

Agroforestry development

Aspects of agroforestry in the Sino-German Afforestation and Nature Conservation Project, Sichuan province, China

By Ian Armitage



Photo 1: Barren mountains, Chaotian district

I. Armitage

1. Introduction

The Sino-German Afforestation and Nature Conservation Project was inspired by concern amongst Chinese officials about declining agricultural productivity, the widespread use of unsustainable agricultural practices and increasing poverty amongst village communities in the northern mountains of Sichuan province, China. The cause of these trends is increasingly severe degradation of land ecosystems. The most widespread and obvious effects of environmental deterioration are extensive and serious erosion, periodic and often severe flooding and sedimentation of rivers.

The Sino-German Afforestation and Nature Conservation Project is funded under a programme of German financial co-operation with China by Kreditanstalt fuer Wiederaufbau (KfW) of Frankfurt. It is being implemented by the Sichuan Forestry Department with technical assistance provided by a consortium of German consultants (GITEC Consult GmbH, Duesseldorf, and Deutsche Forstservice

GmbH, Feldkirchen). The project commenced in 1998 and operational work will continue until 2002.

2. Characteristics of the location in Sichuan province

The project is located in Guangyuan prefecture in the northern part of Sichuan province, a generally mountainous region bordering onto Shaanxi and Gansu provinces in western China. It is a part of the Yangtze River Shelterbelt Protection Programme within the upper catchment of the Jialing river, a major tributary of the Yangtze river. There has been considerable deforestation of the natural forests during the 20th Century and now a large rural population is heavily dependent upon agriculture for food production, mainly for cropping, and often on quite steep slopes. Periodic heavy rain on steep slopes (see Photo 1), mostly in summer, leads to rapid water runoff and flooding. Droughts often occur in spring, a severely limiting factor for agriculture and for community forestry, both being critically important to the rural communities living in Guangyuan prefecture.

Agroforestry development

Landforms vary from rolling hills in the south to high and steep mountains, up to 3,500 m altitude, in the north. Yellow brown and purple soils of moderate to low fertility occur, all being prone to erosion (see Photo 2).



Photo 2: Eroding hillside, Shizhong district

I. Armitage

The buffer zone edge of the Tangjiahe National Nature Reserve is included in the project area. It is a mountainous spruce/fir forest that is an important habitat for giant panda, lesser panda, golden monkey and other endangered animals. Losses experienced by farmers living close to the reserve boundary caused by wildlife that feed on their corn and other crops is a cause of local poverty amongst many local families.

3. Project goal and activities

The ecological fragility of much of the land, linked to poverty amongst local communities, led to the definition of a project goal that focuses on the stabilisation and rehabilitation of land ecosystems, to the improvement of local people's income and poverty alleviation and to the establishment and sustainable management of both protection and production forests that may be harvested by them in the future.

Three main sets of activities are being implemented:

- To contribute to the sustainable management of approximately 45,000 ha of newly planted and enriched, mixed species, broad-leaved conifer forests under the active participation of local communities. Afforestation includes new planting of bare land and "mountain closure" of land where some natural vegetation is already established.
- To contribute to the reduction of damage to farmers' crops that is caused by wildlife in the vicinity of the Tangjiahe National Nature Reserve.
- Installation of 10,000 energy-saving stoves to poor rural households to improve the efficiency of use of wood and agricultural wastes for cooking, thereby reducing the demand for fuelwood that is collected from hillsides.

4. The active participation of farmers is encouraged

The project aims to be a model in Sichuan province for high quality afforestation. It is being implemented as an "open programme", meaning that the detailed planning of where and when afforestation and mountain closure activities will be implemented may be modified during project implementation in close co-operation and in consultation with the local communities who have chosen to participate (see Photo 3). This approach is being applied in order to avoid land-use conflicts, for example, over the use of land for grazing of livestock and for the collection of fuelwood for cooking. These uses have traditionally caused some damage to mountain forests and shrublands.



