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THE RESURGENCE OF THE TEA INDUSTRY IN CHINA

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ABSTRACT

Over the past twenty years, a period which includes the Cultural Revolution, China's tea production has recorded a consistent and impressive growth and China now has the second largest tea industry in the world. Although it follows India in total production, it completely dominates the 'green tea' market. While China exports only 20 per cent of its green tea, it exports 90 per cent of its black tea production - production which has been expanding at over 7% per annum over the last 15 years. It becomes critical then, whether China continues to push black tea exports in the face of declining world prices or whether it seeks to develop further the exports of its own unique green teas.

The paper explores these issues and ways in which output has been increased so rapidly. It also examines the potential for further expansion of output and the factors that may limit such expansion.

¹ This paper is based on material assembled as background information for a commission by the first author for the FAO. The views expressed here are entirely our responsibility and should in no way be attributed to the FAO or the Tea Research Institute of China.

THE RESURGENCE OF THE TEA INDUSTRY IN CHINA

"Beware of the Tail of the Sleeping Dragon."

1. INTRODUCTION

1.1. Background

An important contributor to China's developing agricultural sector and one not always given the attention it warrants is the country's burgeoning tea industry. Over the past twenty years, a period which includes the Cultural Revolution, China's tea production has recorded a consistent and impressive growth.

For the Chinese, tea has always been more than a hot beverage. It is a symbol of hospitality and a central component of leisure activity. A banquet without endless cups of tea would be as unimaginable for a Chinese as a picnic without a plentiful supply of cold beer for an Australian.

In the history of tea, China has recorded a number of world "firsts". It is the source of the tea bush, was the first country to cultivate the tea bush for its herbal and later potable qualities, and produces the greatest variety of commercial teas. The tea bush has been cultivated in China for over 2,500 years. In 780 AD the Tang scholar Lu Yu produced his *Classic on Tea (Cha Jing)* and the culture and history of tea have been the subject of a wide range of writings in China ever since.

Tea is grown in a wide range of climatic and topographical environments. In China it is grown from the moist, rich slopes of temperate Yunnan and tropical Hainan island to the lower hillsides of eastern China and the more severe climates in the north. And the range of teas consumed covers the whole gamut of black teas, green teas, jasmine and Wulong to the butter tea preferred by the Tibetans.

In the twentieth century tea production in China dropped dramatically as a result of the depredations of war and economic dislocation. For example, in the major tea producing province of Zhejiang, the area planted under tea fell from 34,800 hectares in 1937 to only 2,120 hectares in 1949. Output over the same period fell from 20,000 tonnes to 6,000 tonnes (Liu Hezhou 1983, pp.69,71). After 1949 the new Chinese government formulated a policy to rehabilitate tea fields left desolate and neglected. Following initial success in this endeavour, expansion of areas grown to tea saw the planting of bushes as far north as Shandong province. Today, eighteen of the twenty nine provinces of the PRC produce tea.

In terms of area planted under tea, China now has the largest tea industry in the world although it follows India in total production. However, it completely dominates the 'green tea' market. In the next section the paper reviews the international scene before turning to a more detailed examination of specific developments within China.

1.2. China and the World Tea Trade

There are two broad divisions in the types of tea entering domestic and international markets: 'black tea' and 'green tea'. Both these teas are produced from varieties of *Camellia sinensis* but are processed quite differently. Black tea includes in its processing a period of fermentation while green tea is unfermented. Within both types of tea there are many quality distinctions resulting from plant varieties, specific environmental conditions (climate, elevation, soils), tea garden management and the quality of 'plucking', as well as the care and skill in processing. Tea prices reflect both the quality associated with unique environmental conditions which cannot be emulated and the quality control in field management and processing. In general, but not exclusively, black tea is made from the leaves of *C. sinensis* var *assamica* and green tea from *C. sinensis* var *sinensis*. The former tends to be a larger bush with relatively broad leaves while the latter is smaller and is better suited to harsh climates.

Of total world tea production of over 2.25 million metric tons, 75 per cent is black tea. About 57 per cent of the black tea is exported. In contrast, only about 16 per cent of green tea is exported. China ranks third in total tea exports (of black and green tea), contributing 80% of the green tea but only 8% of the black tea trade. (See Table 1)

Table 1 World Tea Production and Exports in 1985

Country	Black Tea				Green Tea			
	Production	Exports		Production	Exports			
	(000 t)	%	(000 t)	%	(000 t)	t	(000 t)	%
India	652	38.4	219	24.8	7.5	1.3	3.0	3.4
China	75	4.4	70	7.9	365.0	64.0	70.0	79.1
Sri Lanka	214	12.6	196	22.2	1.2	.2	1.2	1.4
USSR	124	7.3	0	.0	31.0	5.4	0.0	.0
Kenya	147	8.7	126	14.2	0.0	.0	0.0	.0
Indonesia	109	6.4	90	10.2	23.5	4.1	.1	.1
Turkey	123	7.3	2	.2	0.0	.0	0.0	.0
Japan	0	.0	0	.0	96.0	16.8	1.3	2.0
Bangladesh	43	2.5	30	3.4	0.0	.0	0.0	.0
Malawi	40	2.4	37	4.2	0.0	.0	0.0	.0
Argentina	33	1.9	32	3.6	0.0	.0	0.0	.0
Viet Nam	0	.0	0	.0	22.5	3.9	10.0	11.3
Others**	137	8.1	82.5	9.3	23.2	4.1	2.4	2.7
Total	1696	100.0	884.5	100.0	569.9	100.0	88.5	100.0

Source: International Tea Committee, Supplement to the Annual Bulletin of Statistics 1986. **Taiwan's output (23,203 tonnes) is put as Green tea.

