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RECENT DEVELOPMENTS AND FUTURE PROSPECTS FOR THE WORLD TEA ECONOMY

G.P. Tyler

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The Post War Experience

Since the mid-1950's, the real price of tea has been steadily falling relative to the prices of other internationally traded goods, (halving in fact between 1956 and 1974). This is shown in Table 1 which gives the average price of tea at the London auctions in both money and 'real' terms.

Table 1: London average tea prices (newpence/kilogramme)

Year	Money Price	Real Price	Year	Money Price	Real Price
1951	40.24	37.26	1962	49.00	49.49
52	33.54	31.94	63	46.5	46.50
53	40.14	40.14	64	47.2	46.27
54	58.02	58.61	65	46.0	44.66
55	55.82	56.38	66	44.8	42.67
56	53.17	52.64	67	45.7	43.52
57	48.78	47.36	68	43.5	41.83
58	50.47	50.47	69	40.5	37.85
59	50.03	50.54	70	45.7	40.44
60	50.68	50.68	71	43.3	36.39
61	48.51	49.00	72	42.2	32.97
			73	43.4	28.18
			74	59.8	26.66
			75	62.3*	25.00*

Source: International Tea Committee, Annual Bulletins of Statistics, 1964, 74, 75 : 'Real' prices are based on money prices deflated by an all traded commodities price index given in the U.N. Monthly Bulletin of Statistics.

* own estimated, based on press reports, and estimated world inflation at 10% during 1975.

(a) This paper is based on a Dissertation completed in August 1975 at Oxford University as part of the requirement for the M.Sc. in Agricultural Economics while the author was supported by a M.A.F.F. studentship. The work could not have been done without the thorough guidance of Mr. A.G. Antill of the Oxford Institute of Agricultural Economics. The present paper has benefitted from comments by Mr. A.R. Roe of Warwick University, and the later stages of the work were carried out under the umbrella of the S.S.R.C. project "Applications of a data framework for planning Income Distribution and Employment". Responsibility for any errors rests solely with the author.

It is clear that world supply has been growing too fast for world demand to absorb it all at stable real prices, so prices have fallen in order to boost demand and discourage supply.

The expansion of supply, however, has not been uniform amongst the major exporters. In fact, exports from India and Indonesia have been virtually static since the early 1950's, and Sri Lanka's exports grew only 1.7% p.a. between 1947-73, and have not grown at all since 1965. It has been the newer producers that have created the oversupply; Kenya's exports rose by 9.6% p.a. between 1947-73, "East Africa's"(b) grew by 9.4% p.a. and "Rest of the World's"(c) by 6.4% p.a. between 1947-72.[1] These different rates of growth are reflected in the changing shares in world exports depicted in Table 2. below.

Table 2: Shares in World Exports

Year	India	Sri Lanka	Kenya and "East Africa"
1938	.377	.253	.022
1947	.532	.359	.037
1950	.455	.339	.040
1955	.366	.363	.052
1960	.365	.351	.078
1965	.332	.373	.109
1970	.314	.327	.179
1972	.305	.276	.201
1973	.273	.298	.206

Source: Derived from International Tea Committee, Annual Bulletin of Statistics.

(b) Throughout, "East Africa" is a title given to Uganda, Tanzania, Malawi, Mauritius, Mozambique, and Argentina.

(c) "Rest of the World" is a residual item consisting of total world exports less the named exporters, and includes exports from China, Taiwan, Turkey, Brazil, Bangladesh, and Papua - New Guinea.

Thus while the tea exporting industry as a whole has suffered falling real revenue since the mid 50's, this depression has been concentrated in Asia, while in Africa and South America tea has continued to be a prosperous growth industry. Between 1955 and 1973, Kenya's real revenue from tea exports rose about six fold, and "East Africa's" threefold, while in Sri Lanka revenue fell by over a third. In India the labour force on the tea estates fell from 1,018,000 in 1951/2 to 807,000 in 1966.[2] in Sri Lanka, open unemployment on the estates was estimated as 10% in 1968[3], while general unemployment was put at 17% in early 1975[4].

An Interpretation

A steady fall of 50% over 18 years in the real price of an established product is certainly quite remarkable. While labour and bush productivity have both been rising in the tea industry, it is doubtful that these factors alone can explain how producers have been able to survive a halving of price. One possible explanation is provided by the role of export taxes in determining the price of tea at auction. During the tea boom of the 1950's India and Sri Lanka imposed quite heavy export and profits taxes on tea in order to cream off some of the large profits being made, and to a significant extent thereafter substantial taxes continued to be levied, as is shown in Table 3. In fact in 1968, about one-quarter of the auction price of Sri Lankan tea was taken up by taxes and levies falling on exported tea (shown in Table 4), and in 1974 taxes averaging 28% of the auction price, gross of rebates, were levied on tea sold at Colombo.[5]

Table 3: Taxation of Tea Exports in Sri Lanka

Year	Export Duties Rm	Company Taxes Rm	After tax profits as a % of export receipts
1946	9	25	12
1947	92	56	15
1948	113	55	8
1949	113	55	13
1950	131	91	16
1951	164	68	9
1952	115	57	7
1953	139	119	9
1954	214	194	10
1955	300	173	9
1956	221	142	7
1957	238	126	6
1958	281	156	6
1959	198	125	6
1960	139	203	7

Source: D.R. Snodgrass ; Ceylon - An Export Economy in in Transition.

