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## AGRICULTURAL CHANGE IN NYASALAND: 1945-1960†‡

### INTRODUCTION AND HISTORY

The fifteen postwar years in Nyasaland, 1945-60, represent a well-defined period covering in the main the final phase of the colonial government's preparation of the Protectorate for assumption of full responsibility for its own affairs. It was a period in which the importance of agriculture to the economy of the country and the livelihood of its people was recognized, and a determined attempt made to develop it. These were formative years of great significance. Progress in the first part of the period was somewhat inhibited by the inevitable difficulties of getting under way after the war: there were shortages of experienced personnel, equipment, and fertilizer. And after a peak of achievement, there came some deceleration of development towards the end of the period owing to increasing preoccupation with political affairs.

Much of the following account of postwar events is necessarily framed in general terms, for accurate definition and measurement of progress, particularly as it concerns African farmers, was frequently impossible. Detailed data could not be obtained: there is intrinsic difficulty in eliciting this kind of information, and the government field staff was preoccupied with advisory and other duties. Nevertheless a reasonably accurate picture of agricultural change can be given.

The form and sequence of this record reflect the nature of Nyasaland's postwar development. After brief introductory descriptions of the physical, demographic, and historical background there is an outline of government policy and other factors that influenced change, followed by an account of the changes themselves set in relation to policy. Particular prominence is given to policy because it so largely conditioned development, especially in the all-important sector of African agriculture.

Nyasaland (called Malawi since independence) is a long, narrow territory stretching down the great Rift Valley of Africa nearly 600 miles below the 9°

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† This is the sixth of a series of studies of agricultural achievement in the countries of tropical Africa during the 15 years following the end of World War II. Grateful acknowledgement is made to the Carnegie Corporation of New York for a grant to the Food Research Institute of funds which made these studies possible. The Corporation is not, however, the publisher or proprietor of this publication and is not to be understood as approving by virtue of its grant any of the statements made or views expressed herein.

‡ A table of contents is given on p. 285.

parallel south of the Equator. More than half of its length borders on the great lake of the same name, but it has no seacoast. Its southern tip is 226 miles from the seaport of Beira, in Portuguese East Africa, with which it is linked by a single-track railway crossing the Zambezi River and scaling 3,500 feet up steep and difficult escarpment. Indeed steep, broken topography is characteristic of almost the whole of Nyasaland (Map 1). West of Lake Nyasa (1,500 feet above sea level) the escarpment rises abruptly to undulating plateau areas between 3,000 and 5,000 feet above sea level, punctuated by mountain masses one or two thousand feet higher. By contrast the southern plains, in the valley of the Shire River that drains the lake, fall to between 100 and 200 feet above sea level as the river approaches its confluence with the Zambezi.

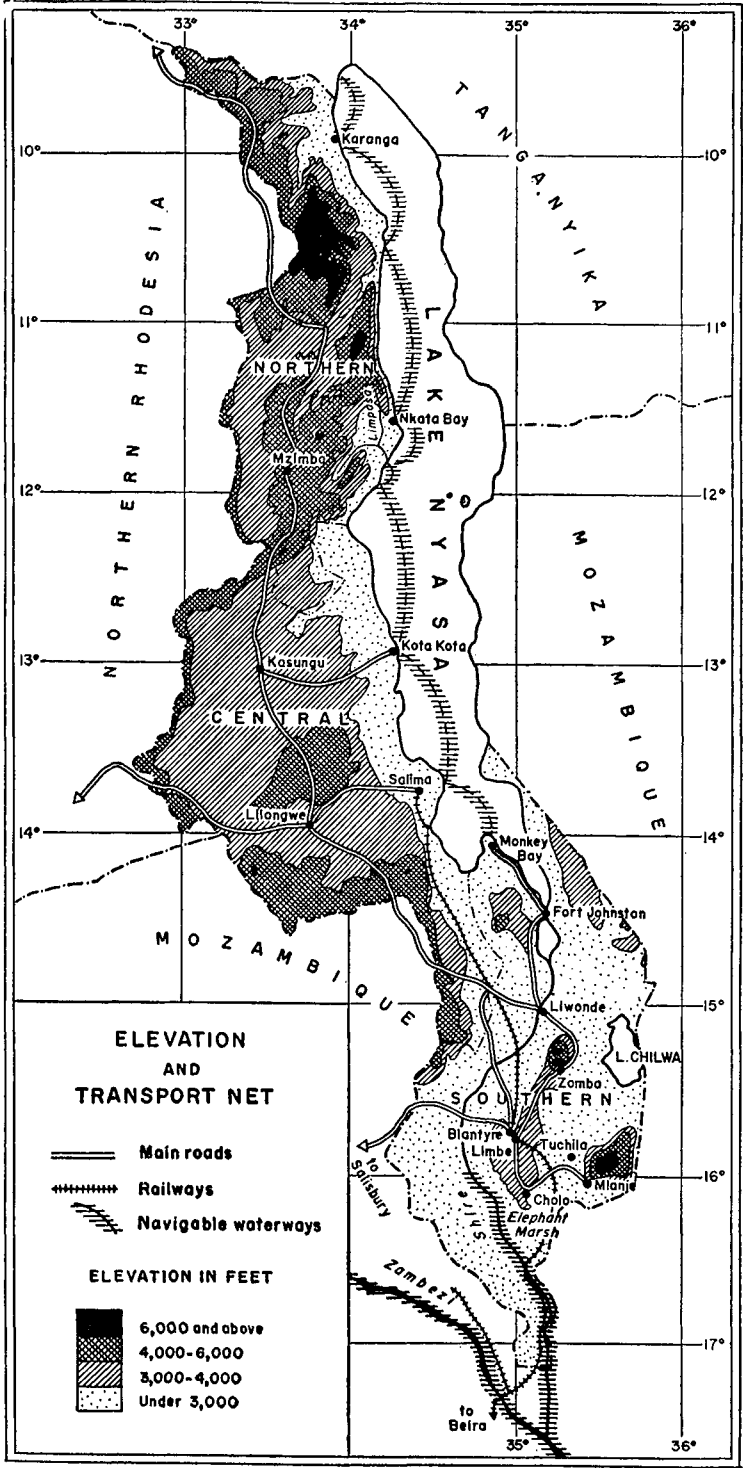
This exaggerated and mountainous topography makes for great scenic beauty. It also materially influences the weather and profoundly affects the pattern of agriculture and the problems of land use. Annual average temperatures are above 60° F. except in the highest mountains (Map 2). The climate is characteristically monsoonal, with a single rainy season during the summer, November through March. Rainfall during that period averages 30 inches, rising in limited localities to 70 inches or more. Other months of the year are comparatively cool and dry, with important occurrences of mist and light rain in certain mountainous regions. There is considerable variability of rainfall from year to year; but by southern African standards the amount is generous (Map 3).

A country so mountainous by nature and subjected to climatic variations naturally exhibits substantial differences in vegetation and soils (see 1, 2, and 3). All freely drained areas in Nyasaland are occupied by latosols, and these predominate. They are mainly reddish in color, friable, and freely permeable. The pH is from 4.0 to 6.0, and the soils are moderately to strongly leached. On the Rift Valley floor the soils are mainly calcimorphic, of alluvial origin, and often imperfectly drained. According to the classification of the International Pedological Service, the latosols are subdivided, in order of agricultural importance, into ferruginous soils, ferrisols, and ferallitic soils (4). Again by comparison with the rest of southern Africa, Nyasaland enjoys a relatively high proportion of intrinsically good agricultural soils.

Given the soils and the fairly dependable rainfall, the density of human settlement is by African standards understandably high. The official estimate for 1960 recorded a population of 2,860,300, over 99 per cent of them African.<sup>1</sup> The Africans are Bantu comprising several different tribes. Some immigrated in the dim past from the Congo region to the west and north; others, offshoots from the Zulus, came from South Africa about the middle of the last century; and there was a third influx into the southern regions from Portuguese East Africa during the first half of the present century. The pattern of population distribution is one of decreasing density from south to north (Map 4). This trend reflects partly the attractions of early development in the more accessible south and partly the higher proportion of fertile soils and dependable domestic water supplies in the southern and central regions than in the north.

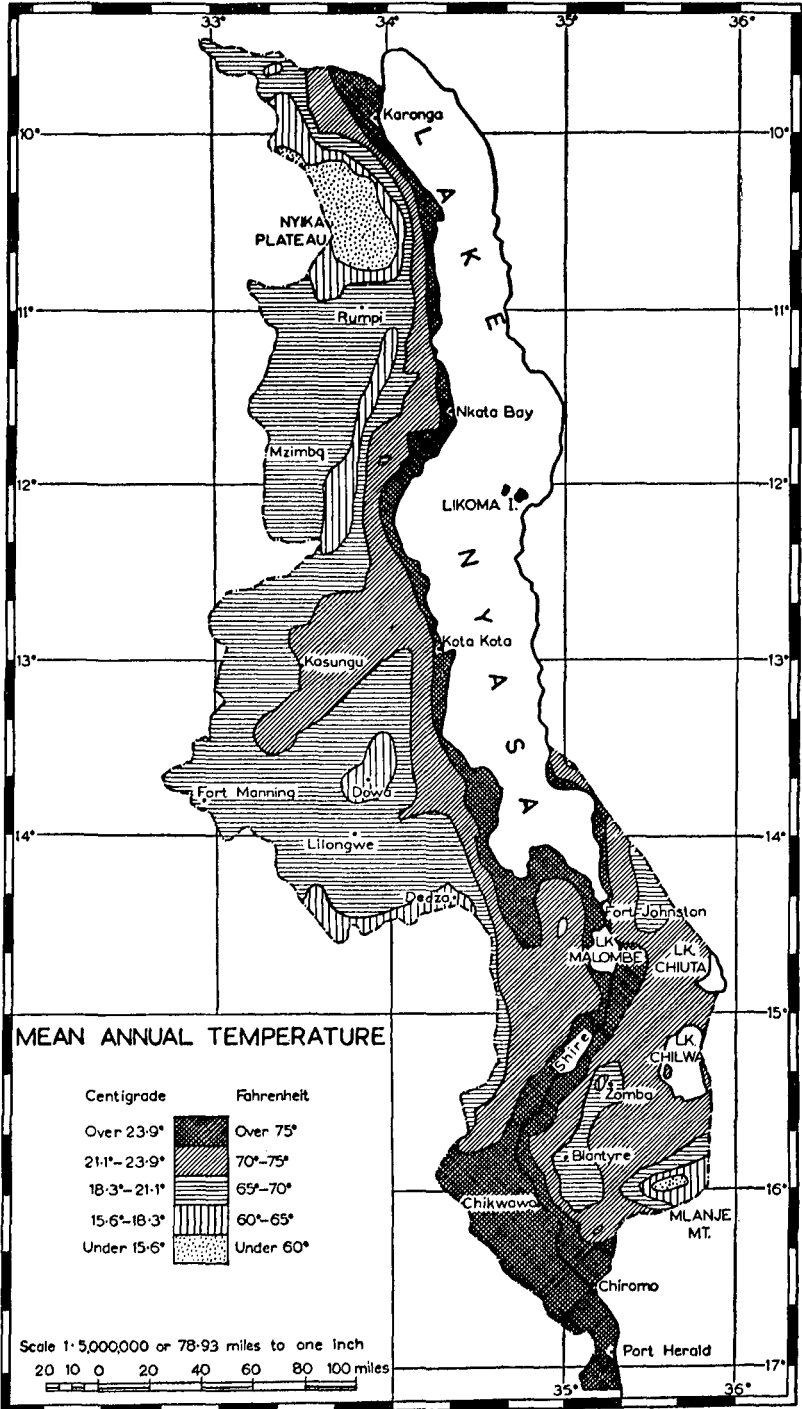
The total land area of Nyasaland is roughly 36,000 square miles. The World

<sup>1</sup> The official figure for 1960 appears to have been grossly underestimated. From estimates made in 1963, the African population in 1960 was probably about 3.5 to 3.7 million.

