 ha irrigation. About 851 livestock available in the market each year consist of 789 pigs and 62 cattle. In addition, around 4200 poultry can be saleable each year. There are 15 methane-generating-pits. Farmer's net income per capita is 1830 RMB. Wild plants include mass on pine (*Pinus*), cypress (*Cupressus funebris*), oak (*Quercus*), rhododendron, vitex, ferns; and the cash trees include citrus (*Citrus reticulata Blanco*), plum (*Prunus salicina*), tea, and mulberry (*Morus alba*), and the like. The major land resources are woodland, garden and slope farmland, on which the farmland is dominated by arid slope fields. Thus, land degradation is of particularly severity. After impoundment up to 175 meters due to operation of the Three Gorges Dam Project, water surface expanded, and Ma'anshan peninsula was formed. A green land tourism development in Majiazhai and water recreation projects might have a good prospect. The Project's target area is typically representative in the Three Gorges Reservoir region.

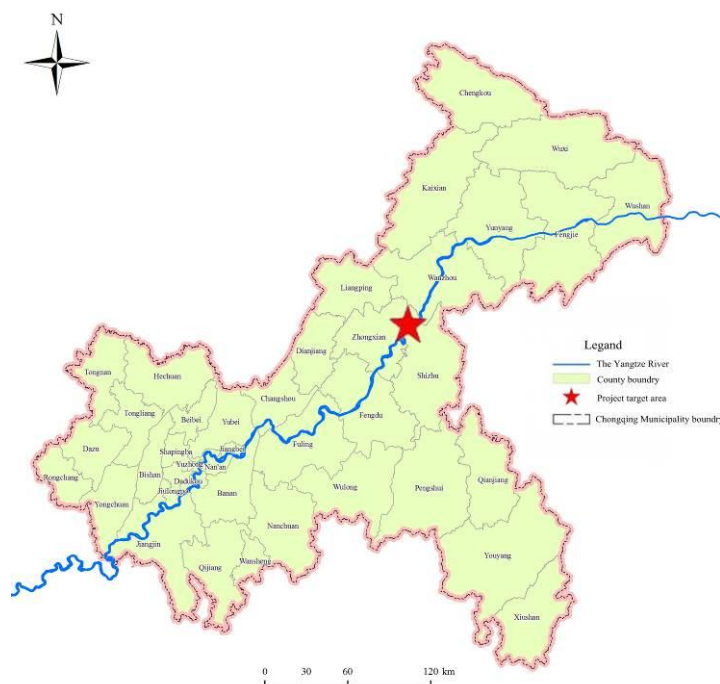


Fig. The location of project target area

4 The Project's Objectives

An adequate policy and social environment has already been formed to effectively support capacity building for integrated community-based management on land degradation thanks to a strong support from national and local government through its policy.

In viewing to the eco-environmental problems in the project target area, such as land degradation, habitat loss, and unreasonable land use, the following specific objectives were set up through participatory planning:

1) To increase forest coverage, and protect and enhance biodiversity through participatory afforestation, participatory closing hill for afforestation, and hedge growth;

2) To popularize and implement environment-friendly eco-agriculture through participatory community-based landuse planning; to promote community's industrial structure adjustment, optimization and upgrading, and increase farmers' income, and enhance their capacity in adaption to and mitigating climate change, through raising farmers' awareness and improving their farming skills;

3) To solve technical issues on integrated community-based land degradation management, and improve local people's integrated management capacity, through Farmers' Field Schools (FFSs) and participatory training workshop. As a result, degraded land in the community is expected to be effectively restored and sustainably managed.

Through these, the following results were anticipated. Vegetation of degraded land in the community is successfully recovered, wildlife habitats are significantly improved, and the degraded land in the community is effectively restored. Upon active participation in environment-friendly community development, local people's living conditions are improved. Local people's awareness is raised in community-based biodiversity conservation, and in addressing climate change; in the meantime, skills in biodiversity protection are better equipped to the locals. An exemplary model is established to help bring on neighboring communities' action in land degradation control and prevention.

