

Vetiver for Sustainable Watershed Management in the Dabie Mountains of China: Final Project Report

1 Background of the project

1.1 The Dabie Mountains and soil erosion

The Dabie Mountains, where the project located, 90-1,700 m above sea level has a total area near 100,000 sq. km. Caused by various factors, the Dabie Mountain area remains under developed and forms one of the poorest region of the country. Water and soil erosion is one of the main factors influencing agricultural development. Since the soil in the Dabie Mountains was mainly derived from coarse granite rocks, soil erosion was proved serious. To control soil erosion, Vetiver System was introduced to the Dabie Mountains by China Vetiver Network in 1998. Field trials in Yuexi County of Anhui Province, and Huanggang Prefecture of Hubei Province showed that vetiver grass grew very well and played an important role in water conservation and slope stabilization.

1.2 The goal of the project

The objective of the Swiss Re supported project was to help farmers control water and soil erosion, protect natural resources and increase income at the same time by:

- Introducing and raising awareness of water, soil and natural resources protection and the effectiveness of vetiver in water and soil erosion control, watershed management and sustainable agriculture, earth work stabilization, disaster prevention, and other numerous multiple uses among policy makers, farmers, extension workers and technicians in the whole Dabie Mountains and other mountain area in China.
- Training farmers on vetiver characteristics, vetiver planting, propagation, pruning and management and the application of multiple uses of the pruning.
- Introducing and extending proper vetiver based agroforestry system, such as vetiver-chestnut-wheat system, contour planting, and crop diversity for erosion control, etc.
- Generating income by establishing vetiver-protected high quality commercial trees and vegetables on terrace, and small animal husbandry.
- Helping women improve social and economic condition by training and demonstration on vetiver management, tea production, etc.
- Extending the above technologies and experiences to the whole Dabie Mountains and other mountain area of China through various activities.

Vetiver based agroforestry system would be introduced and demonstrated, totaling 120 000 tea seedlings, 900 chestnut trees, and 210 000 vetiver tillers would be established in demonstration plots. Series training courses would be organized and over 1 000 persons be directly trained. The experiences and information would be most widely distributed through in-direct training, information dissemination, visiting, and national and international networking.

2 The initiation of the project

To start the project a group from China Vetiver Network went to the project area at the end of May 2004. Discussion was held with local party secretary and the technicians from the soil conservation bureau and soil and water conservation institute. At the meeting China Vetiver Network introduced Vetiver System and its function for

water and soil erosion control. A set of technical materials were distributed, including posters produced by The Vetiver Network (international) and Taiwan university, that contained numerous color pictures vividly showing how vetiver grass control water and soil erosion and protect farming production. Local people expressed high interests in vetiver application and their thanks to the donor's generous support. Through discussion a Leading Group was formed which consisted of village director, technicians, farmers, and members of China Vetiver Network. The responsibility of different people was also discussed and decided. At the end of the meeting a contract was signed.

As an initiation, the Leading Group members went to the field to investigate the demonstration site, the Shao Huo Shan Mount that was 400 Mu area (about 26 hectares). It had a slope for 15-25 degree. Two patches of the slope land were selected for the demonstration of vetiver hedges protected tea bushes and chestnut trees.

To implement the project more smoothly a timetable was proposed, that included three major components: (1) the technical training mainly in September of 2004; (2) land preparation later in 2004; (3) planting of economic trees and vetiver grass in March of 2005.



A meeting was being held at local office.



Field investigation

3 The Technical Training Courses

In September 2004, a group of experts from China Vetiver Network (CVN) went to Huanggang, the site of the project. A series of the training courses were organized there.

