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Authors: Weyerhaeuser, Horst, and Kahrl, Fredrich

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Planting Trees on Farms in Southwest China

Enhancing Rural Economies and the Environment

Horst Weyerhaeuser
Fredrich Kahrl

In Southwest China, agricultural land and forestland are traditionally considered to be separate; but, rather than forestry plantations, there is tremendous potential to plant trees on farms to improve agroecosystem mosaics. Agroforests can increase agricultural productivity and supplement farmers' incomes through the sale of fruits, nuts, fuelwood, and timber. Trees on farms can also alleviate fuelwood and timber shortfalls. The potential erosion and runoff control benefits provided by a mix of appropriately selected and placed trees can help achieve watershed and biodiversity conservation objectives; on farms these benefits are more significant than on plantations. The World Agroforestry Center (ICRAF) is developing agroforestry with farmers and foresters in Southwest China at several levels by: helping select trees and providing high-quality seeds and saplings; training in management and marketing; documenting experiences to inform policy; and supporting environmental educational and rehabilitation programs.



Rural farmers pay the price of past overexploitation

A history of government program failures in Southwest China has left the region's farmers increasingly vulnerable to market and climatic changes. In recent years, massive land transformation projects have been enacted to repair past environmental damage from overlogging and inappropriate agricultural practices. In effect these programs aim to re-afforest sloping land in mountainous river headwaters in order to reduce erosion, regulate runoff, and mitigate downstream flooding. The government has sought to do this by introducing logging bans—China's Natural Forest Protection Program (NFPP)—and through reforestation efforts to restore national forest stocks. In order to re-afforest uplands, the Sloped Land Conversion Program (SLCP) is providing grain, seed, and cash subsidies to farmers in 20 provinces to convert farmland to forest on hillsides steeper than 25°.

As can be imagined, these policies have enormous ramifications for farmers. The rapid implementation of logging bans and farmland conversion programs can place strict limits on farm production and reduce rural flexibility and self-reliance. Affected farmers and local agencies have tried to introduce agricultural alternatives, but they often do not have the knowledge, skills or resources to re-orient farm production toward more profitable and sustainable forms. It is in this climate that ICRAF programs work to introduce agroforestry alternatives to benefit farmers, by increasing livelihood stability and flexibility while meeting government aims to re-afforest, improve watersheds, and protect natural reserves. These programs are targeted at a range of levels from individual farmers through regional policy makers.

This involves expanding the current emphasis on high-input, high-yield grain production and livestock rearing to include new options, such as on-farm trees, non-timber forest products, payments for environmental services, improved market awareness, and inclusive education and environmental rehabilitation skills. Before any project is formulated or implemented, a thorough situation and needs assessment is carried out, involving representative strata from each community, including, for example, the most disadvantaged groups and women.

Northwest Yunnan: a key environment

ICRAF's current work in China is centered on the Three Parallel Rivers area of northwest Yunnan (Figure 1). Within this region, ICRAF's work has centered on 3 prefectures: Baoshan, Tengchong, and Nujiang. These areas epitomize China's Southwest, with rugged mountain topography, variable climates, large populations of ethnic minorities, increasing pressure on natural resources, and chronic poverty. In addition, the region houses the extensive Gaoligongshan Nature Reserve, as well as parts of the Yangtze, Salween, Mekong, and Irrawaddy River watersheds.

