

THE HISTORY AND PROSPECT OF VETIVER DEVELOPMENT IN CHINA

Liyu Xu

China Vetiver Network/Soil Science Institute of Chinese Academy of Sciences,
P.O.Box821, Nanjing 210008, China, vetiver@jlonline.com)

Key Words: China, history, network, prospect

Abstract

Vetiver grass and Vetiver Grass Technology (VGT) was introduced to China by Mr. Richard Grimshaw in 1988 through a World Bank project named as China Red Soil Development Project that covered 5 provinces: Jiangxi, Fujian, Sichuan, Guizhou, and Hunan. Until 1997, VGT was mainly used for erosion control and agriculture production.

In 1997 at the *Fuzhou Conference*, Mr. Diti Hengchaovanich from Thailand introduced some theory and recounted some successful experiences using VGT for engineering protection focusing in particular on highway embankments. His presentation generated great interest among the Chinese participants.

In 1999, China Vetiver Network organized an International Conference on Vetiver Bio-Engineering Technology for Erosion and Sediment Control and Civil Construction Stabilization. It was called *Nanchang Conference* especially organized for highway engineers. Besides, a few of persons from private companies also participated in the conference. It was an extremely significant conference that played an important role in vetiver development from agriculture to other fields and it started the history of private sectors involving in VGT extension. The paper described why HIGHWAY was selected as top consideration and a breakthrough for national vetiver development.

To promote national vetiver development, proper strategy should be designed in order to stimulate more people to use and to SELL VGT. It includes: to select a most promising subject as top development issue; to searching for most potential vetiver users; and to produce and disseminate multiple publications in large quantities.

Although great achievement has been reached in China there is still huge potential for further development and problems to be solved:

- (1) In many places in China VGT is applied in very limited area and needs to be extended.
- (2) Need for transferring research achievements into practice.
- (3) Vetiver for agricultural production needs to be strengthened.
- (4) Problem with private sectors should be solved.

It is approaching 20 years since Vetiver grass and Vetiver Grass Technology (VGT) introduced to China. The technology has been developed very successfully and rapidly, from farmland erosion control to infrastructure protection, and from slope stabilization to environment protection. There is still huge potential for further development, so long as correct strategy is created and carried out.

1. The initiation: VGT for erosion control and farmland protection

1.1 Introduction of vetiver

Although vetiver grass was reported as a native grass in Guangdong province some years ago, the grass and Vetiver Grass Technology (VGT) was introduced by Mr. Richard Grimshaw in 1988 through a World Bank project named as China Red Soil Development Project that covered 5 provinces: Jiangxi, Fujian, Sichuan, Guizhou, and Hunan. He brought 1000 tillers from Indian to China in October 1988. One month later vetiver grass was found in Guangze County of Fujian Province. In March 1989, the grass was distributed and tested at 29 locations in 7 counties of Fujian Province. In May 1989, Grimshaw brought 10 kg planting materials to Sichuan for testing.

In the autumn, on 22-26 October 1989 a National Vetiver Workshop was organized jointly by China Agriculture Ministry and the Ministry of Water Resources in Shaowu of Fujian Province (It was called *Shaowu Conference*). The participants came mainly from the

5 project provinces listed above, in addition to national institutions such as Chinese Academy of Sciences, China Agricultural Academy, International Science Union, China Agriculture Ministry, the Ministry of Water Resources, China Forestry Ministry, etc. Altogether there were 46 participants from 32 institutions.

The workshop focused on following subjects:

- ✧ To exchange planting and testing experiences;
- ✧ To introduce vetiver planting experience obtained from other countries, the prospect of vetiver development, and suggestion for future application in China by Mr. Richard Grimshaw;
- ✧ To visit testing plots and vetiver nursery; and
- ✧ To discuss further development.

The participants from Jiangxi Province and Fujian Province and The Mountain Institute of Chinese Academy of Sciences introduced their testing experiences. They all realized that the grass could play an important role in soil conservation on slope farmland, slope orange garden, tea garden and oil tea (camellia) plantation.

