



POLICY CHANGE IN CHINA: THE EFFECTS ON THE BAMBOO SECTOR IN ANJI COUNTY

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ABSTRACT

China has undertaken major economic policy changes since 1978, having moved from a plan economy to a predominantly market economy. These changes had great impact in the forestry sector. This paper aims to document these changes in the case of bamboo, and at the same time show bamboo's contribution to rural development in the new policy and economic conditions. New challenges will have to be met, such as diversification, improvement in quality, and standard and quality controls. The implementation of the policy changes is seen in a positive light, having avoided major disruptions in the economy. The case study of bamboo in Anji County also confirms the reduced influence of the State on production and consumption behaviour in the presence of a market system.

Keywords: Bamboo sector, China, forest policy, private management, rural development.



INTRODUCTION

Over the past two decades China has undertaken a series of far-reaching policy reforms, moving from a highly-centralised, planned economy, toward one which is more open and market oriented. Though the changes have affected all sectors of the economy, many were implemented early and are being felt first in the agriculture/forestry sector. A prime example is the bamboo sector in Anji County, Zhejiang Province.

The use of bamboo is deeply rooted in the Chinese culture and economy. It ranges from mats, handicrafts and furniture, through plywood, construction material, scaf-

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folding and paper-pulp to food (bamboo shoots) and even medicinal applications. The country is one of the richest in bamboo, with between 300 and 500 species of 30 to 40 genera, depending on taxonomic criteria (Zhu *et al.*, 1994). According to the Chinese Forest Inventory of 1992, bamboo occupies 7 million ha, of which 3.2 million ha are natural stands and 3.8 million ha are plantations. Moso bamboo (*Phyllostachys pubescens*), a tall, large-diameter, mono-podial bamboo, is the most common plantation species, covering 2.7 million ha. The four provinces of Fujian, Hunan, Jiangxi and Zhejiang account for two-thirds of the total plantation area (Ministry of Forestry, 1993).

Partly as a result of its traditional cultural importance, but also as a result of recent policy and economic changes in China, bamboo is economically and socially significant, with 700,000 people working in the sector, and exports amounting to US\$ 271.8 million in 1993 (Zhong *et al.*, 1995). This study examines the policy changes that have taken place and influence in the bamboo sector. The study concentrates on Anji County, in Zhejiang Province, selected because of the long tradition and importance of bamboo in the County's economy.

A team of scientists from the Research Institute of Sub-tropical Forests, the Research Institute of Forestry Economics (both belong to the Chinese Academy of Forestry) and Anji County Forest Bureau has been gathering statistics and working in the field. The Center for International Forestry Research (CIFOR) and the International Network for Bamboo and Rattan (INBAR) have provided financial and technical support for two closely related research projects in the County. The first, with CIFOR support, was responsible for collecting much of the data used in the following analysis. The second, with INBAR support, will look in more depth at the social and economic environment within which the bamboo sector in Anji County functions.¹

The purpose of this paper is to document the policy changes which have been most influential in the evolution of the bamboo sector in Anji County, and to demonstrate

¹ This project, with field surveys of the actors at different stages in the bamboo production-to-consumption system, is expected to provide valuable data for follow up and refinement of the present analysis.

the potential of bamboo to contribute to rural development in the new Chinese policy and economic environment. It begins with an overview of the major policy changes, and then analyses the effects of these changes within the bamboo sector.

BACKGROUND TO POLICY CHANGES IN CHINA RELEVANT TO THE FORESTRY SECTOR

Since 1949 China's economic policies emphasised autarchy, with limited external trade in the context of a planned economy. In 1978, two years after the death of Chairman Mao, China initiated an ambitious plan of economic reforms. They implied three mutually reinforcing processes:

- (1) Decentralisation of production and investment decisions, moving them from central planning authorities to provincial governments and local enterprises;
- (2) Increasing use of markets as a resource allocating mechanism through a "Socialist Market System";
- (3) Opening the economy to the outside world, including foreign capital and technology, and the establishment of foreign enterprises ("Open Door" policy).

With a predominantly rural economy two decades ago, the changes were more actively implemented in the agricultural sector. Urban industry as well as the financial and external trade systems have been reformed at a slower pace (World Bank, 1988; Martin, 1993). The forestry sector, closely linked to agriculture, has benefited from these reforms since their implementation, particularly intensive forestry production systems like that of bamboo in Anji County.

Three stages in the reform process can be generally identified (Hu & Jiang, 1993):

- (1) Predominance of plan economy between 1978 and 1984;
- (2) Plan economy co-exists with market economy from 1984 to 1992;
- (3) Predominance of market economy since 1992.

The first major policy changes in the agriculture and forestry sectors referred to commercial (quota fulfilment) and production (basic production unit) reforms. The State main-

tained commercial planning until 1982, though quotas were gradually reduced and market price mechanisms for "above quota" production were established. The beginning of a legal market with prices higher than those fixed by the State stimulated production. However, it also brought three basic problems (Sicular, 1988): an evasion of the quota by some producers in order to sell at market prices; the difficulties of the State to handle increasing, expensive surpluses; and the fact that most commodities were of inferior quality, for which demand shrank as people gained access to higher quality products, thus aggravating the problem of accumulated stocks.

Reforms of the production units were initially discarded as part of the major reforms proposed in 1978. However, the success of the experience of Anhui Province, where households started contracting land and output quotas, induced the government to promote the change (Prosterman & Hanstad, 1990). Thus, under the new policy of a household responsibility system, households were allowed to contract land to the production units (normally village-level teams), assuming full responsibility in agriculture-related activities. The contracts were based on a 15-year term² and could be inherited. This shift of responsibility to the household level had an immediate effect on production, thus fostering the adoption of the new system. By 1983, 93% of the production teams had implemented a household responsibility system (Prosterman & Hanstad, 1990).