3.1 The production of training materials

Before the training, technical training materials were produced by CVN experts in different area of the country and sent to the Dabie Mountains. These materials included:

- ✧ *Vetiver & Soil Conservation*: FACT Sheets (No. 1-5): printed on different color paper and introduced basic knowledge of soil conservation and vetiver grass.
- ✧ *Vetiver Grass: The Hedge Against Erosion*: A translation booklet from its English version which was produced by The Vetiver Network (International).
- ✧ *Chestnut tree Production*: A booklet introduced chestnut tree planting and cultivation and how to use vetiver grass to protect chestnut trees.
- ✧ *Tea Tree Production*: A booklet introducing basic technology of tea tree planting and management and the method of using vetiver to control soil erosion and improve tea production.
- ✧ *Vetiver Posters*: A printed color poster with numerous photos and vivid drawings introducing vetiver application in China and in the world. As large number of poor farmers in the project

area has relatively low level of education, the poster was distributed to farmers to put on their family wall in order to strengthen their memory.

- ✧ *Vetiver Newsletter*: The newsletter introduced Swiss Re supported project progress and recent news on vetiver development in China and in the world. What are water and soil erosion and what causes erosion?

All of the printed materials were produced and sent to the project sites and distributed in the Dabie Mountain area for several times in September as soon as they were produced. Several CVN experts from different provinces of China were invited to prepare these training materials.

3.2 The training and training courses

3.2.1 Training contents

The training contents included:

- ✧ What was water and soil erosion? What causes soil erosion? How to control soil erosion?
- ✧ Vegetative contour hedges for erosion control.
- ✧ Why vetiver grass was the ideal plant for the vegetative system of soil and moisture conservation, earth structure stabilization, and environmental rehabilitation?
- ✧ How to establish vetiver hedge and nursery and how to manage vetiver for soil conservation, soil moisture and fertility maintenance, and economic tree protection.
- ✧ The planting and management of chestnut tree and the application of vetiver for chestnut production.
- ✧ The planting and management of tea tree and the application of vetiver for tea production.

3.2.2 The training courses

The training courses were organized mainly in two sites: the village office and the tea-processing hall. The trainers were mainly local technicians so that farmers were easy to understand regarding to local tongue. The trainees were local farmers in the project area. In addition to classroom training, some short training courses were also held in the field so that farmers can get more experience and the farmers who had difficulty to go to classroom could get necessary knowledge.

In order to get more farmers involving in the project, the experts and technicians visited farmers' families, the village Forestry Farm, and the Elder People Yard distributing training materials and introducing training contents.

Before the initiation of series training courses the Leading Group visited Farmer Technicians who were fond of cultivating economic trees. The Group exchanged ideas with Technicians on economic tree management and collected their experiences and then introduced to other farmers during the training courses. For example a farmer told the experts that it would be better to use fruit stem instead of productive stem for chestnut grafting so that the chestnut tree could bear fruit earlier. His experience was introduced to other farmers during lecture presentation.

On request of some farmers who wish to get more profit from vetiver grass, the experts introduced farmers with vetiver application experience for engineering protection in China and in the world. The farmers were encouraged to contact railway and highway sections in order to contract road protection projects using vetiver.

All of training activities started from 21 September and ended on 27 September 2004.



Talking with the director of woman federation



Lecture on economic tree management



Introducing vetiver to Forestry Farm workers



Introducing infrastructure protection with vetiver



Visiting tea processing plant



Introducing vetiver reproduction



Discussing at the village hotel on further arrangement



Women are fond of vetiver technology



“Why vetiver can control soil erosion”



Vetiver practice in the field



Vetiver planting demonstration outside the classroom



Farmers learning vetiver planting



Distribution vetiver information to farmer technician



Field practice



Relation between vetiver and economic trees



Introducing root characteristics of vetiver



Lecture on water and soil erosion



Introducing vetiver development in the world



Training course at village office



Women participants accounting for over 60%



What causes soil erosion



Women like vetiver poster



Lecture presentation



Looking at vetiver FACT Sheets



Visiting farmer's tea garden



The printed training materials

4 The demonstration establishment: land preparation and economic tree and vetiver planting

4.1 Meeting and design for land preparation

Another important project component was the demonstration of using vetiver to protect newly planted economic trees. Starting from October 2004 the project Leading Group organized farmers for land preparation, in addition to collect manure. On 20 November 2004, the Party Secretary and the Director of the Village Committee held a meeting. All the 8 Villages Groups leaders attended the meeting. They expressed high enthusiasm in the project demonstration aiming at soil erosion control and economic tree production.