Economic theory suggests that, comparing equilibrium states, if the overall price elasticity of demand for a product is inelastic (i.e. less than one), while supply is to some degree responsive to producer price then an export tax, by initially lowering profits and so discouraging production.. will both lead to higher prices and higher overall export revenue, as well as directly increasing government revenue. That is, the larger share of the export tax will be 'passed-on' to the consumer, and only a small share will be borne by the producer. Thus as long as India and Sri Lanka together face a price-inelastic demand for their teas in particular, their high export taxes are a method of raising total export revenue, certainly it can be argued that until the late 1960's India and Sri Lanka's export taxes did indeed raise their export revenue, and kept prices significantly above the cost of production.

However, the higher the price obtained, the greater is the stimulus to competitors to try and increase their production and reap large profits. Moreover the price-elasticity of demand for any particular country's tea rises as its market share falls. Thus, for example, as the share of the market captured by other producers rises, India and Sri Lanka find the price-elasticity for their teas rising, and therefore the lower is the possible rise in price that follows from any given export tax they levy.

A simple approximation of the price-elasticity of demand for the tea of one exporting country is given in the equation below, and is derived rigorously in Appendix 1.

$$E_i = \frac{E_w - e_{rw}.k_{rw}}{k_i}$$

where : E_i is the price-elasticity of demand for the tea from country i

E_w is the price-elasticity of demand for all tea

e_{rw} is the price-elasticity of supply of tea from other countries

k_i is the share in world exports of country i's tea

k_{rw} is the share in world exports of all other countries teas $(1-k_i)$.

That is, the price-elasticity of demand for the teas of, for example, India and Sri Lanka taken together is equal to the world average price-elasticity of demand for all tea minus the price elasticity of supply of tea from other countries multiplied by their share of the market, all divided by India and Sri Lanka's share of the market.

It is clear that as k_i - India and Sri Lanka's share of world exports - falls, so E_i rises. In my estimation of E_w and e_{rw},(*) figures of approximately -.3 and .25 respectively were produced. Thus for 1950;

$$E_i = \frac{-.3 \ -.25x.2}{.8} = -.4375$$

while for 1973;

$$E_i = \frac{-.3 \ -.25x.429}{.571} = -.7132$$

Thus over the last 20 years, the ability of India and Sri Lanka to pass on export taxes into higher prices has decreased as competitors production has increased, and prices have gradually deteriorated. This implies that export taxes have increasingly fallen on the producer instead of the consumer, with rebate schemes being necessary to help the hardest hit of the producers.

In my projections of the world tea economy over the next 15 years, I estimated that, depending on precisely which of the series of price-elasticity of demand estimates were used, India and Sri Lanka would jointly face a price elastic demand for their teas (i.e. less than -1) by 1975-80, and so would loose entirely their ability to gain in overall revenue terms from a policy of restraining their exports, either by levying export taxes or by direct restrictions.

That this ability has virtually disappeared already is evident from Table 4. It is clear from these data for a selection of estates that high export taxes in India and Sri Lanka now generate very low

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(*) Discussed in detail in the thesis referred to earlier, with the broad methodology summarised in Appendix 2 to this paper.

profit margins for producers, instead of high prices, while in Africa, where export taxes have always been very low.

a handsome profit margin remains, encouraging continued expansion of production.

Table 4: Costs and Profit Margins in the Tea Industry

Cents (U.S.) per pound of tea produced

	N.India	S.India	Sri Lanka	Uganda	Kenya	Malawi	Tanzania
	(--------- 1968	---------)		(----------1970	----------)		
Total costs to London auction	35.37	30.62	32.55	35.91	32.61	31.00	36.16
London Price	48.07	42.26	49.30	50.98	52.98	43.41	52.80
Margin	12.70	11.64	16.75	15.07	20.37	12.51	16.64
Total taxes on tea exported	8.08	6.29	11.62	0.28	0.28	0.33	1.50
Post tax margin	4.62	5.32	5.13	14.79	20.09	12.08	15.14

Source: D. Elz, (I.B.R.D./I.D.A.), Report on the World Tea Economy 1971, Based on a selection of estates.

Of course, the economic theory of equilibrium states is too simple to be applied directly to the real world. However, it is probably true that high export and profit taxes in India and Sri Lanka originally did help to sustain high prices because, by reducing post tax profits margins they discouraged investment in Asia and so discouraged too large an increase in production. Table 5. gives the dividends of U.K.registered tea companies - chiefly operating in Asia - which gradually fell during the 1960's as the share of the export taxes born by the producers gradually increased so reducing profit margins even further.

Table 5: Mean Dividends declared by tea companies listed in the Stock Exchange Year Book 1973

Period	Dividend %	Period	Dividend %
1959/60	14.95	1966/67	12.16
60/61	13.20	67/68	10.10
61/62	13.98	68/69	7.03
62/63	14.14	69/70	7.88
63/64	9.51	70/71	7.98
64/65	9.77	71/72	5.39
65/66	11.59	72/73	6.13

Source: Stock Exchange Year Book.