Facing increasing production and commercialisation problems within the quota system, the government decided in 1983 to complete the quota reform process for most agricultural commodities. The first step was to eliminate the quota and above-quota price distinctions for selected commodities (initially oilseed). In 1985 the quota system was abolished and the State Supply and Marketing Cooperatives (branches of the Ministry of Domestic Trade) had to negotiate prices with producers (Sicular, 1988). The vast Chinese internal market opened and farmers were allowed to sell directly at the local and provincial markets as well as to other provinces.

² Some early contracts were based on a 10-year term.

At the same time, increasing wealth and production above subsistence levels led to increased domestic savings, already amongst the highest in developing countries (Wang, 1995). There is evidence that part of the savings were still "involuntary" (i.e., due to an unmet demand because of lack of supply both in quantity and quality) in the mid-eighties, although the increased spending due to availability of goods has been more than compensated as a result of economic growth and consolidation of market reforms (Wang, 1995). The present savings rate is estimated to be around 40% (Sender, 1995). In this context, domestic savings have played an important role in the exponential expansion of rural industries in the last 15 years, to which the availability of raw materials and the somewhat more flexible regulations compared with those for urban industries have also contributed (see Naughton, 1987, for an interesting discussion about the role of household and enterprise savings in off-setting the government budget deficit). This has resulted in enhanced opportunities for labour to shift between agriculture and industry (Meng Xin, 1990; Martin, 1993; for a description of the reforms in the Chinese industry, see Jefferson & Rawski, 1994).

Two additional factors deserve consideration. In 1988 China initiated the reform of foreign trade, previously controlled by State Foreign Trade Companies. Under the new system, three categories of enterprises are authorised to export directly: (1) Factories where at least 70% of the production is for export, with a minimum export value of US\$ 1 million. (2) County-level Trade Companies that export goods valued over US\$ 3 million per year. (3) Any joint venture with foreign firms. The liberalisation of foreign trade has also meant the removal of direct export subsidies,³ which were eliminated on 1st January 1991 and which reached to a record US\$ 7.6 billion in 1987 (Cheng, 1991).

Coupled with the reform of foreign trade, China also initiated reform of foreign currency controls and exchange rates in three stages (World Bank, 1988; Martin, 1993). The

³ Indirect subsidies, such as special prices and priority for water, electricity or land allocation and favourable interest rates, are still found in the case of some export-oriented companies. Moreover, China still maintains high import tariffs for about 6,000 products.

first stage introduced foreign exchange retention in 1979 that authorised enterprises or provincial authorities to keep a percentage of the foreign currencies they received in order to finance their own import needs. The retention rate, introduced in January 1984, varied between provinces and products, and was 100% in the Special Economic Zones. The second stage was the introduction of a legal secondary market for the retained currencies in 1988, that kept their rates higher than the official rates for foreign currency. The third phase brought a series of devaluations of the yuan to adjust it to the secondary and black market rates. This stage culminated in January 1994 with the opening of the foreign exchange market and the elimination of State-regulated exchange rates.

Finally, a key reform with major effects in the bamboo sector was the "Open Door" policy mentioned above. Its implementation began in July 1979 with the "Law of the People's Republic of China on Joint Ventures using Chinese and Foreign Investment" that allowed foreign direct investment in the country for the first time since 1949. It has developed to provide for different forms of direct investment, from wholly owned foreign enterprises to joint ventures, assembling arrangements or joint exploitation of natural resources (normally for the oil industry) (World Bank, 1988). It was initially applied in a reduced number of Special Economic Zones but has been gradually extended.⁴ The main effects are related to technology, management and quality improvements as well as opening of export markets.

We now turn to a discussion of the effects of these policy changes in the bamboo sector in Anji County.

THE BAMBOO PRODUCTION SYSTEM IN ANJI COUNTY

Anji County is situated in Zhejiang Province, one of the economically dynamic coastal provinces close to Shanghai. The capital of Di-Pu is some 120 km north-west of Hangzhou, a thriving provincial capital. The County has a total area of 1,325 km² and 446,100 inhabitants, a density of 337 people/km². Most of Anji corresponds to the basin of

⁴ In January 1995 all provincial capitals were allowed to establish a Special Economic Zone.

TABLE 1. ANJI BAMBOO AREA AND STANDING CULMS/WEIGHT

YEAR	TOTAL AREA	<i>PHYLLOSTACHYS PUBESCENS</i>		OTHER SPECIES	
	ha	ha	'000 culms	ha	'000 tons
1975	51,400.0	42,800.0	88,140	8,600.0	129
1982	54,022.1	43,610.8	110,867	10,410.3	161
1989	55,496.4	44,019.1	112,263	11,477.3	172
1994	57,315.5	44,519.9	114,567	12,795.6	192

Source: Yearbook of Anji Forest Bureau.

the river Xi Tiaoxi, that flows into the Tau Hu Lake. It has a typical basin geomorphology, with watersheds of forested hilly lands with small villages, while the central zone is a flat area of sedimentary soils used for agriculture and where the main towns are located.

Anji has a multi-century tradition of cultivating bamboo, being known in the region as "the native place of bamboo". Traditional management seems to have succeeded in controlling some of the unevenness associated with bamboo cultivation. The last record of gregarious flowering⁵ dates back nearly four centuries to the year 1601 AD. This has allowed for a continued use of the resource. Similarly, the typical biennial shooting cycle of *Phyllostachys pubescens* has also been adapted in order to provide yearly crops at the county level. Thus, while most bamboo in the eastern part of the County is sprouting (on-year) the western part is not (off-year), the south being a mix of on and off. Due to the biennial cycle, bamboo production uses the "du" (two years) as the basic time unit.

Bamboo is a major land-use feature in Anji. There are 7 genera and 42 species of bamboo in the County, occupying 57,300 ha (equivalent to 43.3% of the County's area). Anji County cultivates the second largest area of moso bamboo in China (44,500 ha). Table 1 shows the changes in bamboo area in the County over the last twenty years.

⁵ Gregarious flowering is a synchronic flowering of all the populations of a given species in a large region. It happens in many bamboo species and it frequently leads to the death of the whole bamboo forest. The species of the genus *Phyllostachys* are debilitated but do not die after a gregarious flowering (McClure, 1993).

