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AGRICULTURAL CHANGE IN KENYA: 1945-1960†

I. INTRODUCTION

Kenya is a country approximating 225,000 square miles, of which 5,191 square miles is open water, and 219,800 square miles land of various categories. It is a country of tremendous ecological variation from the tropical coastal strip to Afro-alpine conditions on high mountain ranges, and from stark deserts in the north to forests with over 80 inches of rainfall annually.

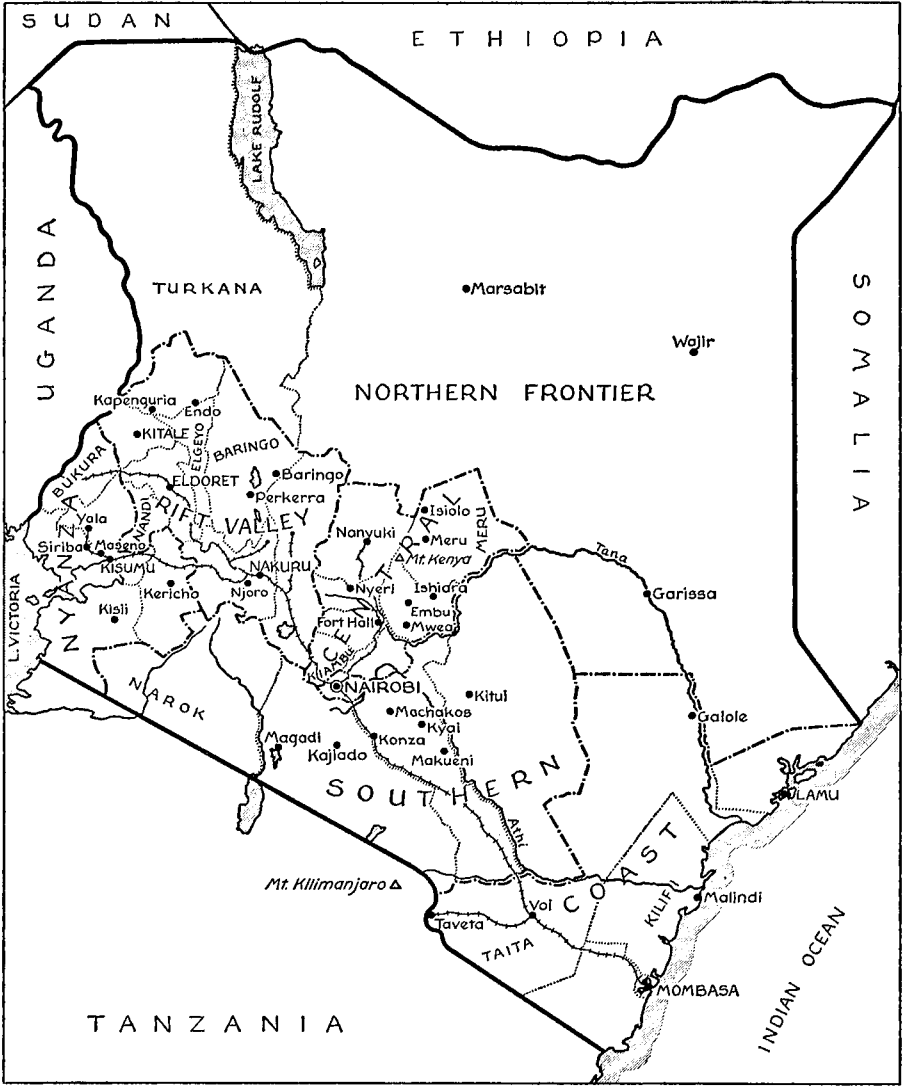
The complex plant ecological associations are further complicated by three rather distinct rainfall systems. East of the Rift Valley the rain normally falls in two short sharp seasons, March-May and late October-December, with marked drought in between and with one or other of these seasons predominating in different localities. In the Rift Valley and on the adjacent plateaus the peak rainfall months are from April to September. In the basin of Lake Victoria the heaviest rainfall occurs from March to May, with smaller falls later in the year and a subsidiary peak in November. This approximates more closely to one long rainy season than to two short, well-defined seasons, as occur east of the Rift. None of these rainfall patterns can be described as regular, and at almost any recorded station the fluctuation in total annual or monthly rainfall is great, e.g., at Kapenguria the average is about 55 inches and the range 24 to 84 inches. There is no such thing as a "normal" year in Kenya, a fact which affects the regularity of the cropping cycle.

The various interacting factors may produce quite sharp changes in climate

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KENYA

and ecological conditions even within a few miles, or on different aspects of the same topographical feature. Long acquaintance with the country is necessary before the agricultural potential of any area can be understood. However, one may say that Kenya differs from her neighbors, Uganda and Tanzania, in two main respects, one ecological, the other political and economic: (a) the relatively small proportion of the country receiving more than 30 inches of rain per year; and (b) the fact that a large-scale farming industry in the hands of European settler-farmers was deliberately encouraged as policy both by the British and the Kenya governments. These two basic differences have had a profound effect on the development of Kenya as compared with her neighbors, especially in the 1945-60 period.

(a) Ecologically, about 172,160 square miles (79 per cent) of the land area is semiarid or arid, having less than 30 inches of rainfall per annum. Of this, 134,172 square miles has less than 20 inches of annual rainfall and can be called semi-desert or desert. The land receiving more than 30 inches of rainfall per annum totals about 47,640 square miles and of this 5,171 square miles is in forest reserves and about 840 square miles is otherwise allocated. This leaves about 41,630 square miles of the higher rainfall areas available for agricultural pursuits.

Throughout East Africa the 30-inch rainfall isohyet may be regarded as the lower limit of reliable arable cropping. Below this level of rainfall cropping becomes unreliable and the land is more suited to stock raising. Minor variations result from the rainfall distribution; for instance, when 30 inches per annum falls in one rather long rainy season the reliability of cropping is higher than when it is divided into two seasons, each with less than 15 inches of effective rain. However, in broad terms the 30-inch isohyet bounds the country which is suitable for cropping. Since much land is occupied by forest reserves, mountains, steep slopes, lakes, and other areas where cropping cannot be undertaken, the land available for farming is considerably less than the total area with 30 inches of rainfall.

Using the simple rainfall criterion, however, the total area of land in Kenya receiving 30 inches of rain is about 47,640 square miles, in Tanzania 185,000 square miles, and in Uganda 94,000 square miles. The total estimated population of the three countries was, in 1945, about 4.9 million in Kenya, 7.2 million in Tanzania, and 4.6 million in Uganda. By 1960 these had risen to 7.13 million in Kenya, 9.24 million in Tanzania, and 6.69 million in Uganda. Thus in Kenya there were in 1945 about 6.1 acres of all types of land with more than 30 inches of annual rainfall per head of population. By 1960, owing to population increase, this figure had fallen to 4.3 acres. These figures compare with 16.4 acres falling to 12.8 acres in Tanzania, and 13.0 falling to 9.0 acres per person in Uganda.

It will be clear, therefore, that in Kenya there is, and has been for many years, more intense population pressure on land of high potential than in either of the neighboring countries. Moreover, most of Kenya's moister areas are in mountainous terrain, whereas large parts of the areas with 30 inches or more in Uganda and Tanzania are relatively flat so that the situation is probably even less favorable in Kenya than appears from these figures. These facts have led to high local densities of population in the most favorable areas, the much-publicized land hunger of the Kikuyu and other tribes, and, on the part of the advisory and

executive services dealing with agriculture, a more urgent and intensive approach towards land use than has been the case either in Uganda or Tanzania, even in ecologically similar areas.

(b) Of the total land surface of Kenya about 12,200 square miles, or 5.5 per cent, had been alienated to European or Asian farmers by 1960. Of this about 4,640 square miles is semiarid or arid ranching land, leaving 7,560 square miles with 30 inches of rain or more. Much of this is steep broken escarpments, on either side of the Rift, or running down to the lake basin, on which no arable farming is possible. The common assertion (for example 2), that the Europeans "grabbed" all the best land in Kenya leaving the Africans with the poorest, is therefore untrue.

The fact is that Africans have always owned rather more than four-fifths of the land available for agriculture receiving more than 30 inches of rain, including almost all of the most favorable areas. Early this century the areas alienated to Europeans were uninhabited or sparsely inhabited no-man's-land between warring tribes, areas in which the endemic disease of East Coast fever prevented occupation by pastoral tribes, or high cold lands in which the available native food crops of millet and legumes would not and will not thrive. To state that these now valuable lands were "taken" from Africans already living there and making use of them is simply wrong.

Whatever may now be said about these lands, the fact is that European settlers were actively encouraged by the British and Kenya governments to come to Kenya, take up residence, bring in their capital, and develop large-scale farms. This continued to be official policy until 1960. Economically, it was wise. Despite the relatively small proportions of the different classes of land in European hands (about 20 per cent of the high potential and 3 per cent of the semiarid and arid lands), these areas produced at least 83 per cent of the agricultural exports in 1945; even in 1960, despite strenuous efforts to develop the high potential African land with cash crops, the European areas still produced about 85 per cent of the exports and about two-fifths of the gross agricultural production. Moreover, the presence of a large number of demanding European settlers compelled the development of more sophisticated research and marketing systems (the latter often producer-inspired and voluntarily operated) than would have been necessary in a country inhabited only by small-scale peasant farmers, perhaps producing only an unreliable surplus for export. In particular, the European farmers produced the main stimulus to the development of a high-class livestock industry; no such industry was developed in other territories by government initiative.

These background facts and contrasts with neighboring territories must always be borne in mind when considering the development and changes in Kenya's agriculture. It must also be said that this development, in the period under review and for years before that, has never depended solely, or even mainly, on the need to ensure the best forms of land use or maximum production on a sustained yield basis. Partly because of the presence of European settlers, and partly for political reasons in Britain, development has always been bedevilled by a surfeit of politics. In the African areas, especially, it has been delayed, not only by the opposition of local politicians to anything inspired by government, but also by archaic forms of land tenure and tribal customs which the political situa-

tion made more difficult to change and which, through fragmentation and other handicaps, made sound farming a physical impossibility.

Despite these difficulties, immense strides in the development of agriculture in Kenya were made in the period 1945-60. Even if they were but a shadow of what, in the light of available technical knowledge, they might have been, they are still a remarkable example of what can be done in an unpromising demographic and ecological situation to better the livelihood of all types of farmers.

In tracing the course of this development the 1945-60 period may broadly be divided into three phases.

(1) A recovery phase, 1945-50, in which the main effort was directed to repairing the damage caused by the policy of maximum production for the war effort, regardless of long-term consequences, and which affected Kenya perhaps more severely than it did her neighbors.

(2) A planning phase, 1951-55, in which plans were laid for long-term agricultural development, including the well-known Swynnerton Plan for African areas and the complementary Troup report for the European farmlands.

(3) A rapid development phase, 1955-60, in which farm enterprise and production, both in African and European areas, were greatly accelerated, and which saw the agricultural revolution brought about in Kikuyuland by land consolidation. In 1960 this rapid development was brought abruptly to a halt in European areas by the British government's political volte-face with regard to European settlement in Kenya, but in African areas its momentum continues and the plans made in these latter years are still broadly the basis of agricultural policy in Kenya.

II. THE SITUATION IN 1945

In 1945, with World War II coming to a close, Kenya's agriculture was suffering from many ills, chiefly due to the deliberate wartime policy of maximum production of food grains from the land. This had led to a period of continuous exploitation of arable land to produce needed wheat and maize, and many other crops, without a commensurate input of fertilizers, soil conservation measures, or sound long-term farm planning. Many of the farmers in the White Highlands had halted development on their land while they joined the armed forces, and in the African lands continued cropping aimed at maximizing food production (to reduce the need to import food, and to supply the armed forces stationed in Kenya) had done lasting damage, the effects of which are still observable today. Soil erosion was rife all over the country, especially in some African districts such as Fort Hall and Machakos. Locusts had been menacing agricultural production since 1942, and were in 1945 being brought under control by great efforts. Rainfall in 1945 was lower than average, and had been for several years, accentuating the erosion problem. Finally, owing to the demands of wartime service, advisory staff and funds needed to deal with these pressing problems were quite inadequate to meet the situation. It was a time of great difficulty, but one for looking forward, and in his annual report the Director of Agriculture stated the departmental policy as follows:

European farming areas.—Basically "to ensure that the land of the country is used to the best advantage, giving the best returns to the individual farmer

commensurate with the maintenance of fertility" and the development of the colony as a home for a prosperous European community. The main lines of this policy consisted of:

(1) The stabilization of farming practices, and the endeavor to ensure that the practices generally adopted are those known or discovered to be best suited to the particular area concerned, having regard to the following factors:

(a) The maintenance and improvement of fertility and the prevention of degeneration of the land;

(b) Diversification of farming, giving a more balanced agriculture with fluctuations in market conditions and labor requirements spread over a number of activities;

(c) The introduction and fostering of stock husbandry as an integral part of the system;

(d) The state of demand for produce, both internally and externally, and the price levels for such produce prevailing or anticipated;

(e) Standardization and improvement of the quality of produce for export;

(f) Introduction, selection, and breeding of crop plants to fit them better with the farming economy;

(g) Protection of crops from pests and diseases by placing the means of protection within the reach of farmers, and by the application of compulsion in cases where individuals expose their neighbors to risk of infection;

(h) Collection and dissemination of information regarding prices, markets, costs, and methods.

To enable the above policy to be carried out the Department of Agriculture considered that two main services, a research service and an extension service to disseminate knowledge, were required.

Thus, for European agriculture there was a series of long-term aims, which, if not perfect, were at least a fair attempt to cope with the situation. To accomplish its aims the Department had sections dealing with general agriculture, economics, plant breeding, soil chemistry, plant pathology, entomology, grassland, coffee, sisal, and pyrethrum research, and general agricultural investigation and experiment. The established coffee, sisal, and pyrethrum industries, built up over the years largely by the efforts of European large-scale producers, were closely concerned with the research and general agricultural officers, and the Department kept in close touch with boards, committees, and other bodies representing particular industries. Parallel services were run by the Veterinary Department to foster the expansion and improvement of the livestock industry.

There was, in fact, a sophisticated Agricultural and Veterinary organization in being, prevented from carrying out its aims as well as it might have done mainly by lack of funds and staff. Although this organization was largely European-oriented, it also laid the foundations for most of the development which was later to take place in African areas.

African farming areas.—With regard to the latter areas it was considered that (8, 1945, pp. 8-9):

The African in Kenya has not yet arrived at the level of education which enables him, of his own accord, to plan his agricultural economy successfully. He has little knowledge of farming practices . . . no means of gauging the

effects of external factors on this economy. In his case, therefore, it is essential that his general farming policy shall, to a large extent, be dictated to him in the light of the experience and knowledge of officers of Government responsible for his welfare. Agriculture is the base and foundation of the whole existence of the native... Without prosperous agriculture... he cannot advance above a very low level in health, education and welfare...

At that stage, it was considered that the policy for African agriculture must include:

- (a) A sufficiency of food to maintain life, or the means (cash presumably) of obtaining that sufficiency.
- (b) Maintenance and improvement of fertility to enable an increasing standard of production.
- (c) Adequate nutrition to ensure a healthy population.
- (d) The production of marketable products from the land sufficient to enable those living by agriculture to obtain their cash requirements.

The general lines advocated to put this policy into effect were:

- (a) The production of cereal and other food crops in areas of good rainfall, grown in rotation with grass leys, with sound stock husbandry integrated with the arable.
- (b) Dairying, or production of other stock products, in areas of lower rainfall, with arable cropping reduced.
- (c) The adoption of necessary measures to maintain fertility, including fencing, closure of steep slopes and river banks to cultivation, rotational grazing, etc....

It was generally felt—and this proved to be a major error—that cooperative effort was the best way to achieve the desired results and that individual holdings should be discouraged. It was also recognized that cash crops were necessary, though the tendency was to suggest low-priced crops such as cotton and wattle as suitable for Africans. There were many opponents to cash cropping by Africans but it was considered evident that, “so long as the fertility of the land does not deteriorate, and the nourishment of the people is adequate, cash crops should be encouraged” (8, 1945, pp. 8-9).

A set of aims, similar to those in European areas, was then enumerated. Finally, the Department of Agriculture observed that “The results of some 25 years work on these lines has been to indicate clearly that unless some direct pressure is applied to urge methods or practices, and unless such pressure is continually applied the results obtained are extremely slow. Localized improvements... have by no means made up for, or even halted, the general deterioration rapidly going on.” Compulsion, to prevent deterioration, was thought to be necessary (8, 1945, pp. 8-9).

These views may seem surprising at the present date, but at the time they were clearly a reflection of the problems facing the Agricultural Department in African lands, where soil erosion, overgrazing, and famine, threatened or actual, were the most obvious features of existence. The Department often has been unjustly attacked for attempting to deal with these problems in the way it did, but they had to be dealt with, and the extremely slow and localized results obtained

purely by persuasion were inadequate to stop the rot that was all too evident.

Clearly, however, there was no real realization of the very high quality of much of the African lands, the appalling appearance of which disguised the reality of abundant potentially fertile soil in adequate or good rainfall. Further, there seems to have been no realization whatever that, while it might be possible to prevent soil erosion by legislative pressure, progress towards better farming systems in African areas depended upon radical land tenure reforms, the availability of credit, and the widespread introduction of high-priced cash crops and good quality stock.

This then was the background of agricultural thinking at the beginning of the period under review.

III. GENERAL ACCOUNT OF DEVELOPMENT: 1945-60

The "Recovery" Phase: 1945-50

1946 was a year of generally low rainfall until the break of the short rains in October east of the Rift. Locusts and local famines were still troublesome. The general policy remained one of maximum production, though it was noted that the effects of this policy were becoming more and more serious, with the ill effects on the land cumulative and rapidly increasing both in African and European areas. Soil conservation in Central Province received a setback "owing to the exhortations of ignorant politicians" (8, 1946, p. 18). However, there was an increase in the overall value of agricultural produce exported, from £4.7 million in 1945 to £5.6 million in 1946 (19 per cent).