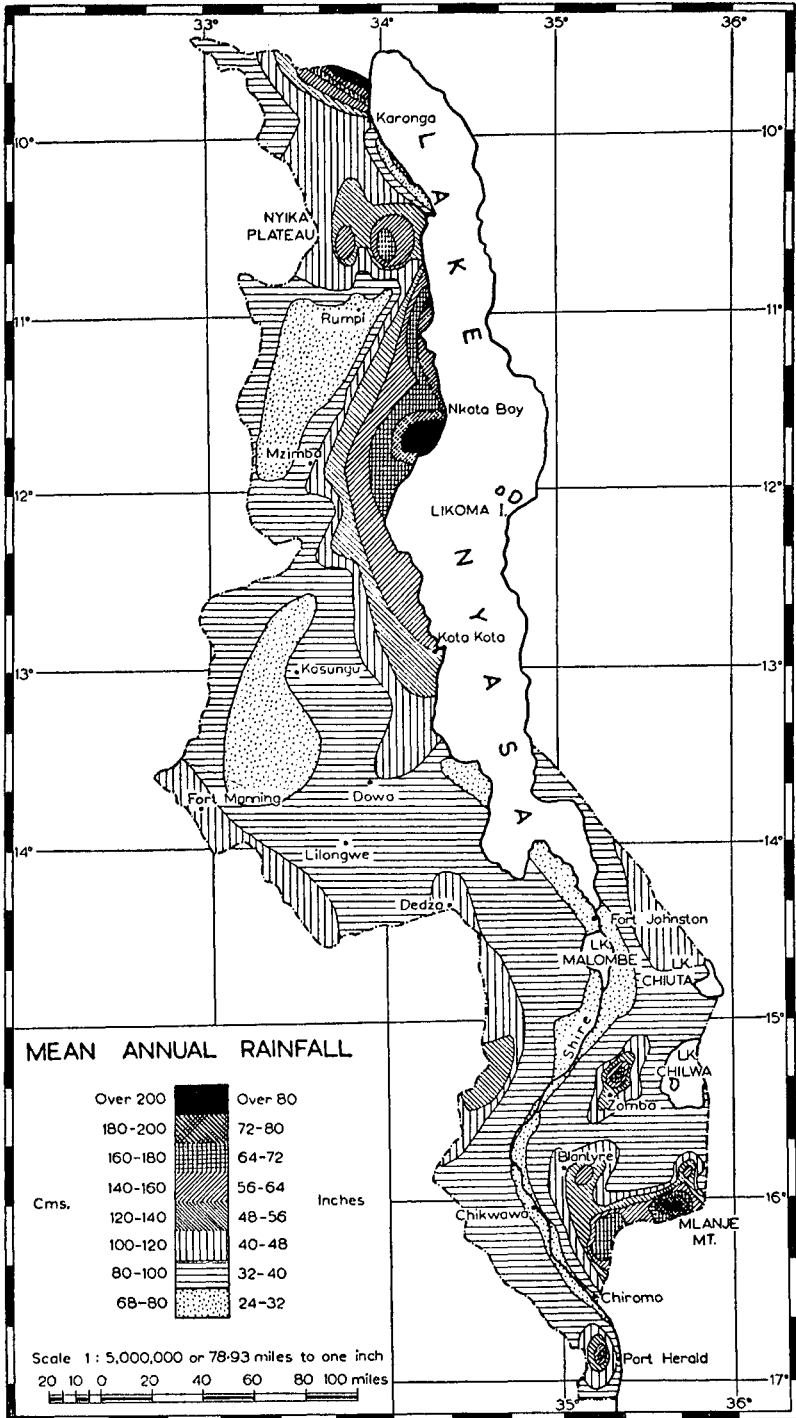


Map 1

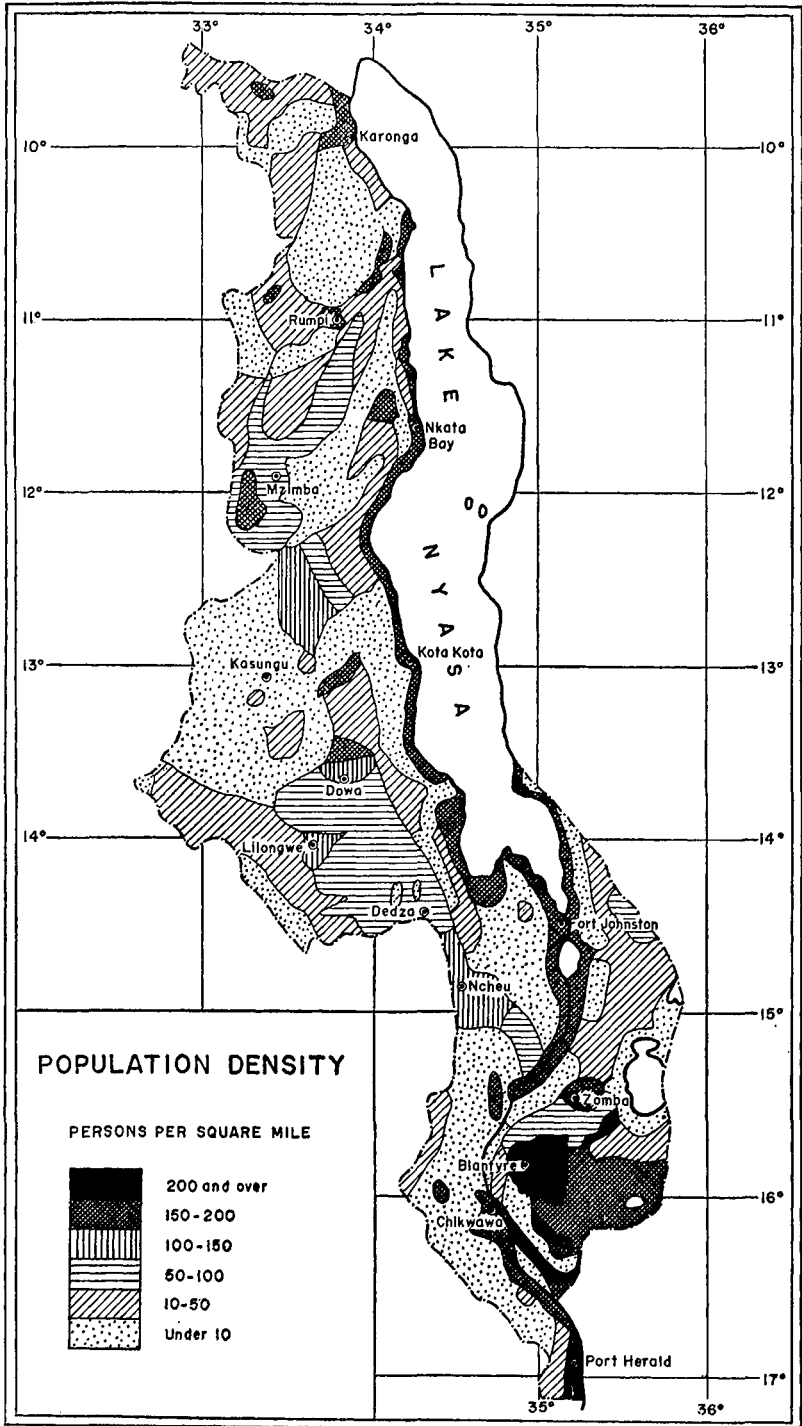
\* Transport net based on W. A. Hance, *The Geography of Modern Africa* (Columbia University Press, New York and London, 1964), p. 442.



Map 2



Map 3



Map 4

Census of Agriculture undertaken by FAO in 1950 hazarded that of this total only about 10,000 square miles, less than a third, could be considered potentially suitable in terms of soil and gradient for arable agriculture. At least a third of the total area seemed unfit for sustained cropping without major advances in technique, and much of the balance was only usable for occasional cropping. Of the remainder, 1,000 square miles might be suitable for tree crops, while the balance was classified as woodland, forest, swamp, rough grassland, steep escarpments, and hillsides. Some of this might be turned to productive use, mainly of a non-arable nature, with the development of new techniques and management skills; but a high proportion should remain uncultivated for the foreseeable future in the interests of soil and water conservation. On this broad analysis the overall average density of African settlement on land of arable potential in 1960 would have been about 300 per square mile. Deviance from this mean was obviously considerable, from as much as 800 or more per square mile in the more densely settled rural areas of the south to 100 in the poorer and more remote northern region. Thus the average family in large areas of the south had as little as 1 to 2 acres of land. The African population is reckoned to be rising at about 2.5 to 3 per cent annually.

The great bulk of the indigenous people lived in small, scattered villages and were engaged in subsistence cropping, supplemented by the cultivation of cash crops if suitable and sufficient land was available, by casual employment in towns and on European farms, and by a variety of seasonal activities as opportunity offered. Mining and major industries were lacking, and it was estimated in 1956 that approximately 175,000 men were voluntarily employed in other southern African territories, principally as farm workers and in mines.

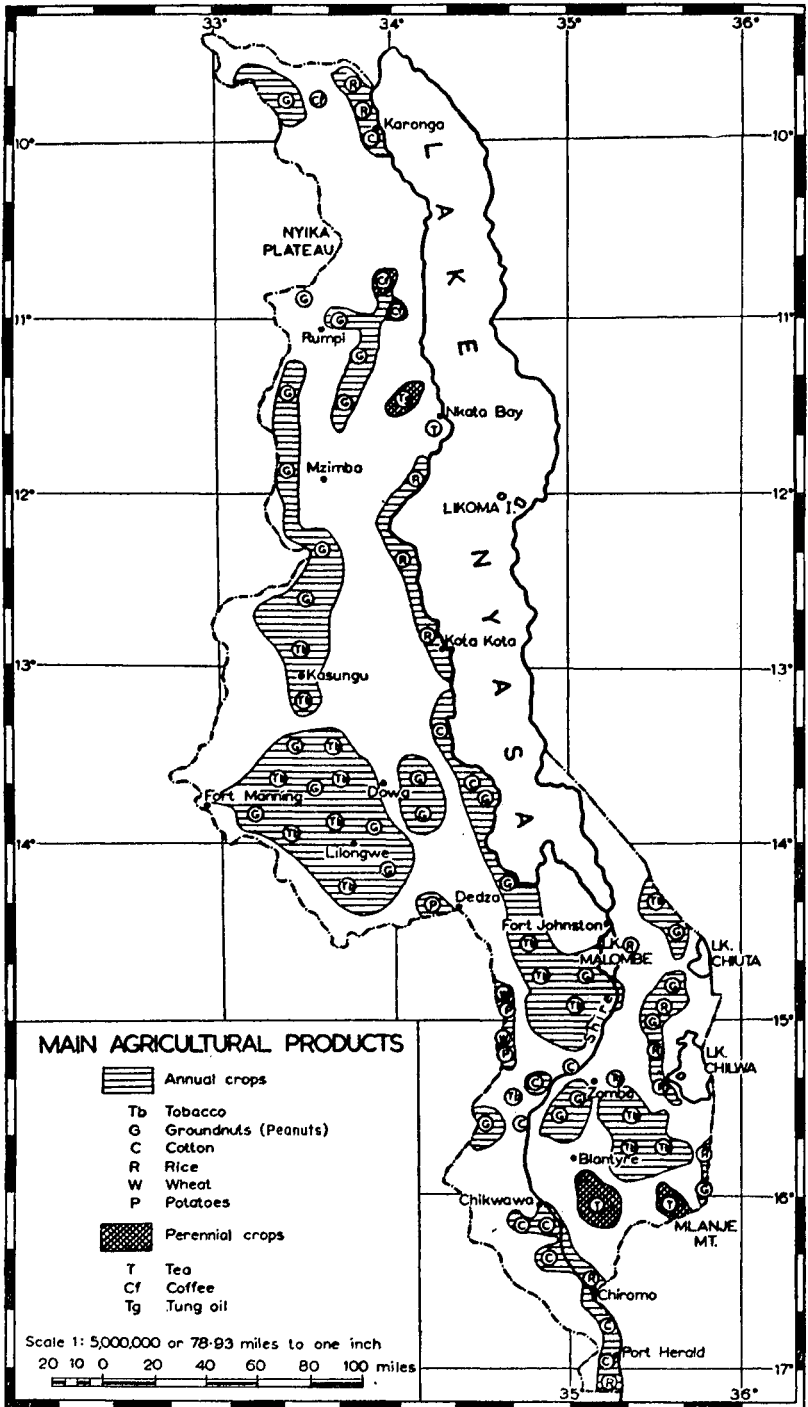
The European population numbered 8,500 in 1960, having increased from 1,948 in 1945; immigration contributed about 300 yearly. The Europeans were mostly in government service, commerce, and religious missions; their agricultural community was comparatively small, but its productivity was of great significance. The Asian population, estimated at 11,800 in 1960, was mainly engaged in trading.

Nyasaland became part of the Federation of Rhodesia and Nyasaland, established in 1953; and in 1964 it became the independent country of Malawi.

The early years of Nyasaland's modern history, following Dr. Livingstone's discovery of Lake Nyasa in 1859, were mainly concerned with exploration, missionary pioneering, suppression of the slave trade, and the establishment of general commerce to replace it. The British Central Africa Protectorate was established in 1891; but even before that historic event the seeds of agricultural development had been sown by a handful of adventurous British settlers. They laid the foundations of Nyasaland's agricultural economy and gave it an impetus which has continued to the present day. The principal cash crops and their distribution are depicted in Map 5. Maize and other food crops distributed widely throughout the country are not shown.

The first crop to be grown commercially was coffee; but the combined effects of falling prices, disease, unsuitable climatic environment, and a lack of knowledge to combat these adversities resulted in the rapid decline and virtual extinction of the embryo industry. But tea and tobacco soon took its place, the first tea





Map 5

seed having been planted as long ago as 1878. Through varying fortunes these two crops have gathered strength and have been the mainstay of the commercial economy ever since. Cotton was another early experiment, first planted in 1900. A host of insect pests assailed it increasingly down the years, but it too survived and expanded to become a major export. Tea, tobacco, and cotton accounted for some 83 per cent of the total value of the Protectorate's exports in 1960. Peanuts were the only new crop to achieve comparable importance.

All this pioneer endeavor was by European "planters," who had acquired certain land rights, mainly in the comparatively healthy southern highlands. In 1908 they gained the advantage of being linked by railway to the navigable Shire/Zambezi river system. The rail line was extended to the port of Beira in 1922.

African participation in the Protectorate's agricultural development was first as laborers on European plantations. Gradually the techniques and skills of growing new crops were acquired, and slowly the incentive to produce them for cash grew. A system evolved in which Africans were encouraged and assisted to grow cotton and dark-fired tobacco by planters, who subsequently purchased the crops and handled, graded, and resold them. This was a form of sharecropping which, with all its limitations, served, in the absence of any government field services, to introduce the beginnings of a cash crop economy to the indigenous people.

The government's early contributions to agricultural development were small and virtually confined to superficial investigation and limited specialist advice concerning the main plantation crops. The Empire Cotton Growing Corporation, set up under a British Charter in 1921, started investigational work in Nyasaland in 1923 and continued up to the end of the period here reviewed. During the interval between the two world wars the government was able, despite the overshadowing economic depression of the later years, to expand its field services modestly and to devote more specific attention to the all-important development of African agriculture. Much was accomplished despite inadequate resources; it was at this stage that African tobacco, cotton, and rice growing were firmly established on progressive lines. In 1926 the Native Tobacco Board was set up by the government to organize and encourage the production and orderly marketing of dark-fired tobacco by Africans in the central areas of the territory. This body in its various evolutionary forms has had a very decidedly beneficial influence on the development of African farming.

But these early steps, significant though they were, were pathetically inadequate in the glaring light of the present-day needs of an emergent country entirely dependent upon agriculture. Just prior to World War II the field staff of the government's agricultural department comprised only sixteen Europeans with professional and practical training; three-fourths of these had taken up their duties only within the previous five years. There was no African staff with any professional or technical training.

These slender government resources, and of course those directly engaged in commercial agriculture, were reduced during World War II by the demands of the armed forces, leaving those who remained to do their utmost to achieve internal self-sufficiency of food requirements and to increase the export of such

crops as cotton, tea, and tung oil needed for Britain's war effort. This broad objective was attained; food imports were confined to modest supplies of sugar and wheat; tea, cotton, and tobacco exports rose during the war by 10, 11, and 23 per cent, respectively, and tung oil exports climbed from nothing to about 100 tons in 1945.

But this period was inevitably one of exploitation of the Protectorate's natural resources. There was neither the time, nor the staff, nor the money to plan on a long-term basis or to attempt to build an agricultural industry on a sound foundation.

Cold appraisal of the position at the end of the war revealed a serious situation. It was well-known that Nyasaland's future depended upon its agriculture. Yet essential knowledge on which to base advice to farmers was rudimentary, extension services were superficial, and (except for the dark-fired tobacco industry) there was no organized marketing for African crops. In the circumstances it is not surprising that the standard of land use, at any rate among the majority of African cultivators, left much to be desired.

The government devoted approximately 2.5 per cent of its budget to agricultural services in 1945. Investigational work was virtually limited to a 30-acre experiment station for tea, the part-time responsibility of one scientist; a similar station for tung oil work (again with one scientist); and a cotton research station operated by the Empire Cotton Growing Corporation. No investigational work was being done on problems of general husbandry. There were no extension services for European farmers, and the ratio of trained extension staff to African farmers was of the order of 1:20,000.

It was the latter, occupying 95 per cent of the agricultural land, contributing only 40 per cent of the total value of exports, and multiplying at a rate that doubled the population every twenty-five years, that posed the most urgent problem. The vast majority were subsistence cultivators, shifting periodically wherever land was sufficient to permit it. Where it was not, soil-exhausting practices continued with declining productivity as increasing pressure on the land tended towards mono-cropping with maize. The transition from the traditional subsistence of a nearly static population with plentiful land to a situation in which this vital resource was in relatively short supply had been too rapid to allow the natural evolution of better agricultural practices to cope with it. There was no consciousness, for example, of the disastrous consequences of soil erosion. And yet, with soil structure deteriorating with increasing cultivation in a predominantly steep and broken terrain—and no measures to counter it—this evil was rapidly becoming more serious. Crop rotation scarcely existed, for maize with a few interplanted legumes provided for the immediate needs of the majority. Livestock were few by comparison with many African territories and were regarded simply as wealth. Being increasingly confined to a smaller area as cultivation encroached on grass, the cattle added to the problem of erosion by overgrazing. Land tenure was based on usufruct and in most tribes a system of marriage prevailed in which the husband moved into his wife's village for so long as the marriage survived. Such a man had little incentive to invest effort and money in a holding over which he had tenuous and transitory tenure and no prospect of handing it on to his son.