TABLE 2. ANJI MOSO BAMBOO MANAGEMENT REGIMES

YEAR	STATE FARM		COLLECTIVE (VILLAGE)		INDIVIDUAL	
	area (ha)	per cent	area (ha)	per cent	area (ha)	per cent
1975	617	1.4	42,183.0	98.6	0	0
1982	617	1.4	42,993.0	98.6	0	0
1984	617	1.4	3,376.9	7.7	39,773	90.9
1989	617	1.4	3,377.1	7.7	40,025	90.9
1994	630	1.4	3,377.9	7.6	40,512	91.0

Source: Yearbook of Anji Forest Bureau.

Since 1975, the area under bamboo has increased by 5,915.5 ha, representing an 11.5% expansion. Since bamboo has to compete with other land uses, the changes in the total area have not been as dramatic as the production figures may imply (see below). Its importance is only fully appreciated in the context of a highly populated county where most of the suitable land is already under intensive use.

The new policy of household responsibility system was very quickly adopted in Anji's bamboo production sector. It was virtually an "instant adoption". By 1984, the year after approval, all villages had introduced the system and 90.9% of the moso bamboo area was under private management (see Table 2). This figure coincides with the findings in other provinces for agricultural production (Prosterman & Hanstad, 1990).

The speed of the change may be related to the proximity to Anhui Province where the first experiences took place as well as to the general dynamism of that part of China. As can be seen, the shift has been from the collective farms run at a village level to individual contracts, while the state farms, always a minor component of the bamboo management system in Anji, remained practically unchanged.

It is worth mentioning that this shift to private management has not meant a total dismissal and abandonment of the collective action and its more egalitarian aspects. In fact, most contracts are arranged in such a way that the farmer is required to pay the commune the equivalent at current market prices of the value of the average culms produced by the land at the time of signing the agreement (see Ap-

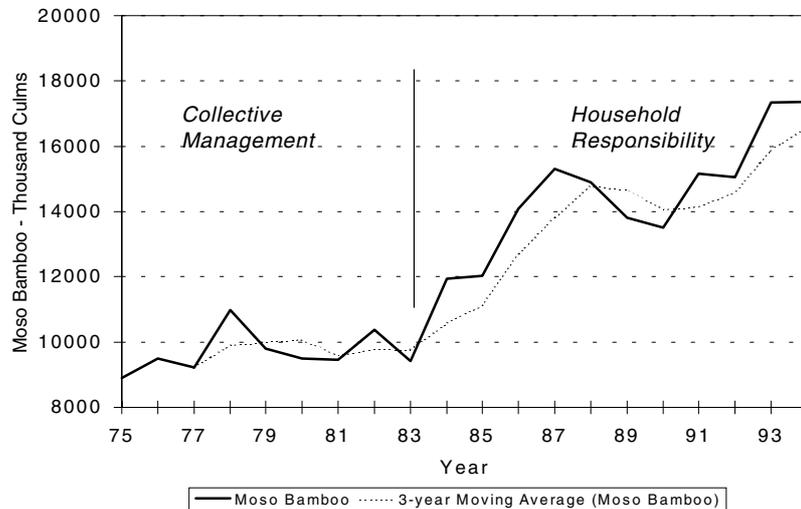


FIGURE 1. MOSO BAMBOO HARVEST
 Evolution of moso bamboo harvest in Anji. Grey line shows 3-year moving average.

pendix 1 for a standard contract, in this case with a forest company). The commune then pools the total income from renting the land and distributes it back amongst its farmers after discounting general services and other expenditures, such as government taxes. Distribution is based on work performed and the total number of family members, thus incorporating the egalitarian practices of former times. The farmer can keep the culm production above the amount established in the contract plus all the bamboo shoots, branches and leaf production,⁶ which provides the incentive for improved management. After ten years the land rent (specified as number of culms) is increased by 10% in order to allow the commune to capitalise part of the improvement (see Appendix 1).

This incentive has led to greatly increased bamboo production and harvest since 1975, as can be seen in Figure 1. Four phases can be identified for moso bamboo, the main species under cultivation. Prior to the implementation of

⁶ A 12% government tax was charged on this extra culm and shoot production until 1993; that year the tax was reduced to 8%.

the household responsibility system in 1983, moso bamboo harvest was stable at around 9.7 million culms per year. The first five years of the new policy brought a sharp increase of 62.7% in the harvest of moso culms. This increase was caused mainly by the desire for quick profits possible with increasing prices, and uncertainty about land lease rights and continuation of the new policy. Over-harvesting resulted from this combination of factors. Similar over-exploitation responses have been reported for bamboo in Guangdong Province (see Gu, 1992) and other forest products (Changjin, 1992; Chen, 1993, quoted Hill, 1994).

The moso harvest declined between 1988 and 1990, dropping 11.8% during the 3-year period. Over-exploitation and market adjustments, with lower prices due to excess supply and external market problems (see below), seem to have been the main factors causing the decline. A new phase of growth, though less pronounced than the former, has taken place with an increase of 28.6% from 1990 to 1994, when harvest reached 17.4 million culms. It appears that the over-exploitation problems have been reduced as farmers' confidence in the new policy has grown after several years of experience and after extending the lease to twenty years. The total increase since 1975 amounts to 95.3%, whereas the increase for the twelve years after 1983, when the responsibility system was introduced, was 84.5%. A similar pattern, though with more marked fluctuations, can be observed for other species of bamboo.

The total harvest is a function of the area planted and the intensity of management. As has been shown, the total increase in area has been rather moderate. Most of the increase has to be attributed to intensified management, which is reflected in the changes in stand density⁷ and the production per unit area. Table 3 shows these indicators of management intensity.

This intensified management has yielded a 79.3% increase in the annual culm production per hectare since 1975. The most important input has been fertilisers, followed by

⁷ The relation between production and standing culms is complex. For a given intensity of management (such as fertilisers, labour and other inputs) there is an optimum density of standing culms above which the production decreases (Ma, 1982).