Photo 3: Participatory planning

I. Armitage

Detailed planning takes place each year as the project is implemented and the active involvement of the households who are associated with it is encouraged. An important aim is to avoid land-use conflicts and to involve individual farmers in detailed project design and in implementation. Land-use planning is a prerequisite of the project that needs to be met by communities who show a willingness to participate in the project before operational work can be carried out. Once general agreement has been reached on the need for and the extent of afforestation or mountain closure for a community by following the participatory land-use planning process, then afforestation contracts for specific activities are able to be negotiated with individual farmers.

5. Afforestation categories

An underlying theme is the restoration of forest landscapes through the establishment of mixed-species protection/wood production forests involving tree species that are ecologically appropriate for the range of sites that occur in the mountains of Guangyuan prefecture. A feature of project design is the establishment of a diversity of tree species, both conifer and broad-leaved species, where at least 30 percent of broad-leaved species are planted. Mixed-species forests must consist of at least two species, none having a share less than 30 percent by area. If three species are planted, none must have a share of less than 20 percent by area, and where more

Agroforestry development

than three species are planted none must have a share of less than 10 percent by area. Four afforestation categories are applied – protection/wood production, mountain closure without enrichment planting, mountain closure with enrichment planting and “economic” treecrops. The choice of category depends upon the ecological features of each site and of the amount on shrubby or low forest vegetation that may already be growing.

It is hoped that the long-term effect of this approach will be to strengthen the basis for establishing ecologically sustainable forests that are beneficial for soil and water conservation and for the production of limited amounts of wood for use and for sale by farmers. It is expected that populations of birds and other wildlife will also increase.

6. Afforestation models

Several afforestation models have been defined from which farmers can make choices of the trees that may be planted. The most widely planted include cypresses (*Cupressus funebris*, *C. lusitanica*, *C. torulosa*), alder (*Alnus cremastogyne*; see Photo 5), mason pine (*Pinus massoniana*), birch (*Betula luminifera*) and Chinese fir (*Cunninghamia lanceolata*).



Photo 4: One-year old alder

I. Armitage

A small though popular part of the project is based on “economic” treecrops that produce saleable fruit, nuts or medicinal plants rather than wood. The major species are chestnut (*Castanea mollissima*), walnut (*Juglans regia*) and ginkgo (*Ginkgo biloba*).

7. Important features of forest establishment practices

An essential and indeed critically important aspect of the programme is achieving high treestock survivals. All operational work is pre-financed by the Sichuan Forestry Department; financial reimbursement follows by the donor based on specified establishment criteria being met. Project design requires that financial reimbursement for afforestation be made in two stages based in large part upon the average treestock survival in each stand that has been planted. Average treestock survivals for each stand must reach or exceed 85 percent after six months for the first reimbursement and must reach or exceed 70 percent after three years to qualify for the second financial reimbursement.

There are five important features of forest establishment practices that are important in achieving high treestocks survivals. These are:

- Avoid ecological mismatching of tree species to sites.
A vital aspect of participatory planning is that farmers' choices of tree species are ecologically appropriate for specific sites and that ecological mismatching of species to sites does not occur. Ecological mismatching of species to sites invariably leads to low treestock survivals and to poor stand performance.
- Efficient forest establishment.
Forest establishment must be undertaken efficiently with the aim of ensuring high quality tree planting in order to achieve, or exceed, 85 percent survival on the first planting.
- Deep and firm planting of trees.
Farmers are encouraged to practice deep cultivation of soils in each position where trees are being planted and to firmly plant each tree at each planting position, using their boot/shoes to carefully “firm” the soil around each tree. Both practices are important because they will increase the likelihood of achieving acceptable levels of tree survivals.
- Use of container-grown conifer treestocks.
The use of container-grown pine and cypress treestocks is now standard practice because it contributes significantly to achieving high treecrop survivals. The use of container-grown treestocks reduces planting shock when trees are transplanted and effectively protects root systems from the drying effects of the sun and wind.
- Care in treestock handling.
Improved protection of bare-rooted treestocks that are being transported between nurseries and planting sites has led to reduced root damage from the drying effects of sun and wind. Covering roots of bundled treestocks with soil and “mud puddling” to protect root systems soon after lifting is encouraged to protect root systems.

