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DAN M. ETHERINGTON*

AN INTERNATIONAL TEA TRADE POLICY FOR EAST AFRICA: AN EXERCISE IN OLIGOPOLISTIC REASONING†

The world tea market is in a situation of oversupply in the sense that this commodity, the demand for which is inelastic to price, is faced with declining prices. In these circumstances an International Tea Agreement (I.T.A.) makes sense as a method of global redistribution of income. However, the stakes of the various producer countries in an Agreement differ with their widely differing market shares. This paper is concerned with the particular interests of East Africa in such an Agreement.

The issues discussed are not of merely academic interest since active negotiations toward an International Tea Agreement have been proceeding for the last four years under the auspices of the Food and Agriculture Organization (FAO). The possibility of an Agreement being concluded is perhaps increased by the fact that this is a commodity for which there have been similar agreements in the past.

The paper starts with an examination of trends in tea production and trade in the East African countries and then turns to the international market and East Africa's share of it. The main burden of the paper is the study, within an oligopolistic bargaining framework, of the relative costs and benefits of East Africa's participation in an Agreement. It is believed that the approach adopted in the analysis has relevance to other commodity agreements as well as tea.

EAST AFRICAN TEA PRODUCTION

The tea industry in East Africa was, for the most part, established by British tea companies with considerable experience of tea estates (or plantations) in India and Ceylon. The explanation for the form of plantation agriculture adopted for tea production in these areas lies mainly within past incidents of politics and

* Senior Research Fellow, Department of Economics, Research School of Pacific Studies, Australian National University, Canberra, Australia; formerly Acting Chairman, Economics Department, University of Nairobi, Kenya.

† Paper presented at East African Agricultural Economics Society Conference, Nairobi, Kenya, June 23-26, 1971. I am grateful for the comments and suggestions for improvement made by colleagues in the Economics Department and Institute for Development Studies, Nairobi. I am particularly grateful for editorial comments from W. O. Jones and C. P. Timmer, and the detailed checking of the manuscript by Rosamond H. Peirce. Any errors that remain are, however, entirely my responsibility.

history.¹ The technology and method of estate management adopted in East Africa were taken over with little modification from the Asian subcontinent. Estates of 250 to 1,000 hectares were established in East Africa in the 1920s with the sizable factories needed to handle annual crops from each estate of between 200 and 1,000 metric tons of made tea. The lack of experimentation with alternative organizational arrangements or production techniques in East Africa was undoubtedly reinforced by the production quotas and consequent acreage restrictions imposed by the International Tea Agreements of the 1930s and 1940s.² These restrictions were burdensome to the established growers. Furthermore, they reinforced domestic restrictions which frustrated those African farmers who wished to enter the cash economy by growing the crop but were prohibited from so doing. "In the years directly after the last war, there was a demand from the people for the introduction of Cash Crops. . . . There were numerous (suitable) areas in the Central Province (of Kenya) where tea would grow. This had been proved by go-ahead Africans, some of whom had brought home seedlings from their employers (on the tea estates), planted them in their back gardens and were producing a tea of a sort" (13).

Fortunately, since the early 1950s, the legal and technical constraints on African tea growers have gradually been removed, and it is in the African sector of the industry that the most dynamic growth has taken place in recent years. As Table 1 indicates, Kenya had led in this respect. Starting with less than a thousand hectares in 1960, the area under smallholder tea is, today, in excess of 20,000 hectares. The proportion of the total Kenya tea acreage grown by smallholders has increased from about 6 per cent to almost 50 per cent in this ten-year period. However, realized grower tea prices have been declining over this same period, suggesting that this is clearly a disequilibrium situation caused by the removal of the constraints. Although Uganda and Tanzania have achieved less spectacular growth, their future plans call for an acceleration of their planting programs. Uganda is expected to increase its annual planting from less than 1,000 hectares to over 2,000 hectares each year until 1975. However, even if the planned expansion of estate plantings materializes, the projected growth of production (to double between 1970 and 1975) seems rather optimistic. Tanzania, for its part, hopes to initiate major smallholder planting programs in four areas of the country. The scheme, in part financed by the World Bank, calls for the planting of 8,300 hectares over a three-year period. The impact of this on production will not be felt until toward the end of the decade.

Over the last decade of development in Kenya a major constraint on the rate of growth of the area under tea was the availability of planting material from the large centralized nurseries of the Kenya Tea Development Authority (KTDA). The introduction of vegetatively propagated (VP) stumps has not only removed the seedling constraint but opened a potential floodgate of "illegal" planting—incidentally making the future statistics for smallholder tea acreages increasingly suspect. However, the KTDA, by registering individual nurseries,

¹ This history is set down in a most readable form in 27.

² The East African Territories were late signatories to the 1933 agreement. They signed the renewals of 1938 and 1943 but did not join the restriction agreement of 1950-55. The effect on East Africa is discussed in 24. The background to these agreements is given in 26, 32, and 33.

TABLE I.—SMALLHOLDER AND TOTAL TEA AREA AND PRODUCTION IN KENYA, UGANDA, AND TANZANIA, 1960-70 AND PROJECTIONS FOR 1975*
(Area in thousand hectares, production in thousand metric tons)

Year	Kenya				Uganda				Tanzania			
	Area		Production		Area		Production		Area		Production	
	Small-holder	Total	Small-holder	Total	Small-holder ^a	Total	Small-holder	Total	Small-holder ^a	Total	Small-holder	Total
1960	0.97	15.9	—	13.8	—	6.4	...	4.7	...	7.3	—	3.7
1961	1.4	17.4	0.09	12.7	—	...	...	5.1	...	7.8	—	4.4
1962	2.5	19.8	0.23	16.4	—	...	...	6.3	...	8.1	—	4.3
1963	3.4	21.4	0.32	18.1	(0.7)	...	...	6.2	...	8.1	—	5.0
1964	4.3	22.8	0.6	20.2	(1.1)	9.9	...	7.6	(0.33)	8.9	.03	4.8
1965	5.1	24.5	1.2	19.8	1.6	10.2	...	8.4	(0.6)	9.5	.04	5.7
1966	6.5	27.2	1.8	25.4	2.6	12.8	...	11.2	(0.9)	10.0	.11	6.8
1967	8.4	30.2	1.6	22.8	(3.1)	14.4	.52	11.2	(1.1)	10.5	.23	7.1
1968	10.6	33.5	3.9	29.8	(3.9)	15.4	...	15.2	1.7	10.8	.36	7.9
1969	14.7	37.4	5.8	36.0	5.3	17.0	...	17.6	...	11.2	...	8.8
1970	18.0	40.3	8.0	41.1	7.0	19.9	...	18.4	...	...	...	8.5
1971	20.5 ^b	43.4 ^b	8.1	36.3 ^c	...	...	...	18.0	2.2	...	...	10.5
1975	(26.2)	(50.2)	20.0	63.0	10.0	23.0	...	39.0	(10.0)	...	...	14.0

* Data for 1960-71 from *Tea—Journal of the Tea Boards of East Africa* (Nairobi), to Vol. 12, No. 4, 1971; Kenya Tea Development Authority, *Annual Reports*, 1965/66-1970/71; Tanzania (Tanganyika) Tea Board, *Statistical Reports*, 1964 to 1969; private communication from Kenya Tea Board; *Uganda's 3rd Five Year Development Plan 1971/2-1975/6*.