TABLE 3. BAMBOO STANDING CULMS (OR STANDING BIOMASS) AND PRODUCTION PER HECTARE

YEAR	<i>PHYLLOSTACHYS PUBESCENS</i>		OTHER SPECIES	
	standing culms/ha	production culms/ha*	standing biomass tons/ha	production tons/ha*
1975	2,059	208	15.0	–
1982	2,542	224	15.5	1.04
1989	2,550	333	15.0	1.16
1994	2,573	373	15.0	1.29

* Average of the reference year and two previous years.

some pesticides and labour (weeding and tilling). This has allowed for a better standing culm ratio and shortened cutting cycles, which have been reduced from eight to six years in most of the County. In fact, the increased production is not fully reflected in the above table since many farmers have partially moved to a mixed culm-shoot production in the case of moso bamboo, whereas the data only show culm production. This change, related to the very high benefits obtained by farmers producing bamboo shoots, has also been noticed in other areas of China (see Zhong, 1994).

REFORM OF THE MARKETING SYSTEM

Until 1980 all bamboo produced was sold at fixed prices through the State-run Supply and Marketing Cooperative. That year the new policy allowed the sale of above-quota production directly by villages. This initiated a market for excess harvest, encouraging increased productivity by the villages themselves, that were also authorised to establish their own enterprises for semi-processed products. During the five years that followed, markets put pressure on the planned prices; planned prices could not lag very much below market prices if they were not to trigger mechanisms to bypass quotas. As Sicular (1988) demonstrates for other agricultural commodities, planned prices could not be above market prices in the Chinese context.

The pressure of the market on planned prices in the context of expanding production forced the government to eliminate the quota system. The "Bamboo purchase task"

was abandoned in 1985, moving bamboo production to a full market situation. The Supply and Marketing Cooperative had to negotiate prices with individual farmers, who were by then responsible for 91% of moso bamboo production. Consequently, 1986 marked the highest rate of increase in the private market of moso bamboo, 71.5% higher than the previous year when the new policy was introduced. This represented a turning point, with private market channels for bamboo overtaking the State system for the first time since 1949.

This clearly indicates the positive response to the policy. However, unlike the virtually instant adoption of "Household Responsibility", the reform of marketing channels needed some time to be fully developed through individual initiatives. Gradually, a number of intermediaries appeared in the County specialising in and facilitating trade relations. Currently there are some 200 traders, most from Anji County. The market channels they control handled 91.7% of the total moso bamboo sales in 1994. This can be considered close to the ceiling since the rest is produced by State or Village farms that sell directly to their own enterprises.

We include as private market channels some bamboo factories that acquire part of their raw material through direct purchasing from farmers. In order to guarantee a steady supply, some factories are arranging production agreements with farmers at fixed prices before the harvesting period. The farmer sometimes benefits from a small cash advance and the factory secures supplies of the raw material. Field interviews, however, indicate that the agreements are only partially respected given the pressure on prices due to scarcities at county level (see below).

In 1978, 95.7% of the moso bamboo produced in Anji County was sold in unprocessed form to other counties or provinces in China, and the remaining 4.3% was sold in Anji. The situation has changed with a steady trend selling in the county market for processing by factories established in Anji. By 1994 the Anji's market absorbed 42.6% of (the significantly greater) production, whereas the sales to other counties or provinces declined to 56.6%. Extrapolation from the last ten years suggests that 1998 will be a turning point where more than 50% of the bamboo traded in Anji will be processed within the County. Export of bamboo

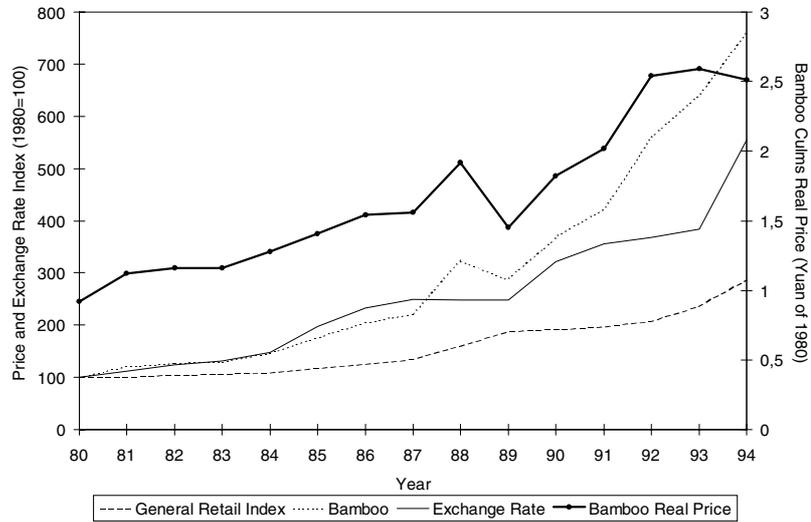


FIGURE 2: BAMBOO REAL PRICE, INFLATION AND EXCHANGE RATE INDEX 1980-1994

culms, initiated in 1991, represents a small fraction (0.9%) of total trade. At the same time, purchase of bamboo from other counties or provinces begun in 1990 in order to cope with the increasing demand, reaching 13.2% of total trade in 1994.

Increased production and opening of trade to a full market situation has not been sufficient to cope with growing scarcity due to increased demand by the new enterprises that have been established. Consequently, bamboo prices have increased much faster than the general retail⁸ or exchange rate indices, as can be seen in Figure 2. A moso culm that sold for 0.95 yuan in 1980 would fetch 2.64 yuan (constant 1980 prices) in 1994.

The temporary decline observed in the real price for the period 1988-1989 is related to excess of supply and over-exploitation as has already been noted. On the other hand, the real price for bamboo has remained stable over the last

⁸ There have been some disagreements about the real inflation rate in China, that may have been underestimated in recent years (see *The Economist*, 1995). We adopt here the official figures.

three years. This is the result of two associated factors: the import to Anji County of bamboo bought in other counties or provinces, initiated at a very low level in 1990, and the establishment in 1991 of the Anji Bamboo Association. The Association, that meets once per month, is composed of the big bamboo factories (private, public and joint ventures), and chaired by the Director of the Anji Forest Bureau. Its original purpose was to reduce the bamboo culm prices, that were increasing sharply, through joint negotiation of purchases and prices. The Association has expanded its role to other activities (see below). Both supply and real prices of bamboo culms have been relatively stable in recent years. Cultivation has tended to be constrained by the availability of suitable land.