5 The Overview of Project Activities

This project was started in December 2011. At the beginning of this project, specialists from Southwest University, Chongqing Academy of Forestry, Zhong County Forestry Bureau, and the government of Shibao Township in Zhong County investigated the project's target area to make a plan for the project.



Investigation and planning for the project in December 2011

5.1 Revegetation for degraded land

5.1.1 Revegetation in hydro-fluctuation zone

1) Revegetation in the project area

The Three Gorges Dam created the biggest reservoir ever built in China. Due to annual water level adjustment of the Three Gorges Reservoir, a hydro-fluctuation zone between 145 m a.s.l and 175 m a.s.l is formed. Formation of the hydro-fluctuation zone caused an almost entire loss of the original vegetation that had previously distributed on this zone. Thus, it is urgent to get the riparian vegetation restored.



The exposed bare part of the hydro-fluctuation zone in the Three Gorges Reservoir area

On the basis of many studies, we have successfully selected some suitable plant species for the revegetation. In this project, members of the community participated in tree planting activities, and restored more than 13.33 ha degraded land in the hydro-fluctuation zone in the Three Gorges Reservoir Region.



Afforestation (March to April 2012)



Pondcypress (*Taxodium ascendens*), baldcypress (*Taxodium distichum*), and willow (*Salix matsudana*) planted in the hydro-fluctuation zone in the project area (March 2012)



Pondcypress (*Taxodium ascendens*), baldcypress (*Taxodium distichum*), and willow (*Salix matsudana*) grown in the hydro-fluctuation zone in the project area (April 2012)

In consideration of the planting season, all of the plants were planted before April 2012. A vegetation pattern of tree-shrub-grass was established. To improve growth of the plants in the revegetated hydro-fluctuation zone, villagers actively tended saplings that were previously planted, including weeding, pruning, and wiping off plant vine, and the like.



Tending saplings that were previously planted in the hydro-fluctuation zone



Weeding and wiping off plant vine



Weeding



A comparison before and after tending saplings (Left: before tending; Right: after tending)



A glimpse of the project area in June 2012 after tending plants

The plants were fully tended in the project area before June 2012. The survival rate and maintaining rate of the saplings were 100% respectively.

After autumn, the Three Gorges Reservoir began to hold water. Because of water level rising, some plants in the water-fluctuation zone were submerged in winter.



The water-fluctuation zone in summer and early spring after revegetation

(Left: July 29, 2012 when the water level was 165.37 m, and the zone was dominated by *Salix matsudana*; Right: January 12, 2013 when the water level was 172.25 m, and *Taxodium ascendens*, *Taxodium distichum*, and *Arundo donax* were emerged partly)



The water-fluctuation zone in summer and early spring after revegetation

(Left: July 29, 2012 when the water level was 165.37m, and the zone was dominated by *Taxodium ascendens* and *Taxodium distichum*; Right: January 12, 2013 when the water level was 172.25m, and *Taxodium ascendens*, and *Taxodium distichum* were emerged partly)



Taxodium ascendens, *Taxodium distichum* saplings in water (October 22, 2012)



The exposed *Taxodium ascendens*, and *Taxodium distichum* saplings after decreasing the water level of the Three Gorges Reservoir (January 12, 2013)

Along with decrease of the water level in the Three Gorges Reservoir, the plants in the water level fluctuation zone began to emerge gradually. In spring, plant saplings began to bud and grow, and the effects of revegetation in the hydro-fluctuation zone occurred.