Area Projections for 1975 for Kenya from *Kenya Development Plan 1970-1974*; for Uganda from *Uganda's 3rd Five Year Development Plan 1971/2-1975/6*, pp. 183-84; and for Tanzania, private communication. Production projections from FAO, Commodities and Trade Division, *The Longer Term Outlook for Production* (FAO, CCP: TEM 70/2, March 1970).

Dashes (—) indicate that quantities are negligible; dots (...) indicate that data are not available.

^a Figures in brackets represent planned acreages; official statistics do not indicate whether these plans were fulfilled.

^b Provisional estimate.

^c As in 1961, so too in 1971 the Kenya tea industry was affected by the very severe drought conditions at the end of (1960) 1970 and the beginning of (1961) 1971.

aims to keep track of actual plantings. The VP material for a new annual planting program of some 6,000 hectares over the next few years will be obtained from these nurseries. If this planting program is realized, the total area of tea in 1975 will be close to 70,000 hectares rather than the 50,200 figure that is noted in Table 1.

As a cash crop, tea has many attractions for the smallholder.³ For example, once the crop is mature the weeding requirements are minimal. But probably the greatest attraction is in terms of the regularity of the tea harvest. Not only does this even out the labor flow but it provides a regular monthly income analagous to the monthly "milk cheque" of temperate latitudes. From a national viewpoint, within the context of the urban-rural income gap and the rapid rate of growth of the population in the rural areas, the employment potential of this labor-intensive crop is of the utmost significance. For example, by 1976 Kenya's smallholders are expected to be producing 27,000 metric tons of made tea. This represents about 122,000 tons of green leaf. Labor on smallholdings pluck at about the rate of 1.4 kilograms per hour and will typically pluck for four hours a day for four days in the week (4, p. 150; 25). Thus, over 50 plucking weeks, each person would pluck about 1,200 kilograms, implying a total labor requirement of about 100,000 workers of whom at least one-third will be hired (4, pp. 159-61).⁴ Added to these are the additional direct employment opportunities associated with the collection, transportation and processing of the leaf. In addition, the sector has some forward linkage with the industrial sector (for transport, fuel, factory, buildings and machinery) and even some backward linkage with the rural areas—particularly to the basket weavers. Furthermore, the indirect employment creation caused by the regular injection of £5 million a year in cash incomes into the rural areas is also likely to be considerable.

Although in the following discussion we shall concentrate on the foreign exchange earnings derived from tea exports, it is clear that the contribution of smallholder tea to rural incomes and employment is at least as, if not more, important. This is the context within which East African attitudes toward the proposed planting restrictions under a new International Tea Agreement have been formed and must be viewed. It should not be surprising that East Africa takes a hard line in the current international negotiations. That this is the rational attitude for these small producers to take will become clearer after our discussion of the world tea market.

THE WORLD TEA MARKET

The situation in the international black-tea market is extremely complex but the essentials can be stated fairly simply. About 70 per cent of world exports come from two countries with approximately the same shares in the market, India and Ceylon. The remainder of the exports is supplied by 15 other countries located mainly in the tropics. In all, 11 of the countries shown in Table 2 supply over 98

³ A detailed discussion is contained in 4. See, in particular, Chap. VII, "Labour Inputs in Tea Production."

⁴ This calculation can be reversed in terms of the plucking labor required per hectare of mature tea. This works out to about five persons per hectare. However, such a figure is not particularly useful when so much of the acreage is immature.

TABLE 2.—EXPORTS FOR SELECTED YEARS 1959–70 AND INTERIM ARRANGEMENTS FOR THE DISTRIBUTION OF NET EXPORTS OF BLACK TEA IN 1970*
(*Thousand metric tons, except as otherwise indicated*)

Country	Exports					Interim arrangement 1970	
	1959	1965	1968	1969	1970	Allo- cation	Pct. of allo- cation
Ceylon	174.0	224.3	208.7	201.4	208.3	420.9	70.29
India ^a	212.0	198.0	206.2	164.8	196.2		
Indonesia	32.3	32.3	34.7	27.1	35.6	34.9	5.83
Kenya ^b	10.9	16.9	28.4	33.8	36.1	38.9	6.50
Uganda ^b	3.6	6.9	11.4	16.0	15.1	18.4	3.07
Malawi	10.2 ^c	13.2	15.8	17.3	17.7	17.4	2.91
Mozambique	8.0	10.8	14.1	15.4	16.7	16.4	2.74
Argentina	0.7	12.3	14.7	14.6	19.1	14.7	2.45
Zaire	3.2	4.1	4.3	4.1	...	10.0	1.67
Turkey	—	2.6	7.4	8.3	7.8	9.4	1.57
Tanzania ^b	2.9	4.4	7.1	7.7	7.1	7.8	1.30
Mauritius	0.5	1.1	1.7	2.6	2.6	3.0	.50
China (Taiwan) ^a	5.3	13.1	3.8	2.4	2.0	3.7	.62
Rwanda	...	0.3	0.6	1.0	...	1.5	.25
Cameroon	...	...	0.8	0.6	...	0.9	.15
Vietnam Rep.	0.5	2.3	0.7	0.2	...	0.7	.12
Burundi	...	...	...	...	...	0.2	.03
Sum	464.1	542.6	560.5	517.3	564.3	598.8	100.00
Less estimated shortfall						4.0	.67
Net			...	...		594.8	99.33

* Exports from International Tea Committee (ITC), *Annual Bulletin of Statistics 1971*, pp. 11, 13, 20; and *Supplement to Annual Bulletin of Statistics 1971* (London, Dec. 1971). Allocations as amended by the standing Exporters' Group in September 1970, from FAO, *Monthly Bulletin of Agricultural and Economics Statistics*, Jan. 1971, p. 15.

^a Black tea only.

^b Exports include interterritorial trade; 1970 allocations do not.

^c Federation of Rhodesia and Nyasaland.

per cent of world exports. On the demand side of the market, imports are similarly concentrated with nearly 40 per cent of the tea being consumed in the United Kingdom while the United States, Oceania, Canada, South Africa, Ireland, and the Netherlands take an additional 25 per cent.

The relatively few countries involved in the world tea trade should, in the FAO's view, greatly facilitate both the negotiation of an international commodity agreement and its implementation (7). The case for such an International Tea Agreement is, on the face of it, strong. World production is increasing more rapidly than world consumption with the resultant secular decline in the price of a commodity which has an inelastic demand. Furthermore, our economics (and the FAO) tells us that the total export earnings of the less developed countries (LDC) tea producers could be increased by reversing this trend. That is, by reducing the export volume and raising the selling price more than proportionately, there would be a net transfer of funds from the high income (consuming) countries to the low income (producing) countries thus providing the

latter with "the means to accelerate the rate of growth of their capacity to import . . . which, in turn, would make the attainment of their economic growth targets more practicable" (7, p. 3). At the very least it would be hoped to reduce the downward trend in prices—a possibility which would be strengthened by increased generic advertising in those high income countries (particularly the United Kingdom) where per capita consumption of tea has been declining.