Through discussion a decision was made that the land preparation should be carried out by all the village farmers so that all the farmers could understand the importance of the project and soil erosion protection. They divided the terrace to be prepared into 8 sections, some longer and some shorter with the longest section for 1200m and the shortest for 400m, depending on the scale of the Village Group, and each Village Group should be responsible for each section of the land preparation.

The Leading Group paid each group a certain compensation for their effort depending on land work quantity and difficulties. Tea seeds, chestnut seedlings, vetiver planting materials and fertilizer were provided by the Project. At the meeting three farmers, Mr. Zheng Mohua, Mr. Long Dezhi, and Mr. Wang Liangfang, were selected and responsible for routine management after land preparation, including the preparation of pits for chestnut tree planting and ditches for tea seeds broadcasting.

Originally the land was covered by bushes and weeds with bad quality terraces, some sections wide and some sections narrow, some places high while other places low. At the meeting it was required that during land preparation the bushes and weeds should be cleared and buried as manure. The terrace should be at least 3m wide. Besides, the Leading Group prepared a regulation for chestnut and tea planting, including the scale of pits and ditches, manure application, etc. It was required that the chestnut trees should plant spacing 4 x 3.5 m. The pit should be 0.6 x 0.6 x 0.6 m³, while the ditches for tea planting should be 30cm wide and 30 cm deep. Altogether 10ton farm manure, 50kg phosphorous fertilizer, and 20kg soybean cake be applied for each MU of tea tree plantation. For chestnut, 50kg farm manure plus 0.5kg phosphorous fertilizer should applied for each pit. In addition, lake sediment and plant ash were collected as manure.

4.2 Field operation for land preparation

On 28 November 2004, 3 Village Groups for altogether 31 farmers started land-leveling operation. The next day all the 8 Village Groups started their work. The village leaders and technicians also joined the work. Each day around 50 farmers joined the work with a maximum number over 70. Through 6 days hard work the land preparation was finished on 3 December 2004. Totally 5359 m earth terraces were constructed. Later, the Leading Group organized an observation to check the project quality and asked the responsible farmers to repair few sections of terraces.

4.3 Economic tree and vetiver planting

After the Spring Festival the planting of trees started on 23 February 2005. The most productive varieties of economic trees that had local priority were selected. The farmers were divided for 3 groups for the planting.

They contracted the project with the Leading Group to guarantee the planting quality and ensure the success the trees. To insure the survival all the tree roots were dipped in the clay paste to retain moisture. The activity was finished on 6 March 2005. Fortunately, there was rain and snow on 11 and 12 March 2005 respectively. The high survival rate was reached. To protect possible following draught, the reservoir that just situated at the top of the mount was maintained and the pumping engine, electricity, and the pipes were all ready for working.

On 3 April 2005, totaling 210 000 vetiver tillers were transported to the project site from Yuexi County of Anhui Province. Before planting the project Leading Group discussed planting experiences and prospective of vetiver system with Mr Zhang Huasheng from Yuexi County who owned the Farmer Award from The Veiver Network (international) during Third International Conference on Vetiver (ICV-3) in 2003. The grass was planted strictly according to the Planting Regulation. They were planted at the edge of the terraces to fix the terrace and conserve water and soil. The whole planting lasted 3 days and finished on 6 April 2005. Watering was provided during the planting. Fortunately there followed a spring raining on 9 and 10 April 2005. It is expected that the planting materials could well survived.