Bringing diversity to smallholder farms in Baoshan

Supporting on-farm trials

In Yangliu Watershed, ICRAF is supporting the Baoshan and Nujiang Forestry

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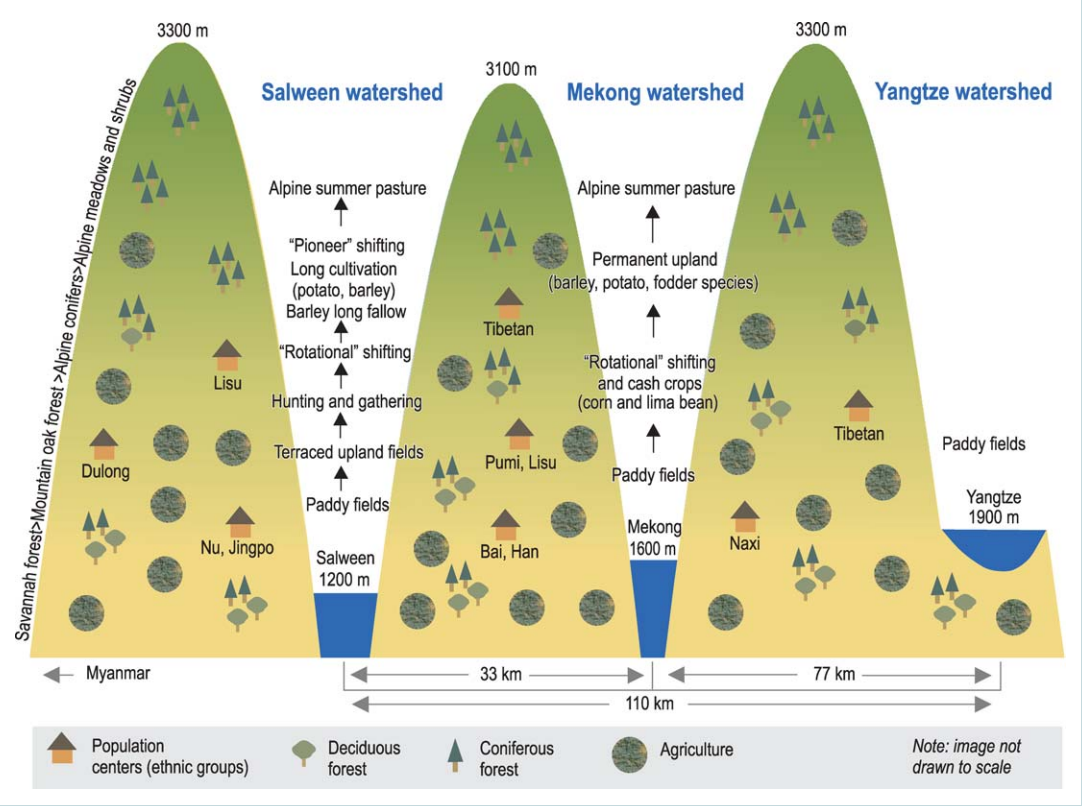


FIGURE 1 A cross-sectional representation to highlight agroecosystem diversity in northwest Yunnan. (Diagram by ICRAF–China)

Bureaus' efforts to bring new skills and technologies to village-level production within the constraints dictated by national and provincial policy. Chief among these skills and technologies are agroforestry methods, particularly as a complement to the SLCP program. Farmers are offered the resources they need to experiment with new plant varieties. In Pingzhang Village, low-quality seedlings received from the SLCP are being replaced with higher quality pear, walnut, and chestnut saplings. Participatory on-farm trials have also been initiated with varieties of medicinal plants, which are being intercropped on SLCP-designated land (Figure 2).

Together with the Baoshan Forestry Bureau, we are adopting a participatory approach to technology development. More active farmers who are willing to take risks are first identified and placed in 'small groups.' These farmers are then supplied with the seedlings and training to plant and manage new varieties of crops. On a regular basis during and after the trials, in an up-scaling of activities, the Forestry Bureau convenes households throughout the village to exchange experiences, to discuss the market potential of different crops, and to identify problems and concerns.

In further efforts to improve the basis for farmer and government agency decision making and expand agroforestry alternatives, ICRAF has supported monitoring and evaluation to determine the soil fertility and socioeconomic benefits of agroforestry experiments and provided the Forestry Bureaus and NGOs with GIS-based land use maps and satellite images.

Village producer associations and enterprises

Providing technical agricultural and forestry support to help introduce agroforestry alternatives is one step; however, for sustainable rural economic benefits it is essential to develop awareness and acumen about local markets. The intermediary market (ie middlemen) in China is undergoing massive changes. At the same time, its competitive functioning is critically important for rural livelihoods. In northwest Yunnan, government procurement systems have been replaced by a bevy of buyers that include state-owned forest

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enterprises, private companies, and small-scale traders. Inexperienced in marketing and without marketing associations, village households and collectives often find themselves subject to predatory pricing.

As part of a multi-country project coordinated by the International Institute for Environment and Development (IIED), ICRAF is examining the potential of village forest associations and small enterprises to improve technology dissemination, enhance villagers' bargaining power, and increase villagers' share of value added profits. To achieve this, ICRAF–China has helped build platforms for dialogue among stakeholders. Village discussion forums for exchanging technological and marketing information and experiences among farmers, communities, and government agencies were established. Moreover, prefecture, provincial, and national decision makers were regularly convened in policy workshops to exchange ideas and experiences.

Further concrete activities include, first, supporting household organization efforts to enable groups of households to conduct their own market surveys. Farmers and individuals who are already engaged in cottage enterprises are supported by cross visits to learn from other communities as well as to get a better sense of existing markets. A joint program with partners links communities with young researchers and practitioners who come to stay with them as 'interns' and co-develop marketing and processing strategies. Second, the potential to improve the efficiency and effectiveness of local markets for forest products (eg mushrooms, medicinal plants, and nuts) was assessed.