Faced with all these formidable difficulties, the average African generally

accepted them fatalistically or sought to escape from them. Agriculture was in any case an unexciting and conservative occupation in a new world full of glamorous opportunity. It was difficult, also, to save money unless one got away from the demands of importunate relatives. A high proportion of the more ambitious and energetic men therefore emigrated. It is estimated that in the late 1950's some 20-25 per cent of the adult male population was engaged in wage employment outside the Protectorate (5). In some districts it was as much as 60 per cent. The wives and families continued to till the same area of land less efficiently.

At the risk of attempting an over-generalized summary of the immediate post-war position, one may say that Nyasaland's agrarian problem was that of too many people multiplying too fast and attempting by traditional and inefficient methods to derive an ever-rising level of living from a limited amount of land. There was temptation to argue that a respite, at least, could be gained by large-scale movement of population from the more heavily settled areas to those of lower density, or by creating industries into which surplus population could be siphoned. But the answer lay in neither of these directions. Unoccupied spare land was nowhere sufficient in area nor of adequate fertility to attract and accommodate enough people to make a significant change in the situation—quite apart from tribal and sociological impediments to such movement. As for industry, Nyasaland obviously was not well placed geographically to compete on world markets; its primary products did not on the whole lend themselves to secondary processing, and there appeared little likelihood of mineral discoveries on a commercial scale. In fact industry was only likely to be generated to the extent that the agriculturist acquired the wealth to purchase the products of industry. In short, the initiative for the development of the Protectorate's economy lay with agriculture. And unquestionably European agriculture, with its limited opportunities for expansion, could not continue to carry the bulk of the burden; the great potential lay, as it always will, in the development of African agriculture. This was the primary aim of postwar planning.

#### POSTWAR AGRICULTURAL POLICY AND ITS APPLICATION

The principal objects of government's agricultural policy were to conserve the soil; to encourage the production of more and better food; to develop an agricultural cash economy; and to blend the foregoing into sound farming systems. Although these broad objectives of policy continued unchanged throughout the postwar period, modifications were made in response to changing circumstances. Discussion needs to be prefaced by mention of two events that had profound influence on the evolution of policy as a whole and its application. The first was the appointment of Sir Goeffrey Colby as Governor of Nyasaland. It was during his tenure of office from 1948-1956, and due largely to his initiative and drive, that the greatest advances in agricultural development were made. The second event was the drought and famine of 1948/49, which sharply revealed the vulnerability of the country's livelihood to adverse weather.

#### *Soil Conservation*

Nyasaland's susceptibility to erosion on account of topography, rainfall pattern, relative intensity of cultivation, and agricultural practices has already been

emphasized. The traditional method of growing crops on the flat or in separated circular mounds did little to check rainfall runoff and erosion. The advantages of contour cultivation had been advocated for several years, to the extent that the meager extension services made it possible; but the response was disturbingly small, and government concluded that if it waited for the slow enlightenment of education to change age-old practices the loss of soil in the interim might well prejudice the whole future well-being of the Protectorate. It was felt that a measure of compulsion was necessary and justified for the common good, and accordingly in 1946 the government enacted legislation to prescribe soil-conserving methods of land use, entrusting regional boards with the power to enforce them.

These measures, which applied equally to all land users, were unquestionably arduous for the small African farmer equipped only with hand tools. Most of the work had to be done during the dry season, before preoccupation with planting, and the ground was then hard. Moreover, much of the burden fell on the women where their menfolk were absent. It is not surprising that these conservation measures were at first resented. Their purport was explained, but it was understandably difficult for those who traditionally regarded land as an expendable commodity in unending supply to appreciate their long-term significance. However, the government pressed its policy firmly and the great majority of the farmers complied. Incurable offenders were fined and those who deliberately or persistently opposed its implementation or incited others to resist were, in some cases, given short prison sentences. They were held to be causing the destruction of an irreplaceable national asset that was not at their personal disposal.

Immense strides (described below) were made in simple conservation, and in 1957 the government decided to moderate its policy of compulsion. The law was not amended, but its application was no longer pressed. Indeed it was not necessary to do so, and the number of offenders brought before the courts steadily declined to negligible proportions by 1960. Nevertheless, opposition to agricultural legislation had become a powerful focus for African nationalist sympathies. Everyone, being a cultivator, could be relied upon to support it, and obstruction of government agricultural policy became one of the chief planks of nationalist campaigning in the late 1950's. It is not yet demonstrable whether the political opposition and the comparatively short-term hiatus in agricultural progress that it provoked were justified in view of the long-term benefits of the government's firm and forceful conservation policy.

### *Anti-famine Measures*

With relatively good soil and rainfall Nyasaland had no history of serious famine prior to 1948/49. The local and seasonal food shortages common throughout Africa had occurred; but nothing to evoke particular preventive action. In that season a widespread failure of the early rains caused the majority of first plantings to fail and, by the time sufficient rainfall came to establish replacements, it was too late for them to give an adequate yield. There was extensive hunger, and almost the entire machinery of government, and much voluntary help besides, was temporarily diverted to relief. A total of 26,000 tons of food (chiefly

maize) was imported, replanting material was distributed, and afterwards a critical analysis of the causes and consequences of the famine was made.

It was officially concluded that, unless determined action was taken, the effects of the famine would carry over into subsequent seasons as people searched for food at the expense of proper preparation for future crops. It was also recognized that the earliest possible planting of almost all crops was the surest safeguard against unfavorable weather. The early preparation of land was therefore the main plank of government's subsequent policy against the risk of famine, to which it was felt the country would be increasingly liable as the strain on the land grew. This, as with soil conservation measures, involved digging hard dry ground ready for planting at the onset of the rains. It was contrary to custom and encroached on the traditional period of relaxation between harvesting one crop and planting the next. Again a measure of compulsion was considered justified to overcome the lethargy induced by famine and to minimize the risk of recurrence. Farmers realized the wisdom of early planting, but exceptional impetus was needed to get it done. Local authority legislation remained in force until 1957, by which time early planting was habitual practice. It is generally acknowledged that no single factor so influenced crop yields. No further food shortages of any consequence occurred during the postwar period.

### *Agricultural Research*

The paucity of research facilities immediately after the war has already been noted. Sustained agricultural progress could not be made without much more technical knowledge on which to base advice to farmers. Both fundamental and applied research were needed. The extent to which this gap was filled was one of the more impressive achievements of postwar development.

During the early postwar years Nyasaland relied upon (and subscribed to) the East African Agricultural and Forestry Research Organization, with headquarters in distant Nairobi, for information of a more fundamental nature. Closer at hand in Central Africa there was at first no counterpart organization, though useful exchange of information and some coordination of research programs between neighboring territories occurred. Indeed it was on the recommendation of a committee responsible for this liaison (6) that the Agricultural Research Council of Rhodesia and Nyasaland was established by act of the Federal parliament in 1959.

The Empire Cotton Growing Corporation, another externally based body, also made a major contribution to Nyasaland's agricultural knowledge. From its main research station in Uganda emanated scientific information, specialist advice, and plant material of particular value in combating cotton pests and diseases. Latterly, investigation into the behavior and control of certain pests was organized on a Federal basis. In consultation with the Corporation, local cotton research was completely reoriented during the postwar period and concentrated in the main producing area.

Another external organization that augmented Nyasaland's agricultural knowledge was the Tobacco Research Board of Rhodesia and Nyasaland. Concerned primarily with the flue-cured crop in Southern Rhodesia, it nevertheless

contributed much information of fundamental value to tobacco growing in Nyasaland.

Finally among the external agencies must be mentioned the Red Locust Research Organization based in Tanganyika. Prior to 1944 harmful invasions of the red locust occurred almost annually. Primarily through the work of this organization that pest was subsequently kept under control by rendering basic breeding grounds unsuitable.

But the need was greatest for applied research under local conditions. Government policy went far to redress it. During the fifteen postwar years capital and recurrent expenditure on investigational work were £400,000 and £750,000 respectively and the annual budget rose from £5,500 in 1945 to £100,000 in 1960. The scientific and technical staff engaged in research increased from six to thirty-two in the same period.

The general station at Lilongwe, established in 1950 to assist the development of the potentially rich central region of Nyasaland, was the largest institution of its kind. It undertook a comprehensive range of studies designed to provide practical information, primarily for African farmers, on almost every aspect of local husbandry. Five satellite stations,<sup>2</sup> in different ecological circumstances dealt with general agronomy problems or specific crops, supported by a series of local trial plots. On three government stations a program of selection of indigenous cattle was undertaken, and management studies were carried out with a view to making available both breeding stock and knowledge, again primarily for African farmers.

Tea and tung oil had separate and specific research stations established before the war; but each underwent considerable change in the postwar period. The environmental conditions under which tea is grown in Nyasaland differ materially from those in the older tea-growing countries for which research data and experience are available. To meet the need for local scientific knowledge in Nyasaland's most important export crop, two new stations were opened in 1949 and 1958; the professional staff was increased from one (part time) to six and the annual budget from a negligible sum in 1945 to nearly £30,000 in 1960.

Investigational work on tung oil, begun in the Cholo district in 1939, was important to the promising infant industry during and shortly after the war, when the product was in great demand. One experiment station, supported by satellite plots, was wholly devoted to trials of practical value to planters and to the improvement and standardization of oil quality until market demand declined and future prospects became unpromising. The scope of the station was then, in 1950, expanded to examine alternative crops, particularly coffee, and mixed farming based on milk production for local urban markets.

Investigational work in animal husbandry aimed primarily at the improvement of indigenous strains of cattle with the object of producing a beef animal that could rear a calf with some milk to spare, be useful for draft purposes, and be tolerant of endemic diseases. Experimental work also included animal management and the incorporation of livestock in arable farming systems.

<sup>2</sup> Mbawa, northern plateau region, general, opened 1949; Lisasadzi, central plateau region, flue tobacco, opened 1947; Chitala, central lake plain, cotton, taken over from E.C.G.C. in 1956; Tuchila, southern mid-elevation plains, general, opened 1951; Maklanga, Lower Shire Valley, cotton, E.C.G.C.

All this investigational work throughout the Protectorate profoundly affected agricultural practice, as will later appear. The knowledge accumulated was far in advance of general practice and paved the way for future progress. Much of it emerged because of generous grants from funds made available under the United Kingdom Colonial Development and Welfare Act. The aggregate sum from this source in the postwar period was £328,000.

### *Agricultural Extension Work*

Useful practical knowledge was soon available; but as in most of Africa, the means of imparting it to farmers and getting it into effective use lagged far behind. Government staff were deficient both in numbers and in understanding the ways of evoking response where incentives were still weak.

The essence of policy was simplicity and concentration; the pursuit of limited objectives, and concentration on the more responsive people. This policy was put into effect in separate but complementary ways: by raising the general standard of agriculture of the mass of cultivators, and by so advancing the more responsive individual farmers and the more cooperative communities that their prosperity might encourage others to follow their example.

Raising the standards of the mass of cultivators was achieved by concentration on such elementary measures as soil conservation, early preparation and planting of crops, early weeding, better spacing, timely uprooting for phyto-sanitary reasons, and improved processing and preparation of crops for market. Similarly the government sought to increase the indigenous cattle population, and to improve its health and productivity by control of tick-borne diseases with regular dipping. An essential feature of this aspect of extension work was the annual publication after 1955 of government's Crop Production Program. It set out not only production targets, guaranteed prices, and general market information but also the most up-to-date agronomic methods for producing the various crops. In this way all concerned with extension work spoke with one voice, the authoritative printed word of the government. Gradually oral advice was supplemented by more sophisticated propaganda media, such as pamphlets, posters, press articles, films, and latterly an illustrated magazine.

Practical demonstration was obviously also necessary. It soon became apparent that plots operated and financed by the government, however impressive, were discounted by the individual cultivator as products of resources far beyond his own reach. These governmental plots were discarded. A successful cultivator reaping the reward of his own enlightened efforts was the most effective demonstration. By the same token it was essential that African field staff should maintain their own small plots of land at an unquestionably high standard and be able to speak from experience.

At the other end of the scale from the policy of gradual improvement of the mass of cultivators lay the policy of concentrating on the most progressive individuals. This policy was rooted in the belief that the foundation of a prosperous agricultural industry would eventually depend upon the individual yeoman farmer with a secure, heritable title over sufficient land to enable him to be efficient and to enjoy an improved level of living. Moreover, the tendency seemed to be towards individualism and away from traditional communalism. It was this phi-



losophy that gave rise to the Master Farmer Scheme, discussed in detail below. This Scheme provided for the payment of a bonus for three consecutive years to farmers who fulfilled specific conditions. It enjoyed modest but important success in setting up many examples of farm prosperity; but the minimum qualifying acreage limited its applicability, and in 1959 a Smallholders' Scheme on similar lines was introduced for the more congested areas.

The limitations of the approach to the masses on the one hand and to individual farmers on the other were plain enough. Neither could provide an ordered layout of land use in place of the disorderly, fragmented patchwork of plots on a scale that would make an agrarian revolution possible. A policy of land reorganization was needed that would permit a whole community to become much more efficient cultivators and pave the way for further development of progressive individuals. Land consolidation in Kenya furnished an example and inspiration, and an adaptation was evolved for Nyasaland. The plan envisaged that all cultivators in an ecological land unit, such as a catchment basin, would voluntarily relinquish usufructuary rights to their existing scattered and fragmented plots and submit to their reallocation in single, consolidated, conveniently-shaped holdings conforming to a sound pattern of land use. Apart from promoting greater agricultural efficiency such a layout would permit economic use of mechanical farm equipment. In the future it was hoped that, as in Kenya, negotiable title would eventually be issued to reorganized plot-holders with safeguards against refragmentation.

With the comparatively small number of larger farms and plantations, government's extension services needed to be direct and personal. These services too were expanded and modernized during the postwar period, though frequently they were handicapped by shortage of personnel. The methods employed were personal visits to farmers and gatherings of farming communities, periodic field days at research stations, quarterly letters of technical news and advice, and the publication of the semi-scientific Nyasaland Agricultural Journal.

The government's field staff increased from about eighteen professionally and technically trained men in 1945 to approximately sixty in 1960, and the number of trained subordinate staff increased from forty-six to about two hundred and fifty in the same period. The marketing board staff (about sixty) helped seasonally (p. 248).

### *Agricultural Education*

Institutional teaching of agriculture was given to the African staff of government departments, to selected farmers and their families, and to schools.

All government appointments were made irrespective of race, and it was government policy to equip Africans for higher responsibility as quickly as basic education enabled them to undertake technical and professional training. During the postwar period the chief preoccupation was training field staff for extension work in the agricultural and allied departments. A school and teaching farm existed before the war. It was moved twice, in 1947 and again in 1956, the second time to a modern residential institution (Colby School of Agriculture) in the heart of the most productive central region. It was built with the aid of £17,000 granted by the Colonial Development and Welfare Fund. During the fifteen

postwar years the qualifying entry standard for the school was steadily raised from a minimum of Standard III (completion of junior primary school) to Standard VI (completion of senior primary school) as more suitable candidates emerged from the schools. After a brief probationary period, the usual course was two years. More advanced training was available subsequently, either locally or in England, for any who were qualified. By 1960, eight Africans had undergone a year's training at the Surrey Farm Institute in England, and seven had been promoted to technical appointments formerly occupied by Europeans commonly possessing a recognized United Kingdom diploma in agriculture. About 250 students passed successfully through the local institution during the postwar period, and they comprised nearly half of the total African strength of the government's agricultural field service.