Policy and practice continued virtually the same in 1947 and 1948. Maximum production was still aimed at, with misgivings as before about the effect on the land. All the available machinery of the Soil Conservation Service was in use on the "non-native" areas, and in African areas virtually the whole time of the agricultural staff was devoted to soil conservation. By means of continuous pressure a great deal of work was achieved, though it was continually hampered and opposed by African politicians, and in Fort Hall District the outstanding communal effort partially collapsed. But good rains in 1947 meant an abundance of food in most areas and famine and locusts were both less troublesome. Wartime restrictions and controls on exports were relaxed or modified to some extent, easing the flow of some commodities such as coffee and tea. Coffee prices began to rise. Shortage of farm equipment (tractors, harvesters, etc.) and of good foundation stock hampered development in the European areas, which would otherwise have been more rapid.

The 1949-50 biennium resulted in a change of emphasis. In 1948 it had been at last recognized by several officers of the Agricultural Department that fragmentation of land, stemming from African inheritance and land tenure customs, was the most serious obstacle to development. Basically, two lines of thought evolved at this time. One sought to combat fragmentation by "group farming" which involved the cultivation of a large area of fragmented land, by a group of people, either by hand or mechanically. In this system, which had some temporary effect in Nyanza Province, each man would retain his fragments but these would be farmed more efficiently than when cultivated individually in the normal way.

The other, more radical, stemming largely from the Central Province, inhabited by the individualistic Kikuyu, sought to do away with fragmentation by consolidation and subsequent individual ownership. This was generally regarded with alarm and indeed horror by the provincial administration, but was adopted as departmental policy by a District Agricultural Officers' conference in Central Province in 1950. A further result of that conference was the production of the first Provincial Agricultural Policy, coordinating the practice as well as the aims of the Agricultural Department in the seven districts of Central Province. This work was to set the pattern for most African agriculture today.

By the end of 1950 soil control had been very largely achieved and officers of the Agricultural Department and others could turn with relief to more forward-looking policies, involving the development of sound, long-term farming systems both in European and African areas. First steps in farm planning had been taken in the European areas, and research had produced some of the needed tools for development. The stage was set for the next, or planning, phase of development.

This "recovery phase," however, had had serious ill effects, particularly in the poor relations that existed in African areas between agricultural staff and the people. Several years of pressure (with a fair amount of compulsion to back it) to achieve the necessary soil conservation measures, and against the continuous opposition of African politicians, had left the Agricultural Department's field staff among the most unpopular men in the whole country. Had more thought been devoted in 1945 to the real and underlying causes of soil deterioration more forward-looking policies could perhaps have been adopted earlier with more rapid and far-reaching results.

Materially, the value of agricultural exports had increased from £4.7 million in 1945 to £14.8 million by 1950; a considerable part of this very large increase of around 250 per cent was due to an increase in world prices. Coffee in particular began to dominate the economic situation to a greater degree than hitherto; output valued at £3.5 million was exceeded only by sisal at £4.1 million.

The Planning Phase: 1950-55

With soil erosion, famine, and locusts receding into the background, except as local problems, it was possible by about 1950 to turn to long-term planning aimed at maximum production on a sustained and increasing yield basis. The urgent need for such planning was underlined by the results obtained from the World Agricultural Census 1950 and by the Kenya population census 1948. The latter indicated that there had been a sharp increase in population and that the rate of increase might be accelerating. The World Agricultural Census 1950 confirmed that, in African areas, yields were generally low, and that fragmentation was a crucial obstacle to good farming in all densely populated districts. Radical changes in land tenure were necessary if output from much of Kenya's most fertile land was to be increased.

In September 1952 the Mau Mau Emergency broke out, which had two main effects. It seriously delayed departmental plans for the more rapid development of cash crops and good farming in the Kikuyu, Embu, and Meru districts and disrupted staffing and extension work because of the calls on manpower and the actual danger to staff involved. Secondly, it made possible a far more thorough,

immediate, and far reaching attack on the crucial problems of land tenure in Kikuyuland. The government's proposals on this vital matter would certainly have been much less comprehensive if they had been (as would certainly have been the case in "peacetime") consistently opposed by local politicians and agitators. One effect of the Emergency, in fact, was to make possible the rapid voluntary consolidation of the Kikuyu lands, thus placing the Kikuyu tribe in the position to make the "Great Leap Forward" in agriculture which the potential of their land so amply justified.

In 1953 the Royal Commission on Land and Population visited Kenya and other East African territories. They were asked to survey land resources in relation to population in the three territories and make recommendations for the future. The urgent need for land tenure reform and accelerated development in the African lands was vigorously pressed upon them at every opportunity, but in the end they made only rather cautious recommendations on these vital points. Their main conclusion was that Kenya's population problem could best be solved in an East African concept and they recommended a nonracial approach to land use.

The outbreak of the Emergency focused attention more sharply on the productivity of land in Kenya. It was as necessary to increase productivity on the European lands as in the African lands, firstly to raise the general standard of living and secondly to allay criticisms that land was not properly used. Two important complementary reports were produced in 1953 and 1954. The Troup report made provision for increased field and research services, especially in farm planning, in the European areas, and gave forecasts of the increase of production that would be possible as a result. The Swynnerton Plan, issued in 1954, recommended large increases of advisory staff, land consolidation, and farm planning services and set targets for greatly increased cash crop production in African areas.

These two plans coincided with the passage of a new Agriculture Ordinance, amalgamating and improving upon previous legal provisions. The main feature of the agriculture ordinance was to place agricultural development under two main boards, the Boards of Agriculture Scheduled and Nonscheduled Areas, dealing with European and African areas respectively, with provincial and district committees beneath them on which the individual farmers were to be represented.

Unfortunately, however, these three important measures were never properly coordinated from the top and it is no exaggeration to say that the average district agricultural officer in the African areas was unaware of the provisions of the Troup report for the European areas, and regarded the Agriculture Ordinance as a factor scarcely affecting African areas at all. Because of this failing at ministerial and head office level, the chance of coordinating all agricultural effort in Kenya into one far-reaching land use plan was lost at a time when such a measure would have been politically possible, indeed welcome.

Nevertheless, the "Planning Phase" concluded in 1955 with forward-looking long-term policies available, based soundly on the increasing research results for most parts of Kenya whether inhabited by Africans or Europeans. Land consoli-

dation in the Kikuyu districts was gaining momentum, so that there was some real chance in these districts of putting into practice the policy proposals. (There was little chance in other African areas because of fragmentation.) Some much-needed extra advisory and research staff had been obtained and were at work, gaining experience of the problems that faced them. Finally, there was a sharp increase in the planting of cash crops in African areas, and accelerated development of sound farming in the European areas.

The gross value of agricultural exports of the country rose from £14.8 million in 1950 to £22.7 million in 1955. Internally, the large surpluses of maize derived by unwise exploitation of the land in some African areas, notably in Nyanza Province, began to fall, the loss in income being made up by increased production of other crops in some cases but not all. Coffee, worth £8.9 million, was by far the most valuable single export, no other product exceeding £3 million.

The Development Phase: 1956-60

This was a period of rapid development and consolidation of progress made in the previous five years. It was the time of the "Agricultural Revolution" following the recommendations of the Swynnerton Plan. Land consolidation went ahead rapidly in Kikuyuland and was completed in three districts and the more productive parts of a fourth by 1960. The actual area involved as of June 30, 1960 was 884,000 acres belonging to 148,000 farmers in Central Province. A further 250,000 acres was in process of consolidation. Enclosure of unfragmented high-potential land in Rift Valley and Nyanza provinces affected 989,000 acres belonging to 65,000 farmers. The total area consolidated or enclosed, 2,925 square miles, was about 6.8 per cent of Kenya's high potential land and about 8 per cent of such land in African areas, while about 213,000 smallholders (about one-fourth of all smallholders) were now in a favorable position to make the best use of their land.

The Swynnerton Plan recommended large increases in the acreage of cash crops to be planted in African areas. These, to some extent, satisfied political demands to be allowed to grow the same crops as European settlers but, far more important, they enabled the small grower to obtain his cash requirement from a small area of high-value crops as opposed to a much larger area of low-priced food crops. Far from competing with food production, as many unthinking observers have implied, introduction of cash crops actually released more land for food production, especially for livestock products. In some districts consolidation of fragmented lands was coordinated with cash crop development; in others cash crops were planted on fragmented parcels of land. This later led to difficult situations tending to fix the fragmentation pattern because long-term crops were in situ on fragmented land.

The large extent and profound value of this advance has not even yet been fully appreciated outside Kenya, but it has formed a sound foundation for accelerated development by the present African government and has persisted while "cooperative" and "collective" approaches have disappeared.

In the European areas, rapid progress toward sound development was made, spurred by new advances in research, loans, and funds. Particularly noticeable

was the increase in value of the livestock industry. Flocks of good quality woolled sheep became noticeable in many places partly undeveloped before. Had this development been allowed to continue unhindered the value of Kenya's agricultural industry would today be much higher, particularly in the field of quality livestock. But at the end of 1960 the British government altered its policy toward European settlement in Kenya, and made it clear that instead of aiming at a multiracial government this was to be replaced by an entirely African-dominated state. The resulting feelings of insecurity brought down land values in the European areas with a crash and halted, for the time being, most long-term development including the development of pedigree herds of livestock.

During this period the total value of agricultural production increased from £22.7 million in 1955 to £31.2 million in 1960. This took place despite a fall in the price of coffee, the largest single agricultural export, from £517 per ton in 1954 to £388 in 1960 and a general worsening in the terms of trade for primary products. By the end of 1960 the African share in the cash sector of the agricultural economy was rising rapidly, with the prospect of a still more rapid rise to come as the large cash crop plantings made under the Swynnerton Plan came into bearing.

The claims made for the benefits of land consolidation and farm planning could be abundantly demonstrated in the field and, as opposed to a handful of progressive men in each district, there were now hundreds of relatively prosperous smallholders in each of the three Kikuyu districts, Embu, and in the Kalenjin districts of Elgeyo, Nandi, and Kipsigis. The Luo tribe, all coastal tribes, and the Abaluhya and Kamba peoples continued to struggle in the morass of archaic land tenure customs from which their political leaders helped to prevent their emergence, with only small local advances toward good farming possible.

IV. CHANGES IN THE ORGANIZATION OF PRODUCTION

It should be made clear at once that the organization of production differed greatly between the European and African farming areas of Kenya. In the European areas a Board of Agriculture coordinated activities and production committees in each district, formed during the War, approved schedules of crops to be planted and in some cases directed the farmers as to what they should plant. In 1954, a new Agriculture Ordinance was passed, which replaced the functions of production committees by district agricultural committees. In general, however, in the European areas production of even food crops was organized. There are, in consequence, reasonably accurate figures available for the major food and cash crops produced by European farmers in this period and for the livestock population by classes on the large farms. These figures appeared in published reports from 1954 onwards. This also applied to the small Asian farming industry, producing chiefly sugarcane in the Kisumu area.

In African areas the situation was far different. Africans planted what food crops they wanted for themselves, usually in mixtures. If a surplus arose through a good harvest, they sold it. Certain cash crops such as cotton and wattle were a little more closely controlled but there were no accurate records of acreages or yields. Prior to the 1950 census of agriculture there was no real statistical information on which to base estimates of the acreage cultivated per family or the

yield of produce obtained. Any figures for estimated total production prior to 1950 are purely informed guesses. Much the same applies to estimates of live-stock numbers, for instance, by a computation based on the number of rinderpest doses administered. The Veterinary Department, responsible for the livestock industry, never attempted an accurate stock census in African areas.

The statistics which follow must all be considered in the light of the above remarks. For the European farming areas they are reasonably accurate. For the much larger African areas they are only an estimate, and frequently a very rough estimate. Even the 1950 and 1960 sample censuses of agriculture did not cover the whole of the African areas, and the results from the two are in some respects so conflicting as to be quite meaningless. Only for certain plantation crops, such as coffee and tea, are the figures for African areas reasonably accurate.

Area farmed.—The area farmed in Kenya can be roughly divided into four classes:¹

(a) Mixed farming or plantation cropland under secure tenure permitting long-term development—about 3.5 million acres.

(b) Land of similar ecological potential but occupied under native law and custom, which generally resulted in fragmentation, shifting cultivation, etc. and effectively inhibited development—about 10.6 million acres.

(c) Land suitable for ranching held under secure tenure permitting the development of a sound livestock industry—about 4.35 million acres (the total alienated area less (a) above).

(d) Similar land under native law and custom, usually resulting in nomadic habits, unlimited stock increase, lack of control over numbers and movement of stock, and erosion and destruction of the habitat, thus inhibiting the development of a sound livestock industry in these areas—about 162,000 square miles (the land area of Kenya less the above categories, forests and national parks, etc.). In practice this figure would be lower as these are parts of Kenya almost totally uninhabited, but it would not be less than 100,000 square miles or 64 million acres.

Thus, of the total available area, the great majority of the land could not be said to be "farmed" at all, since the use of that term implies order, planning, and system. It is questionable whether any land under shifting cultivation with tumbledown fallow can be said to be farmed. However, to limit the definition of farmed land in this way would eliminate most of the land occupied by Africans, even some consolidated land, which is not farmed efficiently by the owners though they may have secure title to it. Much of this African land was cultivated and produced some agricultural produce. The subsistence sector of the agricultural economy was, in 1960, estimated to be about three-fifths of the whole by the present writer.

In attempting a more accurate assessment it is necessary to split the country into areas farmed by Europeans and Asians for which there are reasonable records, and areas cultivated or occupied by Africans for which the records are very unreliable. In regard to the former land—the scheduled areas—the situation was as follows in thousand acres (based on 3):

¹ Author's estimates based on figures supplied by Lands Department.

	1955	1960
Arable crops	570.1	578.8
Plantation crops	399.2	493.6
Planted leys and fodder	128.7	286.7
Grazing or fallow	4,974.2	5,410.0
Total area farmed	6,072.2	6,769.1

It will be seen from the above that there has been a large overall increase in the acreage farmed in the scheduled areas, and considerable changes in the detail of land use and development. In particular, the land under grass leys, fodder crops, etc. more than doubled between 1955 and 1960, reflecting the greater intensity of arable farming. No accurate census figures have been officially published for European areas prior to 1954, and earlier reports of the Board of Agriculture were not available to the writer. Had they been available, the figures would undoubtedly have shown a more striking increase in the area farmed, as much postwar development had already taken place by 1955. The area farmed in 1960 compares with the total of about 7.7 million acres for all holdings in the scheduled areas, indicating that by 1960 nearly 88 per cent of the scheduled areas had been developed to a varying extent. The balance includes undeveloped and unusable land, and patches of forest retained on steep slopes or for fuel and poles.

In African areas the available estimates must be based upon two sample censuses of agriculture, made in connection with the 1950 and 1960 world censuses of agriculture and extrapolated in relation to the total population. From the latter should be deducted the total of purely pastoral tribes, such as the Masai, Somali, Boran, Rendille, *et al.*, who are largely nomadic and cannot, in general, be said to farm any land, though they utilize huge areas after a fashion. The area "farmed" is thus confined to the agricultural peoples who do undertake some form of cultivation.

Unfortunately, the two agricultural census figures conflict wildly in regard to African farming. The average area under cultivation per head of population in 1950 was estimated at .7 acre in the Nyanza and Central provinces and about .86 acre in Kenya at large, giving a total area cropped of 4.5 million acres. In 1960 the average area cultivated per head was estimated at .38 acre in the sample areas, resulting in a total area under crops of 3.2 million acres, much less than in 1950.

This apparent decline is manifestly inaccurate; the area under cultivation in 1960 was certainly markedly larger than 10 years previously. Farm population increased by some 30 to 40 per cent and the area cultivated per head of population was probably close to .4 acre throughout this period, as indicated by the 1960 census. In certain areas increased use of oxen and even tractors would have resulted in some increase in the area cultivated per head in 1960 as compared with 1945. In total, however, this effect is not likely to have been very large. Moreover, in some areas limitations on land available for expansion probably led to reduction in cultivated area per head of population because of the rapid growth of farm population that was taking place. On balance, it seems likely that there was some small decline in area cultivated per head of population, at least since 1950. It will also be evident, by comparing the total area farmed with the figure of 10.5 million acres of potential mixed farming land available to Africans in 1960, that

there can have been no real land hunger in 1945. By 1960 about 76 per cent of the farming land available to Africans had been utilized to a degree, but as compared to the land in the scheduled areas the usage was far less intensive, and in many areas sound long-term development was still impossible because of the existing land tenure customs.

Livestock production.—Reliable figures for livestock populations are only obtainable from European areas; figures for African areas are generally rough estimates. As stated, the Veterinary Department never attempted a full stock population census in African areas.

In the European areas there was a steady increase in the numbers and quality of most classes of livestock during the period. The development of the European stock industry is broadly indicated by the figures in Table 1.

Thus in the European farming areas the numbers of livestock increased to about 2.5 times of the level 20 years earlier, and there was a tremendous parallel improvement in quality. This was particularly noticeable in the huge increase in the numbers of purebred sheep, the sheep industry having moved from one based upon native foundation stock mainly for meat in 1940 to one based on exotic sheep for wool and meat by 1950. There was also a very great improvement in the quality of dairy cattle, not adequately brought out by the figures for increase in pedigree animals only; grade also improved. Between 1955 and 1960 the average yield per cow improved from 214 to 238 gallons (3, p. 28), and the numbers of work oxen decreased as more and more tractors came into use. Thus in 1948, there were 82,513 work oxen, 76,999 in 1950, 33,300 in 1955, and in 1960

TABLE 1.—LIVESTOCK POPULATION IN THE EUROPEAN AREAS OF KENYA, SELECTED YEARS 1940 TO 1960*
(Thousand head)

	1940	1949	1955		1960
			Unadjusted	Adjusted	
Cattle					
Pedigree	...	5.9	...	...	17.9
Grade and native	...	583.4	...	...	961.6
Total	326.7	589.3	769.3	809.8	979.5
Sheep					
Purebred	1.1	263.2	...	...	457.2
Other	310.9	25.8	...	...	125.4
Total	312.0	289.0	352.9	371.3	582.6
Goats	2.2	...	...	...	...
Pigs	35.9	55.6	35.9	37.8	50.5
Horses	4.1	6.5	5.5	5.5	4.6
Total all animals	680.9	963.2	1,163.6	1,224.4	1,617.2

* Census data for 1955 and 1960 are for farms of 20 acres and over in the "Scheduled" areas; data for 1955 were officially adjusted to cover the same geographical area as the 1960 census. Estimates for earlier years may differ in coverage. Sources of data are as follows: 1940 from Kenya *Agricultural Census, Scheduled Areas*, cyclostyled report; 1949 from East Africa High Commission, East African Statistical Department Kenya Unit, *Statistical Abstract 1959*, p. 66 except cattle, from *Agricultural Department Annual Report 1949*, p. 14; 1955 unadjusted and adjusted from East Africa High Commission, East African Statistical Department Kenya Unit, *Kenya European and Asian Agricultural Census 1958: An Economic Analysis*; 1960 from *ibid.*, 1960: *A Statistical Analysis*.

they are not mentioned. The numbers of pigs fluctuated according to market demand and reached a peak of 70,000 in 1958. Small flocks of goats continued to exist, both Angora goats for wool and native goats for meat, but their numbers are relatively insignificant. European farmers do not generally welcome goats, in some ways a mistaken attitude.