However, with only small export taxes being levided in Africa, Asian and local companies initiated a large investment programme there, and the governments also encouraged smallholder production, which together by the 1960's were creating a large absolute increase in African output. This shift in the location of production has now reached such an extent that the continued discouragement of export growth in India and Sri Lanka alone would not be enough to sustain higher prices. Thus Asian producers have sought to arrange a new International Tea Agreement (ITA) to share the burdens of export restraint, and to restore the price of tea to former higher levels.

The Attempts to Establish an International Tea Agreement (ITA)

Faced then with this fall in the price of tea, and an inability to reverse it by themselves, India and Sri Lanka have had to resort to trying to get an ITA off the ground. An *ad hoc* consultation on tea problems was held in Sri Lanka in 1965, but no firm decisions were made. Subsequently with the price of tea deteriorating, an F.A.O. Consultative Committee on Tea (later Intergovernmental Group on Tea) was formed in 1969 and an interim system of export quotas was agreed to. However since 1970 the quotas have made no pretence of restricting exports, but have simply been set more or less at what participating countries were expecting to export anyway. There was a special session of the Intergovernmental Group in 1974 for "intensive *ad hoc* intergovernmental negotiations" as part of a general UNCTAD initiative on commodity problems, but it produced no commitment to action. Again, in April 1975, a special working party of the subgroup of exporters of the Intergovernmental Group on Tea met to examine proposals for:

- a minimum export price scheme
- an export quota scheme
- co-operation in pro motion
- rationalisation of the marketing structure
- provision of an independent market intelligence service

However, agreement was reached only on the last three items, and even then, essentially, only to request further study. The minimum export price excheme was considered by some to be too administratively costly, while the African producers did not feel able to restrict exports when their smallholder production was being encouraged. |Kenya, in fact, plans to treble its average under smallholder production 1971-81|.

At the moment therefore, no advances are being made towards an agreement on an ITA because the African exporters apparently see their long run interest as that of taking the export market from the Asian producers, rather than in creating, and sharing in, a high price market for all. That is as they are the strongest, they prefer competition to co-operation. This failure to establish an ITA is despite the declared willingness of the leading importing country - the U.K. - and the largest tea distributor - Brooke-Bond Liebig - to co-operate in an Agreement. Further, tea is one of the commodities for which international agreement is being sought as part of UNCTAD's campaign for an Integrated Commodities Programme, to be debated in May 1976. No doubt, if price stabilising agreements can be reached for the other exported products of African countries, such as cotton, coffee, and sisal, then this would increase the willingness of African tea exporters to accept some restriction on the growth of their tea production.

A question remains, however, of precisely what the prospects for tea are should no agreement be reached, and so to what extent the establishment of an ITA is really necessary.

A Model of the World Tea Economy

In order to get a view of the outlook for tea, a very simple model of the international trade in tea has been estimated. It consists only of trends in imports and exports and short-run responses to changes in price. Altogether the model has export equations for six regions, and import equations for 38 regions, plus one equation for the change in the level of stocks in the U.K. For some importing regions 'high' and 'low' estimates of the price elasticity of demand were used, to see

how sensitive the results were to the different estimates. The details, and the many reservations, of the model are presented in Appendix 2. It is important to recognise that the model is a very simplified view of the factors affecting the trade in tea, and that it involves many specific assumptions about future developments. In fact, at best, all the model can really do is to answer the question - if the present trends in imports and exports continue in the various regions, are we likely to get a significant excess of shortage of demand, and roughly, what sort of price change would be necessary to bring supply equal to demand in the short run ?

The Results

Firstly, the results suggest that the choice between existing high and low estimates of the price elasticity of demand in several major importing countries did not make too much difference to the results. For example, in 1980, according to the projections of the model, the world average price elasticity of demand for tea lies in a range of -.29 to -.42 depending on which elasticity estimates are used. In either case, demand is very inelastic with respect to price.

The results suggest that, given recent trends, if India's consumption continues to grow at its underlying rate of the 1960's, then there would in fact be no overall surplus tea production, and prices would stabilise at about 35p/Kg. (at 1953 prices) for the next fifteen years. However, the implication of this for India is that by 1981 she would be a net importer of tea, and by 1990 would be importing 350,000 tonnes. Clearly, it is most unlikely that India would allow this to happen, and indeed in the last few years India has maintained her exports above the trend suggested by the model, because the rate of growth in

production has risen, and India has been taxing domestic consumption. If instead therefore, we project the world tea economy assuming India succeeds in maintaining an exports level of 200,000 tonnes then the outlook changes dramatically. On this assumption, the price of tea in real terms would be expected to halve to 14.5p/Kg. by 1990.

It has been hoped that because demand for tea is growing rapidly in many developing countries, they will become responsible for a larger share of the worlds imports, and so total demand will grow faster, sufficiently so to absorb the likely increase in supply without the need for any fall in price. Table 6 shows how the faster growth of imports into developing countries in the post war years has increased their share in total world imports.

Table 6: Shares in World Imports for Consumption

Year	U.K. and Ireland	Rest of Europe and U.S.S.R.	N. America, West Indies & Oceania	Latin America Asia, Africa and Producing Countries (a)
1938	.517	.103	.204	.176
1947	.520	.054	.227	.200
50	.442	.055	.282	.221
55	.467	.072	.206	.255
60	.444	.099	.204	.253
65	.418	.125	.197	.260
70	.381	.101	.179	.339
73	.295	.133	.205	.366
74	.315	.129	.204	.357

(a) chiefly Japan which became a net importer in 1966

Source: derived from the International Tea Committee, Annual Bulletin of Statistics.