Both India and China have enormous domestic markets and only export about one third of their total production. The accuracy of world tea price forecasts hinge critically on the relative rates of production growth and domestic demand in these two countries. The next level of producing-exporting countries (Sri Lanka, Kenya, Indonesia and Bangladesh) are much more reliant on the international market to absorb any increases in production.

While 99 per cent of tea produced in India is black tea, over 80 per cent of China's tea production is green tea. However, whereas China exports only 20 per cent of its green tea, it exports over 90 per cent of its black tea production - production which has been increasing at over 7% per annum over the last 15 years. For this reason the World Bank concludes that: 'A major uncertainty in future world [black] tea output projections is the prospects of China's black tea production.' (World Bank 1986, p.55)

If China's production and exports of black tea continue to grow at the rate they have in the recent past, the World Bank predicts that world tea prices are likely to be 10% lower than they would otherwise be by the turn of the century. Whether the dragon's tail carries a nasty sting is a question that the rest of the tea-producing world will anxiously await.

It becomes a serious matter, then, whether China continues to push black tea exports in the face of the downward trend in world prices [see Figure 1] or whether China seeks to develop further the exports of its own unique green teas. The current export policy seems to favour the promotion of black tea - with some factories switching processing from green to black tea. On the other hand there is a real awareness that China produces many teas that other countries cannot easily copy. Both these points are covered in an article by Zhuang Xuelan (1987). In tracing the 'evolution' of the world tea market, she notes the historical switch of the North American market away from green tea towards black tea and comments "meiguo ren reqing hao dong" (Americans are receptive to change). Her paper indirectly raises the question as to why the Americans made the change - was it simply a change of taste or was it linked to the relative prices and availability of the competing teas? Zhuang notes the recent surge in American demand for herbal and scented teas. This raises the very significant question as to the potential for the promotion of some of China's own unique teas. However, to develop the overseas markets for these will take a concerted effort, backed by careful planning. Possibly the international "Tea quality and Human health" symposium held by the Tea Research Institute in Hangzhou at the end of 1987 made a contribution towards this.

To direct quality green teas into upper-income market niches in North America in an era when "yuppies" and "dinks" are looking for alternatives to alcohol could be significant. Green tea would give a sufficiently wide and varied range of choice for consumers to become connoisseurs. With wider markets there should be every possibility for China to establish its own tea auctions for both green and black tea.

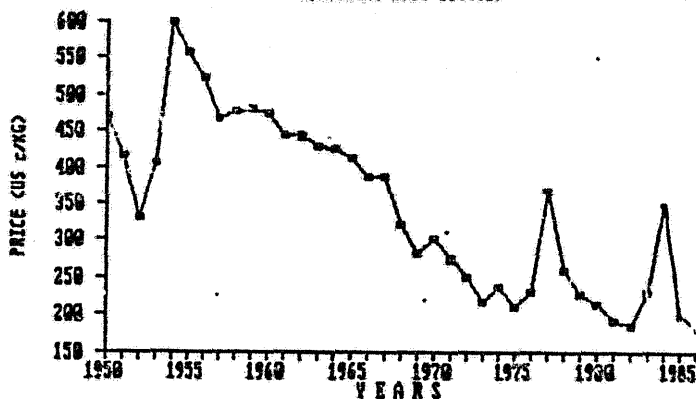
Currently, China sells a negligible quantity of its output through the international auction markets. About two-thirds of exports are in the form of direct commercial 'cash' sales while the remaining third is in the form of government contracts and/or barter arrangements with Eastern

Europe (especially USSR and Poland) and State-run economies (Iraq, Tunisia, Algeria, Libya and the Yemens). While black tea exports go primarily to Europe, N. America and Oceania, China's green tea and specialist teas (Jasmine, Puer(h), steam, compressed, 3505, Gunpowder, Suni etc) are mainly sold by counter trade or cash contract to Overseas Chinese markets, Japan, North and West Africa and, because of its sizeable North African population, France.²

In both 1984 and 1985, tea was China's most valuable agricultural export commodity. In 1985 the total value of China's exports were about US\$27 billion; of this primary commodity exports other than fuels, minerals and metals, made up 21 per cent. Of this US\$5.5 billion, tea exports made up US\$290 million or about 5 per cent. In other words this, the most valuable agricultural export, made up only one per cent of total exports. The consistent increase in the volume of China's tea exports over the last two decades and the more or less matching levels of black and green tea is illustrated in Figure 2.

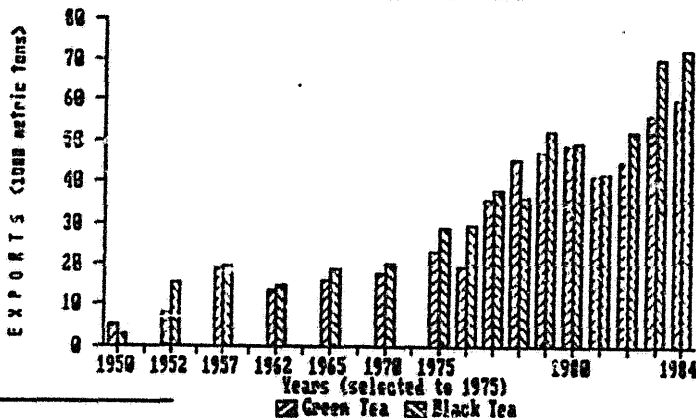
WORLD TEA PRICES 1950 - 1986
(Constant 1985 Prices)