In African areas the livestock population likewise increased, but at a rather slower rate. Cattle increased from about 3.9 million in 1948 to about 6.5 million in 1960, though rather lower figures recorded since then indicate this may have been an overestimate. Most of the increase took place before 1955. Fluctuations in the rate of increase of African-owned stock were the result of disease, droughts, and the overgrazing and bad management which aggravated the effects of both.

The increase in numbers, with small exceptions, was not accompanied by improvement of quality. Indeed, in some overgrazed and eroded areas the reverse was noticeable. When controlled grazing schemes were instituted in pastoral areas, coupled with field abattoirs to provide an outlet for scrub stock, an overall improvement in quality was noticeable in a short time.

Unfortunately, only very vague estimates are available to show the rate of increase. The Veterinary Department does not appear to have attempted a stock census, even for its own information, except at long intervals on an ad hoc basis. The Department's figures given below indicate that the African-owned cattle population must have nearly doubled in the period under review, with the rate of increase slowing after 1955. By that date disease control measures had been largely effective while the adverse results of bad management were increasing. Estimates in thousand head are as follows:²

	1948	1950	1955	1964
Cattle	3,926	5,500	6,300	6,500
Sheep	} 6,942	{ 2,500	3,700	3,300
Goats			3,400	5,100
Camels	...	300	300	1,250
Total	...	12,800	13,700	16,150

It is, of course, impossible that camels could have increased from 300,000 in 1950 to 1.2 million in 1964. They must always have been there, without much variation in numbers, but were largely disregarded and unrecorded even though they are the most important class of stock for the pastoral tribes of the vast arid areas in Kenya's north.

In general the increase was a reflection of the spread of disease control and, to an extent, of the increase of population among pastoral tribes (which was demonstrated by the 1962 population census to be similar to that in agricultural areas).

As every pastoral family requires a certain number of stock to live, human increase tends to be accompanied by stock increase unless the latter is controlled. Disease control at first accelerated the natural rate of increase, and usually led to excessive stock numbers, severe losses during droughts, overgrazing, and permanent damage to the environment. In a number of pastoral areas attempts were made to establish controlled grazing schemes, usually involving a *reduction* in the number of stock in the area. By 1960 about 11,000 square miles (7 million

² Department of Veterinary Services figures compiled by the author from various published and unpublished sources, for example 8, 1950, p. 15, and FAO; *East African Livestock Survey*, 1967.

acres) had been affected by grazing schemes, but after 1960 most of these lapsed, due to a combination of the effects of severe drought and administrative weakness.

It should be added that this dismal picture of bad management and poor quality stock-keeping would have been reversed in some districts, notably Ki-kuyuland, Elgeyo, Nandi, and Kericho, if government policy had permitted it. Farmers in these districts were anxious to keep good quality European breeds of dairy cattle, but the policy of the Veterinary Department was to improve the local Zebu stock by the introduction of Sahiwal bulls or the use of Sahiwal semen and to discourage the introduction of European dairy breeds except under very strict control in optimum conditions. African farmers were, generally, not interested in Sahiwals which they regarded (with some reason) as very little better than what they had. Artificial insemination schemes with semen from European bulls (mainly Guernsey) were used to an increasing degree from 1955 to 1960, but for smallholders these schemes faced obvious difficulties and were never adequate to satisfy the demand. When, after 1960, control over the introduction of European breeds to African areas likewise lapsed there was an immediate rapid increase in the numbers, from about 27,000 in 1960 to 54,000 in 1964, while in many cases Africans, by individual attention to their animals, obtained higher milk yields than had the large-scale farmers who previously owned them. Had European breeds been used on a larger scale and much earlier to improve the African-owned stock in suitable areas, the productivity of African-owned cattle in such areas would today be much higher than it is.

At the other extreme may be mentioned a classic example of a stock population crash through mismanagement. The total number of cattle in Kajiado District, Masailand, was estimated at 347,000 in 1942-44, 450,000 in 1955, and 680,000 in 1960. It rose to a peak of 737,000 in 1961 but in that year, due to a combination of disastrous drought and unprecedented floods, aggravating the overgrazing situation, the Kajiado Masai lost 65 per cent of their stock, the numbers falling to an estimated 203,000. The capital loss was of the order of £2-£3 million and the government was forced to spend large sums on famine relief in Masailand. This catastrophe, repeated on a lesser scale elsewhere in Kenya, was the direct result of disease control, improved water supplies, etc. without commensurate improvement in rangeland management through the control of stock numbers and movement.

Farm Organizational Practices

Tenure.—It is impossible to divorce farm organization from land tenure. Without a satisfactory system of land tenure there can be no organization other than very short-term and uncertain arrangements. Secure tenure, whether for an individual or a group, permits long-term development, though it does not always follow that this takes place. Insecure tenure, such as that involved in most shifting cultivation and nomadic pastoral systems, inhibits sound long-term development, as it is simply not worth anyone's while to undertake this even if he wishes to. Insecure tenure, in fact, renders full production through efficient organization a physical impossibility. The manner in which land is held is therefore of paramount importance in farm organizational practice.

In Kenya, in the period under review, four main types of tenure emerged:

(1) Alienated land in the scheduled areas, held under freehold title or long lease (99-999 years) or available for such tenure. Tenure was secure, encouraging long-term development (until 1960).

(2) Land in African areas held under native law and custom either by pastoralists or agriculturists. This usually involved a right of usufruct and sometimes moderately secure tenure, though fragmentation resulting from inheritance customs usually precluded actual individual ownership or sound long-term development.

(3) In African areas, from 1955 onwards, enclosed and consolidated land became eligible for registration and freehold title, thereby substituting a secure form of tenure for an insecure form.

(4) Unallocated Crown land (later to become national land), forests, national parks, and townships. Some of this might be put to some use, often illegally, but no individual held secure tenure in it.

The broad allocation of the different classes of land in the period concerned is set out in the tabulation below based on Lands Department annual reports (13, *thousand acres*):

Class	1945	1950	1955	1960
(1)	7,100	7,866	8,499 ^a	7,540
(2) ^b	111,329	111,334	107,117	110,354
(3)	—	—	—	1,873
(4)	17,216	26,790	25,747	25,869

^a This figure includes land available for alienation but not alienated.

^b These figures include the arid areas of the Northern Frontier District and Turkana which, though theoretically Crown land, were in practice reserved for nomadic tribesmen and not available to anyone else for development purposes; a proportion was good-class ranching land.

The significant changes since 1945 have been (1) the steady development (because of secure tenure) of land in Class (1), and (2) the increase of land in Class (3) between 1955 and 1960, which represents an agricultural revolution of great significance in rural Africa. The figure appears small, but in effect amounts to about 8 per cent of the high-potential land of more than 30 inches of rainfall in the total area of Class (2) land. In the entire extent of this land, it is only on land eligible for registration and title that farming can be planned and organized on a long-term basis. It is of interest to record that consolidation and registration of high-potential land has been official government policy since independence in 1963.

Rotations and fallows.—The wide variations in ecological conditions, coupled with many different tribal land tenure customs, result in a great variety of rotational and fallow practices in Kenya. Broadly speaking, however, there are three main categories:

(1) Deliberate rotation of crops followed by a planted fallow, usually a grass ley for productive livestock, alternate husbandry, or ley farming. Only small areas in either European or African areas were farmed to this standard in 1945. However, by 1960 there had been a large increase, made up of planned farms in African and European areas, farm layouts, and the land of many farmers who had developed their land more or less intensively without farm planning or layout by government staff. In African areas only a proportion of the total acreage affected

by farm plans and layouts (175,967 acres in 1960) was operative; there were many who did not put their plans and layouts into practice. There were perhaps 250,000 acres of such intensively farmed land in African areas. This figure may appear small, but it represented an increase of several hundred per cent over the area in 1945, which can only have been a few hundred acres. In the European farming areas the total of planned farms was 347,597 acres, but this figure does not represent the total area intensively used as many farmers had developed their own farms without a formal plan. For instance, the area of planted leys and fodders had risen from 128,700 acres in 1955 to 286,700 in 1960. If each acre of such crops indicates three other acres intensively managed, the area intensively used in European areas would have been in the region of 1.1 million acres, and the total in Kenya about 1.4 million acres.

(2) Semideliberate succession of crops followed by reversion to fallow, usually grassland, which might be more or less enclosed and managed for grazing. The majority of the remainder of the European mixed farming areas, perhaps about 2.4 million acres, would fall in this category together with large areas of African land, especially in Kericho, Nandi, and Elgeyo districts. For instance in Kericho District in 1954, 58 per cent of the total area of about 1,000 square miles was estimated to be soundly farmed; by 1960 this estimate would have been increased to about 700 to 800 square miles of land enclosed and alternated between arable and grazing. The total of such land in African areas might have amounted to about 1.7 million acres, for a total of about 4.1 million acres in Kenya as a whole. Virtually the whole of this development in African areas took place between 1945 and 1960.

(3) Shifting cultivation to exhaustion followed by reversion to tumbledown bush and weed fallow, sometimes natural grass, not managed and subject to communal land tenure and grazing practices once out of cultivation. The whole of the rest of the cultivated African areas, probably about 6 million acres of land actually brought under cultivation at one time or another, falls into this category.

Although these figures are only broad estimates based largely on the writer's own experience, they indicate that between 1945 and 1960 there was a substantial improvement in rotational practices in Kenya. From a small area in 1945 (no estimate available, but certainly less than one million acres), the area of mixed farming or cropping land under good farming practices increased to about 5.5 million acres, representing about 48 per cent of the land which actually was under mixed arable farming in 1960 (about 11.5 million acres).

It is fair to add that in some of the remainder, under shifting cultivation, progress that might have been made was effectively shackled by African land tenure customs rendering sound farming a physical impossibility.

Cultivation techniques.—Farmlands in Kenya are cultivated by three principal methods:

(1) Tractors or similar machinery, chiefly in large-scale farming areas but also in smallholder areas to an increasing extent.

(2) By oxplough (no equines are used for ploughing in Kenya), in which category much of the flatter African farmlands are found.

(3) By hand, the traditional method, which persists in backward areas and on steep slopes where neither tractors nor oxploughs can be used effectively.

It is impossible to estimate quantitatively the changes that have taken place in these techniques since 1945. However, it is certain that there was a reduction in hand cultivation in favor of oxploughing in African areas and an increase in tractor cultivation as an advance on oxploughing both in European and Africa areas.

In European areas, for instance, the number of work oxen fell from 82,000 in 1948 to hardly any in 1960, and if each of these oxen was responsible for five acres per annum, this involves a decrease in the area ploughed by oxen of about 400,000 acres. In African areas rather a small acreage was ploughed by oxen in 1945, but by 1960 most African land in Nyanza and Rift Valley provinces and much land in Southern Province was cultivated by oxen. Perhaps the area so cultivated may have been 2 to 3 million acres.

It is often thought that the use of oxen in African areas to do the ploughing, instead of depending upon human muscle, is an advance. In fact, dependence on oxen, particularly in densely populated areas, has its drawbacks. An ox eats as much as a productive dairy cow and, since most farmers like to maintain their own oxen, as much as 10 acres of land may be put out of production in some areas to maintain a pair of oxen that do less than one day's work in 10 in the year. For this reason tractor cultivation has obvious advantages over oxen, and in such districts as Elgeyo large acreages of African land are now cultivated by tractor.

In the European farming areas there was a steady intensification of farm mechanization. Relatively few tractors were available in 1945, but by 1954 the number had risen to 4,799 of which 1,049 were crawlers. The number increased to 6,403 by 1960, including 1,104 crawlers, and there was a commensurate steady reduction in the acreage of cropland per tractor from 219 in 1954 to 169 in 1960, indicative of the steady intensification of farm practices. Annual imports of tractors increased from 158 in 1945 to 424 in 1950 and 1,144 in 1955, falling to 820 in 1960, presumably because the demand had been supplied. Much of this steady development came to a temporary halt after 1960.

Traditional African land cultivation practices, with the machete, hoe, and metal-tipped digging stick, have proved very resistant to change. A number of efforts have been made to introduce such labor-saving implements as wheelbarrows, small hand cultivators and seeders, lighter and more efficient hoes, etc., but none have been generally adopted. At one time wheelbarrows, oxcarts, and other implements were issued free, or at low cost, to "better" farmers in Nyanza Province. The attitude of the average man to a wheelbarrow was illustrated when the writer, then Provincial Agricultural Officer in Nyanza, took shelter from a rainstorm in a Luo household. The owner, unaware of his visitor's occupation, observed that he had recently been given a wheelbarrow, and that had he known he was going to get something so useless, he would not have tried to improve his farm at all! He could not even sell it.

Holding size: plantations or smallholdings.—The vast majority of the African farmers are operating on fragmented or unenclosed land subject to native land tenure customs. The number of large-scale farms and plantations has always been small in relation to the whole, though their production has been of paramount importance in the economy.

It was not until the consolidation process took place in Kikuyuland, from

1955 onwards, that any accurate idea was obtained of the size of smallholdings. Unfortunately, the results obtained in the 1950 and 1960 Agricultural Censuses are so highly conflicting as to be largely useless for comparative purposes (12 and 7). In 1960 the overall average size was 8.4 acres, of which about 35 per cent or approximately three acres was under permanent or temporary crops. In 1950 the acreage cropped per family was said to be about 5.7, almost twice that recorded in 1960. If one assumes the same proportion between acreage under crops and total size of holding, the average size of holding would have been about 17 to 18 acres. Although there was undoubtedly some reduction in the average size of holdings since 1950, due to increase of population, this was not likely to be of the order indicated and would, to an extent, be offset by the occupation of hitherto unused land in some areas.

In the European farming areas there was some slight reduction in size of holding between 1945 and 1960 due to subdivision and greater intensification, as exemplified by the figures for 1954 and 1960 (3, 1954, p. 5, 1960, p. 3):

Acres per holding	1954		1960	
	Number	Per cent	Number	Per cent
Less than 200	462	14.6	685	19.0
200-499	477	15.1	499	13.8
500-1,999	1,462	46.2	1,650	45.7
2,000-4,999	500	15.8	500	13.9
5,000 and over	262	8.3	275	7.6
Total	3,163	100.0	3,609	100.0

The majority of the holdings of over 5,000 acres were ranches in semiarid areas and have remained relatively intact, whereas the subdivision took place mainly in holdings of 500 to 2,000 acres. It might have seemed that subdivision had not been pursued far enough, but reports by the Egerton College Economic Unit indicate that, for a mechanized mixed farming enterprise, subdivision below 1,000 acres is economically undesirable.

An idea of the state of affairs in African areas is given by the 1960 sample survey in which, in a total of 509,800 holdings sampled (about 55 per cent of the total number in Kenya), the size distribution was as follows (12, pp. 18-20):

Size (acres)	Number	Per cent of total
Less than 2.5	125,200	24.6
2.5-4.99	133,300	26.1
5.00-7.49	78,500	15.4
7.5-9.99	43,300	8.5
10-14.99	54,000	10.6
15 and over	75,500	14.8

In Central Province 64.8 per cent of holdings were less than 5 acres, which may be regarded as a minimum economic acreage capable of yielding subsistence and a modest cash income (£70-£100/year) under intensive management. About one-fourth of all holdings are less than 2.5 acres, which is less than is needed by a family for subsistence, and this proportion rose as high as 44.8 per cent in Fort Hall District of Kikuyuland. The inequitable distribution of land among African families in their own areas is, however, demonstrated by the overall average size of 8.4 acres which, in a high potential area, would occupy the whole energies

of a family with some paid labor and could be developed to yield subsistence and £200 cash income per year.

Use of hired labor.—Hired labor is the basis of the plantation and large-scale farming enterprises. In recent years, particularly since consolidation, registration, and the development of cash crops, farm plans and layouts, it has also become increasingly important in smallholding areas.

In the large-scale farming areas there was a large increase in agricultural employment consequent on development and intensification of farms. In 1940 there were 115,111 African males and 4,414 females regularly employed, and 11,040 casual workers, for a total of just over 130,000. By 1954 employment of Africans had increased to 244,000 (149,000 adult males, 54,000 females) and by 1960 to 277,700 (181,400 adult males, 70,800 females). Agriculture was by far the largest single employer of labor. After 1960 the numbers employed fell off as a result of the reduction of development following the Lancaster House Conference (3).

In smallholder areas there are no reliable figures of employed labor, but it is known that it has been considerable. In the Kericho District the Kipsigis tribesmen were among the largest employers of Luo laborers. In Central Province farm planning and development created much employment. For instance, in one case known to the writer an 11-acre holding, fragmented and unproductive before 1957, was employing nine permanent laborers by 1960 and obtaining gross income of £300 per month by very intensive vegetable production, dairying, and coffee growing.

In the interim phase following consolidation, layout, and farm planning, it has been estimated that employment is provided for 1,800 casual and 400 permanent laborers per square mile of developed land. It was estimated (writer's own reports) that an additional 400,000 workers could find employment in smallholding areas, provided that development proceeded uninterrupted.