1.2 Further tests for agriculture protection

After the Workshop, vetiver was tested by research institutes, universities, and extension stations in the 5 Provinces in southern China. Besides, institutions in other provinces also started the tests when they got vetiver information. The topics included:

- vetiver's biological and ecological characteristics;
- establishment and management of vetiver nursery and vetiver hedges;
- effect of environmental factors on vetiver growth;
- effect of vetiver hedges on soil fertility, soil moisture, soil erosion control, and crop yield;
- effect of fertilizer application on vetiver growth;
- comparison of vetiver with other grasses.

To sum up experience and exchange ideas, and to disseminate vetiver grass technology as rapidly as possible, the China Vetiver Network organized an International Vetiver Workshop in Fuzhou sponsored by the World Bank in 1997. It was called as *Fuzhou Conference*. During the post-conference tour, about 100 participants visited demonstrations on Pingtan Island, Fujian Province, that revealed vetiver grass applications to protect coastal areas and fish ponds, to fix sand dunes, and to protect high valued cash crops. The participants also visited a demonstration site that used vetiver to protect highway embankments in Nanping Prefecture in northern Fujian Province.

2. Vetiver for highway protection: a new milestone

Vetiver was used for erosion control and agriculture protection from 1988 to 1997 in China. During *Fuzhou Conference* in 1997, Mr. Diti Hengchaovanich from Thailand introduced some theory and recounted some successful experiences using vetiver grass technology for engineering protection focusing in particular on highway embankments. His presentation generated great interest among the Chinese participants. In China, since economic reforms began several decades ago, highway and railway construction has developed quite rapidly. It was noted that a great potential existed for using vetiver grass technology as a cheap and practical bio-engineering method to protect road embankments and preserve the ecological environment in the vicinity of the roads, especially in mountainous areas.

Unfortunately, few engineers participated in this workshop. Therefore, two years later, in 1999 in Nanchang, Jiangxi Province, the China Vetiver Network organized an

International Conference on Vetiver Bio-Engineering Technology for Erosion and Sediment Control and Civil Construction Stabilization. It was called *Nanchang Conference*. The Jiangxi Provincial Highway Bureau was invited to co-organize the conference in order that more highway engineers could participate in the conference. A few recognized international experts were invited to introduce their experiences utilizing vetiver grass for protection in engineering construction projects. This time most of the participants came from engineering institutions throughout China and most were from highway institutions. Moreover, some landscape companies and interested individuals attended the conference.

This conference had a huge impact on vetiver development and erected a new milestone in vetiver history in China (Liyu Xu, 2003).

- It was the first time to recommend VGT to engineers rather than farmers at an international conference. Therefore it exploited a broad new field for vetiver development.
- In the past almost all of the vetiver projects were implemented in agriculture field under governmental financial support. Without outside support farmers would hardly use VGT. This time participants felt that vetiver grass technologies could bring them fast and considerable profits, which enable VGT stepping forward to the market.
- A few of private company managers from Guangdong Province, the most developed area in China, participated in the conference and then became the first group of vetiver bosses as soon as they departed the conference.
- Now that vetiver could serve engineering in addition to agriculture, more people wished to enlarge the scope from engineering to other field such as landfill protection, polluted water treatment etc., so long as there was market.

Few months later VGT was applied in Zhejiang highway protection in the mountainous Lishui Prefecture in the spring of 2000 by the first highway vetiver company, established by one of the participants of *Nanchang Conference*. In October, the first highway protection evaluation conference in China was organized and VGT was accepted by national highway experts.

Since the close of the *Nanchang conference*, vetiver systems have been rapidly employed for highway embankment protection, as well as with railway embankments, water reservoir preservation, mine tailings, land fills, etc. Universities and research institutes around China have also conducted research in various areas on topics such as the effect of vetiver grass on highway protection and on eutrophication; the result of insect pests on vetiver hedges; and the magnitude of vetiver root strength.

3. Strategy for national vetiver development

3.1 Select a most promising subject

There were a lot of subjects for vetiver development in a country. However we could not expect that all of the subjects could be promoted at the same time. Since *Fuzhou Conference* in 1997, we realized that vetiver had great potential in engineering and infrastructure protection field and possibly in other field. However, how could we promote VGT into the new fields? How could we generate new energy for fast development? We had to design our strategy. The followings were considered seriously by China Vetiver Network:

- We should search for all possible subjects and then select most important one as a target during a certain period.
- The most important topic should have huge potential for further development (had

huge market).