However, apart from the overall objective of raising total earnings, the Consultative Committee on Tea recognizes the divergent interests of individual producers in noting that an additional, necessary, objective of an agreement would be (7, p. 5): "to secure for each producing country at least the same net return from the production of tea for export that it would have obtained without such an export regulation arrangement and, to the extent possible, to achieve a higher net return than would otherwise be obtained." This objective implicitly recognizes the oligopolistic nature of the world tea industry and is indicative that for any agreement to be workable there must be a resolution of the conflicting interests of the small and large producing countries.

Before turning to a theoretical framework for a tea policy for East Africa one other aspect of the world market must be brought to the fore. The export market for tea only represents two-thirds (by volume) of the total market of tea (outside mainland China). One-third of all tea produced is consumed within the producer countries. Japan, USSR, Pakistan, and Iran consumed virtually all their own production. Pakistan is of particular interest since she was a significant exporter in the early 1950s but by the '60s had withdrawn from the export market except as an occasional supplier, as in 1965 and 1966. However, the position of India among producer-consumers dominates the scene: while she is by far the largest producer (now about 400,000 metric tons compared to Ceylon's 240,000) somewhat less than half of her production is consumed domestically. Furthermore, in spite of intentions to the contrary India's domestic consumption has been increasing at 5.7 per cent per annum while her production has increased at only 2 per cent per annum during the ten-year period 1955-57 to 1965-67 (9).

In addition, India's per capita consumption is still very low, being one-quarter the level of that in Ceylon. Writing in 1964 Michael Butterwick noted that (1):

the present low *per caput* consumption of tea in India, where many areas have a tradition of tea drinking, is the most important single factor in the present situation of the tea industry. It would require only a fairly small increase in domestic demand for Indian tea for the whole supply/demand equation to be disrupted.

He then gives a simple illustration of the point (p. 213):

In the twenty-five years since 1938 the *per caput* consumption of tea in Ceylon has approximately doubled. If the same thing happened in India over the next twenty-five years the consumption *per caput* would still be only half the current (1964) level in Ceylon. But after allowing for the increase in population it would mean that India would then be consuming considerably more than her current production of about (360 thousand metric tons).

Seven years later this is still the single most important factor in the world tea market. The FAO/UNCTAD study groups appear to have chosen to ignore

TABLE 3.—TEA CONSUMPTION, AND PRICE AND INCOME ELASTICITIES FOR SELECTED COUNTRIES*

Country	Tea consumption 1966 (thousand metric tons)	Price elasticity	Income elasticity	Trend in consumer tastes ^a
<i>Low income countries</i>				
India	191	-1.60	0.91	...
United Arab Republic	29	-0.50	...	3.0
Pakistan	26	-0.32 ^b	1.35	...
Ceylon	16	-0.54 ^b	1.20	...
<i>High income countries</i>				
United Kingdom	223	-0.33 ^b	0.17 ^b	-1.4
Japan	88	...	0.32	...
United States	60	-0.34	0.52	...
Australia and New Zealand	34	-0.93	0.31	-2.3

* Data from FAO, Committee on Commodity Problems, *The Outlook for the World Tea Market, 1968-1975* (Prepared by the Secretariat of UNCTAD, CCP: TAH 68/8, Nov. 1968, and its Mar. 1969 revision, TAH/IA 69/6), Table 7.

^a Shift away from tea consumption toward coffee consumption (or vice versa) as per cent of tea consumption 1966.

^b Coefficient less than twice the standard error.

this and instead to have placed unreasonable reliance on an econometric projection model.⁵ The model comes up with a price elasticity of demand for tea in India of -1.6 and an income elasticity of demand of 0.9. Thus most of the increase in India's demand for tea (the 5.7 per cent per annum noted earlier) has been explained by a price elasticity which is not only extraordinary for any food crop but is completely out of line with the elasticities found in similar countries, for example Pakistan and Ceylon. The contrasts are evident in Table 3. The additional curiosity is that this price elasticity is based on London auction prices. The teas sold on the London market are for the most part high quality, high price teas which are subject to greater percentage price changes than the low quality teas in the domestic market.⁶ The model has probably measured an elasticity that incorporates the suppliers' shift between domestic and overseas markets as relative prices have changed.

The major consequence of accepting the model's measure of elasticity is that the projected rate of growth in India's tea consumption at constant (1967) prices is reduced from 5.6 per cent for the immediately preceding five years to a mere 2 per cent for the period to 1975. Such a figure, being below the current rate of growth of population of 2.6 per cent per annum, implies an assumed decline in per capita incomes in India over the period (since prices are assumed constant). At the same time the rate of increase of India's tea production has conveniently been calculated to increase from 2 per cent per annum to 2.5 per cent.

There is a very real sense in which the world tea crisis hinges on projecting India's production to be increasing more rapidly than her consumption.

⁵ The model made allowance for changes in consumer tastes and then related the corrected time series of apparent consumption to the corresponding series of tea and coffee prices and real consumer expenditure. Some of the resultant price and income elasticities are given in Table 3.

⁶ To be fair, the report (TAH 68/8) adds in a footnote that if Calcutta auction prices had been used it would have probably reduced the price elasticity to -1.20. However, the important fact remains that FAO used the -1.6 figure.

TABLE 4.—ALTERNATIVE PROJECTIONS OF PRODUCTION AND CONSUMPTION FOR THE WORLD AND INDIA, 1975*

Area	1965-67 (<i>thousand metric tons</i>)	FAO 1975 projection		Alternative 1975 projection	
		Thousand metric tons	Percentage rate of growth	Thou- and metric tons	Percentage rate of growth
		PRODUCTION			
India	373	465	2.5	446	2.0
World	908	1,180	3.0	1,161	2.8
		CONSUMPTION			
India	176	210	2.0	273	5.0
World	906	1,015	1.3	1,078	2.0
		EXPORTS			
India	197	255	3.0	173	-1.4

* Data for 1965-67 and the FAO projections are from Tables 6 and 8 of the source cited for Table 3 above, consumption projected at 1967 prices. The author's alternative projections are described in text.