Large numbers of people find seasonal employment on the small coffee and tea plantations in African areas. The farmer will often prefer to employ a laborer rather than do the work himself, even if this is uneconomic, and recent studies have shown that as much as 88 per cent of the labor expended on cash crops was hired. This effect was not especially obvious by 1960, but it is probable that the numbers of Africans employed as paid labor on African smallholdings by 1960 was not less than 100,000 and may well have approached 200,000.

Family labor, however, remains the basis for most smallholders. Great economy in the use of family labor results from consolidation. The aggregate family holding is now all grouped within a few hundred yards of the homestead instead of, as was usually the case before consolidation, one-half mile to two miles away (sometimes as much as 14 miles). Preconsolidation the harvesting of a bunch of bananas might take most of a day, whereas postconsolidation it might take ten minutes. Manuring a fragmented plot a mile away with manure from the homestead could take five to six weeks, whereas on consolidated land the same job can be done in seven to ten days, even by headloads. The economy of family labor thus achieved can play a very significant part in increasing intensity of development, and in such ways as freeing the woman of the household to attend to her children and household duties far more efficiently.

Purchased Current Inputs

The principal current inputs purchased by farmers in Kenya include fuels, feed, fertilizer, seed, and pedigree or good livestock. In this connection it should be noted that:

(1) For fuel, other than firewood, Kenya is wholly dependent on imports. No oil, coal, or natural gas is produced in Kenya.

(2) Kenya is largely dependent on imports for fertilizers other than animal manure. Phosphates have been locally produced on a limited scale, and are produced in Uganda quite close to the Kenya border.

(3) In feeds Kenya is largely self-sufficient and is an exporter to neighboring countries. Local mills produce oil cakes, cereal residues and offals, and meat and bone meals.

(4) Kenya is also largely self-sufficient in seeds. Seed importations in recent years have usually been of small quantities of new varieties for trial, selection, and multiplication. Many new varieties have been bred, especially since 1955, on plant breeding stations which were expanded and strengthened by the provisions of the Troup report and Swynnerton Plan.

(5) The livestock industry necessarily imports a certain number of new pedigree animals annually. In the case of the buildup of the sheep industry, larger numbers have been imported from time to time to accelerate the rate of improvement. Imports have been largely confined to cattle, sheep, pigs, and poultry.

Some idea of the increased use of such purchased inputs is gained from Table 2.

In the period under review the consumption of fuel oil and fertilizers increased enormously, reflecting the increased mechanization and intensification of the large-scale farming industry. The majority of the fertilizer import was for phosphate and phosphate compounds which were mainly used on large-scale farms. However, an increasing quantity of nitrogenous fertilizers, in particular, was used on African coffee plantations. Kenya became an exporter of bran, pollards, oil cakes, etc. after 1950, but continued to import certain specialized meals not produced locally.

Capital Inputs

It is difficult to arrive at any very satisfactory figure for capital inputs. In the large-scale European and Asian farming areas, capital expenditure ran at 12s.

TABLE 2.—KENYA IMPORTS OF CURRENT INPUTS, SELECTED YEARS 1945 TO 1960*

Commodity and unit	1945 ^a	1950	1955	1960
Fuel and power oil (<i>gallons</i>)	17,665	84,164	142,906	154,868
Fertilizers (<i>tons</i>)	1,690	17,222	33,332	40,354
Seeds (<i>cwt.</i>)	613	1,872	... ^b	... ^b
Oil cake (<i>tons</i>)	331	—	—	300
Bran and pollards (<i>tons</i>)	340	4,460	—	—
Meat meal, etc. (<i>cwt.</i>)	...	11,181	13,260	21,725

* Data from annual trade returns. See 11.

^a Includes imports destined for Uganda.

^b Imports were small, valued at £21,878 in 1955 and at £51,344 in 1960.

to 14s. per acre per annum between 1955 and 1960, the total amounting to about £5 to £5.5 million per annum over the whole of the scheduled areas each year. This equaled about 15 per cent of gross farm revenue over the same period or 23 per cent of revenue less labor costs. It is clear that during this time a very high proportion of farm profits was being continuously reinvested in the development of farms. Of the capital expended in the three years 1957-60, about 26 per cent was on buildings, 10 per cent on roads and dams, 5 per cent on fencing, 21 per cent on plantation development, and 36 per cent on vehicles, machinery, and other development. In other words the majority of the capital expenditure was on long-term improvements, which could not be expected to yield an immediate return, and was not devoted to exploiting the land for quick profits—an accusation which is sometimes leveled at Kenya's large-scale farmers.

If one estimates that an average of only 10s. per acre may have been spent for the whole of the 15-year period under review, the total capital investment by European and Asian large-scale farmers must have been of the order of £46 million. Some of this was imported to the country or obtained on loans, but a large proportion resulted from the reinvestment of farm incomes.

In African areas the situation is very different. The people are, as a whole, poor and require any cash they may obtain to pay taxes and buy a few articles such as clothes and kerosene. They have no money to spare for capital investment and, in any case, up to 1955 there would have been no point at all in widespread capital investment on African lands because of the insecure land tenure situation. In Kikuyuland, after 1955, there was a striking upsurge in the construction of permanent and semipermanent homesteads, as witness the number of houses that acquired corrugated iron roofs. It was possible, by this means alone, to detect from the air the boundaries of Fort Hall, Nyeri, and Kiambu districts. Fort Hall, the last consolidated, had few corrugated iron roofs in 1960, whereas in Kiambu and Nyeri they were numerous.

African capital input has been largely in the form of labor. In particular this has been important in cash-crop development. By 1960 the acreage of African coffee plantations, for instance, had risen to 33,137, almost all planted since 1945. This represents a theoretical capital input of at least £3 million, though the only money which African farmers actually had to spend was about £7.1 per acre for coffee seedlings and dues to cooperative societies. Capital input by cooperative societies in the coffee industry amounted to 160 factories and many other facilities in the larger growing districts, worth at least £300,000, partly obtained by loans from the African Land Development Board. African investment, in cash or in kind, in cash-crop development is not likely to have been less than £5 million in the period 1945-60.

In more general farming, the area enclosed by 1960 was 2,925 square miles. Little of this was enclosed by posts and wire; it was mainly done by hedging or by posts and rail fences of wattle, the material often being supplied by the farmer himself. If, however, enclosure of one square mile in small paddocks of around one acre each is reckoned at not less than £3 per acre, this enclosure represents capital investment of about £5.4 million, almost all between 1945 and 1960.

In addition there was expenditure on farm buildings, the purchase of live-

stock, etc. The 27,000 grade cattle on African farms in 1960 were worth about £800,000 and, although no accurate estimates are available, it is probably safe to say that investment of a capital nature in long-term or semilong-term developments on African farms between 1945 and 1960 would not have been less than £10 million and was probably close to £15 million.

In African lands there were, in addition, large capital investments by government in various forms of agricultural development. The report of the African Land Development and Settlement Board (ALDEV) 1946-62, records a total of 6,297 families settled at an average cost of £117 6s. per family, or about £735,000 (14); these figures do not, however, include administrative charges, which in some schemes made the overall cost much higher. In addition, 14,247 square miles of grazing schemes were developed at an average cost of £57 per square mile, involving about £812,000. Large numbers of water supplies were also installed, the most expensive and elaborate of which was the Yatta furrow, costing £324,849. Three irrigation schemes at Mwea, Perkerra, and Galole involved capital expenditure of the order of £2.2 million. A further £259,000 was spent on afforestation. The total grant expenditure by the Board in 16 years, 1946-62, was £4.8 million and in addition the Board made loans totaling £1.1 million to African district councils, cooperatives, and individual farmers.

The Swynnerton Plan involved a further large injection of capital. The total amount spent on Swynnerton and "extended" Swynnerton programs was £6.5 million, part of which was for the African Land Development and Settlement Board's projects above and part for new agricultural schemes in African areas.

These figures are not an exhaustive catalogue of the government investment in agricultural development in the period under review, but are indicative. Many additional projects, involving capital expenditure by government, were only in part applicable to agricultural development. To a considerable extent government finance supplied the deficiency in capital expenditure in African small-holder areas, quite often on uneconomic schemes in marginal areas, which may have been socially or politically desirable but were never likely to be very productive.

V. CHANGES IN OUTPUT

Yield Per Acre and Per Man-Day

The yields per acre of several crops can be fairly readily assessed, but again the only really reliable figures are from the censuses of European and Asian large-scale farms. For African areas one is dependent, with few exceptions, on the guesstimates of agricultural officers until the 1960 Agricultural Census. Again, a comparison with the census figures of 1950 and 1960 is highly conflicting and misleading. For instance, the yield of maize—the staple African food crop—was said to be 2,000 to 2,100 pounds per acre in 1950 and to be half that (1,000 pounds per acre) in 1960. The latter figure is certainly more nearly correct for, if yields had averaged 10 bags (2,000 pounds) per acre over the planted maize acreage in African areas in 1950, huge surplus production would have been inevitable, whereas actually only 1.67 million bags were produced surplus to local requirements.

The yield figures given in the 1950 World Sample Census of Agriculture in

African areas must therefore be largely discounted. Even some figures of yield per acre in the 1960 census are suspect. For instance, it is difficult to believe that the yield of maize per acre in Nyeri District was 11.6 bags whereas that in Kiambu was 4.2, and the average for all other Central Province districts was 3.8 bags per acre. These observations underline how suspect are all available yield estimates for the African areas.

Available figures show that over the years there has been remarkably little change for the better in the average yield of the main arable crops in the large-scale farms. The yields per acre for three main grain crops are (from Ministry of Agriculture, Nairobi):

	1945	1950	1955	1960
Maize (<i>200 pound bags</i>)	7	7.74	6.6	7.54
Wheat (<i>200 pound bags</i>)	3.7 ^a	5.37	4.55	5.75
Barley (<i>180 pound bags</i>)	6.5	5.88	5.41	7.50

^a This was an unusually low figure, that for 1944 being 5.1 bags.

There has thus been a very slight yield increase, if any, for the main food grains over the years. It is fair to say, however, that the full effect of the plant breeding stations in producing hybrid and synthetic maize varieties, and new rust-resistant wheat varieties, had not yet been felt by 1960; and farmers were still largely at the mercy of uncontrollable disease and weather factors.

In certain cash crops (as might be expected) there have been greater increases in the period under review. The following yields per acre for plantation crops are indicative (8):

	1945	1950	1955	1960
Coffee (<i>cwt.</i>)	...	2.4	4.1	5.5
Tea (<i>cwt.</i>)	...	8.8	6.6	7.3
Pyrethrum (<i>cwt.</i>)	...	2.2	2.8	3.4
Sisal (<i>cwt.</i>)	3.2	3.6	2.8	5.0
Sugarcane (<i>tons</i>)	...	11.7	...	9.3

The yields per acre of such cash crops fluctuate from year to year according to rainfall and other conditions, and are, to a degree, obscured by new planting. However, it is evident that while in several cash crops such as sugar, tea, or sisal there has been little overall increase in yield per acre, there have been larger increases in coffee and pyrethrum, probably stimulated by the high prices prevailing, especially for coffee.

In African areas, only coffee was of significant importance among these plantation crops, while cotton is a cash crop grown almost exclusively by Africans. In 1945-55 the yields of African coffee were high and the quality exceptionally fine. African coffee usually yielded about 10 cwt. per acre, while in 1948 some expert farmers in Meru District averaged 17 cwt. per acre, varying from 7 to 34 cwt. After 1955, however, the close control which the Agricultural Department had been able to maintain over plantings was less effective, partly for political reasons and partly because of sheer physical difficulty with the increasing acreage, and yields were reduced. Yields of cotton have never been very high, 150 to 200 pounds per acre being about average for the whole period. No appreciable effort was made by African farmers in Kenya to obtain high overall yields of cotton and Kenya is really a marginal cotton growing area.

The yield per man-day is more difficult to assess. However, available figures do not indicate that there has been any overall increase in labor efficiency in the period under review—rather the reverse. The yield per acre of most arable crops has not increased greatly, whereas the total labor force employed on large-scale farms rose from 130,655 in 1945 to 277,700 in 1960. Increase in production clearly came, therefore, from an increased area under cultivation rather than increased labor efficiency. However, as in the large-scale farming areas the increase in acreage was of the order of 40-50 per cent while the increase in the labor force employed was 110 per cent, it seems likely that the overall efficiency of labor has decreased between 1945 and 1960. At the same time wages have increased from about one shilling per day in 1945 to about two shillings per day in 1960, so that per unit of crop produced, the large-scale farmer was paying about three to four times as much for labor in 1960 as he was in 1945.

In African areas, where most of the labor is family labor, there is no indication of a significant increase in efficiency. Apart from increased use of oxploughs and tractors, the same tools were in general use on the land in 1960 as in 1945. Only in consolidated areas, where the necessity to waste much of the day uselessly walking about has been reduced, can there have been a significant economy in labor use.

Where paid labor is concerned, Africans tend to be inefficient employers. If recorded figures are correct (which is improbable), a recent economic study of cash crops in Nyeri District has shown that while 88 per cent of the labor employed is paid labor, it is extremely inefficient. The cultivation of tea in its first year, for instance, is quoted at about 440 man-days per acre, a ludicrously high figure (15).

It would appear from available evidence that, although the costs of labor have risen greatly since 1945, there has been no commensurate increase in efficiency or in output per man-day. The increase in costs can therefore only be tolerated in the context of higher produce prices and in relation to high-priced cash crops.

Total Output

In African areas the best available figures for total output are from the 1960 Agricultural Census. Those for 1950, as already stated, conflict so greatly as to be meaningless. Total African output can therefore only be calculated roughly by extrapolating the 1960 figure back to 1945, bearing in mind the reduced acreage then farmed and the lower livestock population.

In 1960 total production from an estimated 950,000 smallholdings totaling nearly 8 million acres, and a herd of approximately 6.5 million cattle and 8.4 million sheep and goats, was approximately as shown in Table 3.

These are only very broad figures, but on this basis it is possible to calculate that the total production in 1945 was about 530,000 tons. There has probably been an increase of around 66 per cent since 1945, mostly the direct result of population increase and the greater acreage cultivated and numbers of livestock. Very little of the increase, apart from the known production of some cash crops detailed later, can be attributed to greater intensification of farm practices in African areas; and the great majority of the production was not marketable.

Changes in total production of main crops and livestock products in Kenya

TABLE 3.—APPROXIMATE TOTAL AGRICULTURAL PRODUCTION IN THE AFRICAN AREAS OF KENYA IN 1960*

Land use	Area		Approximate production (thousand tons)
	Per cent of total	Thousand acres	
Temporary crops	31.2	2,463	610 ^a
Temporary fallow	1.6	124.4	—
Permanent crops	2.9	237	120 ^a
Uncultivated pasture	57.4	4,551	151 ^b
Other (forests, etc.)	7.0	546.1	—
Total	100.0	7,921.5	881

* Area figures based on Colony and Protectorate of Kenya, Minister of State for Constitutional Affairs and Economic Planning, Economics and Statistics Division, *Kenya African Agricultural Sample Census 1960/61*, Part II, p. 1, adjusted to include areas not covered in the sample (e.g. Coast Province).

^a Adjusted area times yields from the *Sample Census* and other sources.

^b The author's approximation based on carrying capacity, yield per animal, percentage take-off, etc.

from large-scale farms during the 1945–60 period are given in Table 4. It will be seen that there were very large increases in the production of all food grains (approximately 87 per cent), and of exportable cash crops such as sisal, tea, and coffee. Wattle and pyrethrum suffered from fluctuating demand in an unstable market situation. On the livestock side there was an increase of about 300 per cent in meat production and 130 per cent in dairy products, while the increase in the wool clip between 1955 and 1960 foreshadowed rapid expansion still to come. The high labor demand for such crops as coffee, pyrethrum, and tea was in part the cause of the large increase in the labor force from 1945 to 1960 and offsets to some extent, but not wholly, the implication of reduced labor efficiency as appears from the previous paragraph.

Without the very large increases in grain and other food production, town-based Africans and especially Asians would have found it extremely difficult to live, while the large total increase in cash crop production and livestock products was the main stimulus to the export economy of the country. In the European areas the main production was for sale within the country or for export, while in the African areas the main production was for subsistence, with a relatively small and unreliable surplus for sale except in the case of certain cash crops such as coffee, wattle, and cotton grown exclusively for sale. The rate of increase in production in the large-scale farming areas was, as a whole, very much more rapid than in African areas, reflecting higher capital investment per acre and increased intensification of farm practices.

Composition of Output

Food crops.—In the large-scale farming areas production has throughout been geared to products for sale, either for export or for consumption within the country, apart from a fraction of the maize, meat, and milk production consumed on the farms. The large-scale farms both fed the nonfarm population and provided most of the agricultural exports.

TABLE 4.—CROP AND LIVESTOCK PRODUCTION ON NON-AFRICAN FARMS IN KENYA, SELECTED YEARS 1945 TO 1960*

Product and unit	1945	1949/50	1955/56	1959/60
Crops (<i>thousand tons</i>)				
Wheat	54.0	129.4	120.9	126.7
Maize	76.3	111.3	111.2	95.6
Barley	5.0	9.8	12.6	20.7
Oats	.4	6.3	8.6	9.7
Total grains	135.3	256.8	253.3	252.7
Sugar	8.2	15.7	16.6	33.5
Sunflower	—	1.9	2.2	2.4
Coffee (clean)	6.3	6.3	12.3	17.9
Tea, manufactured	5.8	6.7	8.5	13.5
Sisal, fiber and tow	31.7	39.8	37.9	60.7
Wattle bark ^a	28.1	55.4	67.1	50.2
Pyrethrum, flowers	7.4	1.8	2.8	6.7
Animal products				
Milk (<i>million gallons</i>)	...	19.7	45.1	57.6
Other (<i>thousand pounds</i>)				
Butter and cheese	5,653	6,967	10,841	13,871
Meat	33,114	42,997	61,233	130,800
Wool	1,472	1,186	1,382	2,246

* Data from East African Statistical Department, Kenya Unit, *Kenya European and Asian Agricultural Census 1960, Statistical Analysis*, pp. 17, 26; with additional data compiled by the author from Director of Agriculture, *Annual Reports*, etc.

