

Some Economic Considerations for Coffee Development Policy in Kenya¹
 by D.G.R. Belshaw and M. Hall²

I: Kenya Coffee in the National and World Economy

This paper is concerned with the short-term situation facing the Kenya arabica coffee industry i.e. within the term of the current five-year renewal of the International Coffee Agreement (I.C.A.). Longer-range questions concerning the net benefits of membership of the I.C.A. have been discussed elsewhere.³

The main features of the short-term situation facing Kenya coffee producers is as follows.

1. In December, 1967, the International Coffee Organisation announced new basic quota's for coffee exporting countries. Kenya's was fixed at some 52,000 tons (860,000 60 kilo bags). This quota became effective for the crop year commencing in October 1968.

2. Estimated coffee production for the 1967/68 year was 39,141 tons, compared with 54,829 tons in 1966/67. The decline in production was caused primarily by the incidence of Coffee Berry Disease (C.B.I.). Auction prices, on the other hand, were somewhat higher in 1967/68, averaging some £320 per ton compared with £288 per ton in 1966/67.

3. Coffee produced on small farms is rising rapidly. The origin of coffee sold via the Coffee Board in 1966/67 and 1967/68 was as follows:

	1966/67	1967/68 (est.)
	'000 tons	
Estates	24.8	15.5
Small farms	27.1	19.7

1. This is an outline of a paper to be given to the Coffee Research Foundation's Conference on 'Intensification of Coffee Production' in Nairobi, December 1963.
 2. Department of Rural Economy and Extension, Makerere University College.
 3. Clark, Ralph, Economic Considerations in Determining Coffee Policies in East Africa - Parts I and II, Kenya Coffee, 32, pp. 273-278 and 327-330 (see also Clark, Ralph, in G.K. Helleiner (ed.), Agricultural Planning in East Africa, Nairobi, 1968).

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The 70,000 acres of small-holder coffee planted in 1962 and 1963 is coming into increasingly heavier production. This factor can be expected to offset and even outweigh the incidence of C.B.D. in future, particularly in these years when climatic conditions do not favour C.B.D. Thus, "indications from the districts are still such that a large 1968/69 crop can be expected."¹

4. Export duty was levied at a flat rate of K£20 per ton until June 1967, when the rate was reduced to K£10 per ton.

5. The high quality of Kenya arabica coffee should allow a fairly large proportion of the total crop to be sold on the non-quota markets. However, as these markets are typically either beset by shortages of foreign exchange or have a small high-income demand only, one would expect the price elasticity of demand for Kenya coffee to be rather low.

These facts can be represented in the form of a simple supply and demand diagram (see Appendix A, diagram 1.) The essential features shown here are: 1) The effect of production in excess of the quota reducing average revenues and the produced price, as in 1966/67. 2) The slight improvement in prices accompanying the effect of C.B.D. on output, as in 1967/68. 3) The problem of adjusting supply to market opportunities if production continues to expand. If the supply curve shifts to a position at SS70+, due to continued expansion of small-holder output, a serious divergence may arise between private and social costs. The optimum national output is obtained where marginal cost equals marginal revenue i.e. at output ON. If, however, producers are paid an average price (AR70) then output will expand along the short-run supply curve until it is equal to OS (there would also be further inducement to acreage expansion and although this might be prevented this would involve society in additional costs). Production OS would involve the country in an unnecessary waste of resources represented by the area of the triangle between MRnq, SS70 and the perpendicular at S. Stability would be achieved only by making the producer price equal to marginal cost. This could be simply achieved through the medium of the export duty. This analysis indicates the economic

growth argument for the apparently paradoxical recommendation that the export duty should be lowered when the auction price average is rising due to a shortfall in supply and increased in severity when the average price is falling due to the pressure of supply upon price. This latter effect will become especially severe when large quantities of coffee are sold in the non-quota market (or alternatively either stored or destroyed).

Quite apart from fiscal policy, average receipts and hence the producer price will tend to fall. How will this affect the different sectors in the industry? Diagram 2 attempts to illustrate the possibilities in diagrammatic form. In the short-term we are concerned with total variable costs (T.V.C.) only; there is insufficient time to select or breed new varieties and bring them into bearing, whilst new, as opposed to replacement, acreage is restricted by law. The diagram shows three marginal firm situations. $T.V.C_s$ represents the low-cost, low output "extensive" system of the small-holder.