Budding willow saplings (March 2013)



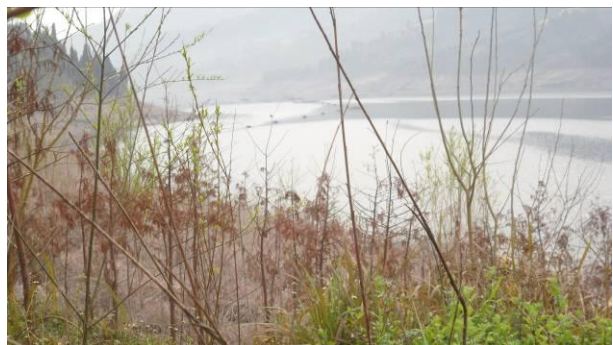
Willow in growth (168m a.s.l, March 2013)



Baldcypress (*Taxodium distichum*) saplings after flooding were budding (March 4, 2013)



Baldcypress (*Taxodium distichum*) saplings in 174m a.s.l were budding (March 2013)



A corner of the project area in the water level fluctuation zone (March 4, 2013)



Baldcypress (*Taxodium distichum*) (left) and willow (*Salix matsudana*) (right) saplings in growth (March 16, 2013)

In the end of April 2013, it was full of green in the project area, which made a great difference to the scenery before the implementation of this project.



The scenery in the water level fluctuation zone before implementation of this project (December 2012)



The scenery in the water level fluctuation zone after implementation of this project (April 2013)

B. Revegetation patterns in the hydro-fluctuation zone in the Three Gorges Reservoir region

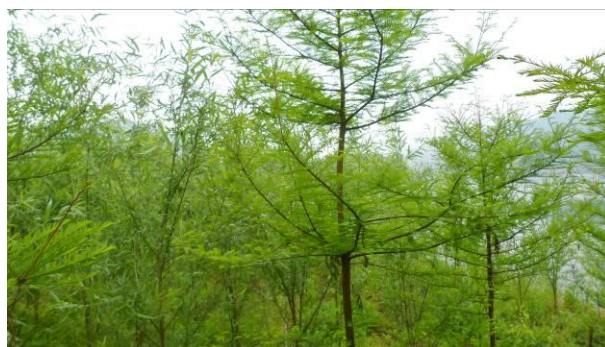
(1) Tree vegetation pattern

① Pondcypress (*Taxodium ascendens*) plantation



One-year-old Pondcypress (*Taxodium ascendens*) saplings in the project area (April 15, 2013)

② Baldcypress (*Taxodium distichum*)



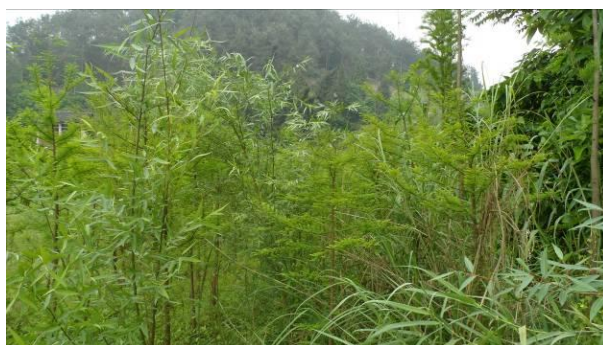
One-year-old baldcypress (*Taxodium distichum*) saplings in the project area (April 15, 2013)
(Left: saplings in the 170~175m a.s.l.; Right: saplings in the 166~170m a.s.l.)

③ Willow (*Salix matsudana*) plantation



One-year-old willow (*Salix matsudana*) saplings in the project area (April 15, 2013)

④ Block mixture plantation of willow (*Salix matsudana*) and baldcypress (*Taxodium distichum*)



Mixture of willow (*Salix matsudana*) and baldcypress (*Taxodium distichum*) (April 16, 2013)

(2) Tree-(shrub)-grass combined vegetation pattern



Willow (*Salix matsudana*) + Limpograss (*Hemarthria altissima*) mixture vegetation pattern



Baldcypress (*Taxodium distichum*) + Bermuda grass (*Cynodon dactylon*) mixture vegetation pattern



Willow (*Salix matsudana*) + Bermuda grass (*Cynodon dactylon*) mixture vegetation pattern

5.1.2 Afforestation of cash forest

In order to improve local people's livelihoods and the eco-environment of the project areas, and to increase the biodiversity, multi-purpose forest and cash forest above the 175 m a.s.l. were afforested in this project, including bamboo, citrus, plum and peach, and the like.