^a Includes both African and European production, not separable prior to 1955. African production in 1955 was 46.9 and in 1960 was 19.2 thousand tons, according to East African Statistical Department, Kenya Unit, *Statistical Abstract 1962*, p. 65.

In the African areas the main change in the period under review was a marked swing from pure subsistence to a cash economy. In the main this affected the areas which had been consolidated, enclosed, and registered; but it also affected some areas still fragmented (or not consolidated) such as parts of Machakos District and Meru. The trends in some individual important products are indicated in the following paragraphs (8).

Maize is the staple food of the country and over the period has increased in importance, supplanting millet or sorghum as the main grain crop in some areas, even those, such as Machakos District, which are basically unsuited to maize production. In 1944-45 the crop on large-scale farms was 839,276 bags (8, 1945), of which 545,375 were delivered to the marketing agency, the remainder being consumed on farms. By 1955 the European crop had increased by 50 per cent (without noticeable increase in yield per acre), but by 1960 it had been reduced again, largely as a result of falling prices. In African areas the peak years for maize production were in the early 1950's when 750,000 to 1.4 million bags were sold from total crops estimated at 2 to 2.7 million bags. Surplus production had decreased by 1960 to 894,000 bags, again partly due to lower prices but also due to increased production of higher priced cash crops (especially in Central Province) and increased population pressure on the land. The figures for total African crops are probably far too low.

Wheat production has steadily increased, from 54,000 tons in 1945 to 126,700 tons in 1960. The main increase took place between 1945 and 1950. Wheat is almost entirely produced by large-scale farmers, and repeated efforts to introduce the crop in smallholdings have been ineffective, except in Elgeyo District where it is grown on relatively large holdings with machinery.

Millets and *sorghums* have declined in importance as subsistence crops in the period under review for two reasons: the need for bird-scaring and the limited variety of ways in which the grain can be prepared. Also, except in very dry areas, varieties of maize exist which will consistently outyield sorghums or millet. However, a large acreage of millets and sorghums is still grown for beer-making.

Pulses (*beans, cowpeas, pigeon peas, etc.*) have been and are important subsistence crops but of relatively little value as cash crops. Prices were high in 1945 and consequently there was a considerable sale, 3,800 tons, despite poor weather conditions. Sales rose steadily to a peak of 14,533 tons in 1952 but fell thereafter to a low of 3,884 tons in 1956, increasing again to 15,506 tons in 1958, and falling to 11,465 tons in 1960. The fluctuations reflect the fluctuations in price rather than any marked change in the proportion of pulses grown and sold.

Potatoes have decreased in importance as a surplus export crop and increased in importance, particularly in Kikuyuland, as a staple food crop. The acreage under potatoes increased between 1945 and 1960 but the surplus sales outside main growing districts tended to fluctuate. In 1945 recorded exports from African areas (much less than the real figure) were 12,293 tons, whereas in 1955 estimated exports had dropped to about 6,200 tons (having been 13,358 tons in 1953) and in 1960 had increased again to 9,700 tons.

A small proportion of most smallholdings is planted to *root crops* and *bananas*. Cassava covers a greater acreage than any other, especially in Nyanza and Coast Province. The 1960 Sample Census gives a figure of 218,200 acres planted to cassava in the sample area, with an estimate of 293,200 acres in Kenya as a whole. A large majority of this acreage had been planted since 1945 due in part to the ready availability of mosaic resistant varieties.

Oilseeds have never been a very important product in Kenya for a variety of reasons. On large-scale farms, linseed does not compete economically with wheat, nor does sunflower with maize. In African areas groundnuts should be an attractive crop economically and can produce good yields, yet they have never been popular. Sunflower seed, produced mainly by European growers, reached a peak of 112,851 bags in 1951, production falling thereafter to 44,353 bags in 1955, rising to 55,102 bags in 1959, and thereafter falling again. Only 7,500 bags of groundnuts were sold (mainly in Nyanza Province) in 1945, 27,955 in 1950, 21,928 in 1955, and 12,641 in 1960. Production has been only a fraction of what it could be.

Export crops.—The changing share of African smallholders and European and Asian planters is indicated by the following figures of acreage and production for several main crops (Table 5).

Some other cash crops, such as sisal and sugar, are extremely difficult to introduce successfully in African areas owing to the large-scale processing plant they require. The African tea industry in Kenya, starting from small beginnings and despite the difficulty of transporting leaf to a factory from scattered smallholdings,

TABLE 5.—AREA AND PRODUCTION OF COFFEE, PYRETHRUM, AND TEA, BY EUROPEANS AND AFRICANS IN KENYA, SELECTED YEARS 1945-60*

Crop	1945		1950		1955		1960	
	European	African	European	African	European	African	European	African
Area (<i>thousand acres</i>)								
Coffee	...	...	59,724	1,374	59,564	5,339	67,000	26,161
Pyrethrum	52,837	—	15,500	600	17,321	1,850	39,700	18,000
Tea	...	—	18,676	—	24,364	165	37,000	1,683
Production (<i>thousand tons</i>)								
Coffee	6,200	20	9,642	85	11,489	750	18,770	4,607
Pyrethrum	7,409	—	2,151	15	2,400	300	7,263	1,257
Production (<i>thousand pounds</i>)								
Tea	13,023	—	14,938	—	19,000	—	30,009	363

* Data from Director of Agriculture's *Annual Reports*, various issues; Coffee, Tea and Pyrethrum Boards.

has made enormous strides since 1960 and will, in due course, have a greater acreage under tea than will the European plantation industry. This position has already been reached (1966) in both pyrethrum and coffee; in coffee African acreage now exceeds European in the proportion of about 3:2.

Certain other cash crops, such as cashew nuts and cotton, are grown mainly or exclusively by African smallholders. The cashew nut acreage in 1956 was 6,343 of which 5,590 was African-owned; in 1960 it reached 23,105 of which 20,805 was African-owned. African production rose from 555 tons in 1950 to 1,522 tons in 1955 and 4,966 tons in 1960. Cotton production was 13,824 bales from about 50,000 acres of smallholdings in 1950, 16,297 bales from 76,000 in 1955, and 19,174 bales from 95,300 acres in 1960. The indications are that output per acre actually fell rather than otherwise, but the figures for acreage are probably very inaccurate.

The share of crops and livestock.—Relatively speaking, and coffee excepted, the livestock industry increased in value of products sold more rapidly than did the arable crop industry in the period. The main salable products from large-scale farms were whole milk or butterfat, beef cattle, wool, lamb and mutton, and pigs. As can be seen from the figures already given, the amount of livestock products from large-scale farms nearly trebled between 1950 and 1960, whereas the gross cereal output remained about the same, the main increase in cereals having taken place in 1945-50 during which time there was also an increase in livestock products.

From African areas the main livestock product for sale has been hides and skins during this period. Traditional reluctance to sell stock had not been fully overcome even by 1960 and the African livestock herd was mainly a subsistence rather than a cash asset. The value of hides and skins exported increased greatly from £196,841 in 1945 to £1.9 million in 1950, of which about £1.1 million probably came from African-owned stock. Changes thereafter were smaller and the value of exports lower (about £1.3 million in 1955 and £1.7 million in 1960). The increase in value of African hides and skins is largely due to the establishment of a hides and skins inspection service after 1948.

Countrywide, livestock products exported were worth £344,730 in 1945, 7.1 per cent of the total value of agricultural exports of £4.7 million. In 1950 livestock exports were worth £2.2 million out of £14.7 million, or 15.1 per cent of the total, and by 1960 the share of livestock products was £4.9 million out of £31.1 million, 15.7 per cent of the total. By 1960, however, coffee had come to dominate agricultural exports, accounting for more than a third of the total. The figures for livestock products exported reflect broadly the relatively rapid development of the European large-scale livestock industry, for it was not until after 1960, with the introduction of numbers of exotic dairy cattle, that African farmers could produce substantial quantities of surplus livestock products.

Changes in Marketing

Institutions and facilities.—Kenya has often been said to suffer from a surfeit of commodity boards and marketing boards. The idea of organized marketing of products for export originated largely with the formation of the Coffee Board in 1933. This was mainly a producer board made up of European planters, but with official representation. The successful coffee auctions it started in 1935 encouraged buyers to establish offices in Kenya, a fact which has probably benefited other East African countries as well. Other early boards or producer co-operatives were the Pyrethrum Board established in 1938, the Kenya Cooperative Creameries in 1931, and the Kenya Farmers Association.

In 1945 there existed or were established:

(1) *The Coffee Board*, providing an outlet for coffee. It was soon divided to form the *Coffee Board*, which has controlled the growing of coffee ever since, and the *Coffee Marketing Board* responsible for sales.

(2) *The Sisal Board*, responsible for the sisal industry ever since, was established in that year.

(3) *The Pyrethrum Board*, which has continued to date, and has (since 1960) been split into a *Pyrethrum Board* and a *Pyrethrum Marketing Board*.

(4) *The Passion Fruit Board*, which has since lapsed because of the breakdown of the market.

(5) *The Flax Board*, also since lapsed, because of lack of grower interest.

(6) *The Kenya Co-operative Creameries*, the main outlet for dairy products.

(7) *The Pig Industry Board*, appointed in 1945, with powers to control the production, manufacture, and export of pig products in cooperation with the Up-lands Bacon Factory (established in 1904).

(8) *The Maize and Produce Control*, set up under Defense Regulations, to which most grain, pulses, and oilseed crops had to be sold.

Various other boards and committees, such as the Agricultural Production and Settlement Board and the African Settlement Board, affected the development of the agricultural industry, but not on the marketing side except through other boards.

In the ensuing years some boards lapsed and others were formed. In general, the principle has been that in the early stages one board or cooperative controls both the growing and production, and the marketing of a particular commodity. As the industry becomes larger or more complex a marketing board with specific marketing responsibilities for that particular commodity may develop from this,

while the original board still controls production. In some cases, e.g., tea and sisal, commercial interests attend to the marketing side; this situation is often, although not always, preferable to the establishment of a marketing board.

Between 1945 and 1960 other boards were established as follows:

(1) *The Tea Board*, 1951, has taken over the responsibilities of the Tea Cess Committee. It does not directly concern itself with marketing.

(2) *The Cotton Lint and Seed Marketing Board*, 1955, which controls growing, production, and marketing of all cotton lint and seed.

(3) *The Coffee Marketing Board*, 1946, which markets coffee.

(4) *The Kenya Dairy Board*, 1958, with overall power to control dairy production. It does not handle or market dairy produce which is done by the Kenya Co-operative Creameries as before.

(5) *The Kenya Meat Commission*, which in 1950 took over the functions of the Meat Marketing Board set up in 1947, controls the purchase, processing, and sale and export of all meat other than pork and poultry.

(6) *The Maize and Produce Control*, 1950, which took over the functions of the organizations set up under defense regulations, to market maize, legumes, and oilseeds. This Board operated either through appointed agents or, in some cases (e.g., in Nyanza Province), through provincial marketing boards. Certain crops were "scheduled" under the relevant legislation and could legally only be sold to this Board, a situation which caused some dissatisfaction among traders and producers alike. Various crops were removed from the schedule in time (often because their marketing involved the Board in heavy losses) until finally it concerned itself almost entirely with maize. Later, it became the Maize Marketing Board.

(7) *The Wheat Board*, 1952, designed to maintain an overall control over the wheat industry without being directly concerned with marketing, though it is advisory to the Minister of Agriculture in this respect.

(8) *The Canning Crops Board*, 1957, largely concerned with pineapples, but having powers over other crops as necessary.

Certain other products, such as wool, were marketed through commercial channels; and some other boards, such as the Cereal Producers Board, were set up to control the growing of crops. Other boards have at times been suggested, e.g., to control the production and marketing of potatoes and cashew nuts. Provincial marketing boards were extended to Central and Southern provinces (combined) and to the Coast Province, and had powers to market a large variety of crops, including crops not scheduled.

By and large, this rather unwieldy and oversophisticated system has served Kenya well. One of its main drawbacks, to the writer at least, has been the disruption of normal duties of senior government officials resulting from the need to attend board meetings. The necessity to attend many monthly board and committee meetings made it impossible for the Director of Agriculture and other high officials to get out into the field and properly direct the Agricultural Department. As boards and committees proliferated this position grew worse, until no senior staff member in Nairobi could find a clear week to do his normal work. This, however, was not really the fault of the system but of the manner in which the Department chose to contend with it.

Transportation.—The rail network in Kenya has remained unchanged during the period 1945–60. The main line runs from Nairobi-Nakuru-Eldoret to Uganda. Branch lines run from Nairobi-Nanyuki, Voi-Taveta (connecting with Tanzania), and Nakuru-Kisumu-Yala. A small branch from Athi River-Kajiado-Magadi carries little or no agricultural produce.

Although the rail network has remained unchanged, facilities have been greatly improved. The line through Kenya to Mombasa carries not only produce from Kenya but that from Uganda also. Large sums have been spent by the East African Railways and Harbours on new locomotives, new rolling stock, and new harbor facilities. The railway continues to be the main channel of export and import of bulk produce, though the road network has become increasingly important in recent years.

In 1945 Kenya had only about 125 miles of paved highway outside townships. The majority of the country roads were of unsurfaced earth and could be described as execrable. Roads have, however, improved enormously since 1945, and in 1960 there were 531 miles of paved (bituminous) roads, 8,739 miles of varying standard gravel roads, besides earth roads and trails not qualifying for maintenance grants.

Roads in the large-scale farming areas have been constructed, improved, and maintained by the local county councils aided by grants. In smallholder districts a rough track was often made first by local people wanting a road, later improved, sometimes by communal labor, and finally taken over and maintained by the appropriate African district council.

The road development program throughout Kenya is controlled by the Road Authority, set up in 1951, which receives the funds from licenses and gasoline consumption taxes and disburses them according to a program of priorities for capital works and through grants to local councils for maintenance. Kenya is not thus in the unsatisfactory position of some developed countries where most of this form of finance is devoted to uses not necessarily beneficial to road users.

In Kenya most imported commodities move inland from the Coast at least 300 miles to Nairobi and a proportion of the imports then moves on to stations further west. The maximum distance that any commodity has to travel in important agricultural areas is about 600–700 miles by rail and road from the port. This distance is sufficient to create substantial increases in the cost of essential farming products and equipment between Nairobi and western Kenya. The same sort of distance and price differentials apply in reverse from western Kenya to Nairobi and the port.

In some areas and in the case of some products, transport cost has been equated within a province, so as to give a producer in a remote area the same price per bag as one in an area close to the main storage depot. This has enabled provincial marketing boards to pay a stated price through all their agents for particular types of produce, e.g., maize, and has greatly facilitated the marketing system for such produce. The same principle is applied to cotton within a ginnery area, allowing a uniform producer price.

The main towns in Kenya are Nairobi, Mombasa, Nakuru, Kisumu, Eldoret, and Kitale. Fresh produce is obtained for these towns from neighboring areas, and a noteworthy feature of the period under review has been the development

of market gardening in the Kiambu and Machakos districts to supply the Nairobi market and to a lesser extent in Teita District to supply Mombasa. Milk, meat, etc. are often obtained from much further afield; for instance, much of Mombasa's milk supply came, and still comes from dairy ranches 250 miles from the port, while Kikuyu market gardeners 350 miles from Mombasa can often undercut the Teita growers 100 miles from the port.

Proportion of production marketed.—In some cases, e.g., coffee, tea, sisal and other plantation cash crops, it is easy to assess this proportion. Virtually all of such crops are marketed either through commercial channels or through marketing boards. Some tea, coffee, and sisal is retained in Kenya for the domestic or the East African Market, but the great bulk of the production of such crops is exported. An exception to the general rule in regard to plantation crops is sugar; Kenya's production is insufficient for her needs and all is marketed for consumption within the country.

In the case of major food crops, such as cereals, pulses, roots, and vegetables and fruit, etc., the proportion marketed is more difficult to assess and differs between large-scale and small-scale farming areas. In the former, such crops as maize, wheat, and barley are grown mainly or entirely for marketing, though some maize and barley may be retained on farms for feeding labor or livestock.

In the case of the large-scale farms, the proportion of maize production marketed was about 65 per cent in 1945, and about the same in 1955. Production had increased but a greater amount was retained on farms for feeding the increased labor force. In the case of small-scale farms, 750,000 to 1.4 million bags of maize have been marketed in peak years from total crops estimated at 2.0 to 2.7 million bags, or about 40 per cent of the total. This figure is probably too high as total production has probably been underestimated; the actual figure might perhaps be 25 per cent in a good year, 5 to 10 per cent in a bad. Practically all wheat from large-scale farms was marketed for internal or East African consumption. Some maize was exported, often at a loss, as the world market price was usually much lower than the domestic price.

Virtually all root crops, bananas, fruits, etc., grown on large-scale and small-scale farms are consumed locally, with the exception of some English potatoes which are exported. The trend here in recent years has been for potatoes to increase in importance as a domestic food crop and to decrease in importance as an export crop.

Among livestock products the majority, with the exception of wool and hides and skins, is consumed locally. Apart from hides and skins, almost all the production of African-owned stock is consumed in the district of origin. Some cattle, goats, and sheep are sold to butchers in towns or to the Kenya Meat Commission, often for canning, and some cattle are sold through the African Livestock Marketing Organization as foundation stock for ranches.

In the case of large-scale farms, the majority of the slaughter stock produced are sold to the Kenya Meat Commission, milk and cream to the Kenya Co-operative Creameries, and pigs to the Uplands Bacon Factory. Most of the livestock produce from the larger herds in developed farming areas has thus been marketed through organized channels during the period under review, but the production from the much larger herds of smallholder and nomad-owned stock

in African areas has normally not been marketed but has been locally consumed.

The marketing chain.—The marketing chain begins on the farm and varies for different crops, according to whether they are produced by large-scale or small-scale farmers. In general, the situation has been and is that the large-scale farmer is better able to cut out intermediate middlemen than is the smallholder. This is mainly because he has larger quantities to offer for sale at one time, and is also able to invest capital in storage or processing facilities beyond the resources of the smallholder. Examples showing the sort of variation which occurs are given below.

