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AGRICULTURAL DEVELOPMENT IN THE
COFFEE-BANANA ZONE OF UGANDA:
A LINEAR PROGRAMMING APPROACH. ||

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Summary.

The thesis is concerned with aspects of the agricultural development problem in the main robusta coffee growing area of Southern Uganda, an area of smallholding agriculture which has been termed the 'coffee-banana zone'. Part One of the thesis examines the physical parameters of the zone and also the economic, social, technical and institutional setting of its agricultural development problems. The second part considers details of data collection and planning methodology as well as presenting the results of the planning exercises and their policy implications for research, extension and agricultural development planning.

The basis of the zonal development problem (Chs. 3 and 9) is identified as the need to achieve immediate increases in agricultural production in order to facilitate the realization of longer term national aspirations involving the diversification of the general economy. The initially rapid development of the agricultural sector of the zonal economy is described in Chapter 4. Cotton was introduced at the beginning of the century and first this crop and later robusta coffee was integrated into the smallholding economy. Coffee prices began to decline in the mid-1950s, but production has continued to increase. The decreasing prosperity of the zone which accompanied the decline in coffee prices has forced planners to consider strategies for diversifying agriculture. Uganda's quota obligations, which resulted from her adherence to the International Coffee Agreement in 1962,¹ also introduced the problem of controlling the volume of coffee

¹As a result of Resolution 206 approved by the membership of I.C.O. in 1969, producing members were enjoined to take steps to bring production into line with suggested levels by 1972/73.

production. Diversification possibilities appear to be numerous, at first sight, because of the favourable physical environment of the zone, but market prospects are not good for many crops e.g. tea, and markets would appear to be limited to relatively small volumes in the case of others such as horticultural produce. This situation means that the diversification of agriculture must depend heavily on the expansion of such existing smallholding crops as maize, groundnuts, beans and cotton. These have fairly good export prospects and the fact that they are produced on the majority of smallholdings has the advantage of allowing the mass of the rural population to share in the benefits of any increases in productivity. It also means that the problem of diversification can not be separated from that of general agricultural development.

Another aspect of the problem concerns the effects of urbanization and rapid population growth, together with the slow growth of non-agricultural employment opportunities. These factors highlight the need to induce rapid technical change in order to keep the price of food from rising in an inflationary manner in the industrial sector and to feed the rapidly growing population without diverting foreign exchange from development purposes to food imports. They also involve an employment creation problem within agriculture which has fundamental implications for the type of technology which is advocated and the orientation of agricultural research.

The development of agriculture will almost certainly occur within the existing framework of smallholding agriculture (Chs. 7 and 11). Chapter 5 describes the main characteristics of this type

of farming illustrating the description with empirical data gathered during the field survey and from the results of the 1963 national agricultural census. The structure of the government services connected with agriculture and the major improvement approaches which they are pursuing are discussed in Chapter 7 and an evaluation of technical and economic research strategy is contained in Chapter 6.

Current approaches to agricultural development planning are analysed in Chapter 9. These approaches tend to be based on general improvement policies concerning better husbandry and higher yields derived without any formal reference to relative costs and returns in either private or social terms. Although recent discussions have focussed on the consideration of export prospects as an indicator of expansion targets, no comprehensive, quantitative framework for agricultural development planning currently exists. The planning approach considered in the thesis represents an attempt to construct such a framework. In essence the approach consists of using linear programming techniques to obtain a macro-optimum supply position by constructing a single stage model with regional resource levels and social prices. This nationally optimum position is contrasted with that indicated by the aggregation of a series of micro-solutions obtained from a two stage model incorporating farm-level constraints and using farmgate prices. The latter supply position is theoretically that to which farm production is tending, as opposed to the nationally desired position. By analysing the difference between the two equilibrium supply positions,

policies which can stimulate the desired resource reallocation can be evolved (Ch. 10). The phasing of such changes could be aided by utilizing a multiperiod planning model of the type described in Chapters 11 and 12. This model is valuable for handling problems of cash constraints and perennial crop establishment, and the uprooting and replanting which would almost inevitably accompany resource reallocation in the zone.

Data for testing the planning approaches were almost entirely absent in the zone and a major portion of the total research effort was devoted to their collection (Ch. 8 and the Statistical Appendix). Difficulties concerning sampling and recording errors and problems connected with the use and comprehensiveness of the data in the planning model were examined in Chapters 8, 9 and 13, together with suggestions for improving the specifications of the models (Ch. 13).

While retaining reservations about the details of the planning approach, the models reveal a current misallocation of resources (Chs. 10 and 13). Economically desirable policy adjustments indicated by the planning models and their implications for research and extension orientation are discussed and further investigations suggested. The issues involved in the choice of production techniques, population growth and coffee control are also examined in Chapter 10 and the final chapter.

This thesis attempts to improve the current agricultural planning process in Uganda. It examines the factors which are generally considered i.e. technical, economic and institutional; these are

inescapable ingredients of the improvement situation. In addition, a complementary procedure is investigated, which utilizes linear programming techniques to aid policy formulation by indicating a nationally optimum resource allocation position which is contrasted with an optimal aggregated farm-level position. No claims are made regarding total comprehensiveness, nor are the optimal supply positions absolutely definitive; such a position will not be achieved until further research and planning exercises are completed. The present research has, however, attempted to investigate the agricultural problem in a comprehensive way and has evolved a system which is both empirical and quantitative. It presents a valuable additional dimension to what is necessarily a broad and complex problem.