Ian Armitage, Consultant
50 Ranui Terrace
Tawa, Wellington 6006, New Zealand
Tel/Fax: 64.04.2327470
E-mail: iarmitage@compuserve.com

Agroforestry development

Commercial agroforestry investment schemes in India

Success or failure in the context of the rural economy

By Kulbhushan Balooni

1. Introduction

In recent years, the concept of agroforestry in India has undergone radical changes. Of late, new models of commercial agroforestry have evolved in the country creating a number of new investment opportunities for the general public. These new large-scale commercial schemes have grown dramatically, generating a high degree of interest amongst investors.

Several companies have successfully attracted substantial private capital investment in agroforestry and tree plantations. This approach started with eucalyptus in Northern India in the mid-1980s and has been followed by teak plantations in Southern India, starting in the early 1990s.

Initially, these schemes involved only monoculture plantations, but were later followed by modified versions of tree plantation schemes influenced by agroforestry approaches. These so-called "commercial agroforestry investment schemes" attracted investors with promises of high returns, tax-free agricultural income after a certain maturity period, and in some cases intermediate income. For example, SK Agro Enterprises promised to double a Rs 20,000 (1 US Dollar = 26.15 Indian Rupees in December 1992) investment in vegetable cultivation near Gurgaon in the State of Haryana in only 30 months (Press Trust of India, 12 December 1992).

The agroforestry-type investment schemes offered to the public included vegetables and other horticultural crops planted along with teak, rosewood, and many other valuable tree species. In some cases, the schemes included flowers and herbal plants. Some schemes allowed investors to buy a piece of land for a stipulated price, after which the companies intended to plant vegetables and fruit trees. Not least, the companies charged a development fee from the investors for acquiring and developing the land.

The promoters of these plantation schemes continue to speak highly of the new production systems – some of which are quite similar to the traditional agroforests and orchards widely spread throughout India. They are therefore also promoted as ameliorating the environment and providing various important produce.

For example, Imperial Farmers Forestry Corporation Limited (Ltd.), while inviting investments from the public for its forestry and agriculture projects in 1994, proclaimed that it had successfully invested in seasonal crops, cash crops, fish, poultry, sheep and goats (Sunday Mail, 20 November 1994). Furthermore, the company raised hopes of generating employment for more than 10,000 people through its agroforestry program.

Parasrampurias, a 125-year-old business house in India with an annual turnover of Rs 4,000 million, started a Rs 50 million (1 US Dollar = 31.37 Indian Rupees in March 1993) capital-based company, Parasrampur Plantations Ltd., in 1993 to promote agroforestry (Free Press Journal, 20 May 1993). Trees planted by this company were to be maintained by the Agro Forestry Federation, the apex body of a tree growers' cooperative in the State of Maharashtra, which claims to have vast experience in raising tree plantations on a large scale (Khungar, 1993).

2. Traditional vs. commercial agroforestry

There are numerous definitions for the term "agroforestry". Bene et al. (1977) have defined agroforestry as a "sustainable management system for land that increases total production, combines agricultural crops, tree crops and forest plants and/or animals simultaneously or sequentially and applies management practices that are compatible with cultural patterns of the local population". If this definition is compared with above description of commercial agroforestry investment schemes in India, it becomes obvious that two very important components are missing in the latter: animals and a decisive role for the local population. Moreover, the agricultural crops and timber of commercial agroforestry investment schemes are produced for cash, while traditionally farmers have grown trees and crops and raised animals mainly for meeting subsistence needs. This practice of mixed farming has developed over centuries in response to specific agroecological and socioeconomic circumstances.

Agroforestry systems in the "narrow sense" have several tangible and intangible advantages – they provide food, fodder, construction material, medicinal plants, income and employment opportunities, environmental benefits, and shelter for wild animals. There is no doubt that some of these benefits, especially intangible ones, could also be generated by commercial agroforestry investment schemes. Those benefits that are important in the context of the rural economy (e.g., farm income, employment), however, do not play a major role in the new concept of commercial agroforestry. In many cases, the income generated by selling the products of commercial agroforestry investment schemes is mainly distributed amongst urban investors and promoters.