Coffee.—The large-scale farmer sells parchment from his own factory direct to the Kenya Planters Cooperative Union (K.P.C.U.) and the Coffee Marketing Board, which sells it abroad. The small-scale farmer sells ripe cherry to a co-operative society, which prepares it to parchment and sells that to the K.P.C.U. and Coffee Marketing Board. Co-operative societies have a registered mark in the same way as an individual estate. The small-scale farmer thus has an extra middleman between him and the main marketing channel, but does not himself have to undertake capital expenditure on processing machinery. Since 1955 control by the Agricultural Department has become less effective, and the co-operative societies have sometimes become so inefficient that a demand arose by small growers to have their own processing facilities. This was, however, resisted by the Coffee Board and the Coffee Marketing Board because of the obvious accounting and sampling difficulties of dealing with multiplicity of small lots.

Tea.—Large estates produce made tea in their own factories and sell through established commercial channels. Small-scale farmers sell green leaf to the Kenya Tea Development Authority, either for processing in the Authority's own factories or in an estate factory by agreement.

Sisal.—Large growers produce and sell their sisal fiber through commercial channels. Small-scale producers in Machakos District sell small quantities of washed and dried fiber to agents who sell it to the Machakos African Sisal Factory, which brushes and bales it and sells it through commercial channels. In other districts small producers may sell washed fiber direct to factories for brushing and baling. This frequently leads to poor quality production and has been discouraged by the Sisal Board.

Pyrethrum.—Large growers sell dried flowers direct to the Pyrethrum Board, small growers through a cooperative society to the Board in the same way as coffee.

Cotton.—This crop, which is entirely produced by small growers, is sold in small quantities at buying posts operated by ginneries. The ginnery then gins and bales the lint, and the lint and seed are then marketed through the Cotton Lint and Seed Marketing Board to commercial outlets.

Tobacco.—Production is small, by small growers only in Kitui, Embu, and a few other districts. In 1945 the system was for green leaf to be sold to the East African Tobacco Company which had a monopoly over the growing and processing of tobacco in particular areas. The East African Tobacco Company then processed the leaf in its own curing barns, manufacturing and selling the product locally in Kenya. Later, a system of master growers was developed in which the

grower cured his own leaf in a simple barn and sold the cured leaf to the Company. This resulted in higher returns to a much smaller number of individual farmers than was the case in 1945.

Cashew nuts.—These are sold by farmers to small traders who sell to larger exporters who export the crop on license. Nuts can also be sold direct to a processing factory at Kilifi.

Sugar.—Large producers (few in number) operate their own factories or sell to a factory in bulk. Small producers sell to a factory at an agreed price. Some medium-sized growers process their own cane into jaggery, unrefined brown sugar, which is then sold.

These examples illustrate the sort of variations in the marketing chain which occur in the major cash crops. The main difficulty has been to fit the production of the smallholder into an established industry (e.g., coffee, tea, sisal) without causing a variation or loss in quality, and without burdening the individual smallholder with the heavy capital expense necessary to undertake the processing of some crops.

Certain cash crops, notably coffee and pyrethrum, lend themselves quite satisfactorily to marketing through primary cooperative marketing societies. There has been pressure to extend the cooperative approach to cotton, as in Uganda. However, in some crops (notably sisal, sugar, and tea) the capital expenditure involved in the processing stage is an excessive burden for a cooperative society and other methods have had to be developed to enable the small grower to participate in the industry.

Tea is one of the outstanding successes in this field in Kenya. The formation of the Kenya Tea Development Authority has enabled many thousands of small African growers to sell leaf, even in remote areas which could never have been served by any of the established estate companies.

Livestock and food crops.—Again, the main difference between the large and the small producer is that the large producer can usually sell direct to a marketing board or a large agent, but the small producer is often, indeed usually, compelled to sell at a lower price to a small trader who in turn sells larger quantities to agents. However, in Kenya and in East Africa generally there exists no such complicated chain of minor middlemen as occurs in West Africa. Small producers generally sell to a trader in a market, in quantities as small as a bushel measure. Such traders may then sell to an agent of the Maize Control or of a provincial marketing board or, if sufficiently substantial, transport and sell produce at a main collecting center.

Thus maize, the staple food crop of the country, is sold by large-scale farmers to the Control direct and by smallholders to traders. Wheat is sold by large producers to the Kenya Farmers Association as agent of the Wheat Board. Legumes, oil seeds, etc., might or might not be scheduled crops in a particular area; if so they would be sold by small growers to traders and by them to agents of the relevant marketing board.

Frequently in the course of this process, when the marketing boards offered low prices, the produce disappeared on the black market. When the board offered high prices it often made a heavy loss which had to be passed back to the producer in some other way. There was much to be said for the viewpoint that the

maize and produce control attempted to control marketing too closely, and that for most crops it would have been better to leave it to commercial channels. However, there was clearly a direct relation between the price paid for maize and the amount produced, and in general the small producer was to a degree protected from market fluctuations and speculation by the controls imposed on the marketing chain.

It was in the marketing of livestock and livestock products that the greatest differences existed between large-scale producers and smallholders. Large-scale producers have disposed of their products to the Kenya Co-operative Creameries, the Kenya Meat Commission, the Uplands Bacon Factory, or to commercial channels. The major part of their production was for the market, with subsistence a very secondary factor. Smallholders and nomad pastoralists, on the other hand, had little or no surplus milk to sell and were traditionally reluctant to sell surplus livestock. Their main saleable product was hides and skins.

Some progress was made in the period under review. Dairy cooperatives, selling either whole milk or ghee, were set up in several districts, and by 1960 the North Tetu Dairymen's Co-operative had gone a long way toward completely supplying their local markets. However, disposal of milk and milk products through organized channels was often hampered by the higher prices that could be obtained locally or on the black market; ghee, for instance, usually disappeared when prices were high and was only offered to organized channels when prices were low; on such a basis a cooperative marketing society could not possibly work and several failed.

The main difficulty in disposing of African livestock has been, apart from reluctance to sell, its often very poor quality. The main problem has been to find a market of some sort for otherwise unsaleable scrub animals. This was at least partially solved by the establishment by the Veterinary Department of field abattoirs, where poor quality animals could be processed into biltong, meals, and other by-products, obtaining at least some return. These field abattoirs made a substantial contribution in overstocked or arid districts such as Baringo and the Northern Frontier Division.

The African Livestock Marketing Organization (ALMO) also bought young steers for resale to commercial ranches for fattening, foundation stock and slaughter stock for resale to the Kenya Meat Commission. In this way they often provided a bottom to the market price and prevented undue exploitation of the stock owners by itinerant traders.

Up to 1960 there had been rather little advance in the production of pigs or wool by African farmers. Some weaner pigs were sold for finishing, but very few farmers could produce either a finished porker or a baconer. There were relatively few places where wool sheep could successfully be kept in small arid areas. Any producers that there were either had access to direct commercial sale or were organized into cooperatives to market the products.

Another main livestock product produced in large quantities by smallholders was poultry and, to a lesser extent, eggs. These products lend themselves to smallholder production and the Nairobi market has been very largely supplied by smallholders for years.

Storage facilities and agencies.—For most crops, storage facilities have been

adequate during the period under review. Most of the major cash crop boards maintained their own storage facilities (e.g., for pyrethrum) or were associated with companies which undertook storage, as for instance the Express Transport Company which handled coffee storage. Large-scale producers of grain crops usually had their own stores in which they could hold their harvested crop until it could be sold in bulk to a central collecting agency. Again, the storage problems were easier in large-scale than in small-scale farming areas.

The average African smallholder harvests his subsistence crop, and stores it for a while in a homemade store which is usually insect infested or otherwise inefficient. When it appears plain that subsistence is assured he sells his surplus, which may take some time to come on the market. Sales may be stimulated by a change in price for the better, a demand for taxes, school fees, etc. Most of the primary storage is usually on a small scale and inefficient, permitting insect infestation and deterioration of grain crops. It is usually only when the crop is sold in small quantities to primary traders that it can be given insecticidal protection. Once it has been gathered into main stores it can be fumigated or otherwise protected. The loss of food in primary storage by smallholders is always considerable, and although methods have been devised to reduce these losses they have not been generally adopted by the majority of smallholders. Storage on African smallholdings is still primitive.

One of the many storage problems has been that of the country's staple food crop, maize. In a bad rainfall year, very large quantities of maize may be required for relief of shortages, dictating the maintenance of a large reserve of maize. This results in a storage cost burden which raises the price of maize and maize products to the consumer who complains. At the same time, in Kenya's irregular climate, if an inadequate reserve is maintained, a time inevitably comes when large quantities of maize have to be imported at high cost.⁸ Equally, in a good year, surplus maize may be produced in excess of the country's storage capacity and will then have to be exported at a loss, for the world export price has normally been substantially lower than the price paid to farmers internally. Since it has been shown by experience that if an adequate price is not paid for maize this staple food crop is not produced, the situation is one of an impasse which can only be solved by maintaining a still larger storage reserve at still greater cost to the consumer. Storage capacity for maize was steadily increased between 1945 and 1960, but the problem was not entirely solved, and large amounts of grain had to be imported in the famine of 1961.

Marketing Regulations

Standards and grading.—For all of Kenya's major crops standards of grading and inspection are strict, resulting in a uniform product of known and recognized quality. Each of the main cash crops, such as coffee, tea, or sisal, is covered by an ordinance in which the standard grades are laid down, conforming with world market standards. Clear and rigid standards also apply, for instance, to maize for export, though the same standards are not applied to maize for internal

⁸ Although the export price of maize on the world market is low, by the time this relatively cheap maize has been purchased in the country of origin F.O.B., transported to Kenya, and delivered inland it is more expensive than local maize.

consumption. This, in the event of a large export surplus becoming available, may lead to much of the export being of a rather low grade, as it will probably have been held in storage for some time and may be weevil infested.

Smallholders producing such cash crops as coffee or sisal have been subject to the same grading standards as have large-scale producers. The approach has been that the industry concerned produces a uniform quality for export. In the case of coffee this has prevented the development of such products as the native-prepared parchment produced in Uganda or Tanzania, and has ensured the maintenance of high quality in the industry as a whole.

Official price policy.—In the early stages of the period under review the government or its agencies controlled the prices of most of the major commodities. In the large-scale farming areas the production of wheat, maize, barley, oats, rye, flax, pyrethrum, rice, and vegetable and grass seeds was controlled and organized under the Increased Production of Crops Ordinance. Production committees set up under this Ordinance directed farmers as to the crops they should grow and provided financial assistance to farms through guaranteed prices, guaranteed minimum returns per acre, and subsidies on fertilizers. The system of guaranteed minimum returns persisted, in the case of certain staple food crops, until 1960.

For cash crops such as coffee, sisal, tea, and pyrethrum, producers were assured of guaranteed prices by contracts made with the Ministry of Food. The marketing of surplus African food and cash crops, such as maize, millets, legumes, and oil-seeds, was controlled under Defense Regulations which provided a guaranteed price to the producer. The aim at that time, as for several previous years, was to control the output of particular products by price controls. In some cases this policy resulted in the development of a black market, but in the main it was quite effective in procuring the production of what was needed and discouraging what was not.

In the five years following the war some of these controls were relaxed and the prices of many products rose sharply in response to worldwide demand. Although there was relatively little increase in total production between 1949 and 1950 the value of exports rose by 53 per cent, due to increased prices. In such circumstances the prices for many products did not need to be guaranteed or maintained, and could be allowed to find their own level. However, there were exceptions in the case of some essential foodstuffs such as maize, wheat, and legumes, while the marketing boards or cooperatives maintained steady prices for some products on which the price was not actually controlled.

Guaranteed Minimum Return finance continued for large-scale growers of wheat and maize until 1960. Had it not continued it is doubtful if the country could have been fed reliably. The surplus of food grains marketed from large-scale farming areas was both larger and more reliable than that from smallholder areas, and internal supplies of some grains such as wheat and barley could in practice only be obtained from large-scale farming areas. It was at one time suggested that much of Kenya's maize needs could be produced at lower cost across the border in Uganda and that it was not therefore necessary to maintain an artificially high internal maize price to encourage production. Direction of policy along these lines, however, would have placed Kenya at the mercy of unreliable smallholder production in Uganda and would have accentuated the risk of

serious shortage in any bad year. Where prices in Uganda were high for ungraded, dirty maize, as in 1955, considerable illegal export took place from Kenya to Uganda.

In later years official price policy has usually been to maintain the production of essential foodstuffs such as maize and wheat by guaranteed prices in excess of world market prices and to market other crops and products through the controls exercised by statutory marketing boards. Prices of products which were not so essential, such as millets, some oilseeds, and legumes, were allowed to find their own level on the market. In some cases provincial marketing boards guaranteed prices for such products, a procedure which often led to difficulties; if they guaranteed prices higher than the market price they were forced to buy large quantities and later sell at a loss while the converse—purchase at a lower price and sale at a profit—occurred only occasionally. Thus in time official interference with price structures was confined to essential crops, and even then it was often only partially effective. A large, regular, and quite uncontrollable black market trade took place, for instance, between the fertile districts of Embu and Meru on the slopes of Mt. Kenya and the impoverished arid districts of Kitui and Machakos across the Tana River. In the case of maize, district officials even connived at such trade by turning a blind eye because of the high price differential between producer and consumer through the official control.

In several industries not controlled by marketing boards a degree of control was exercised by government over the prices paid. For instance, in the wattle industry representatives of the company and government officers held an annual price-fixing meeting at which the price structure for bark was settled. Owing to the skill and reasonableness of the companies, such meetings seldom or never resulted in disagreement or conflict over detail, and indeed had the government officers concerned protested against any item it is extremely improbable that they could have had any effect in the face of superior accounting expertise. However, in such cases at least a facade of price control by government was maintained, which probably helped to prevent obvious manipulation to the producer's detriment.

A special case is that of cotton which is largely tied to the marketing arrangements operating in Uganda. The Uganda Cotton Lint and Seed Marketing Board actually marketed Kenya cotton produced in Nyanza. As in Uganda, a lower price than the world market price was paid in the years immediately after the war. This resulted in a fund known as the Price Assistance Fund which was not, however, used to assist prices in the 1950-60 decade but rather to carry out projects designed to develop and improve the cotton industry.

VI. CHANGES IN ORGANIZATION AND OUTPUT IN RESPONSE TO CHANGING CONDITIONS AND GOVERNMENT POLICY

Changing Economic Conditions

In general it may be said that between 1945 and 1960 changing economic conditions had a far greater effect on the demand and production of agricultural products than had government policy. The latter has been inconsistent and has been formulated very largely in response to political rather than economic considerations, though naturally the departments concerned with productivity tried

to minimize the adverse effect of politics on economic output—without a great deal of success.

Demand for farm products.—From 1945 to 1950 there was a strong demand for most agricultural products following the war years. The satisfaction of this demand forced sharp rises in the prices of many products (though there were exceptions), a process assisted by the relaxation of various controls. The price of coffee continued to rise until 1954, when it reached a peak of £700 per ton, thereafter declining to an average of £338 per ton in 1960. This was still a good price, but by then it had become plain that large-scale world overproduction of coffee was inevitable, and that neither Kenya nor any other East African territory could have much effect on the market price in view of her small share of the total world market. The price of sisal, second only to coffee as a major cash crop, was to an extent controlled by demand arising from such extraneous circumstances as the Korean War. Wattle bark and extract commanded good prices until the Brazilian Quebracho producers commenced a price war which depressed the market and from which it has never recovered. Large areas of wattle planted in the late fifties can now hardly be profitably processed. The Kenya government would have been powerless to control such factors, even if it had been aware of them (as was often not the case). In general, the first decade of the period under review saw a general rise in the prices of export crops and prosperous agriculture, followed by a recession which was accompanied by rising costs in the last five years so that farmers' profit margins were sharply narrowed.

Prices of products required for internal food supplies tended to hold steadier in the period, and higher relative to world market prices. The prices for maize and wheat were regularly above world price levels. The price of maize was 13s. basic in 1945, 38s. 15d. in 1955, and still 35s. 50d. in 1960 (despite deliberate policy to reduce it somewhat); whereas the price of coffee dropped by 45 per cent between 1954 and 1960. Further depression of the maize price with the idea of avoiding embarrassing surplus production has been shown to result in reduced production and the need to import at high prices, the import price delivered within Kenya being markedly higher than the export price.

Availability of labor and wages.—In theory there has been abundant surplus labor in the country during the entire period. In 1945 a total of 115,111 males were employed in agriculture out of 1.2 million in Kenya, or about 10 per cent. In 1960 the corresponding figure was 181,400 out of 2.6 million males. Agriculture and related pursuits were the largest single employer of labor throughout, but the share of industry and public service increased during the period. In 1946, of a total of 403,700 persons employed, 197,000 or nearly half were in agriculture and about 25 per cent in industry. In 1959, of 596,900 employees, 249,400 were in agriculture (41 per cent) with industry still employing about 25 per cent of the hired labor force. The share of public services rose from 19 per cent in 1946 to 22 per cent in 1959. The total number of people in wage employment has thus varied from about double to about two and a half times the number employed in agriculture, and there ought to have been abundant agricultural labor available throughout.

However, from the total population figures one must subtract a large majority of the pastoral nomads who do not seek employment. Agricultural tribes, such

as the Kipsigis and Nandi, living in high potential areas without undue population pressure, also do not seek employment (except in the army, police, etc.) as readily as do such tribes as the Luo or Kikuyu who live in more densely inhabited country. In some such areas it has been claimed that so large a proportion of the men go out to work away from their districts that it is impossible for the women and children who remain to work the land efficiently. However, an objective look at actual district population figures seldom supports this view.

In general, underemployment of the available population has been a feature of Kenya throughout the 1945-60 period. Only about one male in ten, or less, was employed in agriculture for wages. However, a large proportion of the total population was more or less fully employed in subsistence agriculture, and there is little doubt that had there been widespread intensive development of smallholdings a shortage of labor would have resulted. The apparent underemployment was thus less than it might seem, and in some areas it was difficult to obtain reliable labor. That there was no real acute demand for work is demonstrated by the fact that output per man-day increased scarcely, if at all, in the period while actual wages have about doubled. In 1960 there were still few who desired to work harder to obtain more money.