Transporting saplings



Measuring and recording the base-line data of saplings



Soil preparation before afforestation



Planting



Planting *Liquidambar formosana*



Planting *Catalpa bungei*



Tending trees in winter

5.2 The promotion of conservative farming techniques

For many years, the farmers in the Three Gorges Reservoir area used to adopt downslope tillage, which caused serious water and soil erosion while raising the potential risk of eutrophication in the Reservoir. Therefore, the reclamation index was expected to be significantly reduced in the area, and conservative farming techniques were expected to be widely recognized and accepted by the community.

During this project, farmers in Gonghe Village participated in planting *Artemisia carvifolia* and the planting area reached 36.67 ha after the activity. Conservative farming skills including multi-functional hedge growth, contour-line cultivation and agroforestry were used.

From April 8 to 20, 2012, the villagers established 150 farmland shelterbelts with an area of 27.33 ha, which is 3.3 more than that expected.

In February 2013, all the shelterbelts were in great condition, and the maintaining rate was 100%. In the meantime, through technical training and advocacy to local farmers, the application amount of chemical fertilizers and pesticides was reduced. During December 20 to 24, 2012, there were 101 out of 105 families that accepted the conservation tillage skills, indicating the acceptability rate reached 96.2%.



Mixed plantation of bamboo (*Phyllostachys praecox*) and *Artemisia carvifolia*

5.3 Low-yielding farmlands improvement

There are 28 lakes with low freshwater storage in the village. In order to curb the land degradation and meet the demand of irrigation, the lakes are in pressing need to enhance the freshwater storage capacity and to increase the land productivity. The three lake water conservancy facilities in the project proposal were maintained in summer and autumn 2012. The water holding capacity increased from 150 m³, 300 m³ and 100 m³ to 1200 m³, 800 m³ and 2000 m³ respectively.



A comparison of the first lake before and after the maintenance



Maintaining the lake



Three maintained lakes

In terms of low-yielding farmland improvement, 2 ha farmland was improved in 2012. Drainage systems were purposefully built, soil fertility was increased and soil depth was added. These can not only prevent soil and water loss, but also improve soil fertility. The average yield increased by more than 19.7% per hectare, benefiting 25 families.



Mr. Yunfeng Cui, the project staff member in project area was guiding farmer to improve the low-yielding farmland.



The improved low-yielding farmland

5.4 Carrying out research, training and extension on soil and water conservation, and establishing a set of observation and measuring facilities

After the implementation of this project, the community's capacity in monitoring and measuring runoff and soil erosion was enhanced, and water and soil conservation know-how was obtained.

Six long-term plots to observe and measure runoff and soil erosion were built during January 10 to March 15, 2012. The size of the runoff plot was 5 m * 20 m. By now, two soil redox potentiometers were equipped. During these processes, villagers participated actively.



The runoff harvesting plot



The runoff holding tank

In autumn and winter 2012, three training workshops for a total of 190 participants on water and soil conservation skills were offered. From March 2012 to April 2013, we collected soil and plant samples in the project area for 6 times, and then indoor experimental measurements were also completed. Up to now, three papers that granted by UNDP-GEF/SGP were published on *Scientia Silvae Sinicae*, and *Journal of Chongqing Normal University (Natural Science)* respectively.