That is to say, given the almost equal manner in which production is split between domestic consumption and exports, if production is expanding more rapidly in percentage terms than consumption then the surplus available for export will be increasing at a substantial rate. On the other hand if consumption is expanding more rapidly than production then exports could well start to decline, thus reducing much of the current pressure on world tea prices.⁷

This contention is spelled out in greater detail below but the implications of alternative growth rates are demonstrated in Table 4 and Chart 1. The table contrasts the FAO/UNCTAD projections with an alternative based on maintaining the rate of increase in India's tea production and with a reasonable decline in the rate of increase in consumption from 5.6 to 5.0 per cent.⁸

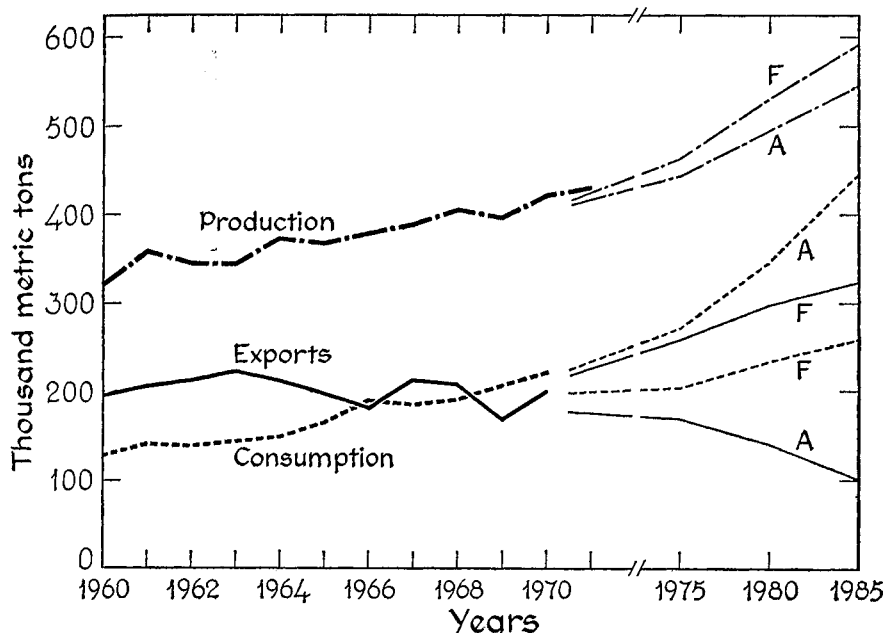
The important point to note about the alternative projection is not that it eliminates the world excess supply problem—which it doesn't—but that under the alternative projection more than half of India's production is consumed domestically and tea exports have actually declined by 1975. This implies that thereafter, provided the percentage increase in consumption is more or less twice the percentage increase in production—which is highly probable—then India's sales on the world market will decrease substantially over the decade 1975-85. Thus, for example, if the projected rates (of 2 per cent and 5 per cent) continued, by 1985 India's tea exports would be down to about 100,000 tons. Domestic per capita consumption would still be only .55 kilograms—an increase of only .20 kilograms over the 1965-67 level—and still way below Ceylon's 1965-67 per capita consumption of 1.5 kilograms (16, p. 56).

The implications of the two alternative growth rates are shown graphically in Chart 1 where the historical situation in 1960-70 is followed by the projections. If FAO is correct, then indeed India will be seeking markets for very substantial

⁷ See fn. 10. A recent IBRD report also lays stress on this point (14).

⁸ The alternative "world" projection accepts the FAO estimates for all countries except India. Thus the FAO projection has only been modified by our assumptions regarding Indian production and consumption.

CHART 1.—INDIA: TEA PRODUCTION, EXPORTS, AND CONSUMPTION, 1960-70, WITH VARIOUS PROJECTIONS FOR 1975, 1980, AND 1985*



* Data for production, exports and consumption from International Tea Committee (ITC), *Annual Bulletin of Statistics*, 1971, pp. 10, 11, 45, 47.

Through 1968, years starting April 1, adjusted for changes in stocks. For 1969 and 1970 approximated by the author using March 31 stocks (p. 47) and the available crop and trade data.

Projections are based on 1965-67 with annual average percentage growth rates continued at the levels shown in Table 4, as follows:

	FAO (F)	Alternative (A)
Production	2.5	2.0
Consumption	2.0	5.0

increases in exports, as is seen by the extrapolation of their growth rates for production, consumption, and (by subtraction) exports. These projections are marked with an "F" while the alternative projections are marked with an "A" and indicate the approximate halving of India's exports by 1985.

Although the documents thus far presented to the Consultative Committee do not mention the alternative possibilities, the FAO Indicative World Plan (IWP) for agriculture does. It presents an intermediate set of projections. Consumption of tea in India "rose by over 3 per cent between the mid-1950s and 1962 and is expected to increase even faster (by 4 per cent per year) during 1962-85. In spite of a 2.1 per cent annual growth of production over the last decade . . . without a determined effort to improve average yields, a considerable decline in exports (from 215,000 in 1962) to about 120,000 tons by 1985 appears inevitable" (6, p. 160). The IWP goes on to discuss briefly the limited impact of loan schemes for replanting and rehabilitation of estates and their factories: "Tea producers in India maintain that increasing costs of production (combined with a high level of taxation on the one hand, and declining export prices on the other) have

reduced the capacity of their estates, to finance replanting or new planting programmes on a large-scale" (6, p. 163).⁹ In this connection it is of interest that the First Session of the Consultative Committee on Tea noted that in 1969 India's tea production had been seriously affected by strikes and adverse climatic conditions and that in spite of the removal of export tax and an increase in the excise duty, producers had preferred to sell a larger quantity on the more attractive domestic market (11).

As far as the world market is concerned, the actual statistics are of far more interest than this vague statement. Between the peak production of 402,500 tons in 1968, output in 1969 declined by only 6,000 tons to 396,000 tons. However, exports of black tea declined by 40,000 tons from 206,200 to 164,800 tons, a figure that is a long way below the "alternative" projection for exports for 1975 presented in Table 4. In 1970, India had a bumper crop of about 422,000 tons but exports of black tea did not reach 200,000 tons (16, pp. 11-13).

After a detailed examination of the policy measures adopted by the Indian Government to encourage extensive replanting programs, the World Bank sees little possibility of the Government's plans for an increase in production to 586,000 tons by 1980 materializing since the capital requirements of Rs 112 million for replanting and Rs 45 million for extension *per year* are unlikely to be found. The World Bank concludes that for its own projections it will extrapolate on past trends until 1980 (14, p. 22).

In the circumstances the projected rates of growth of 2 per cent per annum for production and 5 per cent for domestic consumption are by no means unreasonable.¹⁰ By 1985 Indian exports might be expected to lie somewhere within the range of 100,000 to 140,000 metric tons, assuming reasonably constant prices. But, unless the interim tea arrangements are actually effective, prices are likely to continue to decline somewhat in the early 1970s. Clearly, if India's price elasticity of demand is really more negative than -1.0 then her decline as a major exporter would be hastened although the process is not straightforward since

⁹ See also 14, p. 20; for similar problems in Pakistan see 2; and for Ceylon, see 15, pp. 92-94.

