



Scenes from the Guangdong area before (left) and after (right) ecological restoration. Photo: Jianwu Wang

Agroecological restoration in Guangdong

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In 1980, Guangdong Province became one of China's new Special Economic Zones, encouraging foreign investment in manufacturing and light industry. Today, the province's capital is a major banking and financial centre but agriculture continues to contribute heavily to Guangdong's GDP.

The developments of the last 20 years have, however, had a serious impact on the environmental health of the countryside and as a result on the welfare of many farming communities. Several food safety scares over the past few years have also underscored the importance of developing 'new thinking' for this vital sector.

In response, provincial leaders in partnership with Guangdong's agricultural university and its network of extension agents and consumer health specialists, have risen to the challenge.

Guangdong is now dramatically re-orienting its food production and agricultural research systems, putting long-term environmental sustainability, farmers' welfare, and the promotion of chemical-free and/or organic agriculture at the centre of provincial rural development efforts. Guangdong is skilfully positioning itself to take advantage of rising Chinese consumer awareness of food safety and quality concerns. At the same time it is also securing the position of the province's agricultural export sector under the new international rules that China must now follow as a result of its accession to the World Trade Organisation.

Guangdong has never been a "rice bowl" in the sense of committing vast acreage to growing staple grains. Rather, Guangdong has long enjoyed comparative advantage in the production of sub-tropical fruits, sugar cane, as well as farmed fish and horticulture products. The flat and well-watered Pearl River Delta region in southern Guangdong was famous for the "dike-pond" agriculture system, in which farmers devote the major share of their acreage to ponds for raising fish, particularly carp, and recycle pond wastes onto the bunds and dikes fringing the ponds to grow citrus fruits, sugar cane, pineapples, and mulberry trees for feeding silkworms. But 80% of Guangdong's land is hilly, and in this sub-tropical climate zone the soils are generally poor and easily eroded. The "Great Leap Forward," the Cultural Revolution and insecurity over land tenure in the late 1970s and early 1980s, all accelerated deforestation in Guangdong Province leading to alarming levels of soil erosion. Indeed, control of soil erosion has been a major concern of the Guangdong government for the last twenty years.

Today, Guangdong is one of China's wealthiest provinces and has the resources to deal with the alarming legacy of environmental damage caused by the policy instability of earlier periods. Increased wealth has also meant that the priorities of local consumers have shifted and they are increasingly concerned about food quality and safety.

The major agricultural policy challenge facing the province in the early 1990s can be summarised as follows: How can Guangdong meet the food production and food quality demands of international markets and a growing number of concerned Chinese consumers, whilst at the same time halting the degradation of the rural land base and reducing reliance on dangerous pesticides and chemical fertilisers?

Research and development

Two institutions have played a key role in Guangdong's agricultural transformation: the province's agricultural university, South China Agricultural University (SCAU) and the Provincial Committee For Science And Technology. Together, they have organised agricultural research and development as well as complementary research on large-scale land restoration.

By the 1980s, soil erosion had reached such alarming levels that in many cases the province opted for, or had no choice but to implement, "engineering" solutions that sought only to stabilise hillsides and watercourses. Bracken fern and pine trees were adopted as "green cover", useful for quickly reducing erosion rates, but not useful as economic crops for farmers. Gradually, the provincial institutes for geography and botany, and the university extension services, sought to integrate farming communities into land rehabilitation efforts. In the 1990s, Beijing authorised local governments in China to auction off degraded hilly lands to the highest bidders. In Guangdong, the bidders included individual farm families, local production co-operatives, or private companies. These "wasteland auctions," as they were called, again focused attention on the productivity-enhancing technologies that could be used to bring these lands into production while keeping soil erosion to a minimum. The wasteland auctions were also an innovation with respect to the rights of landholders. Now, families and enterprises could count on long-term tenure security, which made the construction of terraces both possible and profitable. Consequently, in the last ten years we have seen an immense input of labour and capital into terracing, primarily for the production of fruit trees. First amongst these fruit trees is the lychee, which has brought much prosperity to rural Guangdong.