Figure 1



TEA EXPORTS FROM CHINA
SELECTED YEARS 1950 - 1984

Figure 2

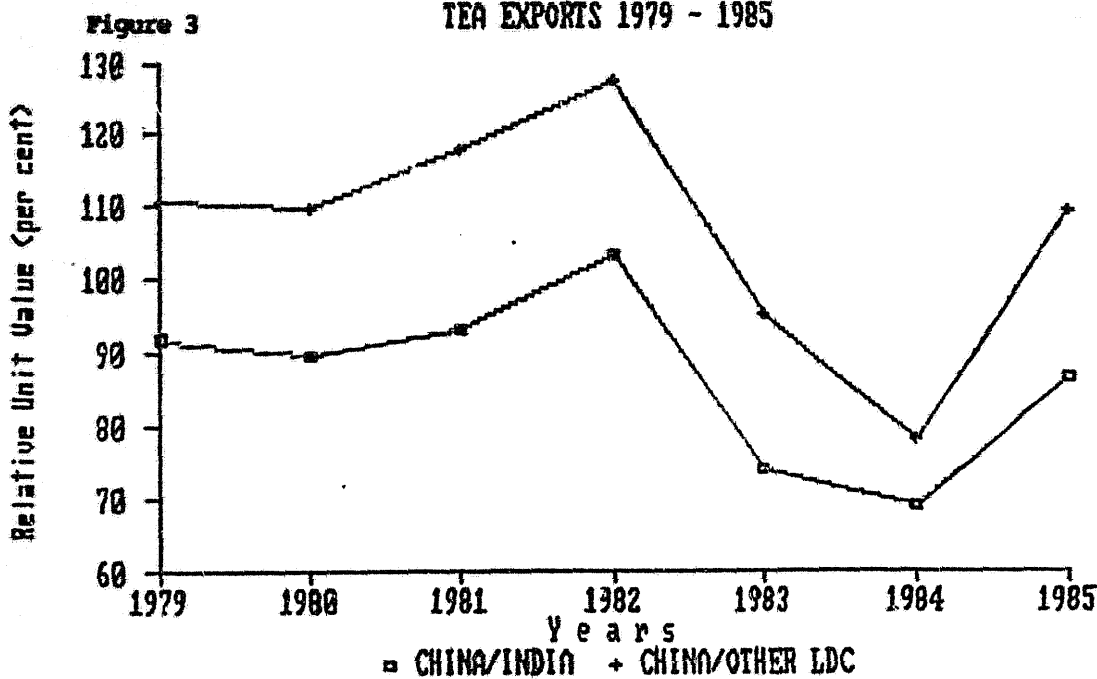


² Because of its expertise in the many forms of green tea manufacture, China has been requested by the FAO to recommend the international classification codes and standards comparable to those already established for black tea (personal communication from the TRC).

It is difficult to gauge the quality of China's tea entering the world market. On the one hand the eleven tons of China's black tea sold on the London auctions in 1985 obtained the lowest average price of any country selling through that market - indeed the price was less than half the average of all teas sold there. On the other hand, the average unit values of China's tea exports measure up very favorably against the international average and are not far behind India's. This is shown in Figure 3. The dip in China's relative performance in 1984 suggests that its 'counter trade' continued at a constant unit value while prices increased substantially on commercial markets. A comparison of Figure 3 with Figure 1 shows the relative stability of the unit value of China's tea exports compared to world prices. China suffered less in the lean years of 1981, 1982 and gained less in 1983, 1984.

There are two problems with gauging the real unit value of China's tea exports from the FAO Trade Yearbook from which Figure 3 is derived: first, the presence of the substantial counter trade and, secondly because Taiwan's exports are included in the FAO figures for China. However, the latter problem is likely to be minor as Taiwan's volume of tea exports is well under 10% of the Chinese total. Furthermore, China's own Customs Department statistics confirm the general quality issue (as gauged by the unit value) depicted here. Whereas the average price of black tea sold on the London auction was US 198c/kg in 1985, Chinese statistics show an average unit export value (presumably f.o.b.) of US 215c/kg - a rise of just two cents on the previous year (Statistical Yearbook of China 1986, p.487). The explanation for the difference between the price received for the eleven tons sold on the London auction and the average unit values could lie in the quality differences in China's green and black tea exports.

RELATIVE UNIT VALUE OF CHINA'S TEA EXPORTS 1979 - 1985



2. TEA IN CHINA

The legends of tea discovery in China date back nearly five thousand years to Emperor Shen Nong. Tea originated in China and here it is found in greatest variability. Tea retains a very special place in Chinese culture although the earthenware and porcelain tea pots have been replaced in many places by thermos flasks. The classifications given above were very simple. In fact tea is not only classed by the type of bush (small or large leaf) and its method of manufacture (fermented, roasted, steamed, scented, semi-fermented, and compressed) but also by the time of plucking (spring, summer or autumn), the region of production, the scale of production (State farm, agricultural collective or smallholder) and final market (domestic or foreign, barter or cash). It is not possible in such a brief survey to give due credit to this complex industry but the wide diversity within the industry certainly provides the connoisseur with ample scope to judge varieties and quality. In the next three sections the paper is focused on national and provincial production trends and ignores varietal and quality differences.