In fact, imports of tea by Latin America, Asia, Africa and producing countries rose from 70,300 tonnes in 1947 to 249,800 tonnes by 1974 (50,000 tonnes more than U.K. imports), a growth rate of 4.8% p.a. However, as we have seen, if India does succeed in maintaining her exports, then this rapid growth in demand in other developing countries will not be enough to absorb the big increase in output which Kenya and "East Africa" will achieve if their present trends continue, without a continuing fall in the real price of tea.

Table 7 (i): Projections based on original trends

		1975	1980	1985
Average price (P/Kg.)		34.24	34.86	34.24
Indian Production (tonnes)		447 920	486 223	542 313
Indian Consumption "		331 364	461 549	661 619
Exports:	India	116 556	24 674	- 119 306
(tonnes)	Sri Lanka	225 276	226 912	242 730
	Indonesia	37 478	38 126	39 381
	Kenya	61 728	108 235	193 551
	"East Africa"	136 331	223 795	374 269
(a)				
Export :	India	40.9	8.8	-41.8
Revenue	Sri Lanka	81.7	83.6	88.0
(£m)	Indonesia	11.3	11.7	11.9
	Kenya	22.1	39.4	69.3
	"East Africa"	43.4	72.4	119.2

(a) 'Export Revenue' is export volume x London Price

Table 7 (ii) : Projections based on India maintaining exports of 200,000 tonnes

		1975	1980	1985
Average price (P/Kg.)		25.75	21.01	17.44
Indian Production (tonnes)		499 164	579 495	676 301
Indian Consumption (")		299 164	379 495	476 301
Exports:	India	200 000	200 000	200 000
	Sri Lanka	205 356	213 955	224 412
	Indonesia	35 352	35 489	35 786
	Kenya	57 188	98 376	170 092
	"East Africa"	126 884	204 727	332 028
Export : Revenue	India	51.0	40.3	32.2
	Sri Lanka	57.3	49.8	44.3
(£m.)	Indonesia	8.5	7.3	6.5
	Kenya	15.8	22.7	33.5
	"East Africa"	31.7	43.3	60.6

Table 7 gives my projections of prices, exports and revenues for these two alternative cases. Of the two, I believe the second 'pessimistic' (for prices) outcome to be the most likely. This view is strengthened by a simulation of the price of tea in the 1960's which was carried out using the parameters of the model. For that period, the model tended to understate the actual fall in real prices that occurred, implying that the price elasticities of demand which were used were, if anything, too high. The implication of this for my projections is that they probably underestimate the extent of any future price declines, (given that export and import trends do continue).

Against this, however, there is the concept of a floor price for tea, and in the discussions of the Intergovernmental Group on Tea, it has been suggested that this has already been reached. That is, as

as much of the excess of price over production costs has already been eroded, there is little scope for any future fall in price without thereby causing extensive bankruptcies and the discouragement of new investment to such a degree that supply trends will slow down and the price of tea stabilise. To the extent that this is so, then the future problems will to a greater degree be ones of tea estate bankruptcy and unemployment, and less ones simply of falling incomes. In either case, however, the outlook is still basically very gloomy, although it must be recognised that if bankruptcy does provide a safety net for prices, then it will probably be Asian producers that bear the brunt of it, whereas all suffer from a general price fall.

The Outlook for Sri Lanka

The 1971 I.L.O. Mission to Sri Lanka concluded that:

> "Ceylon's foreign exchange position has become so critical that it could not afford full employment in the near future..... To cure unemploument, Ceylon needs to raise its foreign exchange earnings very substantially."

They estimated that to make significant inroads into the level of unemployment by 1985, export revenues must rise 2.3 fold in real terms over their 1968 level. Even on the Mission's most optimistic assumptions for other exports, this implies a need for £130 m. (@ 1953 prices) of export revenue from tea in 1985, compared with about £91 m. in 1968 and about £61 m. in 1973. However, as we have seen, the model's projections suggest that, even if Indian output and consumption trends are allowed to continue and thus prices stabilise then Sri Lanka's export revenue would only be about £90 m. in 1985. With India sustaining an export level of 200,000 tonnes, then it is projected that Sri Lanka's

tea revenue would fall as low as £45 m. - just one third of the I.L.O's implied requirement. In fact, it would take the inconceivable combination of both Sri Lanka increasing her export volume by nearly 10% p.a. and India allowing herself to become a net importer for Sri Lanka's revenue from tea to rise to the required £130 m. by 1985. Currently, with real prices still falling, and the volume of exports stagnant, the outlook for Sri Lanka is one of being unable to generate the foreign exchange necessary to meet the imported raw materials and consumption requirement of a substantial increase in employment, given the recent levels of the import intensity of production and consumption.

A Prospective International Tea Agreement

As the projections have suggested, both the need for an ITA, and the fact that India and Sri Lanka no longer have a sufficient share of the market to operate an ITA bilaterally, then some form of broader international co-operation is necessary if export receipts are to be stabilised or increased.