According to Dwivedi (1992), commercial agroforestry investment schemes are usually managed by private companies, corporate bodies or government institutions. Examples of such schemes include tea, coffee and cocoa under shade trees, and eucalyptus plantations for pulp and paper on agricultural land in combination with agricultural crops.

Agroforestry development

Recently, forest-based industries have started to collaborate with farmers to grow timber on their agricultural land. This has been done to meet the demand for raw material due to dwindling supplies from government-owned forests and plantations. For example, Western India Match Company Ltd. has already entered into arrangements with farmers by providing financial and technical assistance for establishing and maintaining timber plantations on private land with assured returns to farmers. Burley (2000) has highlighted the emergence of this new trend in India during the 1990s, referring to industrial plantations that are increasingly attracting rural communities and individuals as out-growers to centralized industries.

At the same time, under the government-promoted farm forestry programs of the late 1970s and early 1980s, farmers took an interest in converting their land into (fast-growing) tree plantations for making quick returns. However, in contrast to commercial agroforestry investment schemes, farmers were directly involved in the tree-growing businesses.

Overall, it appears that using the term "agroforestry" in the context of financial ventures such as the new commercial investment schemes in India may be misleading.

3. Implications of Commercial AF Investment Schemes

Commercial agroforestry investment schemes can be found in the far-flung rural areas and, in some cases, in the rural areas near to cities. The agricultural land that is targeted for these schemes is often cultivable wastelands lying unused due to a lack of irrigation. They are therefore easily transferable to the investors (Manjeshwar, 9 September 1993), who either purchase the land or take it over under long-term leases. In some cases, investors manage to acquire fertile land which is sold by absentee owners or poor farmers working as laborers elsewhere.

The companies promoting these commercial investment schemes acquire the land directly from their owners or through agents. If agents are involved, the original land owners usually do not receive an appropriate compensation for their land. To entice poor farmers to sell their land, agents guarantee them permanent employment within the investment scheme. In the end, however, these farmers are often left unemployed.

An additional concern is whether or not the laborers working in the plantations are paid legal wages as per the norms set up by the concerned State Governments. Singh (1996) investigated the socioeconomic impact of plantations run by Maxworth Orchards (I) Ltd. in six villages in Raigad district, State of Maharashtra. This study revealed that laborers were paid low wages and those who sold their land to the company were not sufficiently compensated. The author also found that Maxworth was frequently confronted with strikes of their laborers. According to Nair (1979), agroforestry is "a land use system that integrates trees, crops and animals in a way that is scientifically sound, ecologically desirable, practically feasible, and socially acceptable to the farmers". As regards the latter criterion, however, given the example of Maxworth Orchards (I) Ltd., the commercial

agroforestry investment schemes of India seem not always to be socially acceptable.

There are various factors constraining farm production in India, including degraded natural resources, lack of agricultural inputs, and lackadaisical attitudes of authorities. These factors will continue to drive rural people to migrate to cities in search of off-farm employment, thus contributing to a further expansion of urban centers and an increase in socioeconomic problems. The growth of companies involved in the current forms of commercial agroforestry investment schemes may actually exacerbate this problem.

4. Government interventions and status quo

Many promoters of commercial agroforestry promised that their schemes would generate employment for a large segment of the rural population. The plantations would also contribute to the rehabilitation of wastelands lying unused for years. In addition, they promised to increase the overall agricultural production in the country.

However, growing skepticism about the functioning of commercial agroforestry and other plantation investment schemes necessitated the Government of India to intervene. In November 1997, a decision was made to put all investment schemes under the provision of the Securities and Exchange Board of India (SEBI) Act of 1992. As a consequence, they are to be treated as so-called "collective investment schemes"

Subsequently, all collective investment schemes were notified to file the details of their operations and apply for a certificate of registration. However, by 31 March 2000, only 37 such entities had applied for registration. A further 605 entities, which failed to make an application, were notified to close their schemes. At the same time, they were also given orders to make payment to their investors by 28 May 2000, failing which these companies were to face legal action by the Government.