2.1. National Trends

Tea was the prime export during the early years of China's seaborne trade with Europe and North America. This trade built up rapidly during the latter part of the 18th and into the the 19th century. The fortunes of the industry since then have fluctuated as widely as those of domestic and international politics.

At the time of WWI China was producing 324 thousand metric tons of tea from about 354 thousand hectares (giving a yield of just over 900 kg/ha) (calculated from figures quoted by Perkins, 1969). By 1949 output had shrunk to a mere 41 thousand tons from an area of 153 thousand hectares, implying an average yield of only about 270 kg/ha. Following the establishment of the People's Republic, the Government called for the reclamation of abandoned tea fields. Output doubled during the period of 'Reconstruction' (see Table 2). At the commencement of the First Five Year Plan period in 1953 there were still a great number of tea fields that had not been rehabilitated. Following a major conference in 1954, convened jointly by the Ministries of Agriculture, Foreign Trade and the National Supply and Marketing Cooperative, renewed efforts were made to rehabilitate old tea fields and plant new areas in hilly regions. During this first plan period, the operational area increased by about 100,000 hectares, half of which was new plantings. However only a proportion of this was in the form of dense plantings in rows (see Etherington 1988) - much of it was in 'clump' planting in fragmented plots.

By 1958 it was estimated that over 250,000 hectares still needed replanting, infilling or severe pruning. Rehabilitation received a severe setback with the climatic disasters of the early 60's (TRI, 1986). Since then progress has been very steady. Not only have old areas been rehabilitated but many new areas have planted tea. Production bases have been established in areas favorable for the production of high yielding, high quality teas. Of the 15 provinces producing tea in 1914, only 8 were doing so in 1949. Today, 18 out of 29 provinces grow tea. The original 500 counties producing tea have expanded to over 900 (TRI, 1986, p.20). Undoubtedly, marginal tea-growing areas will be phased out in the coming

years as Chinese agriculture becomes more geared to specialised commodity production.

Price policy changes also had an impact. After 1965 the government encouraged tea production through a pricing policy which rewarded above-quota sales. The results of this reform were said to have quickly become evident (Guangxi jinji nianjian 1985, p.236).

Thus in the last twenty years the industry has seen a remarkable resurgence (Table 2) with production doubling each decade - implying an annual growth rate of seven per cent. This remarkable growth has continued through changing political climates. The question is, how has this been done? Also, where among the many provinces producing tea, has the growth been greatest?

2.2. Provincial Distribution and Yield Changes

Since 1979 China has published a national annual Agricultural Yearbook (with 1985 the first year of an English language edition) showing a breakdown of the areas and output by province. The statistics for 1979 and 1985 have been brought together in Table 3 and Table 4. These tables should be read together since the first is in absolute, and the second in relative, terms. Over this six year period national output increased by 56%, (7.7% per year) with the increase being shared by all provinces but one (Shandong, and its decline is not unexpected since it is so far north of the traditional tea growing regions). While the total national area under tea has changed little over this period, there have been substantial differences among the provinces, whose locations are shown on the map given in the Appendix.

Zhejiang's 6% annual growth rate during 1979 to 1985 was achieved with a 1.3% growth rate in area and a 4.7% growth rate in yield. The second largest tea producing province, Hunan, has achieved a 5.2% p.a. increase with a declining area and a 12% annual increase in yield. ³ This province now has the highest crude average yields of 676 kg/ha. However the current ranking of Hunan is far from its position in 1914-18 when it produced more than half of China's total output and more than twice its current production (Gardella 1976, p.11). The third ranking province, Sichuan, recorded a similar increase in yield, but with a small decrease in area, its output has increased very rapidly (nearly 11% p.a.).

³ Yields should be calculated with respect to the mature area rather than the total area. Table 3 does not use a lag structure because the area under tea in 40% of the provinces has declined over the period and because some of the increases in area are rehabilitated rather than new fields. Table 6 uses the recorded mature area and shows higher yields.

Table 2 Tea Production in China since 1949

Plans	Year	Output (000 t)	Change %	Periods
	1949	41		Reconstruction
	1950	65	58.5	
	1951	79	21.5	
	1952	82	3.8	
1st Five Year Plan	1953	85	3.7	
	1954	92	8.2	
	1955	108	17.4	
	1956	120	11.1	
	1957	112	-6.7	
2nd Five Year Plan	1958	135	20.5	The Great Leap Forward
	1959	152	12.6	
	1960	136	-10.5	Natural Disasters
	1961	79	-41.9	
	1962	74	-6.3	
	1963	84	13.5	Period of Readjustment
	1964	92	9.5	
	1965	101	9.8	
3rd Five Year Plan	1966	106	5.0	The Cultural Revolution or The "Ten Years of Disaster"
	1967	113	6.6	
	1968	118	4.4	
	1969	122	3.4	
	1970	136	11.5	
4th Five Year Plan	1971	153	12.5	
	1972	170	11.1	
	1973	182	7.1	
	1974	198	8.8	
	1975	211	6.6	
5th Five Year Plan	1976	233	10.4	"Open Door" Policy
	1977	252	8.2	
	1978	268	6.3	
	1979	277	3.4	
	1980	304	9.7	
6th Five Year Plan	1981	343	12.8	V
	1982	397	15.7	
	1983	401	1.0	
	1984	414	3.2	
	1985*	431	4.1	
	1986**	440	2.1	**Official estimate