It is certain that African producers will not enter an ITA in which quotas are based on historical market shares. Indeed Etherington demonstrated in a 1972 article |6| that such an ITA would give little benefit, if any, to African producers. He estimated that, for 1975, if an ITA stabilised price at £EA 372/tonne, and allocated to Kenya, Uganda and Tanzania their 1970 F.A.O. Consultative Committee on Tea export quota share of 10.9%, they would be allowed exports of 66,000 tonnes, yielding £EA 21.7 m. in export revenue. However, without ITA he forecast exports of 85,000 tonnes at a price of £EA 225/tonne - yielding the same export revenue of £EA 21.7. Moreover, without an ITA

East Africa would have the benefit of a more rapid growth in employment in the tea industry, and gain the long run advantage of increasing its share of the world export market, and so increasing its bargaining strength in any future ITA negotiations.

In Table 8, I do a similar exercise, analysing the outcome of an export quota system geared to maintaining an average real price of tea of 35P/Kg.(*), with quotas based on 1972 shares in world exports. It is clear that Kenya and "East Africa" would get far less export revenue from such an ITA, than without one, because of the severe restraint imposed on their export growth. For example, under this ITA Kenya's export revenue would be £18.7 m. in 1980, whereas, even on my second 'pessimistic' projection of the outcome with no ITA, Kenya's revenue is estimated as £22.7 m. in the same year.

(*) In 1975 prices, this is equivalent to 90 pence per kilogram, and compares with an estimate of the 1975 average London auction price of 62.3 pence per kilogram.

Table 8: Price stabilisation with 1972 quota shares

A. The 1972 position:

	Exports (tonnes)	Export shares	Export Revenue (a) (£m.)
India	209 814	.305	70.33
Sri Lanka	190 088	.276	67.58
Indonesia	38 529	.056	11.56
Kenya	47 368	.069	16.13
"East Africa"	90 922	.132	28.03

(a) Estimated by London real price x total exports

B. The quota scheme:

	1975	1980	1985
Average Price (P/Kg.)	35	35	35
Global export quota	665 900	741 936	864 402
Individual Quotas: (tonnes)			
India	203 100	226 290	263 642
Sri Lanka	183 788	204 774	238 575
Indonesia	37 290	41 548	48 407
Kenya	45 947	51 194	59 644
"East Africa"	87 899	97 936	114 101
Export Revenue (£m.)			
India	72.99	81.33	94.75
Sri Lanka	68.00	75.77	88.27
Indonesia	11.44	12.75	14.85
Kenya	16.79	18.71	21.80
"East Africa"	28.55	31.81	37.06

Clearly if it is to get wide spread participation any ITA must in some way be based on projected not historical shares. Table 9 presents a similar export restriction scheme, but with quotas now based on the projection of market shares derived from my second 'pessimistic' case (that is, the case in which India maintains exports of 200,000 tonnes as set out in Table 7(ii))

Kenya's revenue, under this scheme, in 1980 is now estimated as £29.5 m., with her market share reaching 11.4%, as opposed to being restricted to 6.9% under the 1972 shares based scheme.

Working rigidly on the basis of projected shares would, however, imply that Asian exports actually fell over the period. As an alternative therefore, Table 10 presents a compromise scheme whereby India and Sri Lanka are allowed a permanent export quota of 200,000 tonnes each, and Indonesia one of 30,000 tonnes, while other exporters share in the rest of the global quota on the basis of their relative market shares in my second 'pessimistic' projection. Kenya's 1980 export receipts are still much higher than were there are no ITA, being £27.1 m. with a market share of 10%. Both of these schemes, based on projected shares, ensure that in revenue terms African producers as well as Asian producers benefit from the establishment of an ITA. The revenue outcomes of the various schemes are summarised in Table 11.

Table 9: Price Stabilisation with Projected Market Shares

	1975	1980	1985
Average Price (P/Kg.)	35	35	35
Global export quota (Tonnes)	665 900	741 936	864 402
Quota shares:			
India	.276	.232	.184
Sri Lanka	.284	.248	.207
Indonesia	.049	.041	.033
Kenya	.079	.114	.157
"East Africa"	.175	.238	.306
Individual quotas:			
India	183 788	172 129	159 050
Sri Lanka	189 116	184 000	178 931
Indonesia	32 629	30 419	28 525
Kenya	52 606	80 581	135 711
"East Africa"	116 532	176 581	264 507
Export Revenues (£m.)			
India	66.05	61.86	57.10
Sri Lanka	69.97	68.08	66.20
Indonesia	10.01	9.33	8.75
Kenya	19.23	29.45	49.60
"East Africa"	37.85	57.35	85.91

Table 10: Price Stabilisation with Constant Asian Exports

	1975	1980	1985
Average price (P/Kg.)	35	35	35
Global export quota (Tonnes)	665 900	741 936	864 402
Quota shares:			
India	.300	.270	.231
Sri Lanka	.300	.270	.231
Indonesia	.045	.040	.035
Kenya	.072	.100	.137
"East Africa"	.159	.209	.267
Individual quotas:			
India	200 000	200 000	200 000
Sri Lanka	200 000	200 000	200 000
Indonesia	30 000	30 000	30 000
Kenya	47 888	74 241	118 592
"East Africa"	105 919	155 032	230 667
Export Revenue: (£m.)			
India	71.88	71.88	71.88
Sri Lanka	71.88	71.88	71.88
Indonesia	9.20	9.20	9.20
Kenya	17.50	27.14	43.35
"East Africa"	34.40	50.35	74.92