- It should be relatively easy to be implemented with little difficulties, compared with other subjects.
- It could play an important role for further extension, i.e. once VGT was developed in this area it could extend to other relative field with no trouble.
- It could be easily accepted by the related authority.

Based on the above consideration we selected highway as a breakthrough because:

- 1) Highway construction had been very rapidly through out the country. It had huge market;
- 2) There were several grades and related administrative management authorities in highway, i.e. the expressway, national highway, provincial highway, etc. There was very little relation between them. That is to say we could apply VGT at any highway grade without consideration on others. On the contrary, for railway construction there was rigid management. If one wished to plant vetiver they should get approval from its higher authority.

A little later after *Nanchang Conference*, a national regulation was prepared by national highway institution. In deed, once VGT was applied for highway embankment protection, it automatically disseminated to other field: railway protection, mine tail re-vegetation, civil building protection, etc.

On request of railway company, on 20 April 2001, 120,000 tillers of Vetiver planting material were transported to a railway construction site from a village in the Dabie Mountains where farmers had been producing planting materials for contracted Vetiver projects since 1998 as part of a poverty alleviation program and an environmental protection scheme. Very soon the first national demonstration for railway embankment protection was established in east China successfully in just three months.

More inspiring issue was that the railway company did not satisfy their success. Few months later, they organized The First Railway Vetiver Technology Identification and Evaluation Conference of China in Nanjing from 18-20 October 2001. Experts from almost all of the recognized national railway institutions attended the conference. The achievement was that VGT was fully accepted by China railway authority. Furthermore, the first vetiver railway company registered in Nanjing that started vetiver extension for railway embankment protection through private companies. Later, the vetiver application for railway protection emerged in Jiangsu, Anhui, and Fujian Provinces.

Three months later, on January 22, 2002, vetiver grass was officially included in the National Railway Embankment Protection Regulation for Central China, East China, South China, and Southwest China application. It officially announced that VGT could be used for railway embankment protection in China so long as there was no temperature limitation. Meanwhile, many other applications appeared in different part of the country (Fig.1).

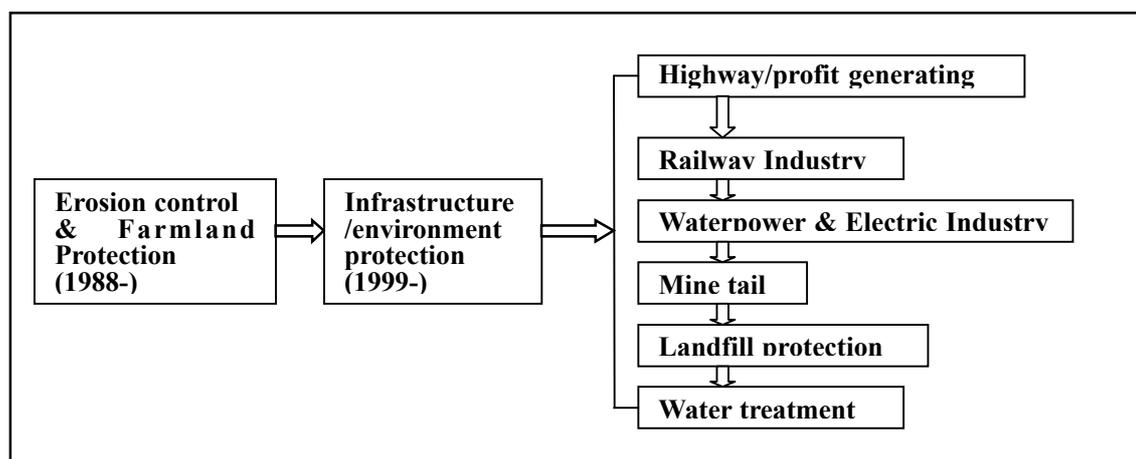


Fig 1 Vetiver development procedures in China

3.2 Searching for most potential people

Wide and effective information dissemination is the key to national vetiver development. In order to achieve great success multiple publications should be produced in large quantities and sent to most potential vetiver users, in addition to using other medium: radio, TV, newspapers, journals, etc. But whom we should send printed matters? Therefore to search potential users national wide formed the most critical issue.