Source: China Agric. Yearbook 1985, p.80. *Stat. Yearbook of China 1986

Table 3 Provincial Tea Production Statistics
for China 1979 and 1985

Province	1979			1985		
	Output (000 t)	Area (000ha)	Yield (kg/ha)	Output (000 t)	Area (000ha)	Yield (kg/ha)
National	277.15	1050.33	263.87	432.42	1044.87	413.85
Jiangsu	4.75	10.80	439.81	9.20	14.33	641.86
Zhejiang	65.45	164.60	397.63	93.15	177.93	523.51
Anhui	29.95	96.20	311.33	42.55	118.60	358.77
Fujian	22.80	99.73	228.61	40.55	122.27	331.65
Jiangxi	9.20	59.93	153.50	14.30	63.80	224.14
Shandong	1.05	5.40	194.44	.70	2.40	291.67
Henan	1.13	12.87	89.38	1.80	15.93	112.97
Hubei	17.00	82.60	205.81	22.75	69.73	326.24
Hunan	57.35	167.47	342.46	77.70	114.93	676.04
Guangdong	10.55	42.00	251.19	22.65	46.00	492.39
Guangxi	7.05	27.07	260.47	9.95	20.67	481.45
Sichuan	28.35	115.60	245.24	52.50	108.87	482.24
Guizhou	6.25	39.47	158.36	10.60	28.40	373.24
Yunnan	14.85	98.33	151.02	31.10	114.13	272.49
Tibet	v/s	v/s	v/s	.04	.20	175.00
Shaanxi	1.35	28.20	47.87	2.80	26.20	106.87
Gansu	.05	.07	750.00	.09	.47	182.14

Note: v/s = very small

Source: Calculated from China Agricultural Yearbook 1980
and Statistical Yearbook of China 1986

National yield increases of nearly 8% are dramatic for any crop but are even more so for a perennial. Over a comparable period (1978- 1983), many other crops in China have also shown large yield increases: grains 6.1%; cotton 11.5%; groundnut 6.0%; rapeseed 10.2%; and sugarcane 4.3% (Lardy 1986, p.98). In the case of tea, while the rate at which yields have been increasing is extremely impressive, the actual levels are still very low. Yields are low in relation to those reported for 1914-18, comparative international yields and the yields actually achieved in China on State Farms (1,500 to over 2,000 kg/ha) and in research institutes (over 4,000 kg/ha). For example, in Anhui Province the average yields of about 360 kg/ha given in Table 3 contrast with Qimen county TRI's consistent yields of over 3,255 kg/ha over the last nine years. In 1982 the Langqi State Farm had yields of over 2,480 kg on 688 hectares (Anhui 1984). Again, in Zhejiang, the TRI has peak yields of over 5,500 kg (Yao Guokun et al 1986) while the Hangzhou Experimental Tea Estate (actually a State Farm in Yuhang County) had yields of 2,628 kg in 1976 (Phipps et al 1977) while in 1986 which was a bad year, the yield was still 2,040 kg per hectare off a productive area of 365 hectares (field notes May 1987).

The comparative international figures given in Table 5 are based on only a three-, rather than the ideal five-, year yield lag. (The figures in this Table are all drawn from the one source and show minor discrepancies with the official Chinese data). The very low level of China's aggregate tea yields is clear.⁴ However, some of the provincial evidence that we have given suggests that a return to the yield levels of WWI (about 900 kg/ha is indeed feasible and, given the rates of growth in Table 4, could be achieved by the turn of the century.

The next section briefly examines production systems, processing and research. Each will be highly significant if such output goals are to be achieved.

Table 4 Changes in China's Tea Statistics From 1979 to 1985

Province	OUTPUT		AREA		YIELD	
	Change	Rate of Change	Change	Rate of Change	Change	Rate of Change
	%	%	%	%	%	%
National	56.02	7.70	-52	-0.09	56.84	7.79
Jiangsu	93.68	11.65	32.72	4.83	45.94	6.50
Zhejiang	42.32	6.06	8.10	1.31	31.66	4.69
Anhui	42.07	6.03	23.28	3.55	15.24	2.39
Fujian	77.85	10.07	22.59	3.45	45.07	6.40
Jiangxi	55.43	7.63	6.45	1.05	46.01	6.51
Shandong	-33.33	-6.53	-55.56	-12.64	50.00	6.99
Henan	56.52	7.75	23.83	3.63	26.40	3.98
Hubei	33.82	4.98	-15.58	-2.78	58.52	7.98
Hunan	35.48	5.19	-31.37	-6.08	97.41	12.00
Guangdong	114.69	13.58	9.52	1.53	96.02	11.87
Guangxi	41.13	5.91	-23.65	-4.40	84.84	10.78
Sichuan	85.19	10.82	-5.82	-1.00	96.64	11.93
Guizhou	69.60	9.20	-28.04	-5.34	135.69	15.36
Yunnan	109.43	13.11	16.07	2.51	80.44	10.34
Tibet	N/A	N/A	N/A	N/A	N/A	N/A
Shaanxi	107.41	12.93	-7.09	-1.22	123.24	14.32
Gansu	70.00	9.25	600.00	38.31	N/S	N/S

Notes: N/S = Not Significant N/A = Not Available

Source: Calculated from China Agricultural Yearbook 1980
and Statistical Yearbook of China 1986

⁴ This is true of those producers of black tea (most of those in the table) as well as green - as in the case of Japan. Also, the figures for made tea understate the differences in yields of green leaf because it takes 4kg of green leaf to make 1kg of green tea compared to 4.5kg of leaf to make a kilogramme of black tea.