Table 11: Summary of Revenue Projections

A = projections with Indian exports at 200 000 tonnes (Table 7(ii)

B = projections with price stabilisation and 1972 based quota shares (Table 8)

C = projections with price stabilisation and constant Asian exports (Table 10)

D = projections with price stabilisation and projected market shares (Table 9)

All revenues in £m. at 1953 prices, and based on exports x London Auction prices

	1972	1975			
	(Actual)	A	B	C	D
India	70.3	51.0	73.0	71.9	66.1
Sri Lanka	67.6	57.3	68.0	74.0	70.0
Indonesia	11.6	8.5	11.4	9.2	10.0
Kenya	16.1	15.8	16.8	17.5	19.2
"East Africa"	28.0	31.7	28.6	34.4	37.9

	1980				1985			
	A	B	C	D	A	B	C	D
India	40.3	81.3	71.9	61.9	32.2	94.8	71.9	57.1
Sri Lanka	49.8	75.8	74.0	68.1	44.3	88.3	74.0	66.2
Indonesia	7.3	12.8	9.2	9.3	6.5	14.9	9.2	8.8
Kenya	22.7	18.7	27.1	29.5	33.5	21.8	43.4	49.6
"East Africa"	43.3	31.8	50.4	57.4	60.6	37.1	74.9	85.9

It is true that in return for substantial gains in export revenue, African producers are required to reduce export quantity 1/3 below projection by 1985 in the scheme outlined in Table 10, where Asian producers are allowed constant exports. Thus it could be argued that employment in the industry would be 1/3 less than without the ITA. Incomes however - of small holders, workers, companies and government - would altogether be directly 20% higher.

It is probable that the jobs created by the extra spending power (all of it in foreign exchange) would outweigh those directly lost due to the smaller volume of tea production. This is because, when spent, the 20% increase in tea incomes creates extra income for others, who in turn will spend their higher income stimulating other incomes still further. As a rough guide, preliminary work on this multiplier process in the economy of Sri Lanka suggests that raising incomes by £1. will approximately generate a further £1. increase in incomes in the economy. If we accept this general order of magnitude, then while tea jobs in the tea industry may be 1/3 down on what they would have been, income may be 40% up on what it would have been if we consider incomes earned in the tea industry and the extra incomes generated indirectly in other sectors. Of course we can't simply say therefore that relative to total tea employment, jobs will rise 40%, since industries on which the extra income is spent may not be as labour intensive as tea. However, it is clear that, at the very least, a major part of the direct loss of employment would be made up by the expansion of other sectors resulting from higher incomes earned by the tea sector.

Further complications(*) of the cost-benefit picture arise because domestic resources 'freed' by export restraint probably have a positive marginal product in their alternative uses, while there is a directly saving of any imported resources. Moreover changes in incomes due to tea price changes will also affect the level of imports.

Taking the case of Sri Lanka, a policy of maintaining constant exports would, with productivity rising, imply that both land and labour are released for alternative use. However it is difficult

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(*) I am indebted to Mr. M.J. Westlake for raising some of the points discussed below.

to estimate the level of resources that would be freed on marginal estates, and even more difficult to estimate their productivity in likely alternative uses.

Clearly the net foreign exchange consequence of an export strategy is more complex than the change in direct export revenues. Account should be taken of the direct saving of imports, the induced changes in imports due to changes in incomes, and the import and export consequences of the use of freed resources.

If the maximisation of net foreign exchange receipts was the short term objective of an export policy then for example, it might be worthwhile for Sri Lanka and India to undertake a bilateral export restriction policy, even though total export receipts fall, if the fall in imports more than offsets this.

Some work has been done on import consequences of changes in tea production and prices in the Sri Lankan case. Using an input/output, income/expenditure model for 1970 it is possible to derive estimates of the change in imports following any combination of changes in the price and quantity of tea output. To do so, of course, requires rather specific assumptions about income distribution, expenditure patterns and technology. Granted these assumptions then we can estimate net foreign exchange outcomes taking account of the effects of the quantity of output on direct imported inputs, and on indirectly required imports, and the effect of price on incomes and thus on expenditures directly and indirectly on imports. While the precise estimates are very time and assumption specific, they do present a guide to the order of magnitude of the relationship between the change in export revenue and change in the net foreign exchange position.

Taking the export projections given in Table 7 (ii) they suggest a fall in Sri Lanka's tea export revenue of R. 375 m. 1970-80, and a 2% rise in export quantity. These combine to generate a fall in total imports of R.140 m., so that the net foreign exchange decline is 62% of the export revenue decline. Similarly in the I.T.A. scheme of Table 9, the net foreign exchange decline, 1970-80, would be 70% of the projected export revenue fall.

Thus even this partial estimation of the net foreign exchange effects shows that they could differ significantly from the direct export revenue changes and so complicate the balance of gains in any I.T.A.

Conclusion

It does appear that based on an admittedly over-simple model, African exporters could combine self interest and international co-operation to produce a workable I.T.A., which is so vital for Asian exporters. The two conditions are, that the Africans must believe that their interest lies in accepting the substantial medium term gains from co-operation, and does not lie in forcing down the price of tea, so under-mining and destroying Asian producers, in order to establish a future African oligopoly, and the Asian producers must be prepared to accept quotas based in some way on projected, rather than historical, market shares.