Sampling soils in the project area



After soil sampling



Measuring plant growth indicators and sampling soils



The planted *Phyllostachys praecox*



Community participatory interviews using Participatory Rural Appraisal (PRA) before project training workshops



Training workshops on non-wood forest products - bamboo shoots (left) and edible mushroom (right)

非木质林产品竹笋的种植及管理技术培训教材

雷竹是我国一种优良笋用竹种，具有年年出笋，出笋早、笋期长、笋味美、口感甜嫩，产量高，经济效益好，适应性强等特点，并具有较高的营养价值和商品价值。为了让广大村民学习雷竹的种植及管理技术，特编制此教材。



1. 选林基地选择

选择海拔 500 米以下，坡度小于 15 度，背风向阳，光照充足，交通方便，靠近水源的坡耕地、丘陵岗地。土壤为沙质壤土或红、黄壤土。pH 值 5-7.5，土层深 50 厘米以下，疏松透气，排水良好。

2. 造林技术

(1) 林地整理：全面整理林地，垦挖深度 30 厘米以上，清除石块、树兜、竹兜。按定植点挖长 80 厘米，宽 40 厘米，深 40 厘米的定植穴，每亩挖穴 60-100 个。

食用菌的栽培技术培训教材



一、常用栽培配方

栽培食用菌的原料很多，有棉籽壳、玉米芯、锯木屑、稻草、麦草等，其中以棉籽壳为最好。各项可用材料宜选用，不管选择何种材料，要求原料必须新鲜、干燥、无霉变。

知识窗
配方一：棉籽壳 93%、原麦 0.2%~0.5%、过磷酸钙 1%、草木灰 1%~2%、石灰 2%~3%。
配方二：玉米芯 45%、棉籽壳 40%、棉籽饼粉 4%~5%、过磷酸钙 1%、草木灰 1%~2%、原麦 0.2%~0.5%、石灰 2%~3%。

二、配料与发酵

按比例称取各种原料，将主料和不适于水的辅料搅拌均匀；将可溶物配制成水溶液，逐步加入，混匀。根据培养料物质的性状，调节到合适的含水量。（注意水分不能一次加完，要分次加，尤其是不能过量。）

1、配料 以上各原料按配方比例 1:1.2-1.3 加水拌料，调至含水量 60%左右和 pH 值 7.5-8。

2、堆积发酵 选向阳地势高燥地方，培养料加 pH 值为 9-10 的石灰水拌料，含水量达 60%-70%，拌匀后按每平方米堆料 50 公斤，料量少，宜堆成圆形堆，有利于通风；料量大，可堆成长条形堆，圆麦秸等有弹性应压实，其他应根据情况压实，然后直接浇 2-3 厘米的水。

The front pages of training materials for non-wood forest products - bamboo shoots (left) and edible mushroom (right)

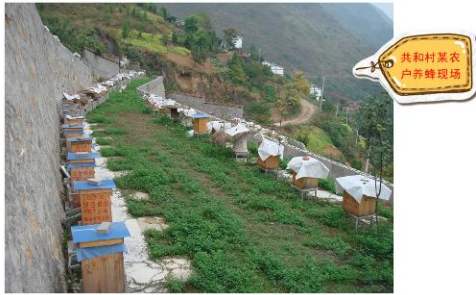


Framers are studying edible mushroom planting techniques during the training workshop.

5.6 Training workshops on beekeeping

Two training workshops on beekeeping were conducted, with a total of 120 participants to attend. Up to now, there are 12 families who are keeping bees, and beekeeping has been one of the livelihood alternatives for these families.

社区养蜂技能培训教材



一、养蜂场地选择

第一，蜂场地选择要求，附近要有一定数量的蜜源植物，既能繁殖蜂群，又能生产蜂蜜。同时调查当地周围养蜂业的发展情况，如果东边附近地点的蜂群已发展到饱和状态，那就应选择西边一点的地点作为场地。