Table 5 International Tea Yields for 1985

Country	Total Output 1985	Total Area 1982	Average Yield
	(000 t)	(000 ha)	(kg/ha)
India	659	395.0	1668
China	440	1096.7	401
Sri Lanka	215	242.1	888
USSR	155	78.7	1970
Kenya	147	81.1	1813
Indonesia	132	109.5	1205
Turkey	123	64.5	1907
Japan	96	61.0	1574
Bangladesh	43	44.7	962
Malawi	40	18.5	2162
Argentina	33	41.4	797
Viet Nam	22.5	49.6	454
Total	2105.5	2282.8	922

Source: Calculated from International Committee Annual Bulletin of Statistics 1986, an. Supplement

2.3. Production Systems, Processing and Research

Since 1978 enormous changes have taken place in the management of agricultural holdings. With the break-up of the communes, there is now a wide range of alternative 'household responsibility' systems in operation and they are continuing to evolve (see for example Watson 1984 and Lardy 1986). Some brigades have retained decision making for tree crops. In others all farming decisions have devolved upon individual households. Thus, at one end of a complex spectrum, there are individual farm households and, at the other end, State Farms.

It has not been possible to obtain specific information from national statistics on the impact of the reforms on the tea sector. However, it must be of some concern that since the decollectivisation of agriculture at the end of the 1970s, increases in output have declined somewhat following large initial growth rates between 1980-82. This has implications for both the domestic and international markets. The reasons for this slowdown are unclear but may relate to the problems that the industry is already facing. These include a labour shortage in an industry which relies on skilled pluckers to perform a painstaking and laborious task; and also an increasingly mobile rural population which is likely to be more attracted to commercial, industrial and transportation enterprises than to traditional agricultural pursuits. These problems could lead to poor standards of plucking, lower yields and processing problems.

Little information is available on the contribution of the various producer sub-sectors to total output. But what we do know is that State Farms produced nearly 26,000 tons of tea in 1984 (China Agricultural

Yearbook 1985, p.187) which implies an area of only 10 to 20,000 hectares. This represents less than two per cent of the national tea area and six per cent of production. However in Anhui province, China's fourth largest tea producer in 1985, output from State farms accounted for 12.6 per cent of provincial output (Anhui 1984, p. 207). We have seen that some State Farms have yields up to four times average yield levels however on these farms returns are closely linked to effort under a contract system which rewards and penalises success or failure in meeting agreed output levels but often with little regard to quality. The official regional purchasing offices of the National Tea Import and Export Corporation are trying to rectify this situation.

However, it is not only in terms of farm output that the reforms will have had an impact - a major question must hinge around their impact on tea processing. While some of the quality teas, such as 'Longjing', are still processed by hand, this is becoming increasingly rare in China as processing technology has developed and become more widespread. Indeed this is one of the major 'revolutions' in recent decades in the tea industry in China.

Twenty five years ago all tea processing in China was done by hand. It is estimated that now about seventy per cent of all factories are mechanized. This is a remarkable change. All the mechanical equipment now used was developed in China, particularly for green tea. Some of the black tea equipment are adapted versions of equipment used in other countries - modified for Chinese leaf and conditions. All equipment is built in China, primarily in Zhejiang Province, and mainly for domestic use but some large scale equipment is exported. There are now about 8,000 tea factories in China. The largest are government factories of which there are about 250, each producing about 500 tons of made tea per year and accounting for about one third of national output. Sixty per cent of the overall processing capacity is for green tea. (Personal communication TRI). Clearly, if these figures are correct then these factories must be obtaining most of their green leaf from sources other than State Farms.

One of the side effects of the return to small-scale household production has been the awareness that the size of processing plant might need to be reduced. Anhui province proposes to establish a chain of basic processing plants each of which will specialise on a stage of the total process (Anhui 1984, p.208). In the Longjing-producing area around Hangzhou the skilled roasting of this tea in electrically heated bowls has reverted to the homestead and the large halls filled with these bowls now have rusting equipment in them.⁵

Tea research in China has not only contributed to developing some of the high yield varieties that have resulted in some of the excellent yields mentioned above but has also been significant in the development of

⁵ In seeking new models for the integration of household production systems with larger scale processing units, much could be learnt from the experience of the Kenya Tea Development Authority. For an early discussion of this see Etherington 1971 and also World Bank 1982.

processing technologies, new products⁶ and methods for the biological control of pests. Tea research in China is the responsibility of the national Tea Research Institute at Hangzhou (the capital of Zhejiang Province). This is one of the thirty six institutes of the Chinese Academy of Agricultural Sciences and, apart from its national responsibilities as the major reference laboratory, collaborates with and encourages the research of 15 provincial tea research centres. The role of the TRI and the 'centres' is crucial in terms of new developments but it is not clear where responsibility lies for moving research results into regular use by farmers. This linkage is likely to be vital if the tea industry in China is to continue its resurgence. However, Anhui province in 1983 had 643 technical cadres of whom 293 had secondary education and above (Anhui 1984, p.207). This represents about one technician per 150 hectares of tea. But the provincial authorities say that there is an urgent need to train more extension personnel to give advice on field management, planting patterns, and fertilizer application. Also extra staff were needed for plant propagation units for improved varieties.

Up to this point little mention has been made of the wide range of different types of tea produced in China. This significant and unique feature of the Chinese tea industry is reviewed in the next two sections.