The shape of his cost curve depends on the opportunity cost of family labour, primarily. The rapid increase in the rural population, leading to farm subdivision and pressure of supply on the wage rate in the uncontrolled rural labour market will tend to shift his whole cost curve over to the right, enabling such extensive systems to still be relatively attractive at lower prices. TVC_{E1} shows the marginal estate operating before C.B.D. incidence. This disease, and rising labour costs, will shift the cost curve to the left, making the firm sub-marginal. The possibility of controlling C.B.D. requires additional 'lumpy' expenditure on sprays raising the cost curve upwards (TVC_{E2}). Only if markedly higher output can be achieved can this cost curve catch up with the total revenue curve. Ironically, if many estates succeed in achieving this increase in output, the combined effect will be to reduce average receipts, i.e. to cause TR to move faster towards the right of the diagram.

The problem then is whether intensification will give a sufficient boost to output to catch up with falling unit prices. The various aspects of this question are discussed in more detail in the next section.

II: Production Cost Aspects of Arabica Coffee

Most technical and scientific aspects of arabica coffee production are currently being investigated by the network of research facilities centred at Ruiru in Central Province. Findings are made freely available in a readable form in the monthly bulletin of the Kenya Coffee Board. This section is mainly concerned with the relevance, in economic terms, of this technical data for the various types of production unit found in the industry, as well as its economic viability in the light of the current state of knowledge.

Technical research priorities have been discussed by the Research Director of the Coffee Research Foundation.¹ Fundamental research was emphasised as it was considered that immediate priorities included finding answers to the problem of coffee berry disease and to the nutritional causation of deteriorating coffee quality. This emphasis assumed the existence of a strong body of agronomic research based on field experiments. It is the results of this latter type of research which are of particular interest to the farm management economist concerned with raising enterprise profitability and with generating information which will be useful in formulating coffee policy at the national level.

Problems of interpreting the results of this research arise mainly from the diversity of production conditions, both ecological and organisational, found in the Kenya coffee industry. Wallis² has demonstrated the variation in yields between the different ecological areas. The 1964 - 67 (3 year) mean ranges from 8.2 cwts of clean coffee per acre in Ruiru (7.2 cwts. East of the Rift) to 1.0 cwts in Nandi and Kaimosi (2.2 cwt. West of Rift). This variation is often overlooked and hidden in the total Kenya average (6.0 cwt in the same period). Wallis' data refers to estate production only, but there is no reason to doubt that similar diversity exists in small-holder production. Just as important as ecological heterogeneity are organisational differences; the range can be illustrated in

1. Huxley, P.A., Priorities in Arabica Coffee Research in East Africa, Kenya Coffee, 31, May 1966.

2. Wallis, J.A.N., Notes from Coffee Growing Districts, Kenya Coffee, 33, February 1968.

extreme form when one contrasts the five acre smallholding with two or three hundred coffee trees, perhaps a couple of dairy cows and a diversity of subsistence food crops are the one hand and the 500 acre estate with over 300 acres of coffee, a large acreage devoted to growing mulching material and perhaps 15 acres of fuel plantation on the other. The smallholder's family provides much of the necessary labour (a Farm Economic Survey Unit study¹ of 12 farms with mature coffee showed an average of 61% of coffee work was done by hired labour). Hired labour is paid at rates much lower than the union labour employed by the estates and the farmer and his wife provide some of the managerial and supervisory inputs which are so costly at the estate level. These are supplemented by government extension services and cooperative society facilities which are paid for indirectly through cesses on coffee sales revenue. Other inputs which are deducted directly in estate costings, such as transport, building and processing-equipment charges and road maintenances are financed in the small-holder sector either by co-operative union charges or by the general taxpayer. As the smallholder sells his coffee as cherry to the cooperative he is only concerned with quality directly to the extent of meeting the minimum cherry standard laid down by the cooperative society. The estates, on the other hand, are directly concerned with the quality of clean coffee produced as they have their own processing plant, and are therefore more likely to follow agronomic techniques producing cherry which will yield a high percentage of Grade A beans.

The concern of the smallholder for an optimum yield of cherry, as opposed to the estates aim of maximizing the value of output by adjusting both yield and quality, will lead to the adoption of different production techniques unless changes in production methods caused the same effect, both in direction and degree, on both yield and quality. There is some evidence to suggest that this is not always the case and that different policies for fertilizers and

1. Government of Kenya, Some Economic Aspects of Agricultural Development in Nyeri District, 1962, Report No. 21, Farm Economics Survey Unit, Aug. 1964.

mulching,^{1,2}, pruning,³, and spraying,⁴ are likely to have divergent effects on quality and quantity.