One example of the serious legal action taken is the case of Golden Forests (I) Limited, Chandigarh. In 1998, SEBI filed a petition against this company, seeking to freeze its assets on grounds that it had collected a large sum of money from the public but had defaulted on promised returns. The company was brought to the High Court and directed to expeditiously sell off its assets worth Rs 4,500 million (1 US Dollar = 43.35 Indian Rupees in February 2000) in order to pay debts owed to investors (Economic Times, 21 February 2000).

Moreover, on the orders of SEBI, the remaining 37 collective investment schemes were to be rated by independent rating agencies. As a result, 34 schemes were classified to be risky investments as they appeared likely to default on their pay-out commitments (Aiyer, 2 November 1998).

As might be expected, these developments heavily affected the commercial agroforestry investment schemes since investors became reluctant to invest in such schemes. The time seems right to re-examine alternatives for developing commercial agroforestry in the context of the rural economy.

Agroforestry development

An interesting finding is that 247 out of 605 collective investment schemes that had been ordered closed were operationally based in five major cities (Mumbai, New Delhi, Chennai, Hyderabad and Chandigarh). All these cities have a large proportion of middle-class households, which made up the main group of investors of collective investment schemes. This suggests that, in spite of their rural setup, these schemes were primarily established to attract urban capital and maximize the profit of urban promoters. The actual interests of farmers in the rural areas of India remained largely unconsidered.

5. Conclusions

The experiences from India have shown that caution is required in the assessment of commercial agroforestry investment schemes. The major beneficiaries are urban investors and promoters, certainly not rural people. Unlawful business practices by, and poor performance of, commercial agroforestry and other plantation investment schemes led to Government interventions resulting in the closing of almost all schemes. Nevertheless, some of the commercial agroforestry investment schemes, after meeting extensive Government requirements, continue to operate in India. Efforts are necessary to further study their development, their impacts (particularly on the grassroots levels), and their potential for boosting the rural economy by generating required capital.

References

- Bene, J.C., Beall, H.W. and Cole, A. (1977): Trees, food and people. International Development Research Center, Ottawa. Quoted in: Dwivedi, A.P. (1992): Agroforestry principles and practices. Oxford & IBH Publishing Co., New Delhi.
- Burley, J. (2000): Man and forests: Foreword and keynote address. In: Kohli, R.K., Singh, H.P., Vij, S.P., Dhir, K.K., Batish, D.R. and Khurana, D.K. (eds.): Man and forests. DNES, IUFRO, ISTS, Botany Department and CVS Panjab University, Chandigarh.
- Khungar, G.P. (1993): High-risk plantations may give high returns. *Plant Trees* 2: 22-24.
- Manjeshwar, N. (9 September 1993): Does money grow on trees? *Times of India*, India.
- Nair, P.K.R. (1979): Agroforestry research: A retrospective and prospective appraisal. Proceedings of the International Conference on International Cooperation in Agroforestry. ICRAF, Nairobi.
- Press Trust of India (12 December 1992): Investments in agroforestry, orchards unexplored avenue. *Observer*, India.
- Singh R.K. (1996): Assessment of the socioeconomic impacts of the plantations of Maxworth Orchards (India) Ltd. in Raigad district of Maharashtra. Project Report: Organisational training II. Indian Institute of Forest Management, Bhopal.

Dr. Kulbhushan Balooni, Assistant Professor
Indian Institute of Management Kozhikode
CEDT Campus, REC (Post), Calicut – 673601, India
Tel: 91.495.287553, Fax: 91.495.287580
E-mail: kbalooni@iimk.ren.nic.in

Editorial note:

The opinions expressed in *APANews* articles are those of the contributing authors. If you have any comments on articles or announcements in this or other issues of *APANews*, please feel free to get in contact with us or the authors. We would be pleased to publish differing opinions and constructive feedback on any of the topics raised and, in this way, facilitate a productive discussion amongst *APANews* readers. The Editor of *APANews* can be contacted by either of the means below:

E-mail: editor@apanews.net
Fax: 66.2.2800445
Mail: FAO Regional Office for Asia and the Pacific
39, Phra Atit Road
Bangkok 10200
Thailand



Small-scale teak plantation on farm land

S. Weidner