Appendix 1

If we consider tea as a homogeneous commodity, then it does not make any sense to ask what is the effect of demand for, say India's tea, if the price of India's tea rises, because for a homogeneous good there can only be one price, and the price of India's tea could not change unless the price of all teas change. It does make sense however, to seek the inverse of the price elasticity of demand for one country's tea, that is, the effect on the general price level of one country changing the quantity of tea it supplies. The change in price will obviously depend on the size of the change in supply, the overall world price elasticity of demand for tea in general, and the effect any change in price has on the supply from other countries.

Thus letting $\%\Delta$ symbolise percentage change in ,

q = world demand;

p = price of all tea;

E_w = world price elasticity of demand

q_i = supply of tea from country i

q_{rw} = supply of tea from all other countries

E_i = price elasticity of demand for tea from country i

e_{rw} = price elasticity of supply of tea from all other countries

k_i = the share in world exports of country i's tea

k_{rw} = the share in world exports of all other countries' tea

then:

$$\%\Delta p = \%\Delta q_i \times k_i \times \frac{1}{E_w} + \%\Delta q_{rw} \times k_{rw} \times \frac{1}{E_w}$$

which simply states that the change in price depends on world price elasticity of demand and the various quantity changes that take place. To determine E_i let an exogenous change in q_i take place. Whatever price change follows will cause q_{rw} to change, the change is determined by:

$$\%\Delta p \times e_{rw}$$

So, following a change in q_i :

$$\%\Delta p = \%\Delta q_i \times k_i \times \frac{1}{E_w} + (\%\Delta p \times e_{rw}) \times k_{rw} \times \frac{1}{E_w}$$

rearranging:

$$\%\Delta p \times (1 - e_{rw} \times k_{rw} \times \frac{1}{E_w}) = \%\Delta q_i \times k_i \times \frac{1}{E_w}$$

let $\%\Delta q_i = 1$

then : $$\%\Delta p = \frac{k_i \times 1/E_w}{1 - e_{rw} \times k_{rw} \times 1/E_w}$$

This then is the percentage change in price following a 1% change in the quantity of exports by country i, and inverting gives the price elasticity of demand for the teas of country i , as defined on page 4.

$$E_i = \frac{1 - e_{rw} \times k_{rw} \times 1/E_w}{k_i \times 1/E_w} \qquad \therefore \quad E_i = \frac{E_w - e_{rw} \times k_{rw}}{k_i}$$

Appendix 2

The simple model of the trade in tea that has been used is designed to have all imports and exports determined by the average London price of tea, and time, only. This means that the equilibrium price of tea for any year can be 'forcast' as that price which ensures total import demand just equals total available exports.

The time trends are clearly a simplifcation of many factors affecting exports and imports. The trend in exports represents the combined effects of assumed steady trends in the productivity of existing estates and smallholdings, and in the extension of acreage. The import trend covers the effect of rising incomes and populations and changing tastes, on tea consumption.

The structure of the model is thus:

EXPORTS : $X_{it} = f^1 (P_{i,t-1}, T)$ ... 1

where X_{it} = exports from region i in year t

P_i = the real price at the London auctions of tea from region i

T = time in years

thus exports this year are viewed as being determined by last years prices on the basis that producers respond to price changes with about a years lag.

PRICES : $P_{it} = f^2 (P_t)$ ... 2

there P is the London average price for all teas.

thus we relate all separate tea prices to the one average, and so we can rewrite 1 as:

$$X_{it} = f^1(f^2 (P_{t-1}) , T) \qquad \ldots 3$$

IMPORTS : $$M_{jt} = f^3 (P_t, T) \qquad \ldots 4$$

where M_{jt} = imports into country j in year t

STOCKS : $$dS_{uk,t} = f^4(P_t, P_{t-1}) \qquad \ldots 5$$

where dS_{uk} = the change in the level of U.K. stocks

thus the change in the level of U.K. stocks depends on how prices have been moving in the recent past, with, in fact, stocks rising as prices fall.

Altogether, the model has export equations for six supplying regions, and import equations for 37 countries and the "rest of the world".

In the cases of India and Japan, exports and imports respectively depend on the difference between production and consumption, both of which have strong trends in them. In these two cases therefore, I estimated equations both for output and consumption and then derived exports as a residual.

The export, price, and stocks equations were directly estimated by ordinary least squares (OLS), however, the import equations were derived from various existing estimates of the price-elasticity of demand for tea in several countries. These estimates were used as a guide to the probable

price elasticity of demand in other similar countries. These estimates were then incorporated into the overall import equations.

The underlying relationship was assumed to be :

$$\log M_{jt} = a' - B' \log P_t + C'T_t \qquad \ldots 6$$

where B' is the estimate of the price-elasticity of demand.

By OLS an estimate of price through time was derived:

$$\log P_t = a'' + \hat{k}T_t + u_t \qquad \ldots 7$$

where u is an error term with mean zero.