There are too many organizations related to vetiver in China. All possible organizations could be divided into four groups: research organizations, action research and extension organizations, education organizations, and administration organizations. The collection and analysis of most interested institutes and representatives became very important for national vetiver development. The details were described by separate paper.

3.3 Production and dissemination of multiple publications in large quantities

Once most promising subject and most prospective vetiver users were found, we should send them necessary information and persuade them to test vetiver. Therefore, multiple publications were produced and disseminated in large quantities:

- *Vetiver Newsletter* was a quarterly journal introducing new achievements, new developments, and new technologies from China and abroad. It was printed in Chinese, occasionally produced in English.
- *Vetiver for Water and Soil Conservation* was a FACT sheet. These were printed on different colored paper in order to attract people's attention. They introduced practical technology and were mainly for use with farmers and extension workers.
- *Agroforestry Today* was a quarterly journal in Chinese. It primarily introduced Vetiver based agroforestry systems and was mostly distributed to agroforesters.
- *Vetiver Research and Development* was a book published in 1998. It was written for scientists, university professors, and government officials.
- *Vetiver New Year's Greeting Cards* were produced in large quantities in 2001 and distributed to many different people during the Chinese New Year holiday called Spring Festival. These cards briefly introduced Vetiver Systems and encouraged interested farmers or others to contact the China Vetiver Network for more information.
- *Vetiver Grass: The Hedge against Erosion in its new edition* of the Green Book was re-translated into Chinese as part of the Salvation Army supported China Vetiver and Agroforestry Technology Project in 2002. It was widely distributed nationwide.
- *Vetiver Grass for Slope Stabilization and Erosion Control* was written by Thai expert Mr. Diti Hengchaovanich and was translated and printed in 1998 and 2001 respectively. This book introduced his successful experiences in using Vetiver for engineering purposes. It was widely distributed to engineering institutions.
- *Vetiver System and Its Research and Applications in China* was a book in both Chinese and English published in 2003 and distributed at ICV-3. It generally introduced vetiver characteristics and vetiver applications in different fields of China. It contained 120 color photos taken in China showing different vetiver applications.
- *Color photo sheets* were produced for special situations to show certain characteristics of Vetiver grass. For example, some wondered whether Vetiver could tolerate waterlogging. To illustrate that Vetiver could withstand long

periods in water, photo sheets showing the whole plant submerged in water were produced. Others were concerned about Vetiver's tolerance to seawater. Thus, photos showing the grass growing on the coast next to the ocean helped to assuage their worries. In addition, three booklets were produced that told farmers how to use Vetiver to protect chestnut trees, tea bushes, and mulberry trees for silkworm production:

- *Chestnut Tree Cultivation with Vetiver Hedge Protection*
- *Tea Tree Cultivation with Vetiver Hedge Protection.*
- *Mulberry Tree Cultivation with Vetiver Hedge Protection.*

3.4 Selflessness: basic quality needed for vetiver networkers

The basic duty for vetiver development people, vetiver networkers in particular, is to organize, coordinate, and promote vetiver activities in a wide area. They should not only work hard themselves, but also unite others as many as possible together to propel vetiver research, application, and extension. What they should consider is not their own profit or honor but the whole vetiver development cause.

For example, to introduce VGT to highway embankment protection, we invited senior highway engineer as one of the authors to publish articles in highway journals in order that more engineers could accept VGT, even though the article was purely prepared by vetiver worker.

When people buying planting materials we should tell them the truth, e.g. where vetiver can grow and where cannot grow. We sent them vetiver planting and management specifications. What we consider was not just selling tillers or making profit, but to use VGT correctly, so that VGT could extended smoothly.

For extending VGT more widely, we should invite more people from different institutions in different provinces together with us to implement projects in order that more people could involve in VGT.