¹⁰ It is actually the rate of differential growth that is of particular importance. Let me illustrate: with the figures for 1970 production which indicated a bumper Indian crop of about 420,000 tons, which means that the actual rate of growth in output from 1959-61 to 1968-70 was about 2 per cent per annum. Apparent Indian consumption grew from 127,000 tons in 1959-61 to 206,300 tons in 1968-70, implying a rate of growth of 6 per cent per annum. The rate of differential growth is derived from the identity:

$$\dot{T}_p = \dot{T}_o \frac{T_o}{T_p} + \dot{T}_c \frac{T_c}{T_p}$$

where \dot{T}_p is the rate of growth of tea production, \dot{T}_o and \dot{T}_c are the rates of growth of tea exports and consumption respectively. T_p , T_o , and T_c are actual levels of production, exports, and consumption.

Rearranging the terms we get the rate of growth in exports as a residual rate of differential growth:

$$\dot{T}_o = (\dot{T}_p - \dot{T}_c) \frac{T_p}{T_o} + \dot{T}_c$$

In 1968-70 production was divided approximately equally between exports and consumption (each at slightly over 200,000 tons per annum) and hence $T_p/T_o = 2$. Substituting the rates for the "alternative" projection we get:

$$\dot{T}_o = (.02 - .05)2 + .05 = -0.01$$

and with most recent data we get the result that exports would fall even more rapidly:

$$\dot{T}_o = (.02 - .06)2 + .06 = -.02$$

this very decline would, in itself, help stem the price decline on the world market.

The major conclusion to be derived from this brief examination of the world tea market is the crucial role that India plays, both as a major producer and as a major consumer. Over the past decade India's tea consumption has been increasing much more rapidly than her production, and there appears to be no slackening off in this trend in spite of persistent efforts in this direction by the Indian Government.

While it is dangerous to make projections simply on the basis of past trends, these trends cannot just be ignored. The East African tea-producing countries need to be aware that there is a strong probability that India's tea exports will decline steadily over the next 10 to 15 years. What is most curious is that the Consultative Committee on Tea does not appear to take cognizance of this possibility in its public deliberations.

AN EAST AFRICAN TEA POLICY WITHIN AN OLIGOPOLY FRAMEWORK

The world tea market is a very interesting oligopoly situation in which the participants are encouraged to communicate and cooperate but where the gains from industry cooperation depend on the individual producers' share of the market.

The gains from any restrictive trade agreement are necessarily proportional to the relative quota shares of the participating countries provided those quotas are issued in the same ratio as the initial market shares. A simple illustration emphasizes the point. Given a 1965-67 export unit value of tea of £(EA)327 per metric ton and world exports of 550,000 tons then the value of the exports was £(EA)180 million. Say that 1975 exports are projected to be 645,000 tons at a unit value of £248, 1975 tea exports would be worth only £160 million.¹¹ In the event of an Agreement, owing to the natural expansion of export markets, it is expected that 610,000 tons can be sold in 1975 at the 1965-67 unit value (9, p. 7). Thus the value of 1975 exports could be as high as £200 million. Now clearly the Large Producer, with, for example, a constant 70 per cent of the market, will suffer a very considerable loss (£28 million per annum) if no Agreement is reached compared to a Small Producer with but 5 per cent of the market (his loss equals £2 million per annum).¹²

These potential losses indicate both the gains to be had from an effective Agreement and the limits of potential sacrifice that individual countries would be prepared to accept. Thus any loss less than £28 million per annum by 1975 would be a net gain to the Large Country and any loss less than £2 million per year would be an effective net gain to the Smaller Country.

This line of argument follows the rational market sharing stratagem suggested by E. H. Chamberlin many years ago (3, pp. 46-51). It suggests that it is rational for the Large Producer to make considerable concessions in order to avoid the heavy losses which will occur if a restriction Agreement does not become operative. If the numerous Small Countries appreciate this there is likely to be vigorous lobbying to gain larger shares in the total quota.¹³

For the sake of clarity on this central issue let us rephrase the argument in

¹¹ These projections are based on 9.

¹² India and Ceylon prefer to be linked together for quota purposes. We shall suggest a reason for this below.

¹³ Clearly some hard behind-the-scenes bargaining took place in arriving at the 1970 Interim

the intended Agreement's own terms. Early on we noted the Consultative Committee's condition that no country should be worse off under an Agreement than it would be without an Agreement. This is simply a statement of an opportunity cost condition since clearly no country would join if it were actually going to be worse off. However, this explicit requirement allows us to draw up a payoff matrix of the minimum conditions necessary for the countries to be indifferent between joining or not joining the Agreement. Consider the hypothetical situation shown in Table 5.

This is a situation of balance in which there is neither gain nor loss from an Agreement. Theoretically if we throw in an additional thousand ton of quota (bringing the total to 490,000) and divide it among the producers they will all be better off under the Agreement (since the total value of their tea exports will have increased) and will agree to it. However, we are dealing with an inelastic demand situation in which for a given price increase there is a less than proportionate change in quantity. Thus at a price of £327 consumers *are* willing to buy 550,000 tons now and 610,000 tons by 1975, not merely 490,000 tons. The central question in the negotiations (a very polite form of haggling) of the oligopolists is: "Who gets the extra 120,000 tons of quota?"¹⁴ Should market shares be maintained? Should costs of production or quality be taken into account?

Clearly if the Large Country insists on maintaining its market share it risks wrecking the scheme if the Small Countries carry any form of veto, believe themselves to be lower cost producers and/or recognize that lack of an Agreement can mean a very large loss to the Large Producer. Seventy per cent of the unallocated (by requirement) "extra" quota of 120,000 tons might be considered to be within the Large Country's "sphere of influence" and over which it might have some power of reallocation. Allowing this country a very considerable positive net gain from the Agreement (say £12 to 18 million per annum) the Small Countries might reasonably expect an additional 30,000 to 48,000 tons to be available to them in addition to their share of 36,000 tons (30 per cent of 120). Thus it would not be unreasonable for the Small Countries to expect their share of the export market for tea to increase from 30 per cent to between, say, 35 and 38 per cent. Or, to put it the other way around, a decline in the world market share of the Large Country of 5 to 8 per cent would be a reasonable expectation of the Small Countries.

Now obviously the Large Country gains most if the principle of keeping to market shares is maintained, and clearly the Large Country should attempt in its strategy to get the eyes of the Small Countries concentrated on the allocation of "their" 30 per cent (36,000 tons) of the profitable "extra" allocation.¹⁵ Prefer-

Arrangements for the Distribution of Net Exports presented in Table 2 since the percentage allocation of the countries does not follow a consistent pattern with past levels of exports. There were also significant changes between the proposals of the Mauritius meeting by the Tea Exporting Countries in August 1969, those of the First Session of the Consultative Committee (Rome, December 1969), and the September 1970 meeting of the Exporter's Group. (Compare 23, Appendix IV; 11, Appendix V; and 12, Appendix III.) Kenya's allocation increased initially by 2,300 tons and then again by a further 4,500 tons. Tanzania's increased by 1,100 tons and that of Turkey by 1,800 tons. Uganda's quota was *reduced* at the last meeting from the unwarranted level of 24,500 tons to 18,400 tons.