Besides, farmer established their own vetiver nursery using spare tellers.

5 Achievements and impacts

5.1 Achievements of the project

Up to 5 April 2005, all of the project components were successfully completed. The project accomplishment includes:

- Vetiver plants for 210 000 tillers were established.
- Chestnut trees for 1500 seedlings were planted.
- Tea bushes of 120 000 were established.
- Altogether 1010 farmers received direct training, in addition to thousands of farmers who received non-direct training through wide distribution of printed maters. The most inspiring issue was that women accounted for over 60% of the trainee and showed high interests in new technology training, which is important for the improvement of women's social and economic position (Table 1).

Table 1. Accomplishment of Vetiver for Sustainable Watershed Management in the Dabie Mountains of China

Item	Accomplishment	Remark
Vetiver planting	210 000	
Chestnut trees planting	1500	
Tea trees establishment	120 000	
Technical training (trainee)	1010	60% was women
<i>Vetiver & Soil Conservation: FACT Sheets</i>	5000 pieces	5 issues
<i>Vetiver Newsletter</i>	2000 copies	2 issues
<i>Vetiver New Years Cards P&D</i>	1500	
<i>Chestnut Tree Production (brochure)P&D</i>	800	
<i>Tea Tree Production (brochure)P&D</i>	800	
<i>Vetiver Grass: The Hedge Against Erosion P&D</i>	2000	Translation from English
<i>Vetiver Poster*</i>	2000	

* Produced by The Vetiver Network (international) and Taiwan University

p & d = production & distribution

5.2 Project evaluation and impact

The project evaluation was reached through discussion and field visitation. Altogether 120 persons were involved. Through final project evaluation, people realized that the quality of the project was well controlled

under the friendly cooperation of China Vetiver Network (CVN), local Government, local water conservation institute and farmers.

All of the planting materials and seeds had high quality. The farmers planted plants very seriously following technical regulation. It indicates that the economic trees will produce high profit in the near future.

Farmers participated in the project very actively and expressed high enthusiasm in technical trainings. Because all of the training materials were well prepared, most of the farmers could read, understand and grasp the trained technologies.

The farmers felt that the project combining farm production with technology training created a good solution for poverty alleviation, which will produce long time influence in the relative large area.

Through multiple trainings farmers realized that water conservation should be the first consideration during agricultural development in order to protect environment and to reach sustainable profit generation.

Through the implementation of the project, the friendship and understanding between multiple partners were enhanced.

The impact of the project is far more than the project itself and the project area. Its influence extended to the whole Dabie Mountains and outside the Dabie Mountains. Over 10 000 copies of different printed matters were distributed through out the Dabie Mountains and other area of China through China Vetiver Network. The wide information dissemination generated great impact in the country. Many institutes contacted China Vetiver Network for more information, while some requested support for the similar project to be launched in their own area. Farmers in the nearby villages urged their leaders to seek similar projects.

The project information was introduced to the Asia and the world through VETIVERIM, a Quarterly Newsletter of the Pacific Rim Vetiver Network and The Vetiver Network (International) web site. The web site not only introduced the success of the project but also put Swiss Re Award at the first page and encouraging water conservation people in the world to compete.

6 Suggestion on international handcraft training

Vetiver pruning handcraft production should form one of the most important issues which can directly generate profit for farmers, women in particular. The handcraft training can improve women's social and economic situation. Because Thailand did an excellent job in this aspect supported by Department of Industrial Promotion of Royal Thai Government and Office of the Royal Development Projects Board, it was planned that Thai technicians would be invited as trainers to teach woman farmers in the Dabie Mountains. If funding permit, foreign participants can also included. It is suggested that the training could be launched in the near future under further financial support by Swiss Re. A special project proposal was prepared and available.



Leading Group discussion



Terrace construction



Field design



Dig pits for chestnut planting



Quality control



Terraces in construction



Transported seedlings



Vetiver and tree planted