China Vetiver Network produced multiple publications and printed matters. We encourage people to disseminate vetiver information so long as the technology was extended correctly, without copyrights consideration.

4. Key to further development

It is approaching 20 years since VGT introduced to China in 1988 and China became possibly the most vetiver-applied country in the world. Although great success has been achieved there is still problem to be solved for further development.

4.1 Regional gaps to be bridged

General speaking, vetiver development is not equal through out the country. In some provinces it has been developed quickly but in others slowly. Even in one province it was developed also not equally. To bridge the gap more extension work should be done.

Besides, it was reported that vetiver can be planted in Nanyang city (about 33°N; annual mean temperature 14.9_), and can not survived in Lishi city_about 38°N_(Liyu, 2005). It is not certain if vetiver can be planted in the wide area between 33°N and 38°N. Therefore, more tests remain to be done.

There were four major conferences organized in China so far: *Shaowu Conference* (1989), *Fuzhou Conference* (1997), *Nanchang Conference* (1999) and the *Guangzhou Conference* (ICV-3, 2003). However, all of these conferences were organized in relatively developed east China. However, the west China may have greater market for vetiver development. For example, in southwest China in Yunnan, Guizhou, Sichuan, and Guangxi

provinces, mountains and hills covered over 90%. Soil erosion was proved to be a critical issue and vetiver application has great potential.

4.2 Need for transferring research achievements into practice

Since 1988, especially in the recent years many research programs have been launched in research institutions and universities. The topics covered planting technique, the propagation of the grass, mechanics of vetiver roots, biological characteristics, polluted water treatment, water conservation, etc. However, compared with research, application was not satisfied. As a result, we should transfer research achievements into practical applications as soon as possible. Therefore, we should suggest government to allocate more funds for vetiver application and extension than research.

4.3 Vetiver for agricultural production

Although vetiver was firstly used for farmland erosion control and agriculture production, it was not extended as expected in this large agriculture country. Most of agriculture projects were supported by governmental agencies or international foundations. Some farmers in the Dabie Mountains persisted in planting vetiver for selling tillers, but few applied vetiver for erosion control and agriculture production even though erosion was proved to be very serious there. The key issue is to bring farmers direct profit from vetiver, while handcraft production might be one of the measures to solve this problem. We should arrange vetiver handcraft training courses and help farmers study market to sell handcrafts at the same time.

4.4 Problem with private sectors

Since *Nanchang Conference*, private companies emerged through out China. Their business concerned almost any field so long as they could get profit: highway protection, railway protection, landscape reconstruction, slope stabilization, etc. Nevertheless, compared with research institutions or universities, there were some problems that procrastinated further vetiver development. The followings are some examples:

- Farmer from Chongqing got planting materials from Shenzhen, accompanied by wrong technique direction provided by a Shenzhen company. The grass was planted in winter that led to a very low survival rate.
- Some companies who may never plant or even see vetiver grass sought vetiver projects with printed advertisement containing few pictures possibly taken from our web site. In case they got projects they could hardly apply VGT correctly and successfully. This would lead to a negative effect and influence further development.
- A company that may never touch vetiver told people in Hubei Province to plant vetiver, spacing 50cm x 50cm!
- To get more customers, private companies usually wish to vaunt some “key techniques” or “special fertilizer” or “stimulant” that were created by their own company, instead of telling people that VGT was a simple technique. It should influence vetiver popularization.

To sum up, China has made great success in vetiver development in the past 18 years. The China's experience showed that the achievements should be fully contributed to numerous Vetiver Workers hard work, wide cooperation and solidification, and support from international friends, colleagues and donors. There still remains a lot of work to be done. We should cooperate more people to join us to promote vetiver development to a new stage.

References

- Liyu Xu 2003. Vetiver System: Its Origin and Development *In*: Liyu Xu, Fang C.J., Wang M., and Qing J.H, (eds.) Vetiver System and Its Research and Applications, Hong Kong, Ya Tai International Publishing Co. Ltd, pp.41-43.
- Liyu Xu 2005. Adequate Area in China for the Application of the Vetiver System. VETIVERIM, No.32, April 2005