¹⁴ In more formal Game Theory terminology, the 120,000 tons is the "constant sum" total stake of the game once it has been decided that the game (Agreement) will be played.

¹⁵ India and Ceylon appear to be playing another diversionary ploy as well. They have said that

TABLE 5.—WORLD: MINIMUM PAYOFF MATRIX WITH AND WITHOUT A TRADE AGREEMENT*

	Total market	Large Country	Small Countries	
			Total	Example
Market shares (<i>per cent</i>)	100	70	30	5
Without Agreement				
Unit value (£ <i>per ton</i>)	248	248	248	248
Planned exports (<i>thousand tons</i>) ^a	645	452	193	32
Total value of exports (<i>million £</i>)	160	112	48	8
With Agreement				
Unit value (£ <i>per ton</i>)	327	327	327	327
Required quota (<i>thousand tons</i>) ^b	489	342	147	24
Total value of exports (<i>million £</i>)	160	112	48	8

* Market shares, unit value, and planned total exports without Agreement are assumed (see text).

^a Allocated to countries according to market shares shown above.

^b Derived; as the total value of exports "Without Agreement" divided by the "With Agreement" unit value.

ably nobody should raise the question of what the Large Country would lose in the event of no Agreement being reached.

It must be stressed that the Small Country is in a powerful bargaining position precisely because it is small and does not have much to gain from an Agreement. There is an alternative complementary way of looking at this. The East African countries fit into the classic mold of the Small Country case. That is to say that their shares of the world market are small so that the price elasticity for their tea is considerably more elastic than is the price elasticity for the world's tea. The following equation relates the elasticity of demand for an individual country's tea to the world elasticity of demand, the market share and the competitors' supply elasticity.¹⁰

$$(1) \quad n_i = \frac{n}{k_i} - \frac{Ek}{k_i}$$

where n_i is the elasticity of demand facing country i

n is the world price elasticity of demand ($n < 0$)

E is the rest of the world's supply elasticity

k_i is country i 's share of the market ($0 > k_i \leq 1$)

k is the rest of the world's share (i.e., $k_i + k = 1$)

This may be represented graphically as in Chart 2.

On the vertical axis we have the market share of a particular country (k_i) and on the horizontal axis the price elasticity of demand (which is necessarily negative). As a country's share of the market gets very small so the demand for its product becomes more elastic,

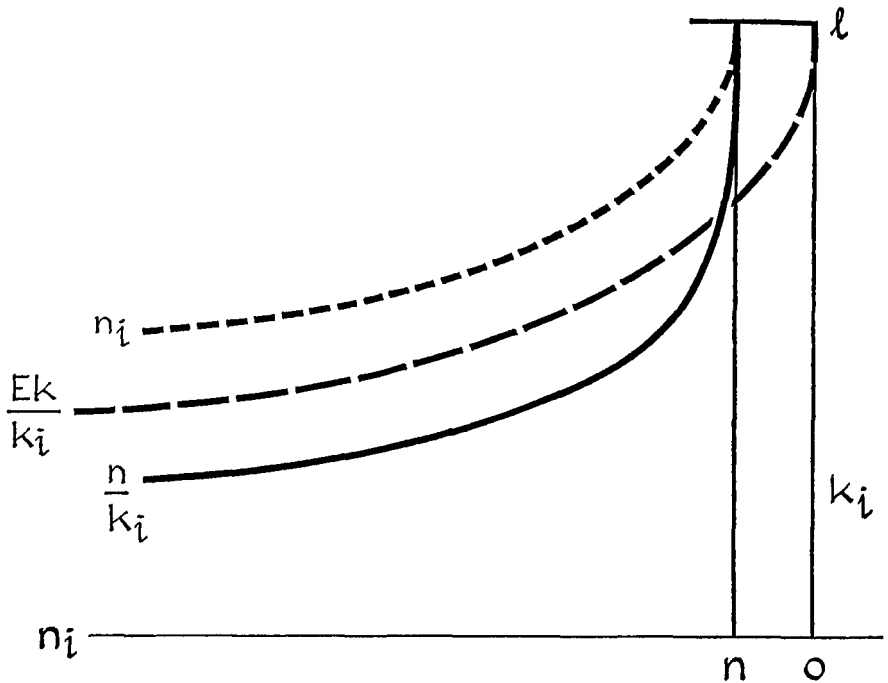
(that is, n_i becomes more negative with $\lim_{k_i \rightarrow 0} n_i = -\infty$).

$k_i \rightarrow 0$

they are withdrawing their contributions from the apparently highly successful generic advertising scheme in the United Kingdom. This is presumably intended to frighten the Smaller Producers into paying for this public good since it is extremely difficult to credit their stated intention.

¹⁰ This is given (actually with the signs wrong) in a rather confused footnote in 22, pp. 158-

CHART 2.—RELATIONSHIP BETWEEN MARKET SHARE AND PRICE ELASTICITY OF DEMAND



This means that the Small Country can increase output without having an appreciable effect on price.¹⁷

The Small Country case is recognized by the Consultative Committee since the exporting countries explicitly recommend that “no constraint should be imposed on exports from tea-producing countries whose exports remain so small that they are not likely to affect the market” (12). However, not unexpectedly,

59. Equation (1) can be derived as follows:

The quantity of any commodity (q) on the world market is split between country “ i ” (q_i) and the rest of the world (q_r),

$$\text{so } q_i = q - q_r,$$

$$\text{then } \frac{dq_i}{dp} = \frac{dq}{dp} - \frac{dq_r}{dp}$$

$$\text{and } \frac{dq_i}{dp} \frac{p}{q_i} = \frac{dq}{dp} \frac{p}{q} - \frac{dq_r}{dp} \frac{p}{q_r}$$

$$\text{Therefore, } n_i = n \frac{q}{q_i} - \frac{dq_r}{dp} \frac{p}{q_r} \frac{q_r}{q_i},$$

$$\text{but } \frac{q_i}{q} = k_i;$$

$$\text{therefore } n_i = \frac{n}{k_i} - \frac{Ek}{k_i}.$$

¹⁷ This sensitivity to Small Market shares is evident from Chart 1. For the mathematically inclined, the first derivative of (1) with respect to the market share stresses the point, since

$$n_i' = \frac{E-n}{k_i^2} > 0 \text{ and } n_i'' = \frac{2(n-E)}{k_i^3} < 0.$$

no definition is given of what is meant by a "Small Country." Would the Committee's breakoff point be a country with 1 per cent of the market? Or up to 10 per cent of the market? Given reasonable values to the parameters in equation (1), it could be argued that even Kenya, the largest of the Small Countries with about 6 per cent of the market, has only a marginal effect on world prices. Thus allowing a world elasticity of demand of -0.3 and a highly inelastic supply to downward price moves of, say, 0.2 , then by substitution in equation (1) we have:¹⁸

$$(2) \quad n_{\text{Kenya}} = -8.1 = \frac{-0.3 - 0.2(.94)}{.06}$$

That is to say that a 10 per cent increase in Kenya's export supply will have only about a 1.2 per cent effect on prices.¹⁹

Whether or not Kenya does, Uganda and Tanzania with their even smaller shares of the market should certainly qualify as countries on whom "no constraint should be imposed. . . ." However, let us continue to assume that quotas are to be imposed on all three countries. What levels of quota should they be looking for? A table similar to, but rather more detailed than, Table 5 can be drawn up for East Africa. Consider Table 6. Once again the principle in drawing up this new minimum pay-off matrix is that no country should lose as a result of joining the Agreement. In actual fact the gain from an Agreement is the discounted value of the difference in the future revenue streams with and without the Agreement. However, it is less complicated to look at the situation in a given future year (1975) and this is adequate for our present illustrative purpose. It is also possible to quibble about the actual price and quantity figures used here but the orders of magnitude are correct. In Table 6 the export unit value of East African teas is assumed to be higher than the average (£248) in Table 5 for the situation without the Agreement (by a nominal amount), since at the generally lower prices it is likely that blenders will be prepared to pay a premium for quality.