Thus an estimate of 6 is given by

$$\log M_{jt} = a' - B'a'' - B'u_t + (C' - B'\hat{k})\, T_t \qquad \ldots 8$$

By OLS an estimate was made of:

$$\log M_{jt} = \hat{a} + \hat{C}T_t \qquad \ldots 9$$

Thus C is an estimate of $(C' - B'\hat{k})$

and so C' is estimated by $C + B'\hat{k}$

Substituting in 6, an estimate of a' is given by

$$a' = \log \overline{M}_{jt} + B' \log \bar{P}_t - (\hat{C} + B'\hat{k})\, \overline{T}_t \qquad \ldots 10$$

where '—' symbolises mean value

and thus is derived estimates of all the parameters of the import equation at 6.

Table 12 presents the trends and price elasticities that were used in the projections, giving alternatives where these were tried.

There are many obvious weaknesses in the model. Firstly, exports are not only determined by last years price and an autonomous trend. Trend itself is affected by long run price movements, while short run changes in exports can be caused by current price fluctuations. Similarly demand cannot be fully explained by one average price and a trend; incomes, population, the price of different types of tea and of other drinks are all important. In all countries export and import duties, retail taxes and subsidies, disturb the relationship between the consumers' and producers' tea prices and the price at London auctions. Moreover, while dominant, the London auction is not the only one, most large exporters have their own auctions, at which prices do not always move precisely parallel with London prices. The price elasticity of demand estimates that were borrowed were not produced on a uniform basis. Some relaate to real prices, others to money prices, some to retail prices, others to auction prices. In the model they were simply lumped together assuming that they were approximately correct for a system using only real London auction prices. Further these elasticities are assumed constant, but it is generally recognised that the price elasticity of demand for tea falls as income rises.

This does not exhaust the list of weaknesses, but it is already clear that the projections based on the model must be treated with great caution. However, because it is simple the model is fairly robust, and providing that the estimates of the price elasticities of demand are of the right order of magnitude, then given the continuation of import and export

trends, the projections should provide a rough guide to possible future developments in the world tea economy.

References

[1] All the tea export and import figures are based on the International Tea Committee's Annual Bulletin of Statistics.

[2] P. K. Banja, "Productivity, wages and employment in tea plantations in India", Indian Journal of Agricultural Economics, 1969.

[3] P. Richards, Employment and Unemployment in Ceylon.

[4] Central Bank Estimate, reported in the 1975 report of a delegation of British MP's to Sri Lanka, "Sri Lanka Tea Estates".

[5] Based on figures given in the I.T.C., A.B. of S.

[6] D. Etherington, "An International Tea Trade Policy for East Africa", Food Research Institute Studies, 1972.

Table 12 Parameters of the Model

SUPPLY

	Price-elasticity of supply	Underlying trend in exports % pa
India	0	2.3 (output)
Sri Lanka	.253	2.0
Indonesia	.196	0.5
Kenya	.227	12.4
"East Africa"	.225	10.9
"Rest of World"	.309	3.0

DEMAND

Country	Actual rate of growth of imports 1963-1972 %pa	Estimated price elasticity of demand		Deduced underlying trend in imports %pa	Underlying Trend if high elas. used
		low	high		
*Australia	- 1.2	-.13	-.94	- 1.65	/ -4.5
USSR	4.3	-.3		3.25	
*New Zealand	- 0.2	-.13	-.94	- 0.65	/ -.34
*U.K.	- 1.9	0	-.33	- 1.9	/ -3.0
Yugoslavia	11.5	-.5		9.75	
Switzerland	2.8	-.2		2.1	
Sweden	5.9	-.2		5.2	
Spain	12.1	-.5		10.35	
Norway	5.3	-.2		4.6	
Belgium	6.4	-.2		5.7	
Poland	9.5	-.3		8.45	
Netherlands	- 1.3	-.2		- 2.0	
Italy	3.0	-.3		1.98	
*Ireland	1.1	-.14		0.61	
West Germany	2.5	-.2		1.8	
France	8.1	-.2		7.4	
Denmark	4.7	-.2		4.0	
Czechoslavakia	-3.1	-.3		- 4.42	
Syria	1.2	-.54		- 0.69	
Lebanon[1]	24.4	-.54		22.51	
Jordan	7.5	-.54		5.61	
Japan (output)	(2.3)			(2.3)	
(consump.)	(4.2)	-.3		(3.1)	
Israel	13.3	-.3		12.25	
Iraq	1.1	-.54		- 0.79	
Iran	2.1	-.54		0.21	
Hong Kong	5.6	-.4		4.2	
Afghanistan	13.9	-.54		12.01	
Chile	5.0	-.4		3.6	
*USA	2.5	-.05	-.34	2.33	/ 1.3
*Canada	0.4	-.13		- 0.055	
Tunisia	-0.3	-.54		- 2.19	
Sudan	7.3	-.54		5.41	
South Africa	2.2	-.4		0.8	
Somalia	9.2	-.54		7.31	
Morocco	4.1	-.54		2.21	
Lybia	14.0	-.54		12.11	
Egypt	-5.7	-.5		- 7.45	
*India (consump.)	(6.6)	-.1	-.93	(6.66)	/ (7.16)
Rest of World (62-71)	3.9	-.3		3.0	

* denotes an estimate of price elasticity was available from external sources.

1 Lebanon's import trend was revised down by ½% pa from 1973 on, because its 1960s growth rate is unmaintainable

: The price elasticity estimate of .54 for most developing countries was derived from a source giving this as the price elasticity of demand in Sri Lanka.

: To calculate India's underlying consumption trend, a Calcutta auction price series was used.