The estimated short- and medium-term price elasticities of supply of bamboo culms are low, as shown in Table 4. The bamboo culm cross-price elasticity with bamboo shoots, is even more inelastic, and interestingly, positive, indicating that the two products tend to be complementary, rather than competitive. Both the own-price and the cross-price elasticities of supply decline slightly as the lag between a price change and the time of response is increased, which is not surprising for a longer-term crop such as bamboo culms. All these estimated elasticities for bamboo culms were statistically significant at the 99% confidence level.

The price elasticities of supply of bamboo shoots are quite different; with a moderately elastic response to current year prices, and an even greater response to the previous year's prices (elasticity = 1.31). The cross-price elasticity of shoot production to changes in culm prices is even higher, in both current and lagged analyses, although this

TABLE 4. BAMBOO PRICE ELASTICITIES AND CROSS-PRICE ELASTICITIES OF SUPPLY

	QUANTITY OF BAMBOO			
	CULMS		SHOOTS	
	Price culms	Price shoots	Price shoots	Price culms
Current Year	0.61	0.41	1.14	1.40
Price y1, production y2	0.60	0.38	1.31	1.48
Price y1, production y3	0.54	0.33	0.56	0.77

may reflect some collinearity caused by price rises for all bamboo products associated with increased demand. Again, the cross-price elasticities are positive, indicating complementarity. It is uncertain whether this complementary relationship will be maintained in the long run, or whether there will be competition between the shoot and culm sectors. However, during the 15-year series study, intensified management promoted by the new policies has allowed for growth of both products simultaneously. In both cases, the estimates for the 2-year lag formulation, were not statistically significant, while the current-year estimate was significant at 95% and the 1-year lag estimate at 99% confidence levels.

The picture that emerges from this analysis is that bamboo culm production, with its longer production cycle, represents a stable, core activity for households: reliable and reasonably profitable. The shoot production activity, as a biennial crop, is much more dynamic: more volatile, more profitable and able to be expanded or contracted quickly in response to changing market conditions.

It is noteworthy that under the former quota and fixed-price system, farmers did not experience price fluctuations, particularly the seasonal changes that are now common. That may have been partially responsible for initial over-exploitation, while farmers underwent a process of learning. One area of concern (and of promising research) is the possibility of expanding the harvesting season, presently constrained for physiological reasons to the period between November and April, with a peak harvest in February–March.⁹

BAMBOO PROCESSING

Prior to 1978 most bamboo was processed outside the County. In 1978 there were nineteen factories for all bamboo products, employing 460 workers and generating a gross output of 940,000 yuan (US\$ 670,000). The first reform of the marketing system in 1980 allowed for the appearance of new village and township enterprises, as well

⁹ That is the period of low activity or dormancy, in which the bamboo has less water and nutrient content thus increasing the quality and reducing the damage to the rhizome.

as some private enterprises (mostly family concerns). They grew in spite of quota and marketing channel restrictions. By 1985, when the quotas were abandoned and the internal market opened, such enterprises totalled 154, with 3,370 workers and a gross output of 12.31 million yuan (US\$ 4.16 million).

The period 1989–1990 showed a slight decline in the bamboo sector. This was the combined effect of over-production before 1988 and changes in the external market (see below). Since then the Anji bamboo industry has recovered, experiencing exponential growth in the last four years in step with the fast overall growth of the Chinese economy. In 1994 there were 505 factories with a gross output of 412.32 million yuan (US\$ 49.68 million) in the sector. It employed 10,292 workers, of which 60% were women. On the other hand the number of bamboo-growing farmers has changed little, with a 1% increase from 110,870 to 111,980 farmers between 1985 and 1994.

Chinese industrial statistics divide the bamboo processing industry into four main sub-sectors: handicrafts, furniture, manufactured products (basically composed of bamboo mats and flooring) and shoots for food.

Table 5 gives detailed information about the different sub-sectors of the bamboo-processing industry in Anji over the past decade. There are only four "State-owned enter-

TABLE 5. EVOLUTION OF THE BAMBOO INDUSTRY IN ANJI
Number of factories (1), output in million yuan (2), number of workers (3).

YEAR	MATS AND FLOORING			SHOOTS			HANDICRAFTS AND FURNITURE		
	1	2	3	1	2	3	1	2	3
1985	134	5.5	2,344	14	6.2	636	6	0.6	390
1986	149	7.5	2,659	18	9.1	770	9	0.7	546
1987	156	9.3	2,766	31	24.0	1,415	12	3.5	873
1988	173	13.1	2,559	32	41.1	1,897	12	5.1	974
1989	180	14.0	2,708	34	37.9	1,944	12	5.5	818
1990	187	17.2	2,651	29	22.8	1,871	11	9.5	694
1991	181	23.4	2,534	37	39.9	1,734	12	19.3	816
1992	224	61.9	4,630	38	69.0	1,956	11	17.5	664
1993	340	183.9	7,122	44	88.1	2,137	11	28.6	741
1994	435	224.5	6,590	56	128.0	2,884	14	59.9	818

Sources: Yearbooks of Anji Statistics Bureau and Township and Village Bureau.

prises" in the bamboo sector in Anji. The rest are "Collectively owned enterprises" (both township and village enterprises) and "Privately owned enterprises" (normally small enterprises or foreign firms) (Zhang, 1995). The analysis covers these collectively and privately owned enterprises.