Several farm institutes were established for the purpose of bringing together community leaders, teachers, chiefs, and progressive farmers for brief practical courses. The first was opened in 1954 at Tuchila in a populous plain of the southern region; the second (1956) formed part of the Colby School of Agriculture in the central plateau. A third and smaller institute was opened at Mbawa in the north, also in 1956. All these comprised residential and teaching buildings and a smallholding such as might be worked by a progressive farmer. A sequence of courses lasting a week or two was held throughout the active farming season: a farmer could not then be expected to be away longer from his own farm. If possible several farmers from one neighborhood attended together to facilitate the treatment of common problems both during the course and in the subsequent follow-up. Wives were also encouraged to attend. In 1960 two further farm institutes were being planned, one (financed by the Beit Trust) to replace the small school at Mbawa in the north and one on the Lower Shire plain, which was to include irrigation.

In a country so dependent on agriculture, education should have an agricultural bias. Most rural schools however, were run by missionary societies under somewhat tenuous government control, and with intense competition between them they tended to offer the type of education the pupils wanted, and this was not agricultural. Increasingly, as success in public examinations became a necessary qualification for a desirable career, the school curriculum followed orthodox channels. In 1957 nearly 58 per cent of the children who attended school did not proceed beyond Standard I (5). This presented two substantial problems—the extent to which agriculture could be taught effectively to these younger pupils returning reluctantly to the land, and how to make instruction interesting and agreeable to them. Finally, there was the task of training the teachers themselves. Despite these problems some instruction had been given in schools for several years; but it was not until 1959 that a comprehensive syllabus was drawn up, brief courses started for existing teachers, and instruction begun for those who were to lecture in agriculture to future teachers at the teacher training colleges. Briefly, the policy embodied in the comprehensive syllabus was that in the kindergarten and early primary stages natural history was taught to stimulate interest in living things, avoiding the risk of discouraging drudgery. On this foundation a more pragmatic slant was given in later primary stages, leaving individual interests to be catered to in secondary schools by means of Young Farmers' Clubs.

*Agricultural Credit and Subsidies*

During most of the postwar period no credit facilities or subsidies were provided by the government, and there was no land bank. In 1955 and 1958 two loan boards were created, the first to serve larger farmers with negotiable security (mainly Europeans), and the second to serve smaller African farmers with little or no realizable backing for loans.<sup>8</sup> The separate boards, administering revolving funds voted by the government, comprised government officials and prominent farmers and businessmen. The loans, particularly if unsecured, were made through the agency of district boards, to whom applicants were frequently known; these loans were more in the nature of supervised credit than loans in the usual sense. In lending to larger farmers, the board generally insisted on farm planning as a prerequisite. The terms of repayment varied with circumstances; interest was at 5.5 per cent. From the inception of the boards to the end of 1960 approximately £120,000 was lent during a five-year period to larger farmers, and about £80,000 in two years to smaller farmers. Loans to smaller farmers were limited more by a lack of applicants prepared to use money for approved farm developments than by the availability of funds. And during the period of political opposition to the government many African farmers were chary of accepting government assistance.

A considerable variety of items and activities was subsidized during the last decade of the postwar period to promote better farming. Some were specific to certain needy sections of the farming industry, while others aimed at general improvement of farming practice. The small flue-cured tobacco industry, comprising some 120 growers, was badly in need of modernizing by new capital investment in curing barns, handling sheds, and special grass leys to reduce nematode infestation. Subsidies for these purposes were used with good effect.

Similar help was given to African tobacco growers. Shortage of space in curing barns was the Achilles heel of the dark-fired industry and resulted in large losses of leaf annually. In an attempt to reduce this loss the construction of small barns, built of mud blocks and thatch, was subsidized. Moulds in which mud blocks were made were supplied at nominal prices. Many thousands of these were distributed at a cost of some £7,000, stimulating not only construction of new barns, but revolutionizing traditional domestic building methods and saving timber that was rapidly becoming scarce. But the resultant net increase in barns was disappointing, as will be seen later (p. 268).

The remaining subsidies were aimed at making fundamental improvements in farming, particularly among Africans. Unquestionably the most important and far-reaching were the Master Farmer Scheme and the encouragement of ox-drawn farm carts. The former is described below (p. 275). Before the introduction of carts in 1952, all African produce was carried to market in head-loads, and no manure was returned to the land. Robust wooden carts with pneumatic wheels costing approximately £55-£60 were sold at 40 per cent subsidy until they became well established, when the subsidy was gradually tapered off. Some 3,700 carts were sold under this Scheme, mainly in the central plateau region, at a cost in subsidy of about £75,000. They not only carried crops to market and

<sup>8</sup> Prior to 1958 loans were available to African farmers from local sources. But the machinery was cumbersome and the funds inadequate.

manure to the fields, but began to change the traditional concept of cattle to that of a farming asset. This paved the way for plowing. Plows themselves were subsidized in one northern district (Mzimba) for a few years in order to encourage plowing, thereby stimulating the clearance of stumps from land to induce permanent settlement in preference to shifting cultivation.

Other subsidies were designed to inculcate healthier methods of stock keeping, and better animal husbandry generally. Assistance was given for improved buildings, and barbed wire was subsidized to encourage paddocking. For larger and more advanced farmers there was a full fencing subsidy to encourage better management of grassland and to help in rearing approved breeding stock. There was also a subsidy for soil and water conservation, irrigation works, and unsuccessful boreholes for water.

Finally, commercial fertilizer was subsidized from 1952 onwards, selling at 3d. per pound to African farmers, to whom it was a new departure. There were two immediate objectives. The first was to produce higher yields of better-quality tobacco; the second was to boost the yield of maize, particularly in densely settled areas where mono-cropping was almost universal, in order to make room for the introduction of leguminous rotation crops. Total expenditure on this subsidy amounted to about £14,000. The response was on the whole disappointing, mainly on account of lack of ready cash among farmers at the time fertilizer was needed. In 1960 credit was allowed to tobacco growers against repayment after the crop was sold.

In all approximately £20,000 was spent on direct subsidies to larger (mainly European) farmers and about £130,000 to smaller African farmers. The government contributed the former, which was ultimately administered by the Loans and Subsidies Board, and the Marketing Board (see p. 248) provided most of the loan funds for the smaller farmers.

### *Control and Regulation of Marketing*

Far-reaching changes occurred in marketing policy and procedure in the postwar years, particularly for crops grown for sale by small African farmers.

The old established plantation crops, tea and tobacco grown by Europeans, had long since evolved appropriate marketing systems; tea went to auctions in Mincing Lane in London and tobacco was sold in local auctions. Wartime control of tea marketing by the United Kingdom Ministry of Food was relaxed in 1951. Tung oil, a newer crop, had no established marketing system, and the demand for oil both during and immediately after the war necessitated some organization and control. A statutory Tung Marketing Board was set up in 1946 to organize the collection and crushing of nuts, the packing and disposal of oil, and the distribution of payments to growers.

These procedures were adequate for the comparatively small number of producers involved, and they stood the test of time. But marketing services for the large number of small African cultivators were, at the end of the war, piecemeal, inadequate, and too short-term in outlook. The Native Tobacco Board had since 1926 done much to give growers advice on production and a reliable marketing service; but its prices were subject to bewildering fluctuation. Cotton was bought by agents on behalf of the government on a year-to-year price policy. Miscella-

neous produce was bought by private enterprise under the Marketing of Native Produce Ordinance (1943), which licensed buyers and brought them into open, supervised competition at specified market sites. The weakness common to these arrangements was lack of stability, particularly of prices. If African cultivators were to be converted from subsistence to a cash economy it was felt that they must have confidence that there was a continuing market for their produce at fair and reasonably steady prices, and an efficient organization to buy it. This was the aim of government policy.

Government concluded that this aim could not be fulfilled if marketing were left to private enterprise. The fluctuations of price inherent in such a system would bewilder and discourage the inexperienced farmer, and it was particularly necessary to safeguard against sudden decline in prices as markets returned to normal after the war. Government control of the marketing of the more important crops produced by African farmers therefore appeared essential. This was accomplished by establishing statutory marketing boards. At first there were separate boards for tobacco (established 1926), cotton (1951), and other produce (maize, peanuts, and beans, 1952). In 1956 these boards were amalgamated into the Agricultural Production and Marketing Board for closer coordination and greater efficiency. The government's Director of Agriculture was made chairman of the Board in order that production and marketing policy might be closely integrated, and the majority of the marketing staff, numbering about sixty, were seconded to the Agricultural Department (at the Board's expense) for extension work when not engaged in marketing.

The Board also helped production by subsidizing farming requisites, fertilizers and farm carts for example. In addition, it assisted the general improvement of African land use by contributing from surplus balances to the African Development and Welfare Fund, which financed a wide range of projects. The total sum thus subscribed by the Board during the postwar period was £1,775,000. The Board contributed another £336,000 to government between 1945-60 for the government's field staff engaged in extension work on crops purchased by the Board, and paid £53,000 towards research. In all the Board paid out approximately £2.5 million towards agricultural subsidies and services, other than marketing, during the postwar period.

The principal aims of marketing policy were to provide an efficient marketing service wherever it was deemed desirable to encourage a crop for which the Board was responsible; and to pay to the producer reasonably steady prices related (with due allowance for the Board's contributions to subsidies and services) to world market values and, if possible, guaranteed in advance of planting. The policy for maize differed somewhat from the export crops on account of its special position as the staple food and its exceptional impact on agricultural practice. The Board built and operated an extensive system of well-equipped markets, its capital installations being valued at over £1.5 million in 1960. It sold its produce on the open market where the scale of its operations (approximately 62,000 tons of produce and a turnover of about £3.5 million in 1960) enabled it to do so to advantage.

Excessive price fluctuations were avoided by setting up cushioning funds for each crop, a proportion of trading surpluses being credited to them in profitable

years and withdrawals for price support made in unfavorable ones. The aggregate value of these funds was about £1.7 million in 1960. For this policy to succeed it was necessary to grant the Board a trading monopoly within its sphere of action. Price stabilization would obviously have been undermined if competitors had paid more when world prices were attractive and abstained when they were unrewarding. Like all monopolies, the Board was subject to much criticism on both economic and political grounds, and towards the end of the period under review the government somewhat relaxed its control. Although the Federal government had constitutional powers to control territorial marketing, and contemplated exercising them in Nyasaland, it did not in fact do so, except temporarily for cotton and to guarantee the price of rice.

The application of marketing policy to the various crops concerned and its effect on production are discussed below.

Government's policy for cooperative marketing must be considered in the context of marketing policy as a whole. This required comprehensive facilities and steady prices for the African crops of major economic significance, and the marketing boards with monopoly rights were established to provide them. The formation of cooperative societies was encouraged to handle produce of smaller and more localized importance, such as rice, coffee, and ghee. Apart from providing marketing facilities, they would give useful experience which could later extend to a wider field.

Legislation enabling the formation of societies was enacted in 1948. The first coffee society was formed in 1950 and the first rice society in 1952. Ghee societies were also formed during that period. Within the limits of their scope imposed by environmental factors, these societies functioned adequately. By 1960 there were 16 produce marketing societies handling rice, seven for coffee and 48 for ghee. Corporately they owned three rice mills and a coffee factory, and their aggregate membership was 12,000. In their best year their total receipts were about £300,000, principally from rice; but the average was little more than half this sum. The fortunes of the rice societies depended very much on a generous protected price guaranteed by the Federal government. By contrast coffee growers pioneered their development through a difficult marketing period, and ghee production declined through lack of consistent interest by milk producers.

### *Land Policy*

Approximately 87 per cent of Nyasaland's total land area was designated African Trust Land. The responsibility for safeguarding it for African use was vested in the United Kingdom Secretary of State for the Colonies under an order in Council and exercised on his behalf by the Governor. Rather less than 3 per cent of the land area was freehold or government leasehold, most of it farmed by Europeans. The balance, roughly 10 per cent, was Public Land used for State forest reserves and other public purposes.

The government had no clearly defined policy on the complex problem of African land tenure in the postwar years. Its importance was well appreciated and suggestions for its solution were not lacking; but the time was not considered opportune to tackle one of the most controversial and deep-rooted problems in Africa.

The African concept of land was that all belongs to the people and all have a right to the use of it. Like air and water it is not owned by anyone and is held in trust from the dead by the living for the unborn. This attitude applied to all land, whether trust, leased, or freehold. There was therefore no ownership of land in the western sense and land could not be bought or sold. Certain traditional authorities had rights and responsibilities of allocating usufruct and of adjudicating disputes. As the population increased and the supply of unused land shrank, the needs of new generations were met by subdivision of land used by the old. These traditional concepts differed sharply from the western concept of land tenure, whose fundamental features of legal security and rights of disposal were held to be necessary to provide the incentives required for the real improvement of land. The two concepts were in fact so diametrically different that it appeared impossible to evolve from one to the other. A revolution in tenure was thought to be unavoidable if the necessary security and incentives to invest in farm improvement were to become effective before subdivision and fragmentation reduced individual plots to uneconomic parcels.

This was the problem. But, apart from a handful of progressive individual farmers, there was no demand for change. The majority felt no insecurity, and no subject could more quickly arouse suspicion and fearful opposition than the suggestion of interference with the traditional control of land. Nevertheless the government was anxious to establish the principle of title to land to have the means available whereby those who wanted it could have it, believing that the evident benefits would generate demand. But this wish never became active policy: public opinion was too strongly entrenched. The traditional land authorities were opposed to derogation from their powers, and cultivators as a whole would have resented advantages for a favored few and the latter were themselves anxious to avoid becoming objects of jealousy and suspicion. There was also a widespread feeling, easily aggravated in the later 1950's, that any reformation of land tenure was merely a planned prelude to the transfer of land to Europeans.

In fact such "inter-racial" exchange of land as there was in the postwar years was in the opposite direction, a result of special circumstances. On several freehold estates acquired by Europeans in the early years of settlement, original and immigrant African families had multiplied to such an extent that a land shortage had developed on the sections set aside for them. Landlords and tenants had mutual rights and obligations. Repeated attempts had been made to equate and regularize these by law, but the problem had become increasingly intractable and friction developed to a disturbing degree. The government concluded that the only solution was complete implementation of the recommendations made by Sir Sidney Abrahams in 1946 (7), that the land occupied by the tenants should be bought by the government so that all rights and obligations were extinguished.

This policy was followed throughout the 1950's as fast as funds were forthcoming (from the British government) for the purchase of land at a reasonable price. By 1960, approximately 520,000 acres had been bought and nearly £500,000 spent on acquisition and the movement and compensation of tenants. This reduced the original problem by four-fifths and achieved three objects: a reduction of friction, "emancipation" of some 42,000 families, and freeing of several

thousand acres of formerly encumbered land for future development by estate owners.

Another system of land use with origins in early days and peculiar to Nyasaland was the "visiting tenant" system, in which African farmers grew cash crops (usually tobacco) on private estates on a seasonal basis by arrangement with the occupier. There was generally no written agreement; the landlord provided land, seed, and supervision, with free issues of fertilizer or advances to buy it and other requisites. In return the "tenant" sold his crop to the landlord, who graded and resold it. This form of sharecropping was beneficial if undertaken on an enlightened and progressive pattern, but harmful if purely exploitative. In general the system improved considerably during the postwar years, many estates adopting sound land-use layouts and producing crops, such as Burley tobacco, which required closer supervision than could be given by the government extension service. And, as a result of more assiduous attention and the application of knowledge derived from research, yields and financial returns to the "tenant" were nearly double those obtained by the average African farmer.