Were East Africa to be considered as a single unit, the 1970 allocation would result in a net loss if it were maintained up to 1975. Interestingly enough, East Africa's total quota was reduced with the latest revision of the allocation (Kenya's went up by 4,500, but Uganda's went down by 6,100). Prior to that revision East Africa would neither have gained nor lost as a result of the Agreement—taking export earnings as the sole criterion for judgment. However, it is highly likely that at least the total East Africa "no gains" quota would be given since it represents a constant share (10.9 per cent) of the global quota. But this is no basis on which to join an agreement in which the total gains to producing countries are considerable.

¹⁸ Since India has such a large share of the market and her producers have shown great willingness to switch to the more profitable domestic market (as in 1969), one could argue for a much more elastic supply curve for exports. However, this should be offset by the generally highly inelastic supply curve of other countries—particularly for downward price moves.

¹⁹ The world tea market is growing albeit slowly. Even if Kenya increases her supply to 54,000 tons by 1975, her share of the market will have increased to less than 9 per cent. Thus, *ceteris paribus*, her 40 per cent increase in output would have had a less than 8 per cent effect on prices. However, if product differentiation, and consequently relative product prices, continue to move in East Africa's favor the effect of such an increase in exports on the price of East African (Kenyan) teas could be considerably less than 8 per cent.

TABLE 6.—EAST AFRICA: A MINIMUM PAYOFF MATRIX FOR 1975

	East Africa	Kenya	Uganda	Tanzania
Without Agreement				
Export price (£ [EA] per ton) ^a	225	225	225	225
Planned exports (thousand metric tons) ^b	85.2	54.0	22.0	9.2
Total export earnings (million £ [EA])	21.7	13.8	5.6	2.3
With Agreement				
Export price (£ [EA] per ton) ^c	327	327	327	327
Required quota				
Thousand metric tons ^d	66.6	42.2	17.2	7.2
Per cent of world total ^e	10.9	6.9	2.8	1.2
Total export earnings (million £ [EA])	21.7	13.8	5.6	2.3
1970 Allocations ^f				
Thousand metric tons	65.1	38.9	18.4	7.8
Per cent of world total	10.9	6.5	3.1	1.3

^a See text for difference from Table 5.

^b Planned production for 1975 of 58.0, 23.5, and 11.0 less probable consumption of 4.0, 1.5, and 1.8 for Kenya, Uganda, and Tanzania respectively. These production estimates are, in the author's view, more reasonable than the FAO's estimates given in Table 1, but by using those figures (which imply exports of 59,000, 37,500, and 12,200 tons respectively for Kenya, Uganda, and Tanzania), East Africa would require very substantial quota increases.

^c Assumed as in Table 5.

^d Total export earnings "without agreement" divided by the assumed price of £327 per ton.

^e Based on the estimated total allocation of 610,000 tons for 1965 from FAO, CCP (TAH 68/9, November 1968), p. 7.

^f From Table 2 above.

Taking the countries individually Uganda and Tanzania gain only very marginally—the former by £.4 million per year and the latter by a mere £.2 million, plus whatever can be raised by selling surplus production in non-quota markets (if such are officially recognized). If this is all Uganda and Tanzania are to gain from the Agreement it is not surprising to learn of Tanzania's reluctance at entering into the negotiations. If Tanzania's quota increases to allow her to sell her total export surplus in 1975 she will gain £.65 million (£327 × 2,000) per annum in foreign exchange under the Agreement (this is 1.6 per cent of the total producer country gains of about £40 million). Under a similar quota expansion Uganda's net gain would be £1.57 million per year, i.e., £327 × (22 - 17.2), which is 3.9 per cent of worldwide producer gain.

One concludes that if Uganda and Tanzania are explicitly told that they come under the "no constraint" clause then, for them, the Agreement is a nice piece of legal fiction which they should desire to see implemented because of the distinct net gains that accrue to them.

The Kenya case is rather different from the other two East African countries: although the 1970 allocation is now—following the last increase in quota to 38,900 tons—at the level of the expected exports for 1970, it is still below the break-even quota of 42,200 tons. There should be no difficulty at the next meeting of the Exporters' Group in achieving this moderate increase in quota; however, given reasonable weather, this could well have been the level of exports for 1971. It is quotas larger than this that become of positive gain and hence of interest to Kenya.

There are a number of approaches to achieving the maximum usable quota—that is (assuming no trading is allowed in quotas), a quota that allows one to sell one's total export surplus. In Kenya's case this is projected to be about 54,000 tons by 1975. If this total is exported the net gain from the Agreement is about £3.86 million per annum, that is, £(54 - 42.2) × 327 million—a most attractive “aid” grant with no strings attached. Clearly this is a prize worth seeking. What strategies can be adopted in the negotiations which might result in this most favorable outcome?

Clearly it is extremely important that Kenya recognize that the Large Countries have very much more to gain from an Agreement and in this sense are less able to afford the collapse of negotiations. Of all the Small Countries Kenya is probably the only one with veto power and, consequently, power to set her own market sharing conditions on the Large Countries. This position has already been argued at length but the problem is that such threat tactics belong more to war games than the niceties of modern diplomatic negotiations. It is poor gamesmanship to antagonize unnecessarily and there are other strong cards.

If Kenya cannot claim to come under the “no constraint” clause proposed by the Exporting Countries she can at least claim that “allowance should be made for commitments already made and, in the case of young producing countries, for the need to diversify their economies by tea development programmes.” This is clause (iii) of the recommendations placed before the Consultative Committee by the Exporters Group. In East Africa the case is much stronger than the mere diversification of exports. Most of the expansion in production comes from efficient, low cost, smallholder development schemes with high internal rates of return and with highly significant employment potential in the rural areas where this is particularly needed.²⁰ All these are matters of particular interest to aid givers and this argument should find strong support among consumer countries.