第二，选择放置蜂群的地点。蜂群应放在背风、向阳、安静的地方，离车道和人行道要有一定的距离。

第三，蜜蜂飞出采集的路程一般为2公里，但是离蜜源越近，采集和授粉的效率就越高。所以场地尽可能选在离蜜源较近的地点。

第四，选择场地注意事项：

①不可选择潮湿的低洼地，因为这种地点容易发生蜂病，孳生虫害，妨碍蜜蜂繁殖，管理也不方便。

②场地应该相对平坦，不可选在坡顶或高地，否则，蜜蜂采集回来时要向上飞，反而降低采集花粉的效果。另外，坡面、高地风大，也不利于管理和越冬。

③蜂场附近要有洁净的水源供蜜蜂饮用，但又不可紧靠水库、湖泊、大河，因为蜜蜂采蜜回箱时，容易被风刮到水里，蜂王交尾时也容易落水溺死。



The front pages of training material for beekeeping



Villagers were communicating beekeeping techniques



Training workshop on beekeeping

5.7 Planting herbal medicine

Artemisia carvifolia is a wholesome herbal medicine. From February 20 to April 10, 2012, 483 households in Gonghe village planted *A. carvifolia* 36.67 ha, which was 6.67 ha more than originally planned. They were planted with trees, in courtyard or using single planting mode, with which the land for single planting mode was abandoned farmland.

At the end of July 2012, farmers harvested *A. carvifolia*. It has now become another livelihood alternative for Gonghe villagers.



The planted *Artemisia carvifolia*



The mixed plantation of *P. praecox* and *A. carvifolia*



P. praecox after *A. carvifolia* being harvested



The harvested *A. carvifolia* (Left: July 29, 2012; Right: September 5, 2012)

5.8 Training workshops on community-based biodiversity conservation

The training workshops on community-based biodiversity conservations have been held, and local people's awareness was raised in community-based biodiversity conservation.



Training workshops on community-based biodiversity conservation

5.9 Raising local people's awareness in addressing climate change

Through the training workshops on addressing climate change, more than 95% villagers were aware of climate change.



Training workshops on addressing climate change

5.10 Setting up Farmers' Field Schools

Up to now, four farmers' field schools have been set up, including Gonghe Village bamboo plantation and management farmers' field school, Gonghe Village edible mushroom cultivation farmers' field school, Gonghe Village beekeeping farmers' field school, and Gonghe Village *Artemisia carvifolia* plantation farmers' field school. One brochure on Gonghe Village farmers' field school in Shibao Township in the Three Gorges Reservoir area was completed.



Gonghe Village farmers' field school



Investigating mushroom cultivation



Gonghe Village beekeeping farmers' field school



Gonghe Village *Artemisia carvifolia* plantation farmers' field school

Upon active participation in the activities mentioned above, local people's living conditions were greatly improved, with a net income increase of more than 226.9 RMB per capita. Local people's awareness was raised in community-based biodiversity conservation, and in addressing climate change; in the meantime, skills in biodiversity protection were better equipped to the locals.



The group photo of training workshop participants



The participants in technical training workshops



Technical books on sustainable agricultural farming that were donated to the community.

In addition, throughout the project, regular investigations were conducted to the project site, ensuring the project's effectiveness. Under the special environment in the Three Gorges Reservoir area, more than 10 suitable plant species were screened out, some of those especially tolerant to both extreme flooding and drought. In the future, the project team will continue to strengthen the actual practice and research on community degraded land, and make a further practice on participatory integrated management capacity building on land degradation in the Three Gorges Dam region.



Photos during the project's period

(Left: November 17, 2012; Middle: January 12, 2013; Right: April 15, 2013)

6 Project investigation and discussion

During the implementation of this project, we visited project areas frequently, in order to assist villagers to participate in project activities, while monitoring and recording project dynamics. Whenever conducting our site investigation, there was always plenty of new findings that were worthy to further our project.