### *Development Schemes*

Having comparatively little unused land of good agricultural potential, the emphasis of government's development policy was more on the improvement of current practices on occupied land than on the development of virgin areas. But the preliminary planning of the Shire Valley Project and the activities of the Commonwealth Development Corporation are worth mentioning. The Shire Valley Project had as three interrelated aspects the regulation of the level of Lake Nyasa by means of a dam in the upper reaches of the Shire River which drains it; the production of hydroelectric power in the middle cataract region; and the drainage and irrigated development of the Elephant Marsh in the Lower Shire Valley, using the conserved water and electric power for the purposes.

A report (8) following a thorough survey by consulting engineers was submitted to the government in 1954; but the high cost of implementing the comprehensive scheme, around £80 million, could not be contemplated. Thereafter various aspects of the development potential of the Valley were considered separately. Of primary concern to agriculture was the Elephant Marsh, an extensive alluvial flood plain close enough to the railway and the southern urban consuming areas to have prima facie prospects for development. These Elephant Marsh prospects were examined in detail, again with the help of consultants, and a report containing a final appraisal was prepared in 1960 and published in 1963. It recommended empoldering and draining 50,000 acres to be developed under flow irrigation by a large commercial nucleus estate and African smallholders. Sugar cane and cotton were to be the principal cash crops with cocoa a promising possibility. The capital cost of reclamation was estimated at £5 million. At the end of the period here reviewed the proposals were still being examined by the government.

The Commonwealth Development Corporation, set up by the British government in 1948 to undertake promising projects for which private finance was not available, established a large tung oil plantation and pioneered the development



of flue-cured tobacco in a new area, Kasungu. These and other activities are outlined in later sections.

### *Changing Economic Conditions*

In general the economic environment in the postwar period was favorable for agricultural development, although transition from war to peace was not without difficulty. The continuation of wartime controls sometimes retarded progress, while at other times the return to normal processes of supply and demand had an adverse effect.

In only two crops did radical changes in demand appreciably affect production. The most dramatic was tung oil. The wartime demand receded, competing substitutes gradually reduced the market price, and producers' confidence in the future of tung oil in Nyasaland virtually vanished with the serious consequences that are described later.

Tea was the second crop for which there was marked change in market demand in the postwar period. Threatened over-production had resulted in 1938 in the extension of the International Tea Agreement to Nyasaland. The Agreement sought to restrict tea production by regulating acreage over quinquennial periods. It was not until 1949 that consumption overtook production and the Agreement was terminated. Thereafter normal economic forces operated, resulting in considerable price fluctuation; but trends were sufficiently encouraging to stimulate consistent expansion of the Nyasaland industry.

A short supply of fertilizers, particularly nitrogen, during the first six postwar years kept tea production well below potential, while not materially affecting other crops, since the practice of fertilizing them was not then generally established. Seasonal shortage of labor was also an acute embarrassment to the tea industry (and to a lesser extent to tung growers) in all but the last few postwar years. Local laborers were absent tending their subsistence holdings during the peak period of activity on the estates.

Economic influences on the production of Nyasaland's other major export crops were less marked; but three instances are worth recording. High cotton prices negotiated between the Nyasaland government and the Raw Cotton Commission immediately after the war permitted a substantial price-support fund to be established, with marked effect on subsequent production. The world-wide shortage of edible fats after the war provided an opportunity to expand peanut cultivation with important beneficial consequences. And a big drop in world maize prices in 1955 triggered a major change in government agricultural policy.

But on the whole government policy was a more potent influence than economic factors in shaping the pattern of postwar agriculture, at any rate African agriculture. The effects of economic forces were mitigated and moulded by the policy of controlled marketing and price cushioning in an endeavor to stimulate and sustain incentives to move from a subsistence to a cash economy. But there were several powerful socio-economic forces opposed to this move. In the first place the material requirements of the average African family were still comparatively simple and easily satisfied. Interest in the more sophisticated accessories of life was not strong. Moreover there was in African society a fear of change and of the unusual, which exposed the more western-oriented individuals to dis-

couraging suspicion and jealousy. Strong and extensive family obligations required the "haves" to support the "have not" relations. This was a disincentive to individual progress locally and an incentive to emigrate beyond their reach. Finally, in the stage of development of Nyasaland during the postwar period, political influences were often more powerful than economic: African cultivators could be motivated comparatively easily by political forces even against their economic interests.

### *Agriculture and the Federation*

The creation of the Federation of Rhodesia and Nyasaland in 1953 had dramatic repercussions in the sphere of Nyasaland agricultural politics. The influence of the Federal government in agricultural research and marketing was noted above. The constitution also empowered the Federal government, subject to the consent of the territorial government concerned, to take over from that territory the responsibility for providing and administering services for non-African farmers. The constitution allocated responsibility for African agriculture to the individual territorial governments.

At the inception of Federation, non-African agriculture in Southern Rhodesia was transferred to the Federal government; the Northern Rhodesia government followed suit in 1955. Understandably non-African farmers in Nyasaland urged their government to do likewise. They believed that the services provided for them would be better; but, more particularly, they felt that their future would be more secure in the hands of the Federal government with a powerful ministry specifically responsible for their corporate interests. Their main motive was therefore political, and it was on political grounds that the Nyasaland government finally declined in 1959 to agree to the transfer, deeming it impolitic to divide responsibility between the respective governments on a racial basis. The controversy over this issue was bitter and protracted, and had its repercussions. The demand for Federal services influenced the Nyasaland government to improve certain of its own services to non-African farmers, and the desire to remove tea research from the political arena undoubtedly influenced the tea industry to take over responsibility for it from the Nyasaland government. There is no doubt, too, that the threatened incursion of the Federal government into the sphere of agriculture sharpened African anxieties and strengthened opposition to federation and to the ruling Nyasaland government as part of it.

### *Financing the Implementation of Government Policy*

The Nyasaland government's policies have been described and their dominant influence in the postwar period mentioned. Before turning to the changes they brought about, it is appropriate to indicate briefly the approximate sums spent on agricultural development and their proportion to total government expenditure. Table 1 shows total annual expenditure on capital and recurrent account both for development and for normal agricultural services, and expresses this comprehensive figure as a percentage of the total government budget. Total postwar expenditure by government on agriculture was about £4.8 million or 7.5 per cent of the total budget. Expenditure on agriculture comprehends money from government's general revenue, the Nyasaland African Development and Welfare

TABLE 1.—NYASALAND GOVERNMENT EXPENDITURE ON AGRICULTURE, 1945-60\*

Year <sup>a</sup>	Budgeted expenditures (£)		Percentage spent for agriculture
	For agriculture	Total	
1945 .....	47,688	1,789,911	2.7
1946 .....	70,182	1,157,497	6.1
1947 .....	82,011	1,409,369	5.8
1948 .....	113,509	2,137,271	5.3
1949 .....	174,035	2,781,944	6.3
1950 .....	200,342	3,639,716	5.5
1951 .....	309,882	4,123,061	7.5
1952 .....	285,887	4,094,268	7.0
1953/54 <sup>b</sup> .....	442,033	7,815,548	5.7
1954/55 .....	386,310	4,446,401	8.7
1955/56 .....	494,210	5,440,870	9.1
1956/57 .....	458,334	6,278,283	7.3
1957/58 .....	542,598	5,898,179	9.2
1958/59 .....	607,440	5,925,454	10.3
1959/60 .....	586,532	6,708,597	8.7

\* Data obtained from the Nyasaland Ministry of Finance.

<sup>a</sup> Calendar years 1945-52, July-June years 1954/55 and later.

<sup>b</sup> Eighteen months.

Fund, and grants from the United Kingdom Colonial Development and Welfare Fund, the last totaling over £666,000 during the postwar years. The African Development and Welfare Fund, which contributed about a fourth of the total expenditure on agriculture, derived its money from the Marketing Board.

Unfortunately no comparable figures are available for expenditure in the private sector of the agricultural industry. In the tea industry alone postwar expansion must have involved an investment of at least £3.5 millions. The value of the effort put into African agriculture cannot be assessed.

The comparatively small governmental financial investment in agriculture was the subject of comment in the *Report on an Economic Survey of Nyasaland* (5), where it was emphasized that in 1958/59 "more than twice as much will be spent on recurrent account on education and health as on agriculture, forestry and veterinary services combined." The report considered that "the widening gap should be narrowed" and the means found for expanding agricultural field services of all kinds.

These views, expressed towards the end of the period under review, would have been equally applicable at any time during it. Nevertheless, increasingly during the postwar years the government was faced with the most pressing demands on its slender resources for improved communications, more comprehensive education and information services, closer administration, and security precautions. It was not an easy period in which calmly and consistently to take a long view of the country's future needs. Doubtless largely for the same reason investment in agriculture in the private sector was, proportionately to public expenditure, far below the comparable rate in neighboring territories.

The serious need for funds for agricultural development, particularly in the early postwar period, led to the imposition of export taxes on the two major crops,

tea and tobacco, in 1949. They aroused much criticism especially within the industries affected, and were removed in 1952 and 1954 respectively. Thereafter, there was no tax on exports and taxation of agriculture was indirect. Most important was the contribution made by African farmers, who did not pay income tax, to the financing of their own agricultural services. This was done through the marketing boards, which were required to pay not only the cost of marketing services, which was common to all producers, but also the cost of staff members assigned to the government for advisory duties on production. The marketing boards also contributed from their surpluses to the government's African Development and Welfare Fund and towards the cost of research and extension services provided by the government. This policy was gradually modified in the later 1950's as the need to maintain producers' prices in a period of deteriorating markets reduced the boards' trading margins. By 1960 payments to the Development Fund and in respect of the government's extension services had ceased. All major sections of the agricultural industry were then on a comparable basis as regards contributions towards the cost of their various research, advisory, and marketing services.

#### CHANGES IN THE PATTERN AND PRODUCTIVITY OF AGRICULTURE

Government policy and economic forces having been outlined against the background of history and environment, the resultant changes will now be described.

##### *Conservation of Natural Resources*

To conserve soil and water, trees and grass involves a complex of land use activities embracing the whole of farm practice and grassland and forest management. But in the context of government policy it was the arrest of erosion of arable soil by straightforward physical means that was given the most urgent priority. Arable soil was the most vulnerable resource, and the future of agriculture and of life itself depended upon its preservation. If soil could be held in place it would be available for the inevitably slower evolution of comprehensive conservation farming. The government regarded the earlier soil conservation measures as a means to an end, not an end in itself. Here we review these measures; those concerning the complex of better land use are recounted separately below.

In effect there were three overlapping phases in government's conservation campaign. The first (1945-49) aimed at the introduction of contour ridge cultivation in place of the traditional systems of planting all crops on the flat or in scattered circular mounds of scraped-up soil. The second (1949-56) sought to reinforce these ridges by contour bunds, or banks, in the areas most susceptible to erosion; and the third (1956-60) involved the use of more sophisticated methods of conservation concentrated in the areas of greatest potential and promise.

Conversion to contour ridges had already begun in 1945 and good progress had been made in several localities. The simple "road-tracer" used for aligning the contours was insufficiently accurate to prevent dangerous accumulations of storm water in low spots, and "tie-ridges" were advocated as an additional safeguard. These were rough and ready measures; but, except on steeper gradients and nonporous soils, they enabled all but the heavier storms to be retained and

absorbed. In most parts of the country no great difficulties were met spreading the introduction of this system of cultivation. It involved little extra work, its virtues were easily explained, and the results were usually its own recommendation. By the end of 1949 cultivation of all the more important crops in contour ridges was almost universal on sloping land, and tie-ridges were common.

But the inherent limitations of these measures, especially on steeper land, had long been apparent and reinforcement with more substantial bunds at vertical intervals of approximately two and one half feet was necessary. Bunds had been encouraged in certain special areas since before the war. To be fully effective they must be allowed to consolidate and remain under binding vegetation. They were an innovation necessitating additional work, and they eliminated a small proportion of land from cultivation. They were less easily understood than contour ridges and less acceptable to traditional cultivators. There was thus some resistance, and the force of law was invoked to conserve the common heritage of soil and to protect the good farmer from the negligent cultivator above him. The Natural Ordinance was enacted in 1946.

As pressure on the land grew and caused more erodible soil to be brought into cultivation, the urgency of the problem became more pressing. The government sought wider powers of enforcement and replaced the 1946 legislation with a new instrument in 1949. With this a more intensive phase of conservation began. Provincial and district natural resources boards were created comprising government officials and both European and African influential farmers. They were required by the central government to make plans and programs for conservation and to recommend rules and make orders to see that they were carried out.

The planning and organization of the work was highly developed and its execution concentrated and energetic. Conservation specialists provided technical guidance and, during the interval between harvest and replanting, almost all government field staff were engaged in supervising conservation work with the support of administrative officers.

Everything possible was done to explain to the chiefs, leaders, and the people the purport of what was required of them. To lighten the physical task they were encouraged to tackle it on a community basis. This they generally did and, although the unaccustomed work in hard, dry ground in the traditional "holiday" season was inevitably unpopular, the majority acquiesced in it and cooperated well. But some opposed and obstructed it. If they persisted they were fined, and if they consistently incited others to opposition they were sometimes given short prison sentences. But the object always was to get the land conserved while there was still time, and not to punish.

Great progress was made throughout the early 1950's. (The only districts in which little or no progress was made were a few growing cassava as a staple crop, where a deep-seated conviction against contour ridges existed because of fear that waterlogging would cause tubers to rot.) It was estimated in 1956 that three-quarters of a million acres had been conserved by the simple methods described and that, with virtually all sloping arable land cultivated in contour ridges, gross erosion had been halted. Indeed Nyasaland had externally the reputation of being one of the countries in Africa most notable for conservation.

But it was a tribute won hardly and at the price of much misunderstanding and unpopularity. It was time to change the policy: to perpetuate a tough line would involve the risk of building up an atmosphere prejudicial to good farming, which could only be taught and not forced. And the position had in any case been reached in which the soil as a whole was reasonably safe; the greater need was to put it to better use.

Accordingly soil conservation in the third phase (1956-60) consisted mainly of endeavoring by propaganda to consolidate what had been accomplished, to protect new ground brought into cultivation, and to provide a conservation framework in planned farms and catchment areas occupied by progressive individuals and communities. In other words it was part of a policy of helping the receptive to help themselves.

Modern planning techniques, more accurate methods, and mechanical equipment were used in this phase. The conservation work was an integral part of a land use plan whether for an individual farm or catchment area. Water storage earth dams (some thirty in all) were incorporated in catchment schemes and on some of the larger farms. Modern mechanical equipment, owned and operated by the government, was used for dam building and the conservation framework. In the remote northern region, where smaller earth dams (averaging 1.5 million gallons) were built to hold water in the dry season for men and livestock, ox-drawn scrapers were used. By the end of 1960, 144 such dams had been built with the willing cooperation of the people for about £140 per dam. In community projects all these works were financed from central or local government funds. Works provided for the direct benefit of the individual farmer were paid for by him.

In some of the steeper, wetter areas with gradients of 20 per cent or more and 50 inches of rain, bench terraces were the only safe and permanent form of conservation work. Government policy was to encourage this construction for high-value perennial crops that would repay the hard work involved. In the northern region approximately 1,500 acres of coffee had been planted on terraces by 1960. On somewhat gentler slopes, where contour bunds would suffice if close enough and well maintained, they were put to profitable use by planting with dwarf bananas.

In the third phase of conservation work another quarter of a million acres were protected from erosion by contour bunds or more sophisticated measures.