Orchards

Guangdong accounts for a high proportion of the *global* production of lychee, a much-coveted fruit in China and amongst overseas Chinese. At a number of research stations in lychee-growing areas of hilly Guangdong, SCAU has been involved in developing organic and “high-quality” production lines. Pest management has been a particular concern and research has focused on biological control, promotion of organic fertilisers through on-farm composting, and the inter-cropping in fruit orchards of species that provide a habitat for those “natural enemy” species that keep pest numbers in check. The diversity of production settings resulting from the “wasteland auctions” has been a complicating factor in the design of appropriate extension services; yet at the same time, has helped ensure a wide range of experimental settings.

As more of Guangdong’s farmers and agribusinesses become interested in integrated pest management to reduce production costs and to enhance product quality, farmers and farm managers are paying greater attention to the environment in which “natural enemies” of pests can thrive. In the past the practice of clearing all the brush and grass from orchards was widespread, even though farmers had no other explanation than that the bare soil “looked better” than an unruly ground cover. Now, farmers increasingly realise that this under-story provides a good environment for insects what can dramatically decrease the need for spraying pesticides. The new frontier for research now is whether it is possible, and whether it makes economic sense, to pursue inter-cropping of annuals (like peanuts or maize) or Chinese medicinal plants to add another source of income from orchard lands. Already, one can see areas in which trees are planted farther apart to enable this kind of agroforestry approach.



Cutting the legume *Stylosanthes guianensis* for decomposition on the farm. Photo: Jianwu Wang

The drive to increase soil organic content has led to two further technical improvements. The first is an increased integration of animal production into these farming systems. The excellent price that farmers obtain for lychees has allowed many of them to set up piggeries, or chicken houses, with pig and chicken wastes recycled back to the orchards. Some parts of Guangdong also have a very high adoption of household-level biogas systems, with pig wastes making the major contribution to these systems. Farmers have also found that having “free range” chickens in the orchards has helped reduce pest problems and increase nutrient cycling.

Some municipalities in Guangdong have also experimented, with some success, in recycling municipal wastes back to farms. In the worst cases, municipalities see this as a “low-cost option” for dumping garbage in areas where farmers are desperate for *any* contribution to soil organic matter. Now several large-scale municipal composting facilities are being set up. Odour control, product quality, investment, and urban-rural linkage schemes remain major challenges for these ventures. The question of how to transform urban China’s growing solid waste problem, through better waste separation and composting, into a stream of benefits for farm communities is a new frontier for research and development activities.

Sustainable agriculture

Guangdong has developed the technical capacity to reorient its rural sector toward “sustainable agriculture.” With South China Agricultural University as the focal point, Guangdong hopes to build the service infrastructure for organic production. There is political will at the provincial, county, and township levels to implement changes in orientation, but in most cases there is still a generally weak understanding of what is required to meet international organic production standards. In addition, there are still a number of issues that urgently need to be addressed. One of these is water pollution. The continued over-reliance on chemical fertilisers and the increase in concentrated animal feeding operations are wreaking havoc with surface water quality. There is an urgent need to develop organic fertilisers, improve municipal solid waste management (including through composting of the organic fraction of urban wastes) and prioritise the safe handling of livestock wastes. Much of SCAU’s research also focuses on the development of botanical pesticides and on the chemical interactions between insect predators and preys.

Another critical issue is the re-tooling of extension services. The move from a centrally-planned economy to a market economy has completely changed the conditions under which the agricultural extension services have to operate. In Guangdong, many extension services have been privatised. A variety of public-private partnerships might be explored, but it is crucial that the worst abuses of the “contract farming” approach found elsewhere in Asia be avoided.

Conclusion

While the immediate driving force behind Guangdong’s rural-sector reorientation is a concern for the competitiveness of its agricultural products in markets increasingly concerned with food quality and safety, the goals of the reorientation are much broader than this. They include restoring a degraded land base; maintaining rural communities and reconnecting them with local cultural traditions; and combating severe surface- and ground-water quality problems. To achieve these goals, scientists and planners in Guangdong have become practitioners of *agroecological restoration*, the attempt to “reconnect food systems with ecosystems.” Of course, one can see such efforts in other parts of China; but it is in this wealthy southern province where the farm-to-table market opportunities, the “knowledge infrastructure,” and the political willingness to innovate have come together most dramatically. Guangdong’s changing countryside may hold important answers not just for the future of agriculture in China, but also for rural livelihoods generally, in response to the challenges posed by globalisation.

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