In all cases the township enterprises tend to be larger both in output and number of workers. This allows for economies of scale, diversified production and the adoption of more advanced technologies. Moreover, the township enterprises generally make a higher use of their installed capacity, working more months per year especially when compared with the village enterprises. Consequently, the output per worker is higher in the township enterprises than in the village or private enterprises. The gap has increased in the later years, reflecting the arrival of the joint ventures with foreign technology associated with township enterprises. Thus, in 1985 the productivity of township enterprises was 4,190 yuan per worker, as compared with 3,030 yuan per worker for village and 2,550 for private enterprises. By 1994 the productivity (1985 yuan) had increased to 23,450 yuan per worker for the township enterprises as against 13,960 yuan per worker in the village and 10,320 in the private enterprises. Similar problems of small-scale, obsolete equipment, single-product structure and poor management have been described in other forest industries in Zhejiang (Zhu, 1994).

However, while township enterprises dominate in the production of bamboo shoots, furniture and handicrafts, they only represent 39.1% of the gross output of bamboo mats and flooring. This is because of the long tradition of bamboo mat manufacturing by village enterprises, as well as the existence of a large number of small-scale, private enterprises that provide semi-processed products to the larger factories. As an innovation in this sector, several mat and flooring factories have contract arrangements with farmers who carry out the first steps of processing at their own farm. This offers the farmer an additional income, while the factory secures a certain amount of semi-processed material and reduces its fixed labour costs.

The growth in the bamboo-processing sector in Anji has to be seen in the overall context of the country's develop-

ment. Two factors have converged to promote or accelerate it. The first of these is the change in the production and marketing system, coupled with facilities for rural industries with more flexible regulations (Martin, 1993), that have allowed for a channelling of domestic savings. This was the driving force from 1980 to 1988.

Since there are only four State-owned bamboo enterprises in Anji, the introduction in 1984 of the "Contract Responsibility System" for this type of enterprises (resembling the "Household Responsibility System" for the production units) did not have a major impact. Although both State and Collectively owned enterprises could be termed "Public-sector enterprises", it is acknowledged that the Collectively owned enterprises operate in a way similar to the standard competition between capitalist firms (Broadman, 1995). In November 1993 the "Decision on Issues Concerning the Establishment of a Socialist Market Economic Structure" was approved. The implementation of this decision, considered the most ambitious reform since 1978, will create a completely new industrial relationship, that will also affect the present collectively or privately owned rural bamboo enterprises.

In 1988 the "Open Door" policy reached Anji, allowing enterprises from outside Mainland China to be established in the County and to benefit from a number of incentives.¹⁰ This has been the second factor, leading the process of reform since that year. The first joint venture, with the Hong-Kong based New Continent Co., began in Anji in November 1988. Since then a total of nineteen joint companies have been established in the County, 1992 being the peak year when eight new factories opened. The total investment has amounted to 36.31 million yuan. Their 3,274 workers represent about one-third of the total labour force in the processing sector. Taiwan is the main source of foreign investment, with thirteen enterprises concentrating on bamboo mats, flooring and plywood, whereas Japanese industries have specialised in bamboo shoots for export to the Japanese market.

¹⁰ They include cheap land, subsidised inputs and tax rebates for the initial years.

Forest authorities and enterprises acknowledge that the joint ventures have brought six positive effects:

- (1) A substantial amount of investment, mainly machinery.
- (2) A multiplier effect that has increased the demand for bamboo culms and shoots and has encouraged the establishment of family semi-processing units.
- (3) New technologies,¹¹ especially for bamboo mats and flooring (from Taiwan) and shoots (from Japan) as well as new management skills, particularly appreciated in the case of the Japanese enterprises (see Qiu, 1992, for similar conclusions on the role of Japanese fresh shoot technology in Zhejiang).
- (4) A competitive market that has encouraged improvements in the production base for the whole sector.
- (5) A wider range of products and enhanced quality that has improved competitiveness.
- (6) The opportunity to enlarge the external markets through direct connections between the foreign enterprises and their countries of origin.

These last two points are analysed in detail below.

BAMBOO EXPORTS IN ANJI

Although the "Open Door" policy intended, *inter alia*, to increase Chinese exchanges with foreign countries as a way to accelerate economic development, it had little effect in the bamboo sector in Anji until 1988, when two major policy changes radically transformed the situation: the approval for foreign industries to establish in the County and the reform of foreign trade. That same year the Anji Foreign Trade Company was authorised to negotiate direct exports and to keep part of the foreign currency, thus avoiding the provincial channels. A similar right was granted to large firms that fulfilled the criteria mentioned above. Consequently exports rocketed in 1988 with an increase of 131.5% over the previous year, as shown in Figure 3.

¹¹ The foreign technology is not always superior, as in the case of bamboo flooring, where Mainland Chinese machines seem to have given better results than the Taiwanese.

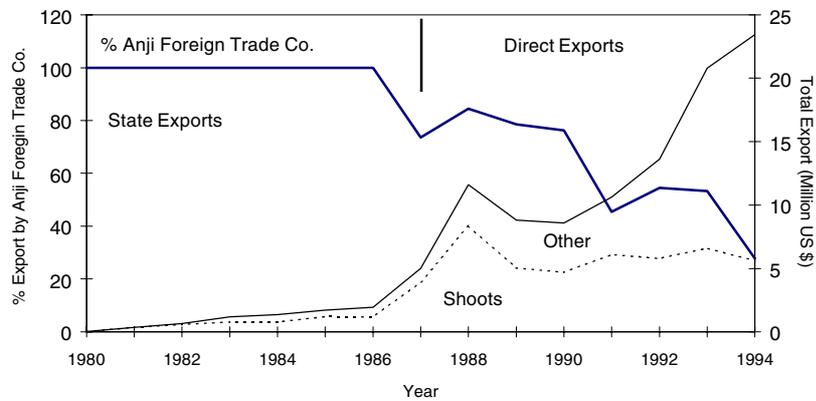


FIGURE 3. TOTAL EXPORTS OF SHOOTS AND OTHER PRODUCTS, AND PERCENTAGE OF EXPORTS SHARED BY THE STATE-OWNED ANJI FOREIGN TRADE CO.