Another effect of the basic organisational differences between smallholders and estates is the different degree of adoption of labour-saving production techniques. Some methods of pruning have been adopted largely because they enable easier harvesting with a consequent reduction in picking costs; the increased use of herbicides to control weeds is also largely connected with the rising price of union labour. As smallholders can hire labour at unofficial rates, these cost considerations are not so pressing. Therefore labour-saving techniques which have the effect of reducing yields could be accepted as economically desirable on estates yet rejected by the smallholder. For example, the increase in mechanical weeding and spraying has been stimulated by rising labour costs on estates⁵ while smallholders find it cheaper to still rely on manual methods. Pruning techniques designed to facilitate mechanical operations will obviously have no attraction to peasant growers.

The multiple enterprise nature of smallholdings compared to the monoculture of the large estates leads to a divergence in decision making. One aspect of this is the different way in which profit is viewed in this type of farming as compared to estate assessments. This will be considered more closely later in the paper. The other main consequence of pursuing several enterprises is that some coffee inputs can be regarded as supplementary whereas these same inputs on coffee estates would be priced more highly. Apart from supplementary family labour resulting from troughs in the aggregate labour demand pattern; mulching and manuring

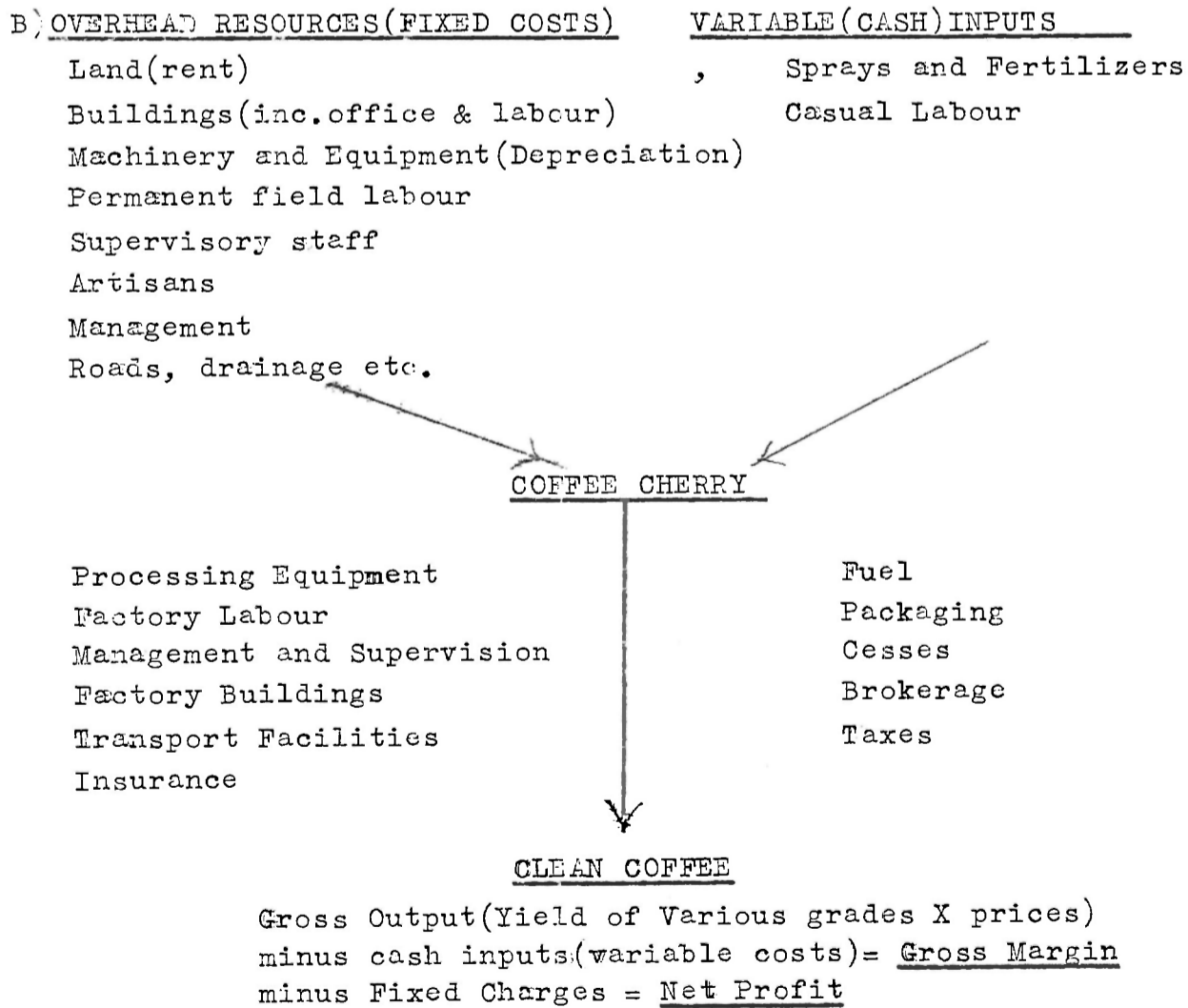
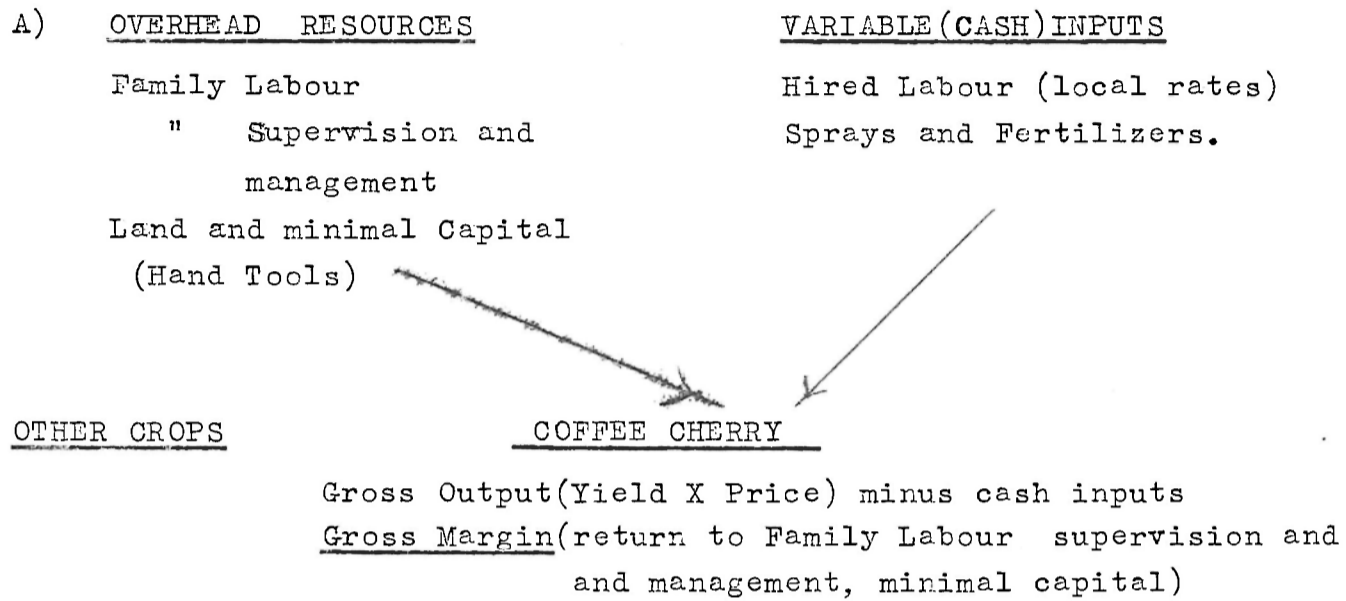
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1. Blore, T.W.D., Some Agronomic Practices Affecting the Quality of Kenya Coffee, Kenya Coffee, 30, 1965.