Farmers' demand for money.—Kenya farmers demand widely differing standards of living. A small proportion of large-scale farmers have a high standard of living—sometimes very high—and in their case there is a strong demand for consumer goods. The majority of African agricultural smallholders aim at subsistence or only a little better, though here again the effects of land consolidation and registration in Kikuyuland and in such districts as Elgeyo have shown that a desire for a higher standard of living is often suppressed to some degree by existing social and land tenure customs which make the attainment of intensive development in a cash economy virtually impossible. Pastoral nomads have little demand for money, and what demand they have is easily satisfied by the sale of a few hides and skins which are readily available. They actually have as high or higher standard of living, both in terms of subsistence and of cash income, as do the mainly agricultural tribes and can improve their standard of living almost at will, whereas the smallholder in a very densely populated agricultural area often finds himself in an impoverished state with little prospect of being able to improve his lot.

The period under review has, however, seen a very marked change in the demand for consumer goods, and consequently for money, obtained either from cash crops, trade, or employment. In 1945-46 it would have been rare in many agricultural districts to see women dressed in print frocks, whereas by 1960 it was the rule. Permanent or semipermanent houses and farm buildings, now very common in most high potential agricultural districts (except where consolidation and registration have not yet become general), are also a recent demand, still steadily increasing. The proportion of the children being educated in schools has also risen very markedly in the period, creating a demand for money to pay school fees. It can be said that in 1960 there was a much greater demand for money and the products that money could buy than in 1945.

This demand could undoubtedly have been stimulated more rapidly than it was by small-scale traders in African farming areas. Partly for lack of capital the

stocks they maintain are frequently very small, and a prospective purchaser will often be unable to obtain what he wants. The difficulty experienced in introducing improved agricultural tools, fertilizers, etc., through normal trading channels in smallholder areas illustrates the point. Trading expertise and enterprise have often been inadequate in small markets, and the small-scale Asian trader, though unpopular, has often captured what market there is simply by working rather harder than his competitors. He is then apt to control the situation at his own desired level without being stimulated by competition to sell products not immediately in demand.

Government policy in connection with this situation has been to control the numbers of plots in established markets for various trades. Immediately after the war there was a tremendous scramble to obtain plots in markets by persons wishing to set up as traders, but the available trade would quite clearly have been inadequate to maintain a tenth of the applicants at a reasonable standard of income. The compromise result attained by allocation of fewer plots than there were applicants was often too many petty traders in any commodity for any of them to make a decent living, satisfying no one. With a daily demand for six chairs and tables one would find these being made by six carpenters, whereas one man and a boy could have done it efficiently. This however, enabled each of six carpenters to maintain his shop as a status symbol while making most of his living from his farm.

Government Policies

Land tenure.—As stated earlier, land tenure is the key to the whole organization of farming. Without a secure and suitable form of land tenure, intensive development is scarcely possible.

In the large-scale farming areas of Kenya, farms and smaller residential holdings were held on freehold tenure, 99- or 999-year Crown leases. The 99-year leases were generally held to be inadequate security and many were changed into 999-year leases by appropriate legal processes. Crown leases could be converted to freehold tenure by a series of payments over years. Freehold tenure or 999-year leases could theoretically be considered very secure forms of land tenure encouraging development. Nevertheless, the European settlers of Kenya were frequently suspicious of the government's intentions in this matter and demanded repeated reassurances—which were always given by, for instance, colonial secretaries of the British government or the governor. In 1960, as a result of the British government's change of policy in Kenya, most farmers felt that their worst fears had been justified and regarded their apparently secure tenure as very insecure. The post-independence African government, however, stated its policy clearly to respect all existing land titles; since 1963 development, which had slowed sharply in an atmosphere of insecurity, has again accelerated.

In African smallholder areas there was a strong reluctance on the part of administrative officers to interfere with existing systems of land tenure which, as indicated earlier, were usually such as to make sound farming an impossibility on the country's most fertile land. The need to reorganize the existing systems of land tenure had been clearly foreseen by the Carter Commission of 1932–33, which recommended that "the tenure of each reserve should be built on the basis of the native custom obtaining therein, but that it should be progressively

guided in the direction of private tenure, proceeding through the group and the family toward the individual holding." The Native Lands Trust Ordinance 1939, enacted to implement the Carter Commission's recommendation, made no provision, however, for the grant of individual title to African agricultural land. Thus, by the failure of the government to act at a time when it would have been relatively easy to enact the necessary provisions, the position of any African smallholder who wished to develop his land intensively was rendered extremely difficult. If he attempted to do so he was immediately obstructed by local elders and politicians, and few persevered in the attempt.

While the degree of security of tenure offered by customary law varied from tribe to tribe and place to place within, for instance, Kikuyuland, it could be said that no existing form of native customary law was such as to encourage intensive agricultural development of a holding on a permanent basis, while any intending smallholder could only obtain partial and very weak support by appealing to the administration of his district. In 1955, when land consolidation first started on a general scale, the situation in Kenya was that "no African, agriculturist or nomad, had security of tenure; his rights were always open to challenge in the courts; he had no negotiable title which he could use as security for a loan to develop the land; and usually he held his land in a number of small scattered fragments" (6).

Since 1955 the policy of the government has been to make secure tenure possible in areas where there is a strong or majority demand for it. In fragmented areas this is achieved by a series of stages:

- (1) The recording of existing rights (in a register) by a committee of elders, assisted by government staff.
- (2) Registration of such rights after a period.
- (3) Consolidation of the fragments into an aggregate holding, usually situated near the owner's largest fragment or homestead, after deduction of a small acreage to be used for public purposes such as roads, schools, churches, etc.
- (4) Demarcation on the ground of the consolidated holding.
- (5) Preparation of the Adjudication Register, in which every man's consolidated holding is described by situation, acreage, and number on a map; this register is open for examination and objection for 60 days.
- (6) Registration of title (a negotiable freehold title) in a Register of Title. The individual farmer can then obtain his freehold title deed on payment of a small fee.

Thus the change in consolidated areas is one from insecure title to very secure title. Objections have been raised to the issue of freehold title on the grounds that this form of title enables a farmer to do what he likes, good or bad, with his land, with no possibility of controlling the process unless actual damage is evident in which case pressure can be brought to bear. Leases with conditions attached would perhaps have been preferable but would have been objectionable on other grounds. As things stand, the potential improvement is from the virtual impossibility of sound development to the possibility of intensive development at the will of the farmer himself, while the problem of preventing actual damage to the soil is more easily dealt with.

In land which was not severely fragmented but had been enclosed by fences

or hedges, as in Elgeyo, Kericho, and elsewhere, it was possible to register a title to any piece of land without going through the complicated consolidation process. Registration in such areas has not been very popular in the period concerned, largely because the pressure on the land was less intense and the individual farmer was under less attack from his neighbors. Nevertheless 1,280 titles had been registered in Nandi and Elgeyo by 1960; thereafter the process accelerated, stimulated to some extent by a desire to obtain scarce loan funds.

Subsequent subdivision of registered holdings below an uneconomic level (which would otherwise be extremely probable because of indigenous inheritance customs) is controlled by local land boards set up under the Trust Lands Registration Ordinance 1959. These boards review any applications to subdivide, and do not permit subdivision below a level that is fixed in relation to the agricultural potential of the area at 8, 10, or any other acreage figure deemed necessary for a minimum living standard. To date, in consolidated areas, very little legal subdivision has occurred, though there is no doubt that in some areas unofficial subdivision (sometimes verging upon the original evil of fragmentation) has taken place. In general, however, the pattern of landholding established by consolidation in Kikuyuland has persisted, and has been spread to other districts since independence. Whether or not the individual farmer wished to develop his land, it has been *possible* for him to do so since 1955-60 in those districts where land consolidation and registration had been applied.

Agricultural research.—The need for an effective research service was foreseen by the Director of Agriculture in 1945. In 1950 the present writer, in a paper on policy in the Central Province, posed the following questions:

- (1) In any given ecological zone, do we know of a sound farming system which can be applied?
- (2) If not, what research is necessary to determine such a farming system?

Research policy was, in African areas, largely devoted to answering these questions.

The research services of the Department, which up to 1945 were largely centered at the Scott Agricultural Laboratories on the outskirts of Nairobi, were completely reorganized after the war and in 1952 were brought under the control of a Chief Research Officer, Dr. C. C. Webster, who laid the foundations of the present research organization. The research services included laboratory services (entomology, plant pathology, soil chemistry, etc.); special commodity research stations (coffee, sisal, pyrethrum, fruit, pasture, etc.); plant breeding services centered largely at Njoro, but with branches elsewhere; and general agricultural research stations situated in districts, sometimes run by the district agricultural officer, but if of sufficient importance managed by research staff. Substations of the main commodity research stations or of the plant breeding services were often incorporated with these district research stations.

This comprehensive research plan has enabled almost all the important research problems of Kenya's agriculture to be tackled. While it could be said that, pre-1945, development often proceeded in the absence of adequate supporting research, by 1955 there was a large bulk of advanced knowledge available from research stations, which the majority of farmers did not put into practice.

By 1960 the available knowledge of research stations was far in advance of most of the country's agricultural practices, and it still is.

It must not be forgotten too that a large fund of practical knowledge had been built up by large-scale farmers and smallholders all over the country. Frequently it was not necessary for a district agricultural officer seeking a sound solution to a problem to initiate a research program. All he had to do was to go and look at what some good farmer was doing and there he had a practical demonstration of what could be done. The majority of agricultural policy in African areas in the years 1950-60 was actually based upon what a few more advanced African farmers were doing, augmented by research results where necessary.

Throughout the period under review, therefore, the government has maintained research services which, if not adequate in terms of theoretical demands of specialists, were often far in advance of existing farm practice. Parallel research services were maintained by the Veterinary Department in respect of the livestock industry, but these were more concerned with the laboratory aspects of disease than with the practical improvement of livestock in the field. The Veterinary Department did indeed maintain a number of livestock improvement centers in which the main aim was to improve the indigenous Zebu cattle, but these centers had relatively little effect in improving the native cattle herds for they could not produce enough improved animals to have much effect on a herd of five million or more native Zebu cattle.

Agricultural education and extension activities.—In 1945 the agricultural education facilities in Kenya consisted of the Egerton Agricultural College, intended then to train young Europeans to diploma level and as practical farmers, and farm schools in African areas in which the Department's staff of instructors (field assistants) received some practical and theoretical training. African students from Kenya also went to Makerere to obtain diplomas and later degrees in agriculture. For individual African farmers there was virtually no training available at all, other than that obtained from field officers who were too thin on the ground to achieve widespread improvement.

These facilities were greatly expanded in the subsequent years. Instructor training schools were set up at Embu in Central Province, at Bukura in Nyanza, and in the Coast Province. The aim still was to produce well-trained subordinate agricultural staff who could be of practical assistance to individual farmers. The main difficulty was to obtain adequate numbers of students of the requisite educational standard. Agriculture was always an unpopular career in relation to, for example, medicine or teaching which required no heavy manual work or continual traveling. However, the numbers of better-trained instructors (or field assistants as they were later called) increased steadily, until most districts had a sufficiency of men who could, for instance, carry out simple experimental observations or plan a smallholding in the light of agricultural policy. At the same time, field training was given to lower echelons of district council and government staff until many of these could, by 1960, do simple farm layouts with the minimum of supervision.

The idea of farmers' training centers to train individual farmers originated at Bukura in Nyanza. By 1952 the training of the instructor staff had been trans-

ferred to Siriba, near Maseno (later to become a diploma college), and the facilities at Bukura were surplus. Individual farmers were trained for a year and later returned to their home districts in the hope that they would be able to set an example. By 1954 it had been recognized that this process, which affected perhaps one farmer in 50,000 per year, was far too slow to have any real effect in extension, and training centers were organized differently. Thereafter they were run on the basis of short courses, lasting a fortnight or so, for progressive farmers, teachers, and others, and refresher courses for agricultural staff on practical problems such as pruning tea. In this way the effect of the farm institutes has been spread to a very much larger number of farmers, and in such districts as Nyeri a majority of the smallholders having farm layouts in a particular area would have attended a farm institute. Even so, farm institute training by 1960 with a total throughput of 2,569 farmers reached only a small proportion of the total farming population. About one farmer in 400 was able to go to a farm institute. The program was, however, expanding rapidly in 1960.

Unfortunately, an education wing of the Agricultural Department was never developed, largely for establishment reasons. There were officers with a flair for education, but if they specialized in it they could not be offered the same prospects of promotion as if they remained in the general agricultural services or in research. Thus education in agriculture never received the impetus it should have received.

Attempts were made to spread agricultural education through schools in all districts. Schools maintained small gardens, farms, or smallholdings. The success of such efforts depended largely upon the enthusiasm of the individual agricultural and education officers in the districts, and they generally did not persist for long. Either the schoolmasters used the pupils to grow their own food (which was very naturally resented), or the education authorities considered that too much time was being devoted to manure and not enough to Shakespeare or the Bible. The present writer has never met a good farmer in Kenya who said that he had been put on the right path at school. This is an obvious failure in Kenya's education system as a whole, for the majority of the population, male and female, subsist by agriculture and will continue to do so for many years.

Agricultural extension work has been the function of the district agricultural and research staff both in large-scale and smallholding areas. Such staff generally had no training in extension techniques as such, and their success depended upon their individual enthusiasm, ability, and character. It was extremely unfortunate that in the period 1945-50 the field staff bore the brunt of the unpopular if necessary soil conservation campaign. There is no doubt that this seriously affected the relations between agricultural staff and farmers in all areas, but especially in African areas, for a long time. However, in such areas, in the absence of any sound systems of land tenure permitting better farming to develop, there was little else that could have been done at that time.

The years 1955-60 saw a peak in extension activity, when all the general field staff were hard-worked and their services in demand by farmers of all races. Unfortunately, the government did not or could not take advantage of the opportunity presented by land consolidation to achieve a massive advance in technique. In 1956, just when the demand for services was increasing, agricultural

services were cut, and cuts continued, for financial reasons, thereafter until 1960. The cuts were largely absorbed at first by reducing staff in the less advanced areas such as the Coast Province, but there was a political limit to this sort of process.

Thus in some districts, where there was the possibility of rapid advance, the available staff could not effectively keep pace with the demand, while in others capable, well-trained, experienced men were frustrated, unable to make any significant advance in the face of archaic land tenure customs, apathy, or political opposition. No objective overall view of this situation was ever taken; money continued to be wasted on backward areas while it could have been well spent in areas where the cooperation of the people was outstanding and rapid progress was being made. This is clearly an instance where political considerations overrode what was economically desirable and feasible.

Development schemes.—Besides the general activities in all districts there were many schemes aimed at specific developments. In the years 1945-50 these were generally aimed at intensifying the soil conservation effort in particular areas, but some were also devoted to settlement of excess population in other areas. After 1950, once soil erosion had largely been controlled, special development schemes were devoted more to accelerated planting of cash crops or to integrated "betterment schemes" in which the planting of cash crops, improvement of water supplies, erosion control, and extra extension staff went hand in hand. During the Emergency three irrigation schemes were started, all of which persisted in 1960 though only one was at that time a success. In some areas afforestation and artificial insemination schemes were coordinated with more purely agricultural measures, and in the more arid pastoral areas a large number of grazing management schemes were organized.

The development schemes were at first largely supervised by the African Land Development Board set up in 1945, with the directors of Agriculture and Veterinary Services as members. The emphasis at first was on settlement (a bee in many officers' bonnets just after the war, largely because of inaccurate assessments of land potential) and on soil conservation. The Board appointed assistant settlement and assistant agricultural officers, responsible to the District Commissioner and not to the agricultural officers in districts. It thus got off to a bad start, for the Agricultural and Veterinary Departments felt their functions were being usurped. The conflict then engendered hampered the activities of the African Land Development Board during much of the rest of the period under review.

In 1955, following the passage of the Agricultural Ordinance, the African Land Development Board became the Board of Agriculture, Nonscheduled Areas, with provincial and district agricultural committees under it. The chairmen of these provincial and district agricultural committees were invariably administrative officers who were, rightly or wrongly, considered by most agricultural officers to be influenced more by political than by any other consideration. The Board did not, therefore, carry the confidence of many of the field agricultural staff and was regarded as an unnecessary "fifth wheel to the coach." For these reasons, which could easily have been avoided at the outset, it achieved less than it might have done.

The actual achievements of the Board have been summed up in the 1946-62 report of the Board (14). They included five major fields of activity:

(1) The settlement of 6,297 families on settlement schemes at an average cost of £117 6s. per family (excluding in some cases administrative costs, which would have markedly increased the cost per family settled). The largest settlement was at Makueni, with 2,187 Wakamba families situated in an area of marginal rainfall where it was extremely doubtful if, in a bad year, the population could survive without famine relief. No other scheme involved more than 700 settlers. It was generally held by agricultural officers that the money spent on settlement could have benefited far more people to a greater degree if it had been used to augment the existing services and to intensify existing farming methods on the better land.

(2) Grazing management schemes, totalling 14,247 square miles at an average cost of £57 per square mile. Up to 1960 these were one of the outstanding successes of Kenya, but most of them lapsed after that date, due to a combination of drought and weakness in their administration.

(3) Some thousands of minor water supplies were installed, including 1,589 dams with a capacity of nearly 2.2 billion gallons, 308 subsurface dams, 76 piping schemes, 104 boreholes, 63 rock catchment tanks, 62 weirs, and 2,650 protected springs and wells. These developments were generally tied in with other developments such as soil conservation, grazing, or district betterment schemes, and were one of the most welcome of the Board's efforts.

(4) Irrigation schemes. The irrigation schemes were at first administered by the Joint Irrigation Committee, composed of members of the African Land Development Board and of the Ministry of Works, which had overall responsibility for water development. The three main schemes were at Mwea (5,000 acres of rice); Galole on the Tana River (400 acre pilot scheme, mainly cotton); and Perkerra in Baringo District (430 acres). There were other minor schemes, never under proper control, at Kyai, Ishiara, Endo, and Makajini. Of these schemes the only obvious economic success was Mwea, where yields of 30 bags per acre of rice were regularly obtained by Kikuyu tenants who had neither grown nor eaten rice before. Perkerra and Galole made heavy losses. Both these latter schemes were started more for political than for economic reasons, that at Galole being originally intended as a settlement for irreconcilable Mau Mau detainees. Perkerra has since achieved some success by development as a main onion-growing area, while Galole based on cotton cannot economically succeed unless it becomes much larger.