The work so far described was to conserve arable land. Since long before the war the government had sought to protect valuable stands of indigenous timber and, indirectly, the water resources of the country, by means of tactically sited state forest reserves. In the postwar years these were supplemented by soft-wood plantations, again sited to protect as well as to produce. By 1960, 25,000 acres had been planted, bringing the total state forest to nearly 3,000 square miles or 8 per cent of the land area of the Protectorate.

But it was perennially threatened by grass fires that swept the country from time immemorial at the end of the long dry season. The traditional reasons for burning, though unenlightened, were none the less compelling, and by the end of 1960 little or no progress had been made to control fires. It is a problem of education, and in 1959 a Fire Education Committee was formed and charged

with the responsibility of enlightening the public, and particularly school children, as to the wisdom of and policy for fire control and the means of carrying it out.

In addition to endangering the forests, uncontrolled fire reduces the productivity of grass and aggravates the problem of over-grazing. It is a localized problem not as serious in Nyasaland as in many other parts of Africa because of the comparatively small livestock population, but carrying capacity cannot be increased without improved grassland management. Here again comparatively little was accomplished. Stock traditionally grazed in communal herds on common land, tended by children, and there was no recognized responsibility for the management of grazing. Striking demonstrations were given of rapid recovery of worn out pasture as the result of simple management, and assistance was given in the form of fencing subsidies; but there is unlikely to be any significant improvement until the general attitude towards land and livestock changes and animal husbandry is integrated into the individual farm plan.

#### *A Sufficient Supply of Better Food*

Quantitative information on the production and consumption of food by the African population is almost nonexistent. Supply was known to be seasonally precarious and its nutritional quality was marginal. In his 1947 annual report the Director of Agriculture warned that future food supplies would be inadequate; but it was the famine of 1949 that underlined the vulnerability of the position and galvanized the government into tackling it.

Maize is the staple food. Except in a few comparatively small localities, virtually every family grew maize for subsistence or sale. The proportion of an individual cultivator's land devoted to maize varied between 100 per cent in the densely settled areas of the south to 55 per cent in the fertile central region, where tobacco and peanuts played an important part in the economy. According to the Economic Survey Report (5), the average for Nyasaland probably lay between two-thirds and three-fourths of the cultivated area. The average size of the family maize plot was about three acres in the northern and central areas and nearer two in the south. There were therefore about 1.5 million acres under maize. An estimate of yield is even more hazardous, but, assuming an average of three bags (of 200 pounds) per acre in the north, five in the center, and four in the south, total maize production varied between 500,000 and 700,000 tons over a series of fairly normal seasons (5).

Three points stand out from this information; the vulnerability of food supply so dependent on a single crop, the need for supplementary foods to give balanced nutrition, and the importance of reducing the proportion of land under maize in order to facilitate crop rotation and make room for the increased production of cash crops. In short, the first part of the problem of agricultural progress was to raise the yield of maize per unit area throughout the country.

This task was tackled through agronomic improvements, economic incentives, and plant breeding. Prior to 1950 there were no precise experimental data on local maize growing. But thereafter a wide range of coordinated studies was undertaken throughout the country and a wealth of useful knowledge was accumulated. It was obvious in the famine year of 1949, and had been apparent before

that, that early planting of maize (and indeed almost all crops) had a profound effect on ability to survive unfavorable weather and on yield. Subsequent experiments proved, for example, that a delay of two weeks might reduce yields by a third and a delay of a month by 50 per cent or more. Traditionally, African cultivators awaited the rains to soften the ground before preparing their land for planting, and preparation was therefore always later than optimum. The effectiveness of a temporary policy of compulsory early preparation of land has already been mentioned in discussing anti-famine measures.

Gradually through the 1950's other information of practical value emerged from experiments and was passed on to cultivators. The optimum spacing of maize, the profound significance of early weeding, the striking value of manure and fertilizer (particularly nitrogen), and the effect of peanuts on maize following in rotation are examples. There is no doubt that the widespread adoption of early planting and timely weeding were, more than anything else, responsible for rapid recovery from the 1949 famine, the general sufficiency of maize for an increasing population and the production of a substantial exportable surplus (See Appendix Table I).

If agronomic methods accounted for higher and more dependable yields, price and marketing arrangements gave an incentive to their adoption. Prior to 1947, African-grown maize was bought, along with other produce, in organized markets and distributed to bulk consumers through normal trading channels. Uncertainty of supply led in 1947 to the formation of the Maize Control Board charged with responsibility for equitable distribution. But it was not until after the famine, when 16,000 tons of maize were imported, that the government began to formulate economic incentives to increased production. The producer price was doubled in 1950 and evoked supplies sufficient to meet all internal demands and establish a small reserve of 2,000 tons. The same price was maintained unchanged up to 1956 and was effective in stimulating production and sale (Appendix Table 1). When the Produce Marketing Board took over the purchase, storage, and disposal of maize, in addition to peanuts and beans, in 1952, a comprehensive marketing organization was developed. Maize production was stimulated to such an extent that, although sales never exceeded 10 per cent of total production, they became an embarrassment in 1955 when world surpluses caused export prices to fall to unremunerative levels.

At the same time it seemed that maize acreage was increasing. Consequently, for both agronomic and economic reasons, government policy was adjusted. The new aim was to restrict production to local needs plus a reserve of about 25,000 tons, encouraging maize as a cash crop only in the areas most suitable for growing it. Export would be confined to the annual turnover of the reserve. But the surplus remained excessive and financial considerations alone necessitated reduction of the Board's price to producers in 1957. The Board's purchases dropped, and this gave the opportunity for African traders to start a buying and distributing service that became an established and useful feature of local maize trading. The Board relaxed its monopoly and the pattern that evolved in the late 1950's and 1960 was one in which the Board bought the maize requirements of government departments, a small emergency reserve of about 5,000 tons, and filled any orders placed by commercial concerns. Private traders handled the balance.



Buying was confined to areas considered suitable for maize growing, and the Board set a standard of marketing practice and price calculated to bring forward the territory's needs without stimulating excessive maize cultivation. The right to export was confined to the Board.

One cannot confidently judge the extent to which this policy succeeded. Except in 1958, maize was sufficient for internal requirements and, having regard to the rising needs of a growing population, the limited amount of suitable maize land available and the larger area devoted to other crops, it is reasonable to infer that the increased supplies of maize came mainly from higher yields rather than more extensive planting.

But still higher yields would be needed in future. With this in mind a systematic maize breeding program was begun in 1953, great care being taken to establish criteria suitable for local conditions and acceptable to local cultivators. The breeding program followed conventional lines, and by 1960, four new varieties had been evolved giving yield increases of the order of 12 to 25 per cent. Preliminary steps had been taken to accumulate enough of these varieties for selective distribution.

Cassava, sweet potatoes, millets, rice, and wheat are, by comparison with maize, of passing interest only. No major policy issue affected any of them in the postwar period and no significant change in method of production or output. Certain improvements were, however, attempted.

Cassava (manioc) is the staple food in certain localities where soils are too infertile to produce rewarding yields of maize. Fortunately, they are in the lake region where cassava's notorious nutritional deficiencies can be offset to some extent by fish and mangoes. The great merit of cassava is its tolerance of weather extremes and, with sweet potatoes, it played an important part in hastening recovery from the famine of 1949. Planting material was widely distributed and the resultant crop relieved the run on maize. In subsequent years cultivators were encouraged to maintain small plots of these standby crops, but interest waned when maize supplies recovered. Some 6,000 tons of cassava were exported in 1957, but this was exceptional.

The only attempt to improve agronomic practice was the substitution of contour ridges for the traditional mound cultivation as a soil conservation measure. But, although demonstrations showed that greater yields resulted and tubers did not rot from waterlogging, as was feared, tradition prevailed and very little progress was made. Importations of virus-tolerant varieties were likewise unsuccessful since consumers preferred the local susceptible types.

Most African cultivators grew small plots of sweet potatoes as a food supplement and useful reserve. Experiments proved that reliability and yield were enhanced as much as threefold by planting before the end of January rather than a month or so later, which was common practice. But this new knowledge had not been widely applied by 1960.

Three types of millet were grown: sorghum (*S. vulgare*), finger millet (*Eleusine coracana*) and bulrush millet (*Pennisetum typhoideum*). All were grown for food or beer and were of local significance only. Export of surplus reached 2,700 tons in 1957, but was normally negligible. After the famine an attempt was made to extend the cultivation of sorghum because it is more drought-resistant than maize. Sixty varieties were imported for trial, mainly from the

Sudan, with a view of making the crop a more attractive alternative. But, although some were slightly superior in yield to those in local use, they were seldom successful on the relatively light and dry soils, where they were needed, and none was sufficiently attractive to overcome the preference for flavor and resistance to bird-damage in the existing local varieties.

The problem with Eleusine was to find a method of cultivation in the cooler northern uplands that was less destructive of natural resources than the indigenous system, which consisted of clearing a large area of bush, concentrating and burning the timber on a smaller one to generate intense heat, and planting the crop in the ashes. Apart from the great waste of timber and time, the physical and chemical properties of the soil were so damaged by heat that only one crop could be grown, subsequent erosion was severe, and natural vegetation took many years to recolonize. The ephemeral fertility is believed to be due to the release of nitrogen by heat-resistant soil organisms given a brief respite from less resistant predators. The success of alternative methods depended on increasing the supply of available nitrogen. Moderate dressings of sulphate of ammonia produced equivalent yields, and planting after manured maize or fertilized tobacco was likewise effective. But traditional methods, though laborious and officially prohibited, continued to prevail.

Bulrush millet seed imported from Nigeria consistently gave twice the yield of the local varieties in a series of trials in the hot, dry Lower Shire Valley. It was undergoing preference tests at the end of the period under review.

Rice had been grown in Nyasaland for generations, but without water control. It was therefore largely at the mercy of the rains and the chance flooding of rivers and swamps. Production could not be extensive on this basis but was of local importance, particularly in certain lakeside districts. It was grown primarily for sale, and the heaviest recorded purchase was about 7,500 tons of unhulled grain in 1955. The postwar average was about 4,000 tons, with a tendency to rise, as compared with about half that amount prewar (Appendix Table II).

Increased production resulted from larger acreage rather than higher yields, the main incentive being good marketing facilities and steady, encouraging prices (rising from 3/4d. per pound of unhulled grain in 1945 to 2d. per pound after 1957). A limited liability company, started by the government in 1942 in Kota Kota district, pioneered this development, milling and marketing an attractive product with modern machinery. Elsewhere cooperative societies followed suit, and preparations to convert the Kota Kota Company into a cooperative were made in 1960. After 1955 the industry coordinated its sales to take full advantage of a generous price of £60 per ton (f.o.b. lake ports) of clean first-grade rice guaranteed by the Federal government for Rhodesian consumption. Coming at a time when world postwar rice production had recovered and prices had correspondingly declined, this help saved the young cooperative societies.

Careful trial, propaganda, and selective buying in the prewar and early postwar years had brought a superior variety (Faya) into general production. Work on the improvement of rice agronomy aimed at more even water distribution by means of simple contour banks; but they were adopted to an appreciable extent only in a new area near Lake Chilwa, where an enlightened community dammed and diverted streams for irrigation.

The only attempt at large-scale mechanized rice production ended disas-

trously. Following successful preliminary trials conducted by government in the Limpasa valley, the Commonwealth Development Corporation embarked on a big project to supply food for labor on their tung oil plantation near by. They did so without adequate survey or hydrological information and with no land leveling. After three years the project was abandoned.

The famine year and the steadily increasing consumption of wheat by Africans focused attention in the early 1950's on the desirability of raising local wheat production. Output ran at about 500-600 tons per annum, confined to the few high, cool, moist areas of good fertility. Consumption of wheat and wheat flour was about five times that amount. But, in common with the rest of tropical Africa, persistent leaf rusts jeopardized wheat growing in the hot rainy season and world prices did not justify the expense of irrigation in the cool dry weather. Wheat production therefore remained static.

As in most underdeveloped territories, human diet in Nyasaland was markedly low in animal protein and fat. The livestock population was relatively small (Appendix Table III), and the ratio of cattle to human population was only 1:9. Meat, milk, and eggs were seldom consumed except in urban centers, where markets attracted modest sales. The total number of cattle slaughtered in 1960 was less than 30,000, representing an average consumption for the year of about two pounds of beef per head.

The government's policy to increase the cattle population and improve its health by reducing tick-borne diseases was successful; the total number increased by about 50 per cent between 1945 and 1960, rising at a steady rate of 3 per cent annually after 1953, chiefly as a result of dipping. But better land management methods to carry the extra livestock did not keep pace. The distribution of improved poultry by government steadily increased to some 40,000 birds in 1960, more than half going to African farmers.

Fish production from lakes and rivers was estimated to total over 7,000 tons per year. Export was controlled in the interests of local needs; but in 1960 was allowed to rise to some 1,350 tons.

It must be admitted that there was no improvement in the intake of animal protein in the postwar period, since increased animal production did no more than keep pace with the increase of human population.

A very wide range of leguminous supplementary crops—peanuts, beans, peas, and grams—were grown throughout the country; and various forms of cucurbits were also cultivated for their fruit and leaves. All these were important dietetically, particularly in view of the small supply of animal protein; but only peanuts were of exceptional importance.

Of the pulses, cowpeas (*Vigna spp.*) were commonly intersown with maize; pigeon peas (*Cajanus indicus*) also were grown during the rains in southern districts; and numerous types and varieties of beans (*Phaseolus*) and grams were grown in the higher, cooler areas at the end of the rains on residual moisture. All were grown primarily for food; but pigeon peas and beans enjoyed some market demand both for local consumption and for export. The market proved somewhat fickle and, despite the efforts of the Marketing Board to provide encouraging facilities from 1952-56, total sales never exceeded 8,000 tons. The average for the later postwar years was, however, three or four times that of the earlier

part of the period (Appendix Table II). The average price to producers was about 2d. per pound.

Peanuts were grown for both food and cash. The cash incentive was undoubtedly the primary impulse to an impressive increase in postwar production; but food value and effectiveness in rotation were additional factors greatly influencing the government in its policy of encouragement. By furnishing some of the amino acids missing in maize protein, peanuts were the most suitable vegetable supplement in a predominantly maize diet. A comprehensive series of experiments showed that the yield of several crops (notably maize) following peanuts was raised by as much as a third above that obtained with continuous cropping.

In the early postwar years surplus production for sale averaged about 2,000 tons. The famine of 1949 virtually eliminated seed stocks; but they were gradually rebuilt by restricting sales, and in the middle 1950's a target of 30,000 tons was set for annual exportable surplus. It was also hoped to get approximately one-sixth of the total cultivated area under peanuts; this, it was felt, would make some impact on the yield of other crops in rotation. Appendix Table IV gives figures on the export and local sales of peanuts.<sup>4</sup>

Progress is attributable to a combination of improved agronomy, marketing incentives, and propaganda. Traditionally the crop was grown haphazardly interplanted in maize; yields were low and disease prevalent. Trials begun in 1952 showed that dramatic improvements in yield were obtained by planting early in pure stand at close spacing, followed by early weeding. These simple practices were widely encouraged by every form of propaganda, including some of the earliest pictorial posters.