2.4. Varieties of Tea

In its recent major book on the tea industry of China (TRI, 1986), the Tea Research Institute states that the highest rates of production increase have been in Oolong (Wulong), green, and compressed tea. Certainly, over the last five years black tea output has increased only modestly, from about 70 to 75,000 tons. Table 6⁷ gives the breakdown of production by Province and by type of tea for 1982.

Five conclusions can be drawn from the table:

- 1) Even mature yields in China remain very low.
- 2) New and immature areas are very large and suggest that output will continue to expand rapidly.

⁶ Of particular note here is the development of a means of recovering edible oil from tea seed. Seed production seems to be normal outcome of the field practices used in many parts of China. The economic implications could be important to the industry because the resultant oil becomes a direct substitute for olive oil. According to the official *Almanac of China's Economy 1981* (p. 967), China in 1979 produced 617,000 tons of 'tea oil seed' which should produce 92,000 tons of oil. The TRI's own estimate of the potential is more conservative, placing tea oil seed production at 125,000 tons with a potential for producing nearly 19,000 tons of oil (Xia et al 1986, p.20). The TRI has also developed a bottled black tea.

⁷ International statistical sources pool all teas other than black as green tea.

3) The growth potential is widespread with six Provinces having 'new + immature' areas of between 30 and 50,000 hectares. The largest increase in area over this period is in Fujian Province.

4) Assuming that average mature yields remain constant then, as the new areas reach these levels, China's production should certainly reach 530 thousand tons by 1990. This implies a growth rate of 3.6% from 1982 to 1990. Such a slackening in the growth rate from the earlier rate of more than 7% is noticeable in Table 2 and may be the basis for the World Bank's forecast of a slowing down in the growth rate of output.

5) If mature yields actually rise then the 7 per cent growth rate could be maintained. Certainly there is ample scope for China to regain its premier status in world tea production.

Table 6 Tea Yields and Output by Province and Major Varieties in China 1982

Province	OUTPUT						AREA				YIELD	
	Total	Black	Green	Oolong	C'press	Others	Total	Mature	New Immature**	Total	Mature	
	(000 t)						(000 ha)				(kg/ha)	
National	397.30	69.05	247.40	14.20	15.90	50.75	1094.93	752.13	77.13	265.67	362.9	528.2
Jiangsu	7.30	3.15	4.10			.05	13.20	7.73	.80	4.67	553.0	944.0
Zhejiang	107.15	7.75	93.85			.70	182.27	137.33	8.53	36.40	587.9	780.2
Anhui	42.85	6.60	36.25				118.53	81.67	9.53	27.33	361.5	524.7
Fujian	32.75	1.55	18.25	11.95		1.00	129.47	78.33	14.20	36.93	253.0	418.1
Jiangxi	13.35	2.45	10.90				78.47	42.80	10.33	25.33	170.1	311.9
Shandong	1.20					1.20	3.33	2.33	.07	.93	360.0	514.3
Henan	1.75		1.75				14.00	7.47	4.27	2.27	125.0	234.4
Hubei	20.55	3.00	11.50		4.60	1.45	79.33	54.07	6.93	18.33	259.0	380.1
Hunan	74.70	14.90	19.80	.05	11.30	28.65	140.47	116.93	1.73	21.80	531.8	638.8
Guangdong	16.05	6.95	5.70	2.20		1.20	46.47	30.13	5.87	10.47	345.4	532.6
Guangxi	9.30	3.25	5.05			1.00	24.73	17.53	2.20	5.00	376.0	530.4
Sichuan	37.25	10.00	14.50			12.75	106.47	71.13	3.27	32.07	349.9	523.7
Guizhou	8.40	1.30	4.65			2.45	31.07	23.87	1.07	6.13	270.4	352.0
Yunnan	22.75	8.30	14.15			.30	101.00	69.73	6.93	24.33	225.2	326.2
Tibet	.00						.07	.07		.00	.0	.0
Shaanxi	1.90		1.90				25.73	10.73	1.40	13.60	73.8	177.0
Gansu	.05		.05				.33	.27		.07	150.0	187.5

Source: Calculated from China Agricultural Yearbook 1983, p49 & 51.

* C'press = Compressed tea. ** Assumes that Immature = Total - Mature - New area

Unfortunately Table 6 does not have any information on areas withdrawn from production. Such information is necessary if accurate forecasts of output are to be made.

One worrying factor in China's tea statistics is the contrast between the fact that, on the one hand, tea is the staple beverage of the country and

seems to be drunk very regularly in the home, factory and office (Phipps 1982) - especially in South China, and on the other hand, the per capita consumption of tea is, as we shall see, low by international standards.

Such contrasts must raise the question as to whether a substantial quantity of output avoids the statisticians' net. The question of the accuracy of Chinese agricultural statistics is a thorny one. Statistical services were severely affected by the ravages of the Cultural Revolution, particularly as they⁸ impacted on the numbers and training of skilled statistical personnel.

2.5. Quality, prices and domestic consumption of tea

The quantity of tea produced is one thing, but the quality of tea is likely to determine the profitability of a tea garden, especially at low yield levels. In addition to environmental factors, quality is determined by the type of bush, the time of year, the plucking standard and the way in which the leaf is processed. There is little public information available on this matter. Personal observations in China however seemed to indicate that there was at least a 10:1 variation in prices between the top and low grades and also that choice teas obtain very high prices - prices comparable to those of high quality black tea on the international market. The official 'List Purchasing Price Index' of tea in 1984 (371.3) had risen more rapidly than the 'General Index' (261.9) since 1952 (=100). Indeed, among farm products only 'oil-bearing crops' (400.5) and 'Native products' (398.8) exceeded tea. In addition, tea prices have risen more rapidly than commonly purchased necessities, as shown in Table 7.