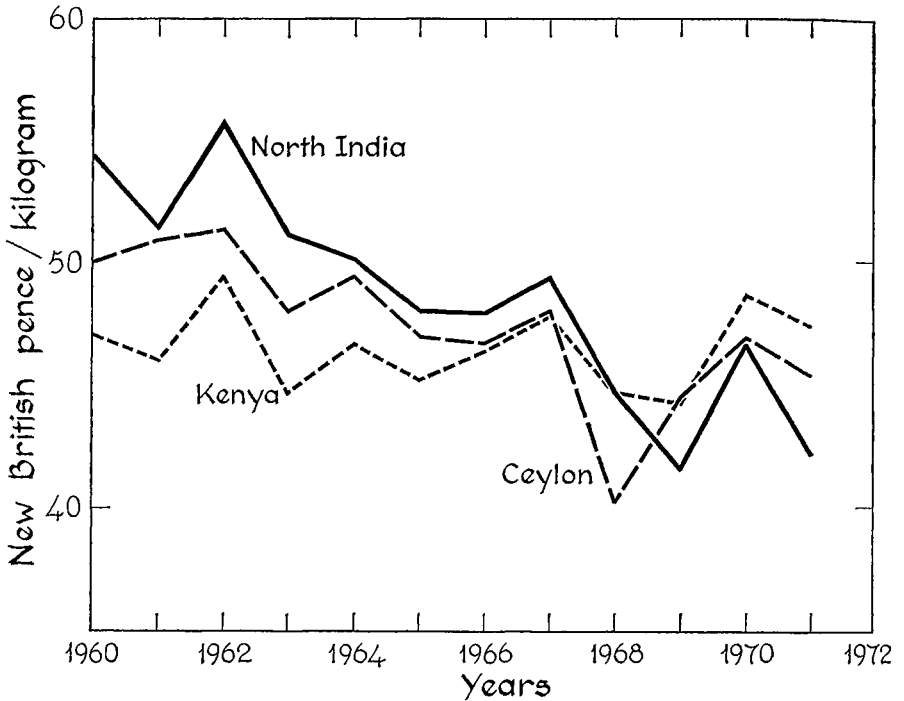
Furthermore, consumers have, in recent years, been showing a preference for the high-quality teas of Kenya which come onto the market at a steady rate throughout the year, thus reducing the costs of carrying large stocks at particular seasons as is necessary with the North India production. Chart 3 shows how relative London auction prices have moved in Kenya's favor during the 1960s. Basically, the situation is one in which Kenya tea producers have not experienced the secular decline in prices which Indian and Ceylonese producers have faced. Since consumers are being asked under the Agreement to aid less developed producer countries the very least *quid pro quo* is to provide them with the products they want.

Two further, and highly specific, negotiating points can now be raised: first, it is curious that India and Ceylon are not given separate quotas but one joint quota of 70.3 per cent of the market. Does this mean that Ceylon, and Ceylon alone, will be allowed to take up the extra market share as India's exports actually decline? Reasons for this anomaly should be sought since, if this position is maintained, it alters the long-term outlook for East African teas.

Secondly, how was the figure of 70.3 per cent market share arrived at for

²⁰ East Africa's low costs of production are emphasized by the World Bank. The comparative cost figures for the main producer countries are to be found in 14, pp. 37-51. High rates of return on investment in smallholder tea in Kenya are calculated by N. H. Stern in 28.

CHART 3.—ANNUAL AVERAGE PRICES OF NORTH INDIAN, CEYLONESE, AND KENYAN TEA SOLD AT LONDON AUCTIONS, 1960-71*



* Data from International Tea Committee (ITC), *Annual Bulletin of Statistics*, 1971, p. 48; and ITC, *Monthly Statistical Summary*, Vol. 27, No. 1, Jan. 1972, p. 7.

India and Ceylon? While it is true that between 1962 and 1964 their share was 74 per cent, between 1965 and 1969 it was 67.8 per cent. A 2.5 per cent share of the market is more than Tanzania's share of the current global quota and is worth a net foreign exchange gain of £1 million per year under an Agreement. Furthermore, Ceylon's higher output until 1968 was based on a considerable amount of coarse plucking (three leaves and a bud) as against East Africa's fine plucking (two leaves and a bud). Are the latter countries to be penalized for maintaining a higher standard?

SUMMARY AND CONCLUSIONS

East Africa's tea industry is efficient and low cost. It is currently in a disequilibrium situation caused by the removal of technical and legal constraints. Thus, in spite of declining prices, production has been increasing at a very rapid rate with important rural income and employment effects. However, the export market is in a situation of oversupply that is likely to persist during the 1970s. An International Tea Agreement is sought to stem the decline in prices and if possible to raise them back to 1967 levels while reducing the quantity sold less than proportionately. The major consequence of this would be to effect the net transfer of about £40 million per year to the low income producer countries by

1975. Such a source of additional foreign exchange is particularly welcome because it is free of the strings associated with conventional forms of aid.

Acting against the general call to restrict exports is a rational market sharing strategy in an oligopoly situation where there are a few (two) large producers and many small ones. Large percentage increases in output by Small Producers have little effect on world prices and, precisely because they are small, the stake of the Small Producer in an Agreement is small. This gives them a strong vantage point from which to bargain with countries (like India and Ceylon), which have a great deal to lose (an annual net loss of about £14 million each by 1975) if there is no Agreement. In other words, reasonable concessions by the Large Countries are likely. In obtaining these concessions the East African countries should stress five major points: 1) the trend in consumer preference toward East African teas; 2) prior commitments toward efficient, low-cost, smallholder tea schemes financed by international loans have already determined levels of production in 1975; 3) the very small sizes of Ugandan and Tanzanian exports should explicitly qualify them as countries on whom "no constraints" should be imposed; 4) quota shares are (presumably) to some degree based on the volume of past exports. But this volume is determined in part by the standard of plucking (coarse or fine) used. Thus there is a built-in bias against those countries that have always used fine plucking; and 5) the joint quota of India and Ceylon is a curiosity which needs explanation. Furthermore, their share of the global quota is higher than is warranted by their performance (with coarse plucking) over the five years up to 1969.

Given their bargaining positions, it is likely that the East African Countries will win regular quota increases allowing them to sell their total export surpluses. If this is the case they stand to *gain* about £6 million per year by 1975 by seeing the Agreement come into effect. Whether or not this most favorable outcome is achieved the East African countries should have clearly in mind not only their own "break-even" quotas but also those of other countries so that the distribution of gains from an Agreement is known and can be used in the bargaining process.

While the free market situation for tea in the 1970s presents a gloomy scene, market equilibrium at higher prices seems to be much more likely during the 1980s. This conclusion is based primarily on a secular decline in Indian tea exports as her internal market grows faster than her production. Past Indian efforts to check this trend have not been successful. Tea is a long-term investment in which production and trade decisions cannot be based on short-run projections. The decision to expand East African tea production further should be based on domestic production costs, alternative production possibilities, and an assessment of the probable world supply-demand situation in the 1980s and beyond. This situation looks more favorable than that of the 1970s and it would be a rational decision to continue the expansion of the industry.

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