The trend was abruptly interrupted in 1989–1990, particularly due to the fall in bamboo-shoot exports, while exports for other bamboo products continued to grow, but at a more moderate rate. Two factors contributed to the sudden change. The deterioration of relations and boycott of Chinese products after the Tian Anmen Square events had an impact, felt more strongly by those goods like bamboo shoots whose predominant market is Western countries (including Japan, the first market). The other factor concerned the fast evolution of the bamboo-shoot industry in one of China's main competitors, Thailand, whose plantations of *Dendrocalamus asper* had just entered full production (Thammincha, 1995), making that country the world's third largest exporter after Taiwan and China. This sudden reduction of exports sent shock waves across the whole sector. There was a general decline from the production of raw material to the finished products.

The sharp expansion trend regained impetus after 1991, with exports increasing by 172.8% in the last four years. This is mainly due to the increase in the exports of bamboo mats and flooring. Bamboo shoots have not recovered the peak level reached in 1988 despite the normalisation of relations and the establishment of two bamboo-shoot joint

ventures with Japanese firms. This suggests that the arrival of Thailand as a main competitor in the market has played a greater role than the economic sanctions. Recent problems experienced by Thailand¹² will likely boost Anji's bamboo-shoot industry.

The reform of foreign trade also changed the role of the Anji Foreign Trade Co. Prior to 1988 the company, acting as an agent of the Provincial Foreign Trade Bureau, was responsible for all bamboo exports. With large firms being allowed to undertake direct exports, Anji Foreign Trade Co. lost its privileged position. Since then it has consistently been losing ground, its exports representing only 27.9% of total bamboo shoots and products¹³ in 1994 (Figure 3). This further illustrates the rapid acceptance and adoption of a policy that has shifted foreign trade from State to more decentralised channels.

It would be appropriate to define the present situation of the bamboo sector in Anji as strongly export oriented. There has been a dramatic change since 1978, at the introduction of the reforms when Anji County did not export any bamboo, to the record 75.3% of industrial production exported in 1990. However, it would be mistaken to overlook the importance of the internal market. In fact the internal market (within the County and other regions of China) has been growing faster than exports since 1990 and accounted for 52.8% of the bamboo industrial output in 1994 (see Figure 4). The importance of the internal market partly explains the reduced impact of the boycott, that could be described as a "hiccup" in the sector. The demand for high-quality products is increasing and the internal market will again play the main role, although unexpected events like the gregarious flowering of Thailand may temporarily slow or revise the trend.

¹² Thai exports of bamboo shoots have suffered a dramatic setback due to the gregarious flowering of *Dendrocalamus asper* all over Thailand, that began in November 1994. By June 1995 the flowering had already meant the loss of 38,400 ha of bamboo plantations with a cost of US\$ 45 million in direct investments, affecting 35,400 farmers (Thammincha, 1995).

¹³ This figure does not include the exports of bamboo culms, initiated in 1991. They are exclusively handled by the Anji Foreign Trade Co. and amounted to US\$ 250,000 in 1994.

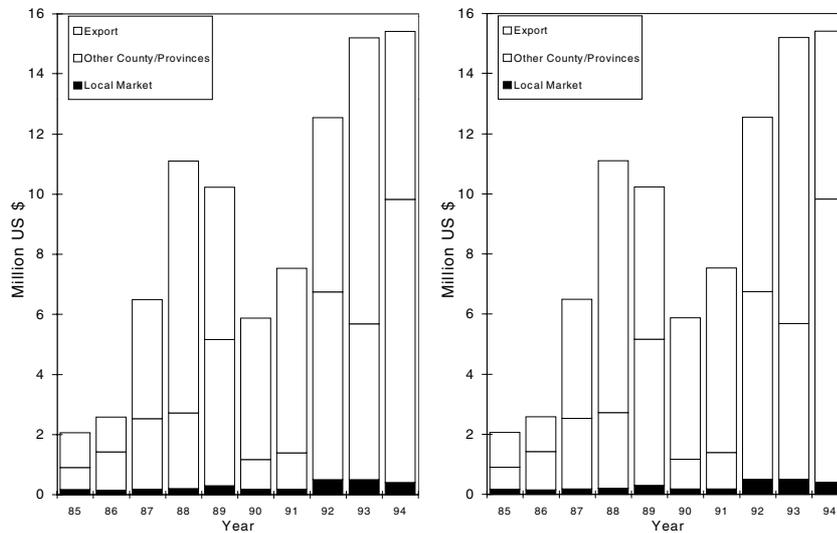


FIGURE 4. LOCAL, NATIONAL AND INTERNATIONAL MARKETS FOR BAMBOO SHOOTS AND OTHER PRODUCTS

In this context, diversification as well as quality improvement and control are the main challenges presently facing the sector. Again foreign enterprises and markets have played a major role. As well as new technologies, the export-oriented enterprises have developed new products like special bamboo mats and vacuum packed fresh bamboo shoots that have increased production and sales.¹⁴

On some occasions exporting companies have reported problems with foreign customers who have received low-quality products from an Anji-based company and have subsequently cancelled all purchases from the County, thereby affecting all export-oriented enterprises. Insufficient quality control regulations and lack of tradition in consumer organisations represented a gap that needed to be filled. In order to avoid these problems and to offer information, the Anji Bamboo Association has begun to play the role of a quality control body that recommends standards and imposes penalties on faulty members. The enter-

¹⁴ The bamboo shoot joint enterprises are considering the possibility of extending the production to conventional agricultural products in order to keep the plants operating at full capacity for most of the year.

prises interviewed acknowledge that the Association has been more effective as a quality control and information sharing body than in reducing the price of bamboo (despite the stability in real prices of bamboo culms since 1992, noted above).

CONCLUSIONS

Since China initiated the political shift towards a more efficient, market-related economy, the bamboo sector in Anji County, Zhejiang Province, has experienced major changes in production, marketing, processing and international trade. Production has moved from village co-operatives to a farmer responsibility system. The main effects have been strong intensification of management and increased output, coupled with a diversification to include highly profitable bamboo shoot production. The total bamboo area has also increased, although to a much lesser extent due to the strong competition for land.