It should be made clear that the irrigation schemes were not the original concept of the African Land Development Board. They were the ideas of individual field officers with experience of the areas concerned, with the exception of Galole which, as stated, had its origins mainly in politics.

(5) Afforestation. The Board provided £258,951 to the Forestry Department to augment its normal budget and to enable it to protect important catchment areas of little economic value in timber production. Some areas of forest were also planted on hilltops in Machakos. The Board also administered what agricultural credit was at the time available. This was never adequate to meet the demands of African farmers.

Two other major development efforts were made in the agricultural field between 1945 and 1960. They were the Swynnerton Plan for African areas initiated in 1954 (19), and the Troup report for the European, or scheduled areas adopted in 1953 (20). Both of these plans aimed at an acceleration and augmentation of existing agricultural services by the provision of extra research facilities, extra field staff, extra funds for accelerated cash crop development and for land consolidation in fragmented African districts. The provisions of both plans agreed better with what most field officers felt needed to be done than did some of the stated intentions of the African Land Development Board, and some of the claimed achievements of the African Land Development Board actually arose from the Swynnerton Plan.

The Swynnerton Plan set targets of achievement over a period of 5 to 20 years as follows:

(a) In African lands of high potential, to raise the standard of living of approximately 600,000 farming families to about £100 per annum plus subsistence by a combination of farm planning, introduction of cash crops, and improved educational, extension, and research services. The total increased income at the end of 15 to 20 years, given adequate continuing effort, was envisaged at about £50 million per annum. In the period of the Plan it was envisaged that about 8,000-12,000 holdings per year (80,000-120,000 acres) could be dealt with by survey and planning staff, involving 300,000-400,000 acres in five years. It was this part of the Plan that so badly needed, and did not receive, adequate continuing follow-up in later years.

(b) Cash crop development: coffee, 12,000 acres; pyrethrum, 10,700 acres; tea, 1,965 acres; pineapples, 7,000 acres; sugarcane, 9,800 acres, rising in later years to much higher figures. In the event most of these targets were exceeded, especially for tea and coffee.

(c) The production of about 300 improved bulls and 500 improved cows per annum from veterinary livestock improvement centers through the use of Sahiwal blood. These figures were never approached, partly because of the disinterest shown in this breed by African farmers.

(d) The expenditure of £1.8 million on water development, irrigation schemes, and swamp reclamation works.

(e) The expenditure of £2.7 million on African Land Development Board Headquarters and about 40 district betterment schemes spread over the country. This part of the program was largely an expansion of the earlier African Land Development Board schemes.

(f) Intensification of agricultural investigation in African areas, to cost £290,107 over five years.

(g) Improved field staff education and services and increased provision for the development of farmer training centers.

(h) The provision of at least some agricultural credit.

The broad aim of the plan was to increase the standard of living of as many smallholders as possible by a series of integrated measures. The target figure of income, £100 per annum plus a full subsistence (which in fact meant about £135 per annum in cash plus basic foodstuffs) may seem a low figure, but it was at least 10 times the existing standard, which varied from £8-£12 per family

per annum in cash with a doubtfully adequate or inadequate subsistence. It was not anticipated that all of the 600,000 farming families (the number was actually nearer one million by 1960) would have their standards raised to this extent, and it was stressed throughout that the effects of the plan would only be limited unless it was one of a series of similar development plans. These follow-up plans never materialized; indeed development was curtailed rather than otherwise in 1958-60.

The Troup report, having examined the present position up to 1953, likewise set out a series of aims and targets, chief of which was the expenditure of about £55 million in capital works over 10 years to achieve an increase in annual gross revenue of about £19.5 million from the acreage of land already farmed. The increase was to be attained by the development of farm planning, research facilities, and other measures in three zones, Zones 1 and 2 being mixed farming areas and Zone 3 cattle ranching. The livestock population was to be raised to about one million head of cattle (not very much more than the actual 1960 figure) with other stock. The pig industry was to be increased by 300 per cent, supported by increased cereal yields and abundant feed supplies resulting therefrom. Broadly speaking, the Troup report envisaged production increases proportionately greater than forecast in the Swynnerton Plan for the less developed African lands and in a shorter period.

The report stressed that the targets could not be achieved without the fulfillment of certain conditions, first and foremost being a sense of security in the future of the European highlands, a recommendation which was fundamental and which was not contested by the government at that time. Farmers would also have to make determined efforts to increase production, and there was a need for increased European immigration to achieve the aims. Water supplies, soil conservation services, drainage, livestock, etc., would all have to be augmented or investigated, and there would be the need for increased technical investigation and advice. The report also included recommendations on finance, sources of capital, and the tax structure, especially income tax, to encourage the maximum reinvestment of profits and support the progressive farmer. The provisions of this report were broadly accepted by the government as a blueprint for the future development of the scheduled areas.

In general, then, there were several major development plans prepared under government auspices covering the period 1945-60, and many minor development plans on a more local basis, some of which were financed by African district councils. These plans suffered, however, from the relationships existing between the various departments of government and especially from the fact that they were usually ad hoc measures prepared with inadequate prior consideration in response to political situations (the Swynnerton Plan resulting, for instance, from the outbreak of the Emergency). They were never really part of a long-continuing development effort for the whole country, based upon thorough surveys of the natural resources and the economic needs of the people. Agricultural officers and others concerned with these plans were usually only too well aware of their defects, but had to content themselves with the feeling that half a loaf was better than no bread.

Agricultural credit.—The availability of funds for loans to farmers was gen-

erally inadequate throughout the period under review, sometimes to a derisory extent. The majority of the available credit funds has always been available in the scheduled areas, and in the period 1945-60 very little was available in African areas. Against this must be set the fact that a large proportion of government development spending was devoted to African areas and amounted to block credits, never likely to be directly repaid, to the people of districts as a whole.

Large-scale European or Asian farmers had access to Guaranteed Minimum Return Funds for the planting of scheduled crops under the direction, first of the wartime production committees, and after 1955 of the district agricultural committees set up under the Board of Agriculture, Scheduled Areas. These committees also operated certain loan funds for development purposes. When a farm was inadequately developed or mismanaged the farmer could be required by the agricultural committee of his area, under the provisions of the Agriculture Ordinance, to accept a development loan for certain purposes. Expenditure of the loan would then be supervised by committee members and government officers. However the funds available for such loans were small; in many cases, a poor farmer could not undertake needed development because he could not get a loan, whereas his own ineptitude would probably have prevented him from making good use of a loan had it been available. Likewise, Guaranteed Minimum Return Funds financing kept many indifferent farmers on their feet when, under strictly economic conditions, they would have failed.

The large-scale farmer, with his secure land tenure enabling him to offer his land or property as security for a loan, had access to private sources of credit that were totally denied to African smallholders. The Kenya Farmers Association and the banks could and did allow farmers credit, either for crops, or for short- or medium-term development. Farmers settling in the country for the first time between 1945 and 1960 were required to bring in a considerable capital sum before they could be considered for a farm. One way and another there was far more private capital or credit facilities available for the relatively small area of good land in the scheduled areas than for the much larger areas of first-class land in African areas.

Up to 1955, however, when land consolidation and registration really got under way, there would often have been very little point in making credit available to African smallholders. Such credit as was given by African district councils could only be for immediate short-term improvements, such as the purchase of a few cart loads of cattle dung, the cost to be repaid from the subsequent crop. This practice became quite common in Kiambu District and extended to other districts from there. Even then, the individual wishing to make use of such facilities was, in some districts, opposed by other tribesmen. Under the system of "redeemable sale," for instance, the original owner of any piece of land could at any time recover his right to it by returning the original purchase price. Progressive farmers were sometimes hindered in this way from obtaining even the small advantage they could have received from a loan to purchase a few loads of manure, for fear that the owner of the land would demand its return before the usefulness of the application had been exhausted. Existing land tenure customs were thus a very severe handicap to the development of credit facilities in African areas prior to 1955.

Between 1955 and 1959 the Board of Agriculture, Nonscheduled Areas supervised the allocation of £72,924 in loans to 1,268 farmers. Most loans were less than £100. This amount of credit was, of course, negligible in relation to the potential demand, but probably had an effect disproportionate to the actual sums involved in that it enabled development of a number of good smallholdings in many districts.

In 1959 and in 1960, a total of £1.1 million was made available to the Board of Agriculture, Nonscheduled Areas for African and Asian farmers. Of this, £100,000 was a revolving fund, and the rest was available as credit at 6.5 per cent interest for use in areas of high potential only. This was the first really significant amount of money available as credit to smallholders in African areas.

The policy has been throughout to devote what funds were available to productive enterprises, and not to permit the farmer to use them for labor. Such a policy required very close supervision by agricultural staff. Wherever possible, in the early stages, the items for which the loan was given were purchased for the farmer; this applied especially to livestock and implements. Up to 1960 close supervision of the loans was possible, but thereafter political events and an increased number of loans coupled with actual staff reductions in some areas made this much more difficult.

Besides this official credit, large sums are made available annually, at high rates of interest, and usually in kind, to small African farmers by Asian and Arab, and doubtless African traders. This leads to a situation of chronic indebtedness from which the peasant farmer seldom or never escapes, and which gives the trader an undesirable degree of control over the produce of small farms. Nevertheless, until 1960, this undesirable form of credit was actually the main source of credit to the small farmer in Kenya. Even after 1960 the amount of "organized" credit available was very limited and inadequate. Kiambu District alone could theoretically have absorbed £4 million a year after consolidation, an amount never available for the whole country. In its failure to provide adequate credit facilities as an aid to the follow-up of consolidation and farm planning the government has laid itself open to legitimate criticism by, for instance, the World Bank.

Cooperatives and collectives.—In 1944 Mr. W. K. H. Campbell advised the government on the constitution and development of cooperative societies, with particular reference to African cooperative marketing societies. As a result of his report a new Cooperative Societies Ordinance was enacted in 1945 and a Registrar of Cooperative Societies was appointed. Although, in the subsequent years up to 1960, the Registrar's Department greatly increased in size and responsibility, the control exercised by him over the development of cooperatives remained almost unchanged in essentials during this period.

The most successful form of cooperatives in Kenya have been marketing cooperatives, such as the Kenya Cooperative Creameries, Kenya Planters Cooperative Union, and others. Even these have worked best when applied to a single product, such as pyrethrum or coffee. When the activities of a cooperative society extended to other functions, such as the use of machinery, the purchase of fertilizers, or the marketing of other less valuable crops such as maize, it frequently became inefficient and failed.

There was a very rapid growth of cooperative societies between 1945 and 1960. In 1945 there were only 25 registered societies including the Kenya Co-operative Creameries and smaller societies responsible for marketing coffee in, for instance, Kisii and Meru districts. By 1950 there were 242 registered societies and after 1955, as a result of the accelerated cash crop development following the Swynnerton Plan, primary marketing societies proliferated. In 1960 there were 625 cooperative societies, of which 597 were African, with many others in formation. They were chiefly concerned with marketing of such crops as coffee and pyrethrum. In the larger coffee-growing districts the primary societies were amalgamated into unions.

Collectives, as opposed to cooperatives, have never been encouraged in Kenya, the word having an odious connotation in British ears quite apart from the well-known inefficiencies of the system. However, in view of the obvious advantages of being able to farm in larger units, cooperative or group farming was encouraged for a time. In this case the individual farmer retained his rights over his own piece of land but an entire hillside or other block of land was planned and cultivated as one unit. Beginning in 1948, with 27 group farms totaling 8,700 acres, the area under group farms increased swiftly in Nyanza Province. However, with the departure of the provincial officer whose enthusiasm had started the movement, the emphasis was altered toward the consolidation of holdings by reallocation within a kinship group. Only two or three group farms, all moribund, persisted in 1953. The process caused a great deal of suspicion, and many officers of the department considered group farming to be barely disguised socialist collectivism. It was found in practice that African farmers, even in Nyanza Province, were too individualistic to operate the system effectively. Reorganization of holdings within a kinship group could be effectively opposed by a few reactionaries, even when the majority were in favor, and the few active and progressive men objected to carrying too many idle passengers. The epitaph of group farming in Kenya may be written in the words of an agricultural instructor visiting one of the last in 1953 who was "favourably impressed by the hospitality I received" but saw nothing else of any interest.

Anti-famine measures.—Government anti-famine measures have taken two forms—prevention and relief. The latter is obviously very costly and undesirable, so that the former is preferable.

Prevention of famine has taken the form of encouraging or requiring the cultivation of a certain area of such root crops as cassava, sweet potatoes, or even bananas to provide a reserve should grain and legume crops fail, and the discouragement of crops such as maize in dry areas where such crops are likely to fail and more reliable local crops are available. If these policies were pursued with sufficient vigor by individual officers they generally had an effect, and the effect was likely to be greater in rather remote districts where a demand for actual famine relief in times of shortage was less likely to be politically audible in Nairobi. Thus the small Wambere tribe in lower Embu could be induced to grow quantities of cassava, while the Kitui Akamba, used to being given famine relief in large quantities for many years, could scarcely be so induced. The Wambere did very well selling cassava to the Kitui Akamba in certain years.

Measures to secure the planting of actual famine reserves were more success-

ful than those to discourage unsuitable crops. During the period 1945-60 there was a gradual but steady swing away from sorghum and bulrush millet in semi-arid districts toward maize. Part of this can be traced to the fact that famine food was usually maize which the people then planted, however unsuitable, and part to the desire to replace crops like bulrush millet, which are prone to bird damage, by maize which is relatively immune and can moreover be prepared in a much larger variety of ways than can millet. Since 1960 maize varieties have been developed which will consistently outyield millet and sorghum in most of the districts formerly dependent upon these crops.

Actual famine relief was supplied at need, and during the whole period under review few if any people are actually recorded as dying of starvation in a bad year. Famine-prone districts include Machakos, Kitui, Baringo, parts of the Coast Province, and much of the pastoral areas of the Northern Frontier, though here the people could subsist more easily on stock. There were serious local shortages or famines in 1949, 1951, 1952, 1954, and 1955. Between 1951 and 1955, 741,986 bags are recorded as imported legally into Machakos, Kitui, and Coast districts. After 1955 strenuous efforts by augmented agricultural staff to improve the agriculture of such districts as Machakos had their effect, and by 1960 Machakos was actually a net exporter of foodstuffs despite a large increase in the total population of the district. Famine, which was frequent in Kikuyuland prior to 1945, has been virtually unknown there on a large scale since 1950, and its control was undoubtedly due in part to the strenuous efforts to check erosion.

Taxing of agricultural land.—The only land which was actually taxed or rated in Kenya was that in the scheduled areas. Leasehold land is subject to certain premiums (an annual rent, equivalent to 1 per cent of the market value of the unimproved land) which must be paid by the farmer. This position continued unchanged in its essentials between 1945 and 1960, and is part of the secure land tenure arrangements offered to immigrant farmers in the early years of the century. Freehold land pays no annual premium, but rates may be levied on it by county councils.

No land in any African agricultural or pastoral area is taxed in any official way, nor is a nomad pastoralist holding of cattle taxed. Without individual registration it has been held to be impracticable to tax land, and revenue for necessary expenditure on services is raised in other ways in African districts. A form of land taxation is long overdue and its absence has led to the persistence of other undesirable forms of cess taxation that penalize good farmers while, under an equitable form of land taxation, good farmers could be encouraged and bad farmers penalized.

There are, of course, native customs by which a man wishing to obtain the right of usufruct over a piece of land pays certain customary dues to elders; this is actually a form of indigenous land taxation, usually paid in kind.

Subsidization or taxing of food.—Kenya is in no financial position to pay actual subsidies on crops produced for food. However, it does the next best thing and pays prices higher than the producer could expect to get on the export market for domestic food supplies. There were also subsidies on fertilizers and on diesel fuel in large-scale areas in the early part of the period under review. However, in general there have been neither subsidies nor taxes on food supplies,

though in some cases the internal price of a product may be fixed at a level different from the export price. Thus, the price of coffee was for some time fixed internally at a level below the peak export price of £600-£700 per ton, and in the case of maize has usually been fixed at from 5s. to 15s. above the export price. This latter measure was necessary, as already explained, to ensure domestic supplies.

The purchase price from the producer is markedly lower than the selling price to the consumer in such essential foodstuffs as maize, the differential being some 15s. per bag or even more. This is made necessary by the unreliability of supplies from year to year, and the consequent need to maintain a large supply in store to meet eventualities. The cost of such storage is high and increases the price to the consumer. If the internal price of maize were allowed to find its own level it would fluctuate wildly between good and bad years, to the detriment of producer and consumer alike, and to the probable advantage of middlemen.

Maize is not sold at subsidized prices to consumers, even in years of shortage. It may be issued on occasion in payment for famine relief works performed, but after 1950 it was usually sold at the full price even in famine-stricken areas. Such areas were usually either pastoral or semipastoral, and the sale of maize at the full price tended to force the sale of surplus domestic stock, which would otherwise have died of starvation, and which were often a contributory cause to land deterioration in the district concerned.

VII. CONCLUSION

Looking back on the period under review, and with the knowledge of hindsight, it may be seen as one in which opportunities were tragically missed, policies ill-conceived for lack of accurate knowledge on which to base them, and implementation inadequate for lack of funds. Nevertheless, there were many outstanding successes and advances, some of which may fairly be claimed to have influenced thought and action far beyond Kenya's borders. Some of the most important fundamental changes, such as land consolidation, have persisted after the period while others (such as the soil conservation effort and grazing schemes) have faded away and will, in due course, have to be resuscitated.

On the whole, it was a period of advance, slowed and impeded by political opposition, but nevertheless resulting in marked material benefits for thousands of farmers of all races in Kenya and, in the research field, providing the basic knowledge for far more spectacular advances at a later date if and when the farmers choose to make full use of the knowledge now available.

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