Improvements in agronomy made progress possible; but it was the consistent price and marketing policy that made it a reality. In 1952 the Produce Marketing Board was set up and given a monopoly of the purchase and sale of peanuts grown on African land. A chain of markets was opened throughout the country wherever the crop was likely to succeed and encouraging prices were guaranteed before planting. As Appendix Table IV shows, the price to producers increased steadily throughout the postwar years from a modest beginning which permitted the creation of a price-cushioning fund, through periods of uncertainty sustained by that fund, to 5d. per pound in 1960. Moreover, with the price-support fund standing at £.5 million, producers could look forward to continuance of this policy.

The Board sold on the open market by calling for tenders for substantial consignments for f.o.r. Limbe. Nyasaland nuts, being hand-shelled and of good size, were popular in the confectionery trade and attracted a premium during years of comparative shortage. But as world production increased, the bulk of the crop was sold on a f.a.q. basis and quality and uniformity became more important.

The government had for several years been engaged in a program of variety testing and selection. The object was to evolve improved strains for the different ecological regions that were acceptable to the trade and sufficiently uniform to allow the use of mechanical shellers without breakage. Selection was made from

<sup>4</sup> The target of 30,000 tons was actually reached in 1961 and exceeded in 1962.

a collection of 140 local and imported varieties. By the end of the postwar period preliminary distribution of two superior varieties had been made. Much useful information had also been obtained on response to fertilizers.

The development of peanut cultivation may well be seen in retrospect as one of the more important features of postwar change.

Although statistical confirmation is lacking, it is apparent from this brief account that, as a result of the government's policy, a more reliable, more abundant, and (with the exception of animal protein) a better food supply was available for the African population at the end of the postwar period than at the beginning—despite the fact that there were 50 per cent more mouths to be fed.

### *The Increased Production of Cash Crops*

The country's economy depended primarily on a third plank of government policy, the increased production of cash crops. Table 2, depicting the values of the crops exported in the postwar years, shows their relative importance.

Significant features are the predominant importance of tea and tobacco (the former gradually overhauling the latter), the increasing value of peanuts and the transitory importance of maize as an export crop. Peanuts and maize have already been discussed under the heading of food crops.

TABLE 2.—RELATIVE VALUES OF THE MORE IMPORTANT CROPS EXPORTED, 1945–60\*  
(Thousand £, except as otherwise indicated)

Year	Tea	Tobacco	Cotton	Peanuts <sup>a</sup>	Tung	Maize <sup>b</sup>	Rice	Pulses	Total <sup>c</sup>
1945	686	845	117	28	18.9	.0	8.3	65.6	1,769
1946	750	1,252	128	35	25.3	—	4.8	43.8	2,239
1947	849	1,526	192	1	16.5	.0	8.6	28.6	2,622
1948	1,350	2,250	369	20	67.0	15.7	.3	25.0	4,097
1949	1,171	3,151	218	19	40.1	4.5	—	6.4	4,610
1950	1,691	2,767	335	22	46.4	5.2	—	22.8	4,889
1951	2,029	2,733	330	40	64.1	372.9	.6	21.1	5,591
1952	1,912	2,134	744	230	88.2	798.0	31.2	105.6	6,042
1953	1,570	2,878	788	455	127.3	966.7	100.5	71.5	6,958
1954	2,728	2,776	557	325	106.4	448.6	89.1	94.2	7,124
1955	3,128	2,395	728	421	141.9	691.4	85.7	151.1	7,743
1956	2,957	3,064	245	1,134	137.0	664.3	106.0	190.1	8,497
1957	3,456	3,232	299	916	111.8	306.9	116.7	177.8	8,616
1958	2,944	2,234	354	468	69.2	82.0	85.2	636.9	6,874
1959	2,843	3,165	594	882	160.0	88.0	94.3	134.8	7,960
1960	3,806	3,514	802	1,008	115.0	189.7	135.3	190.2	9,761
Total	33,870	39,917	6,802	6,003	1,335.1	4,633.9	866.6	1,965.5	95,393
Per cent of total	35.5	41.8	7.1	6.3	1.4	4.9	.9	2.1	100.0

\* Data mainly from Federation of Rhodesia and Nyasaland, Ministry of Economic Affairs, *Report on an Economic Survey of Nyasaland 1958/59* [published by the authority of the Federal and Nyasaland Governments, D. T. Jack, Chairman] (Salisbury, 1960), supplemented for 1958 and later by the Ministry of Finance and adjusted to include exports to South and North Rhodesia from 1954.

<sup>a</sup> Includes some other oilseeds, notably soybeans in early postwar years.

<sup>b</sup> Includes small amounts of other grains.

<sup>c</sup> Sum of the commodities shown, which account for at least 95 per cent of total exports.

Since it first assumed commercial proportions in 1900, tea growing had always been important in Nyasaland's economy. During the postwar period as a whole it contributed 35 per cent of the total value of exports; in 1960 the proportion was 39 per cent. In the same year the capital sum invested in the industry was estimated at £15 million, and the average value of production per acre, approximately £150, exceeded that of any other agricultural commodity. The industry had a highly developed research organization of international repute and was by far the largest employer of labor.

From the outset production of tea has been on a plantation basis. In 1960 28 companies managed an average of 1,000 acres each, almost all on freehold land, manufacturing the leaf in 32 factories. The industry's corporate affairs were administered by an association to which all companies belonged.

The type of tea produced was described in the trade at its best as "very fair quality," the ordinary run of teas being "plain common" used in blending. Nine-tenths of the tea was sold on the London market.

With one small exception, production was confined in roughly equal proportions to two comparatively small areas (Mlanje and Cholo), where there was not only above-average summer rainfall, but also significant winter precipitation and mists. Soils were suitable.

The dominant characteristic of the production pattern was the exaggerated seasonal output curve caused by the coincidence of high temperature and rainfall followed by comparatively cool dry weather. This posed serious management problems; planting, weeding, fertilizing, and plucking must all be accomplished in a short space of time, subject to interruptions from heavy rainfall. And the demand for labor for all these operations was at a maximum when Africans were attending to their own annual crops.

In these circumstances it was difficult to increase acreage, raise yields, and to pluck at short enough intervals to harvest increasing quantities of quality leaf. Nevertheless these were the primary objectives of the industry. The extent of achievement is recorded in Appendix Table V. Total acreage rose by 50 per cent from 19,000 in 1945 to nearly 29,000 in 1960; and yield per acre very nearly doubled, exceeding 1,000 pounds per acre of bearing tea in 1960.

This was accomplished by a variety of means, economic and agronomic, and despite some retarding influences in the early postwar years. Until 1949 acreage was limited by the International Tea Agreement; an export tax of 2d. per pound was imposed in 1949 and repealed in 1952; fertilizer was rationed and labor was short. Gradual improvement in labor and fertilizer supply was offset by discouraging tea prices in 1953, and not until 1954 did real progress begin. Total yield was nearly doubled in the remaining postwar years, despite political uncertainties, some difficult weather, rising costs, and price fluctuations (See Appendix Table V). It was estimated that towards the latter part of the postwar period the gross capital cost of establishing an acre of tea and bringing it into bearing was in the region of £500.

The widespread application of new knowledge derived from local research was an important factor in progress. Research on a small scale had started in the early 1930's with limited though important results. But it was not until 1949 that tea research began in earnest with the opening of a new station by the govern-

ment in Mlanje and the appointment of specialist staff. A substation was opened in Cholo in 1958 and the Tea Association took over the responsibility for research from the government in 1959.

The research organization undertook an impressive range of investigations. Initially it concentrated on applied research into problems of immediate practical concern to the planter. Examples are nursery management, the methods of establishing newly-planted tea, spacing, fertilizer requirements, pruning, and plucking. The elucidation of the fertilizer complex probably had the biggest impact on yield; beneficial applications rose from an average of 35 pounds of nitrogen per acre in 1945 to between 80 and 100 pounds in 1960.

As this work proceeded the dominant effect of soil moisture became apparent. This led to a more fundamental range of studies into the water requirements of the tea bush under Nyasaland conditions and a reexamination of many management practices from the point of view of their effect on moisture conservation during critical periods. Although this work resulted in the mitigation of the effects of drought, it was plain that full yield potential and the spreading of the production peak could only be realized by the addition of water when the lack of it limited growth. This led to the inauguration of important irrigation experiments in 1959/60.

As yields rose in response to improved agronomy there was a tendency to look more critically at quality, a need emphasized by the very low prices of inferior teas in years of general price depression. Finer plucking and more careful manufacture could, and did, have some effect; but preliminary investigation appeared to reveal intrinsic limitations in the varieties in common use and their fermentation characteristics. This led to two further lines of research; plant breeding and the study of the biochemistry of fermentation. Plant breeding involved a thorough investigation of vegetative propagation techniques, begun in 1955/56; the biochemical study was undertaken by the Department of Biochemistry of Cambridge University. Both were long-term projects still in progress in 1960.

The developments described could not have been made if the chronic seasonal labor shortage of earlier years had not been at least partially overcome. Tea field work does not generally lend itself to mechanization and one to one and a quarter laborers were needed per planted acre. Steadily increasing wages, bonuses for regular attendance and extra work, and certain free meals and food allowances gradually achieved a more regular labor turnout. Increasingly, too, a higher proportion of the labor force was housed on estates, amounting to about 40 per cent by 1960. It was estimated in 1957 (5) that the total annual value of direct and indirect wages and benefits amounted to £750 thousand, a figure that probably reached £1 million in 1960.

There was ample room for further expansion of tea growing on many estates and no doubt the plowing back of profits in such development will continue. But it was also hoped that Africans inhabiting the tea areas could be persuaded to turn to this high value crop of proven suitability instead of inefficient monocropping with subsistence maize. With this in view discussions took place in 1960 between representatives of the government and the industry to enlist the industry's cooperation in promoting African tea cultivation.

TABLE 3.—RELATIVE WEIGHTS AND VALUES OF DIFFERENT TYPES OF TOBACCO SOLD DURING 1945-60\*

Item	Dark-fired	Air-cured	Flue-cured	Burley	Turkish	Total
Weight ( <i>thousand lbs.</i> ) . . . .	340,342	61,337	48,586	26,198	59	476,522
Value ( <i>thousand £.</i> ) . . . . .	20,861	4,731	5,151	2,720	8	33,471
Per cent of total value . . . . .	62.3	14.1	15.4	8.1	.1	100.0

\* Weights and values at auction sales, summarized from Appendix Table VI.

Tobacco accounted for nearly 42 per cent of the total value of exports in the postwar years, holding its pre-eminent place in the Protectorate's economy until superseded by tea in 1955. Five different types of tobacco were produced: dark-fired, air-cured, flue-cured, Burley, and Turkish. The first three were grown long before the war, Burley since 1946, and Turkish during the last five years only. Table 3 shows their relative importance during the postwar years, and further details of production and prices are given in Appendix Table VI.

Flue-cured tobacco, requiring comparatively heavy capital investment, was grown by larger farmers, almost exclusively European. Burley, necessitating concentrated supervision, was grown by African tenants on European estates, and the bulk of other types was grown by small African farmers, a minority of them tenants on estates. During the postwar period about two-thirds of the total weight produced and one-third of the total value was grown by Africans on Trust land, the balance on estates. It will be seen from Appendix Table VI, that, with the exception of the small Burley crop, neither production nor prices showed any progressive trend. This was partly due to static demand and partly to the characteristics of the types of leaf produced.

Certain marketing arrangements were applicable to all types. By law they were sold under specified conditions on auction floors in Limbe. The Tobacco Export Promotion Council of Rhodesia and Nyasaland, a Federal organization, assisted in finding markets for Nyasaland leaf in the final postwar years. An export tax imposed in 1949 on all types at differential rates was removed in 1954. The Marketing Board bought all tobacco grown on Trust land through a highly developed organization comprising some forty permanent markets with efficient facilities and experienced staff.

Fire-cured leaf was used mainly for plug, twist and roll tobaccos, and snuff. Throughout the postwar years the United Kingdom was Nyasaland's most important market; but the general trend towards more sophisticated smoking habits had for some time threatened a decline in consumption. Other markets were possible, but competition to supply them was strong. Consequently auction prices remained extremely sensitive to variations in quantity and quality throughout the period.

During the first ten years production tended to fall short of demand; but after 1955 the two were more nearly in balance and the trade became more discriminating regarding quality. For Nyasaland to retain her share of an increasingly competitive market some stability of production in line with market requirements was essential. Approximately 80 per cent of the crop was grown by between



50,000 and 60,000 small African farmers in the central region, and it was government policy to try to build them into a body of regular, experienced growers.

Reasonable stability of prices was the prime need. Substantial seasonal variation had resulted in fluctuations in the number of growers by as much as 50 per cent in consecutive seasons. In 1948 the Marketing Board began not only to fix prices for the different grades throughout each season, but also to establish a price support fund to permit some stability between seasons. Yet fluctuation in the number of growers continued, and in 1950 the government introduced gradually a system whereby intending growers were required to register, and the numbers were regulated in relation to market demand. Persistently negligent growers were refused registration to make way for promising newcomers. All that could be claimed for these devices was that fluctuations harmful to the long-term interests of the industry would have been greater without them.

Although a high proportion of the growers planted year after year, their average yields, less than 200 pounds per acre, were disappointingly low and showed little consistent improvement. Such increase as occurred in the annual cash receipts, averaging about £9, was due to larger area rather than to higher yield. (Appendix Table VII gives relevant data for all types of tobacco grown by African farmers.) The fault lay in curing and handling rather than in agronomy. From a slow beginning in 1950 a considerable range and volume of investigational work was undertaken, covering all field practices. Imported and selected local varieties were compared, and seed was bulked by government and the marketing board for free issue to growers. In such work careful attention was paid to quality of leaf, which the trade asserted was declining. This was believed to be due basically to depleted soil fertility, and great emphasis was given to crop rotation and the wider use of manure and fertilizer to combat it. Fertilizer was made available free by the Marketing Board in 1951, and thereafter subsidized at 3d. per pound. Lack of ready cash limited sales, which reached a modest peak of 458 tons in 1958.

New knowledge was passed on to growers through the most concentrated and experienced extension service in Nyasaland, and generally speaking the field culture of the crop attained a respectable standard. Potential yields were probably twice those eventually marketed, but their realization was frustrated by bad curing and handling. Lack of barn space was the Achilles heel of the industry and, despite great efforts, it was not overcome. The bigger the crop, the higher was the proportion lost.

Curing was done in small mud buildings roofed with poles and thatch. Additional barns were easily erected and strong encouragement produced spectacular results; 70,000 were built in 1950. Later the marketing board paid a subsidy for new barns and for moulds for making mud building blocks. Again there was a strong response. But old barns collapsed because of neglected thatch as fast as new ones were built, so that there was little net increase in barn space.

A deficiency threatening the future of the industry was shortage of curing fuel. Natural supplies of wood were being rapidly exhausted; there was no tradition of replanting, and annual grass fires destroyed young growth. Encouragement for communal and individual planting had negligible success until the introduction of a fast-growing termite-resistant exotic, *Gmelina arborea*, which

aroused much interest and some response. A great economy of timber of course followed from the popularization of building with mud blocks instead of poles.

Air-cured western tobacco differs from dark-fired only in the method of curing. The market demand, for blending in pipe tobaccos, was limited. Throughout most of the 1950's production remained at about three million pounds per annum; but rose sharply in 1959 and 1960 to 5.5 and 7 million pounds to meet a modest increase in demand, which compensated to some extent for declining interest in dark-fired. Air-cured tobacco was grown by both small African farmers on Trust land and African tenants on European estates, the former increasing both in numbers and proportion as the latter turned to Burley.