Riparian zone revegetation design in February 2012



Investigating saplings on March 17, 2012



Collecting comments and suggestions on April 11, 2012



Inspecting project site in rain



The villager who was making notes on the project

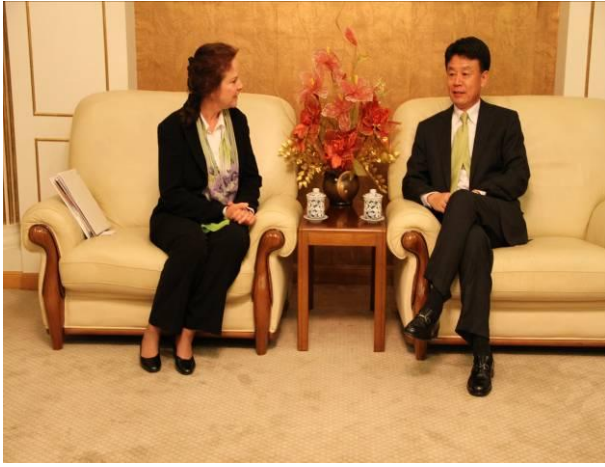
Discussing the content of project brochure in office

During April 13 and 15, 2012, Mr. Dongya Ran, member of National Steering Committee of the Global Environment Facility's (GEF) Small Grants Programme (SGP) in China and Director of the Science and Technology Department of the State Forestry Administration paid a special visit to our project areas. He made positive comments on this project, and encouraged us to make it better.

From May 21 to 23, 2012, a group led by Dr. Rebecca Schneider, a famous watershed ecologist and professor from Cornell University of the U.S., visited Chongqing the first time, made an on-the-spot investigation of this project, and then visited the Key Laboratory of Eco-environments of the Three Gorges Reservoir Region (Ministry of Education) at Southwest University. They were so impressed by the achievement and positive impacts on the ecological environment that our project has accomplished, and especially praised this GEF/SGP work in Zhong County in the Three Gorges Reservoir area to Mr. Jianguo Zhang, Minister of State Administration of Foreign Experts Affairs in Beijing.



The group of Rebecca Schneider was visiting the project area.



Professor Rebecca Schneider recommended this project to Minister Jianguo Zhang.

From November 17 to 19, 2012, Ms. Yi Liu, the National Coordinator of Global Environment Facility's Small Grants Programme, United Nations Development Programme in China and Director Dongya Ran inspected the project area as well. The feedback was very positive as well from them.



Ms. Yi Liu and Director Dongya Ran were visiting the project area.

7 Direct and long-term benefits the communities acquired

During the project period, Gonghe Villagers participated in tree planting, low-yielding farmlands improvement, project training workshops, farmers' field schools and other project activities actively. Community-based livelihood alternatives, such as non-wood forest products - bamboo shoots and

edible mushroom, beekeeping, and Chinese herbal medicine, directly increased local farmers' income and improved their living standards.

The revegetation in the hydro-fluctuation zone has been observed efficiently. Compared with the beginning of this project, the forest coverage rate and biodiversity have been increased significantly, effectively curbing the trend of land degradation. Up to now, pheasants and other wild animals have been witnessed. The hydro-fluctuation zone has been improved in terms of landscape and ecological security.

The afforestation of cash forest and the planting of *Artemisia carvifolia* also brought direct economic income to the community.

The improved farmland productivity and sustainability and the conduct of research, training and extension on soil and water conservation have restored a part of the community degraded land, and lay foundation for the establishment of community friendly environment.

The degraded land has efficiently been restored. The revegetation technique has been promoted surrounding the project areas. Besides, through project training workshops and Farmers' Field Schools, and also participation in project activities, local people have raised their awareness in community-based biodiversity conservation, and in addressing climate change. We believe that they will contribute positively to the land improvement and biodiversity enhancement later.

8 The project's sustainability

This project focused on community-participatory degraded land management. The effective exploration of people's activeness laid a foundation for the project's sustainability. As all the activities were in line with the national and local policies, this project obtained a strong support from governments. Additionally, this project was typically representative, exemplary and replicable in a wide range.