Environmental education

Building capacity among government staff

As well as offering potential economic benefits for farmers, agroforestry can also enhance environmental services. Directly increasing forest cover on vulnerable watersheds can help mitigate flooding and soil erosion problems. Moreover, if agroforestry programs are well-considered and government-supported, they can aid biodiversity and nature conservation. To these ends a third prong of our agroforestry program is to train staff in new concepts and methods of environmental rehabilitation.

Thus, ICRAF–China has organized or supported international training sessions on nursery development and environmental payment schemes. Staff from line agencies, universities and partner organizations attended participatory training in Thailand, the Philippines, Germany, the United Kingdom, and South Africa. In addition, together with Yunnan University, ICRAF supported local-level training workshops on forest rehabilitation and GIS capacity building for prefecture and township forestry bureaus. This technical training and resource access helps land use planners to identify suitable habitats (aspect, soil type, etc) for particular species, and pinpoint sites that need the greatest environmental protection.

Expanding environmental training

This environmental training program has not been limited to government bureaus. In order to foster ongoing community support and understanding, we have worked with local partners to establish community environmental education programs targeted at elementary and secondary schools, as well as training for teachers in environmental education. Village workshops and information exchanges were held regularly, and students and their families attended training sessions at local



FIGURE 2 On-farm agroforestry and intercropping trials. (Photo by Horst Weyerhaeuser)

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FIGURE 3 Indigenous tree seed collection at Gaoligongshan Nature Reserve for germination trials. Choosing 'framework species' helps promote a viable conservation and development approach to forestry. (Photo by Horst Weyerhaeuser)



AUTHORS

Horst Weyerhaeuser, Fredrich Kahrl
World Agroforestry Center, ICRAF–China, Beijing office, #12 Zhongguancun Nan Dajie, CAAS Mailbox 195, Beijing 100081, People's Republic of China. H.Weyerhaeuser@cgiar.org; fkahrl@berkeley.edu

Horst Weyerhaeuser is the China representative for the World Agroforestry Center. He has more than 15 years of experience in natural resource management (NRM) and forestry research and development (R&D) in Southeast Asia.

Fredrich Kahrl is a consultant with ICRAF–China. He has extensive work experience in China and Vietnam, in the fields of cross-border trade and community forestry.

FURTHER READING

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schools. Communities, teachers and students are part of an environmental monitoring program, using simple tools to collect climatic water quality data.

We have also supported curriculum development to enhance vocational training in forest rehabilitation at the Yunnan Forestry Vocational School (YFVS) and the Southwest Forestry College. New teaching material and teaching aids were adapted and translated, and YFVS used these in their newly established course on forest restoration. They have also established their own nursery training sites and have provided further training to provincial and prefecture forestry staff.

An example: using agroforestry to help protect the Gaoligongshan Nature Reserve

After participating in a training session on a 'framework species' approach to buffer zone management in Thailand, staff from the Gaoligongshan Nature Reserve in Baoshan and Nujiang requested ICRAF's support in applying this approach to restore biodiversity in degraded forests bordering the reserve. Indeed, in China, the buffer zone concept is still in its infancy.

The framework species approach is very simple. Reserve staff choose a number of indigenous tree species that meet specified criteria: high survival rates, rapid growth, dense crowns, and attractive fruit. Selected through a phenology trial, these constitute the framework species and are propagated in a nursery within the reserve (Figure 3). Once they are planted in degraded areas, seed-dispersing birds or mammals restore forest composition by transporting seeds from a wider variety of species and creating a 'second generation' of naturally established trees.

ICRAF–China is currently working with nature reserve staff to identify framework species and establish a nursery for their propagation. We are also striving to improve participatory efforts between nature reserve managers and neighboring communities to further enhance agrobiodiversity in buffer zone farms.

Future prospects

Our programs in Southwest China have been well received; however, a multilayered and well-supported program approach is critical for long-term success. We must provide ongoing support to maximize harvests and tackle site-specific issues that will inevitably arise, such as pest control problems. In addition, this on-the-ground technical work must be supported by reliable and viable market demand and, ideally, improved local market share and benefits.

State and collective forest management need to be shifted away from an emphasis on monoculture plantations toward more diverse, multi-use, and economically and ecologically sustainable forests. Such systemic change will require strengthened community confidence, which can be aided by introducing farmers and agency staff to new ideas and methods, and institutionalizing mechanisms for policy feedback; many of the failures of the SLCP and NFPP, for instance, were characteristic of previous policies.

Given the promise of our initial foray into China, ICRAF is looking to continue its work with expanded projects in Southwest China and new projects in areas of northern China that could benefit from agroforestry enterprises.

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