The marketing of bamboo culms has also changed in two ways. It has moved from quotas and fixed prices to a full market system. Also the State-run Supply and Marketing Cooperative, that formerly controlled all bamboo culm sales, faced competition from private channels and lost its dominant position. A number of middlemen have emerged, and some processing companies have started to arrange "future sales" contracts with farmers.

The County has also moved from being an exporter of raw material to being a processor, with many new firms established in the past fifteen years. Consequently, the sector has made a significant contribution to job creation around a new network of bamboo-based rural industries. The high internal saving rate has encouraged the establishment of Chinese enterprises, whereas the availability of raw materials, low costs, traditional know-how and internal and external markets has attracted a number of foreign companies. These foreign companies have played an important role in bringing new capital, technology and products, as well as in opening the foreign market.

In the period studied, Anji has shifted from an exclusively Chinese market orientation to the point that bamboo exports became dominant in the late eighties. How-

ever, although exports have continued to expand, in recent times the faster growth of internal demand has shifted the balance towards the Chinese market. It seems that this will be the dominant market in the near future in the context of increasing demand for better quality and new products.

The exponential growth experienced has led to an imbalance between supply and demand that is perceived as the main immediate problem. Diversification, quality improvement, standards and quality controls are the prime challenges in the medium and long terms. Foreign technology, the higher quality demanded by foreign markets, and the shift towards higher quality by the internal market, will lead the necessary changes to face these challenges. The creation of the Anji Bamboo Association marks the first step towards a declining need for the State to initiate changes, as has been the situation up until now. The industry itself is taking some independent responsibility for its own development.

Bamboo production has a long tradition in the County, but technical capacity, resulting from farmers' innovation and a strong research base, seems to have been well ahead of practice. A series of policy changes have cleared the main bottlenecks in the sector. They have provided the incentives and the opportunities to intensify the production of raw material with very little increase in land area, and to diversify production toward much greater shoot output. That the changes were implemented gradually, and frequently tested at a small scale in an experimental way, has prevented major disruptions. It seems that the sequence of events has also played a very important role in the smooth process and success seen so far. This sequence has moved from reforming the production of raw material in the first instance, with subsequent changes at the marketing, processing and foreign trade stages.

It is beyond the scope of this paper to analyse the distribution of the benefits among the various stakeholders (the family bamboo farmers, the labourers in the factory, the joint venture investors, etc.). Studies with timber and other forest products suggest that the farmer only captures between one-quarter and one-third of the huge new profits occurring in the sector (Changjin, 1992). However, it is worth noting that the increased efficiency and enormous

release of production capability has been achieved within the context of a State land-tenure system with a strong communal involvement, where distribution of land rents is still based on a combination of need and merit. This confirms the earlier conclusion of Sicular (1988) that a mixed system is sustainable and can have desirable efficiency and distribution effects, a view supported by Byrd (1989). The case of bamboo in Anji also confirms Sicular's observation that, in the presence of markets, the State's influence on production and consumption behaviour is dramatically reduced.

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APPENDIX 1

Contract between Tianlin General Service Ltd. Co. (A) and Commune Village of Tianhuangping Town (B) for Managing Moso Stands.

This contract is between Tianlin General Service Ltd. Co. (herewith to be known as A) and Commune Village of Tianhuangping Town (herewith to be known as B) for developing Moso bamboo stands in Tianhuangping town and for negotiating higher economic benefits between those two parties.

1. Contracting of Moso stands' location, area and length of management: B would like to contract A to manage its Moso stands located at Lenshuidong and Zhaojiatang in order to establish 'the 2nd Forest Farm of Shanhe Village', beginning from March 16, 1995. The area of Moso stands is 26.53 ha and the duration for this contract is twenty years.
2. Management plan and economic policy: The ownership of Moso stands still belongs to B even though the stands are managed by A and the management plan is decided by A. Both parties agree that the original contract base, i.e. B's bamboo stands of culms in two "du" (4 years), are 700,000 kg presently. A should pay B according to this contract base and the average selling price. The amount and date of the first payment will be 70% and before December 31 of the 'on-year' and the second payment will be 30% before next March 31

of the 'off-year'. The payment cannot be delayed; unless in cases of unforeseen circumstances/disasters, then *A* should seek *B*'s agreement for late payment. If *A*'s selling price is lower than the average market price, it is necessary for the two parties to re-negotiate the price of payment.

3. Income from sale of branches, shoots and other Moso stand by-products belongs to *A*. After 5 "du" (10 years), *A* should pay the amount equivalent to 110% [Authors note: 1995 is the base year equivalent to 100%] of each du's culm base x current year's average price to *B* because of increment of production during the next 5 "du" (10 years). At the conclusion of the contract, *A* should return the contracted stands back to *B* in accordance with the original contract base. If the stands' culms cannot reach the original base at that time, *A* should compensate *B* for the loss. But if the stands are above the original base, both parties should share the benefits i.e. each party will receive 50% each of the extra stands.
4. Production investment such as the costs of ploughing the soil, fertilising and covering with soil, etc. and other investments such as the maintenance of bridges, roads and houses, should be the responsibilities of *A*. But the benefits from investment, i.e. increment of by-products, shoots and branches, should belong to *A*.
5. Trees and shrubs in the contracted area should be also managed by *A*. If *B* wants to harvest them, permission from *A* should be obtained. Should some trees be cut in the process of managing the bamboo stands, *A* should first notify *B*. For the employment of workers for managing, under the same condition, *A* should first consider the employment of *B* workers. *B* should follow the protection regulation of bamboo stands set up by *A* and help *A* to protect the contracted stands.
6. Both *A* and *B* should bear the legal responsibilities upon signing the contract. This contract is in effect immediately from the date of signing the contract by both parties, *A* and *B*, and by the guarantor, until the completion of the contract.

Party A: Tianlin General Services Ltd. Co.

Party B: Shanhe Village of Tianhuangping

Guarantor: Agro-economy Service Station of Tianhuang-ping Town

Date : 01-01-1995