Since the initiation of the project, it has received plenty of approvals. Three more projects, including the Three Gorges Reservoir's Hydro-fluctuation Belt Revegetation Extension Program, Studies on Soil Microbial Ecological Properties of the Hydro-fluctuation Belt in the Three Gorges Reservoir, and Integrated Watershed Management Key Techniques of the Three Gorges Reservoir, sponsored by both Central and local Government, will continue to succeed the achievement from this GEF/SGP project. We are conducting researches on water and soil erosion, water eutrophication and other issues in the Three Gorges Reservoir region. The results of this project will be used in the fields, and the related contents in this project will be continued and deepened. Certainly, if the lessons from this project could be used in further projects, this GEF/SGP project will be more sustainable.

9 Difficulties during the project's implementation

Afforestation accounted for a large part in this project. Thus, local laborers mainly comprised of female and old males due to migrant-labor to coastal provinces increased the cost of labor. Secondly, given the fact that road was under repairs and local transportation was not very convenient from February to April 2012 (the main time period for afforestation), caused the scattering of original soils being attached to the roots of saplings during transportation. Thirdly, light and thin soils increased the difficulty in planting trees. However, these difficulties were effectively solved through increasing matching funds, taking measures to adapt to local conditions, and planting trees with suitable size and herbaceous plant species in appropriate afforestation sections.

When planning the project training workshops, due to busy farming activities and also relatively small number of people in the project areas, it was hard to determine the training dates. However, through communications with local governments and village leaders in the community, the training workshops were completed successfully.

10 Lessons from the project

In the early stage of this project, relevant experts from different organizations made an investigation to the project site, and formulated the specific plan. During the project implementation process, we kept finding problems and corresponding solutions, which ensured the project's smooth implementation. Therefore, it is suggested that paying attention to project's planning, finding suitable solutions to local problems, and strengthening supervisions will guarantee the project's effects in the limited time period.

Preventing land degradation was one of the project objectives. Quite a number of villagers participated into the project's activities, especially tree planting and tending. These ensured a high tree survival rate and maintaining rate, and a good vegetative condition in the project areas. Thus, it is of great significance to carrying out community-participatory land degradation prevention through enhancement of participation of villagers.

Governments and related institutions have taken how to improve people's income and standard of living into consideration. A good economic condition might be of top priority for villagers. Therefore, this project designed *Artemisia carvifolia* plantation, bamboo and edible mushroom cultivation, and beekeeping to improve local people's economic situation, so that all the related activities have been widely accepted.

In addition, the establishment of farmers' field school was the major feature of this project. The farmers' field school is a school without walls, using "farmer" as center, "field" as classroom, "practice" as means, and "capacity building" as purpose. According to actual conditions in the area, four farmers' field schools have been successfully built, including Gonghe Village bamboo

plantation and management farmers' field school, Gonghe Village edible mushroom cultivation farmers' field school, Gonghe Village beekeeping farmers' field school, and Gonghe Village *Artemisia carvifolia* planting farmers' field school. Community villagers improved their abilities in planting (breeding) bamboo / mushroom / bees / *Artemisia carvifolia* and then improved their livelihood, through on-the-spot studying, technique exchanging, and linking theory to practice.

However, since the project started from December 2011, there were few villagers who did not participate in actively. In future projects, attention should be paid to emphasize community participatory activities, in return, to heighten level of the decision-making and supervision from government departments. Additionally, publicity of the project could be strengthened through radio, network, and multimedia system. On the other hand, it was found that villagers showed enthusiasm to alternative livelihoods. Thus, it is better to increase necessary capital investment to promote the four related farmers' field schools, in order to further enhance farmers' livelihoods and raise biodiversity protection awareness, for example, promoting mushroom cultivation and bee breeding activities. Because of limited and restrained budget, raw materials could not be provided for the farmers' field schools at this time. If excellent strains and species for alternative livelihoods can be provided, it will be of great help to improve the livelihood of local farmers.