Table 7 Price Parity Ratio of 100 Kilograms of Raw Tea and Selected Commodities

Commodity	1952	1957	1978	1984
Salt (kg)	340	462	747	888
Granulated sugar (kg)	75	115	152	161
Plain white cloth (m)	119	177	248	219
Matches (100 boxes)	50	85	110	112
Kerosene (kg)	78	141	298	365

Source: Statistical Yearbook of China 1985, p.541

⁸ In her tour of Sichuan Province in 1980, Audrey Donnithorne noted the paucity of statistical workers at the county level and 'these usually with scant training, and sitting for most of the time in the county seat.' (Donnithorne 1981, p.33)

Not only has the relative price of tea risen over recent decades but per capita consumption has also risen very substantially from a post-reconstruction low of 0.07 kg per capita in 1965 to 0.30 kg per capita in 1985 (Statistical Yearbook of China 1986, p.596). This suggests that the income elasticity has been sufficient to outweigh the negative price effects. Nevertheless the latter consumption level must be considered 'low' by the international standards of countries in which tea is the preferred beverage. Table 8 presents comparative per capita figures for some selected countries. Of particular interest are the consumption levels in Hong Kong, Taiwan and Japan. If China does indeed maintain a per capita growth rate in incomes of 8.5 per cent (World Bank 1987, p.204 & 254); if the income elasticity of demand for tea is 0.7⁹ and population continues to grow at 1.3 per cent, then the rate of growth of demand for tea would be 7.25 per cent per year. This in turn implies an increase in domestic demand from 300 thousand tonnes in 1985 to 890 thousand tonnes at the turn of the century. At this level, the per capita consumption (with a population of 1,270 million) would be 0.70 kilograms - a figure that is certainly not unreasonable.

The implications of these modest speculations are that China does indeed need to continue to increase the yield performance of its tea growing areas if there are not to be continued upward pressures on domestic tea prices. If the area under tea does not change from current levels and export volumes remain at 140 thousand tonnes then the implication is that yields by the turn of the century need to be about 1,000 kg/ha. This is a large but not impossible task given that it implies a growth rate in yield from 1985 of about six per cent. Also many State Farms are already achieving yields well in excess of this level. The problems for the industry may however not be in achieving this yield level but in obtaining sufficient skilled labour to harvest the output because, unlike most other tea producing regions of the world, production in many of the major provinces is highly seasonal and competes with other farm activities.

3. CONCLUSIONS

This paper has reviewed the remarkable resurgence in the tea industry of China, particularly since the mid-1960s. Although tea yields have increased at a very fast rate, they are still very low by historical or international standards and indicate enormous scope for further improvement. This suggests that careful analysis is needed of the precise causes for past increases. Comparative analyses are also needed of the technology used on higher yielding farms in the many different producing regions and for the different varieties.

The paper notes the complete transformation in tea processing technology over the last 25 years. The relationship of this change in technology to the potential for improvements in the quality of tea need exploring.

⁹This guess is very modest compared to the World Bank's estimates of .25 for Indonesia, .5 for Saudi Arabia, .76 for Syria, .95 for Pakistan, .98 for Egypt and over 1.3 for India (World Bank 1986, p.52).

Table 8 Apparent Consumption of Tea per Head in Selected Countries

Country	1977-79	1982-84
	(kg)	(kg)
<u>Europe</u>		
France	.12	.15
Germany(FR)	.21	.25
Netherlands	.65	.66
Poland	.53	.71
U.K.	3.14	3.06
USSR	.56	.75
<u>Americas</u>		
USA	.37	.35
Chile	1.16	.93
<u>Asia</u>		
China ^a	.15	.24
Hong Kong	1.76	1.73
India	.50	.53
Iraq	2.54	2.69
Japan	.97	.91
Pakistan	.80	.90
Sri Lanka	1.50	1.43
Taiwan ^b	.60	.65
Turkey	1.98	1.98
<u>Africa</u>		
Egypt	1.30	1.44
Zenya	.74	.77
Tunisia	1.46	1.61
<u>Oceania</u>		
Australia	1.66	1.39
N.Z.	2.38	1.92

Sources: International Tea Committee 1987 p.105

^a Statistical Yearbook of China 1986 p.596

^b Estimated from FAO CCP: TE/expo 86/2 p.4

The paper has concentrated on the supply side of the industry because this is where the constraints to further expansion lie. Concern has been expressed regarding the adequacy and the effectiveness of the extension and advisory services in reaching farmers within the context of the household responsibility system. The further substantial yield increases required will become increasingly difficult if the transfer of scientific and technological knowledge from the research stations and experimental farms to the producer is not efficient. The dissolution of the commune/brigade production unit, with its administrative network and coordinating roles, may make this transfer more difficult. There are also the issues of the large scale supply of improved planting materials and the timely availability of skilled seasonal labour.

A simple demand projection suggests the domestic market could absorb large increases in production at current prices. The Chinese are also aware that they need to open a variety of marketing channels and to improve

their sales performance for domestic customers. To the extent that supply fails initially to keep up with rising demand, the resultant increases in prices in the freer market situation bring their own remedy.

There is little doubt that in spite of a remarkable resurgence in recent decades, the tea industry in China is faced with enormous challenges in both the domestic and export markets if this expansion is to continue.

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Appendix

Map of the Provinces of China