 2. Mehlich, A., Mineral Nutrition in Relation to Yield and Quality of Kenya Coffee, Kenya Coffee, 32, Nov. 1967.
 3. Fernie, L.M. Coffee, Pruning, Kenya Coffee Vol.31, April 1966.
 4. Wallis, J.A.N. The Quality of Arabica Coffee in Kenya and Tanzania Proceedings of the E.A.A.F.R.O. First Specialists Meeting on Coffee Research in East Africa, E.A.C.S.O., Feb.1966.
 5. Von Roretz, F.E. Pruning on Selian Estate. Kenya Coffee, Vol. 31. Nov. 1966.
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materials may be available as by-products of other farm enterprises. Thus a dairy enterprise would create a year-round supply of manure and possibly a supply of elephant grass (pennisetum purpureum) mulch resulting from a planned wet season excess over the dry season fodder reserve. Although perhaps few coffee smallholdings also have cattle, almost all grow maize as the staple food crop. Mehlich¹ has drawn attention to the usefulness of this crop in supplying mulch material. Although 5 tons of dry maize stover per acre is required for optimum nutritional benefits, and only about 20% of this requirement is produced by one acre of maize, the maize-acreage is quite often several times larger than the coffee acreage and where this is not the case the crop still contributes significantly towards mulch supplies. On estates, land set aside for mulching material may be considered to have an opportunity cost (next best alternative use) in terms of a greater coffee acreage even though it may be poorer land. As fertilizers and mulch

1. Mehlich, A. Production of Maize for Grain and Mulching Materials. Kenya Coffee Vol.31, March, 1966.

Figure One

THE BASIC COST AND ORGANISATIONAL STRUCTURE ON A) an ESTATE
and A) a SMALLHOLDING and B) an ESTATE.



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