Curing in open-sided sheds did not present the same problem of barn maintenance as dark-fired tobacco; but the standard of production was lower and average returns were little better. Details of production and prices are given in Appendix Tables VI and VII.

Burley tobacco had been grown in Nyasaland since early postwar years. The chief market was for pipe mixtures in the United Kingdom, with intermittent demand in South Africa. During the latter half of the 1950's a new market emerged in blended cigarettes made popular in continental Europe by American occupation forces. Production rose from an annual average of one million pounds in the early 1950's to nearly three million in 1960. The advance was cautious after some disappointment in the first attempt to exploit the new market in 1958. It was then that the trade preference for "calory" (pale cinnamon) leaf as opposed to "red" was stressed. Nyasaland leaf was apparently too "red." The pursuit of "calory" dominated investigational work thereafter; but four years of earlier trials had produced much valuable agronomic information, and growers were able to take fuller advantage of the new but discriminating market.

But good Burley is not easy to produce and is particularly prone to disease. The government accordingly restricted its production to estates, where the close supervision of African tenants enabled market requirements to be met without fear of overproduction, and allowed greater scope for the production of other types on Trust land.

Although the first export of flue-cured Virginia type leaf was as long ago as 1893 and early prospects were promising, production never developed to any great extent. An attempt was made after the war to expand and although output doubled from two million pounds in 1945 to four million in the middle 1950's, it declined again to between two and three million pounds at the end of the postwar period. Appendix Table VI gives details.

Failure to expand was due to political and environmental factors. Because of the high capital and recurrent costs involved, the growers were almost solely Europeans. They were few in number (averaging about 140 with from 6,000-8,000 acres of tobacco between them in the postwar years) because of the limitations of land and prospects inherent in the protectorate status of the country. Furthermore, somewhat higher temperatures and stronger soils tended to produce a heavier and darker type of leaf than in the Rhodesias, with a characteristic flavor, for which demand was limited for pipe mixtures. Prices tended to be fickle and averaged up to ten pence less than in Southern Rhodesia, though this was largely due to the excessive proportion of nondescript leaf.

Nevertheless considerable efforts were made to raise the efficiency of the industry. Some local investigational work was started in 1946 in a potential new area (Kasungu); but, the government having neither the staff nor the finance to undertake what was needed, Nyasaland joined the Federal Tobacco Research Board in 1954. Both government and growers contributed financially; much valuable information was made available, though not all was applicable to local conditions.

The Nyasaland Government provided extension services. These were slow in starting, and not until the later half of the 1950's were four men available, working in close conjunction with the Research Board. A demonstration farm was opened in 1959. Reference has already been made to loan and subsidy facilities specifically for flue-cured tobacco farmers.

The aggregate effect of these several services was a substantial improvement in the standard of farming. Early planting (if necessary with water), heavier and more scientific fertilizing, and more timely plowing became general. The battle against pests and disease, particularly in seedbeds, was effective, and improved building led to better curing and handling. Average yields rose from about 400 pounds per acre in the 1940's to nearly 900 pounds in 1960 and several farmers produced high-quality leaf. But few enjoyed regular success. Improvement would have been greater and more general but for a tendency by a section of growers operating on a sharecropping basis to plant an excessive acreage. Three successive bad seasons in the latter 1950's eliminated several of them.

The only postwar attempt to open a new area for flue tobacco (in Kasungu) failed in its initial purpose. In 1950, following survey and preliminary trials, the government leased 30,000 acres in eleven farms. Severe attacks of *Alternaria* disease and unfavorable weather aggravated the difficulties encountered by inexperienced farmers with a somewhat short-term outlook. All eventually withdrew except the Commonwealth Development Corporation which gradually changed its policy to one of fostering small-scale African tobacco farmers operating as tenants in conjunction with a nucleus estate that would help to carry the burden of overhead until tenant production had achieved economic proportions. The future of the local industry depends largely upon this bold experiment.

Interest in the possibilities of growing Turkish tobacco in Nyasaland arose in 1953 when merchants were seeking new sources of supply for the market in the United States. As the result of preliminary trials it was decided to encourage production of the Samsoun variety on the comparatively poor plateau soils of the north, where a cash crop capable of standing high transport costs was badly needed for African farmers.

Further agronomic investigations were followed by a cautious start in 1955/56 with selected growers grouped to give mutual support and encouragement, and to facilitate guidance and marketing. It is a crop requiring great skill, and half an acre was as much as the average family could cope with if quality and encouraging prices were to be achieved.

Initial sales were direct to the merchant who had pioneered the project; later the Marketing Board purchased the crop as with other African-grown tobaccos. Average prices ranged between 20d. and 36d. per pound for the first

four years, 1956-59. In 1960 there were just under 500 growers, who marketed 29,000 pounds from 64 acres at an average of 31.5d. per pound. That progress was not more rapid was due partly to political unrest and partly to the lack of any tradition of cash agriculture in the north.

Grown since 1910, cotton had held third place to tea and tobacco in Nyasaland's export economy since long before the war. Its relative postwar importance is shown in Table 2 (p. 264). The export value of the 1960 crop was about £800 thousand, produced by approximately 35,000 small-scale African farmers. This was admittedly a year of record production; but cotton was the principal source of cash income to between 25,000 and 45,000 families throughout the postwar period. Nine-tenths of the crop was produced on Trust land (Appendix Tables VIII and IX). The type of cotton was Upland, classified as one-inch staple, comparable with Nigerian Allen and of marked whiteness. There was a steady demand for it in the United Kingdom and, latterly, in Southern Rhodesia.

Between 80 and 90 per cent of the crop was grown during the rainy season in the Lower Shire Valley, the balance in the central region and (as a winter crop) on the northern lake plain. Conditions being basically suitable, the government decided to encourage production to the fullest extent and to try to overcome the sharp fluctuations that had characterized output in the past. These were due to the mingled influence of climate, pests, and diseases, whose effects were to be mitigated by a combination of control measures, plant breeding, agronomic practices, and marketing incentives.

The most serious pest, the red bollworm (*Diparopsis castanea*), had been the subject of detailed study by entomologists of the Empire Cotton Growing Corporation during the war (9). The essence of their recommendation was the concentration of cotton growing into a short, early period that would permit a minimum close-season of four months between complete uprooting of the old crop and planting the next. The opportunity to inaugurate this new regime came in 1950/51, when growers were induced, with compensation, to uproot the remains of an unusually small and early crop. Thereafter planting was completed by January 7 and uprooting by July 31. Another concurrent innovation was the planting of cotton in pure stand, instead of interplanting in grain crops which delayed maturation and prolonged vulnerability to bollworm.

Early benefits were dramatic and growers were encouraged. In the six years 1952-57 mean production was 20 per cent higher than in the preceding six, and yield per grower at 373 pounds of seed cotton per acre was up by 75 per cent. But other pests and diseases, notably cotton stainers (*Dysdercus spp.*) and Bacterial Blight (*Xanthomonas malvacearum*) intervened to prevent full realization of potential improvement. Second grade (stained) cotton rose from 15 per cent of output in the six years preceding the new regime to 25 per cent in the years 1952-57.

Bacterial Blight was brought under control by seed treatment and the gradual bulking and distribution (from 1957 onwards) of a new resistant strain of cotton (Albar 637) obtained from the Empire Cotton Growing Corporation in Uganda. A long-term research scheme for studying the etiology and methods of control of stainers and red bollworm was started in 1956 on a federal basis, financed by

the Federal government, the Colonial Development and Welfare Fund, and the Agricultural Production and Marketing Board of Nyasaland. The results of this work should be of value not only in raising yields in the lower Shire cotton area, but also in the central region, where different climatic conditions made the new regime less effective and efforts to increase production were of little avail.

Although the need for pest control dominated cotton policy, considerable attention was also given to a wide range of agronomic investigations, which led to the almost universal adoption of such effective practices as early planting, early weeding, and thinning. The extension services were performed principally by the Marketing Board staff and included the use of films. But incentives were weak, and sometimes as much as 20 per cent of the crop remained unharvested because growers had earned enough cash for their immediate needs.

It was the aim of marketing policy to stimulate greater interest. The war-time arrangement whereby the government bought the crop through local agents and sold it under contract to the Raw Cotton Commission was lucrative and lasted until 1951. Profits accrued to a fund inherited by the Marketing Board and were allocated to a price support fund. The steady and increasing prices which this enabled the Board to pay (and guarantee before planting), despite a falling market, were of paramount importance in the development of a crop so susceptible to misfortunes of weather and pests. The prices paid are shown in Appendix Tables VIII and IX. The disparity between first- and second-grade prices was deliberately wide in order to encourage grading, for the reputation of Nyasaland lint depended largely upon its whiteness.

The Marketing Board maintained between fifty and sixty markets to facilitate selling, and negotiated with local commercial concerns for ginning the crop. When the government's agreement with the Raw Cotton Commission expired (1951) the Board sold on the open market except for a brief period during which the Federal government exercised its legal right to direct sales to spinning mills in Southern Rhodesia—at approximately world parity prices. Thereafter the Board sold to best advantage: in 1960, 75 per cent of the crop went to Southern Rhodesia. Prices obtained are given in Appendix Table VIII.

It is perhaps a measure of achievement that, despite all the vicissitudes of cotton growing, production in 1960 was a record with 35,000 growers averaging nearly 500 pounds per acre of seed cotton. Moreover 86 per cent of it was of first grade. Though average cash receipts—just over £16—were low, the confidence engendered by stable prices, an improved variety of cotton, and some degree of pest control augured well for the future.

The postwar history of tung oil is one of hope, disillusion, and latterly of somewhat hesitant recovery. The oil had been in great demand during the war. Importations of seed some ten years before, followed by agronomic research begun in 1939, had given Nyasaland a lead among Commonwealth producers, and the United Kingdom had urged maximum output. By the outbreak of war, about 4,000 acres had been planted by Europeans; by 1945 the acreage exceeded 10,000 and nearly 100 tons of oil were exported at the encouraging price of £249 per ton f.o.b. Beira.

Appendix Table X illustrates the subsequent story. Prices soon fell as alternative oils and competitive synthetic substitutes came on the market. Profits

dwindled and, with the price down to £127 in 1953, acreage began to decline. Then Chinese wood oil invaded the market and prices fell as low as £61.10 in 1958. But in 1959 and 1960 there was some recovery following an unaccountable reduction in Chinese exports.

But the industry had been badly hit. That it survived was due to the fact that its pioneers were well established on sound lines and its organization was efficient. The bulk of the crop was grown in favorable conditions of soil and climate in the moister southern highlands; systematic research had evolved high-yielding clones and much practical advice for their cultivation, and the expelling factories, aided by a government chemist, produced a consistently good quality of oil. This compensated partially for its being derived from *Aleurites montana* and not *A. fordii*, which commanded a small premium, but did not flourish in Nyasaland.

The organization of the industry was the responsibility of the Tung Board established under legislation in 1946.

But these advantages could not sustain the growers against the discouragement of dwindling prices. The number of growers declined from 60 in 1955 to 44 in 1960, and acreage fell by nearly 20 per cent in the same period. Plantations were neglected; labor was diverted to more profitable tea and tobacco, and vital fertilizer was withheld. A die-back disease (*Botriosphaeria spp.*) invaded debilitated trees and did much damage. Added to these misfortunes, yields fluctuated sharply in accordance (it was believed) with winter rainfall during flower formation. The average plantation yield of 475 pounds of dry nuts per acre in 1960 was less than a third of that resulting from good management on the research station.

The Commonwealth Development Corporation had the misfortune to develop its tung project of 6,000 acres in the Vipya hills throughout the period of depressing prospects. But its plantations were in a healthy condition to take advantage of the recovered market and, representing some 25 per cent of the total Nyasaland acreage, they should help to sustain the future of the industry.

Once of considerable importance, Arabica coffee was of little account in the Protectorate's postwar economy. A determined attempt was made to reestablish it as a substitute for tung in certain southern plantations and as a smallholder crop in the moist, remote hills of the north. But, despite the importance of new varieties, considerable investigational work, and much encouragement, the future seemed still to hang in the balance in 1960.

At best climatic conditions were marginal for coffee; the long dry season and hot spring winds imposed too great a strain on the bushes, particularly when young. Much could be done to mitigate these conditions by terracing, mulching, manuring, and shelter, and the general standard of culture was commendably high. Production increased from almost nothing in 1945 to nearly 200 tons of parchment coffee in 1960, two-thirds of it grown by Africans. In that year African growers, numbering 2,840, cultivated over 1,130 acres, most of it not yet in bearing. And sufficient seedlings were sold from government nurseries to plant a further 250 acres. Nearly 1,000 acres had been planted by Europeans, the majority of it not in bearing.

The marketing of the African crop was undertaken by cooperative societies,

in which there was great local interest and confidence. But after a period of encouraging prices, the slump of 1959 made it difficult to sell the Nyasaland crop for £250 per ton (£100 per ton less than in 1958), despite the neighborly help of the Tanganyika Cooperative Trading Agency through which it was sold in 1960 for the first time. This necessitated the reduction of producers' prices from 1/6d. per pound to 1/4d. for first-grade parchment and emphasized the need to improve quality in an increasingly competitive market. It is a commentary on the times that an offer of £90,000 from the Rhodesia Selection Trust group of copper mining companies, intended to promote the improvement of the northern African coffee industry at that difficult period, was rejected by the growers because their leaders believed the donors were supporters of the unpopular Federation.

Notoriously variable markets will doubtless continue to trouble this small, precarious industry; but its future will probably depend upon the success attending efforts to combat a fungus disease, *Fusarium lateritum*, first noted in 1953, subsequently spreading with increasing severity wherever coffee was debilitated through neglect or unfavorable environment.

The extent to which the attempt to increase the output of cash crops and promote a cash economy succeeded can best be judged by reference to Table 2 (p. 264). During the postwar years the value of agricultural exports increased nearly sixfold from £1.75 million to £9.75 million. The most spectacular rise was in peanuts, from a negligible export in 1945 to over £1 million in 1960; but tea and tobacco retained their preeminent positions.

It is difficult, from the data available, to put a value upon African production of cash crops. There is no record of inter-African sale and barter, and African "tenants" on European estates are part of a joint enterprise. But classing them as African primary producers, the value of African-grown agricultural produce sold through organized markets rose from a level of approximately £1 million in 1945 to a level of about £4.5 million in 1960. On this basis the proportion of the African contribution to total cash crop value declined slightly.

But the more disturbing aspect suggested by these figures is the disappointing growth in the real income of African farmers. If allowance is made for an increase in population of the order of 50 per cent in the 15 postwar years, and if the reduction in the value of money in the same period is also taken into account, the real increase in the average African farm income is small indeed. This is borne out by the comparatively small increase in the average gross return per grower of tobacco and of cotton shown in Appendix Tables VII and IX.

#### *Improved Systems of Land Use*

It will be recalled that the fourth aim of government policy was to blend the other three objectives (soil conservation, improved food supply, and cash crop production) into sound systems of land use. This must be the ultimate object of all agricultural policy.

The great strides made in physical soil conservation during the postwar period helped to retain the soil, but they did not replenish it. And the widespread adoption of more productive agronomic practices such as early planting, though sound in themselves, tended to increase the depletion of plant nutrients. The only restorative practice adopted on an effective scale was a simple form of

rotation in areas, notably the central plateau, where peanut cultivation became extensive.

Whereas the government was prepared to sponsor and subsidize the use of mechanical equipment as a catalyst to bring about the reorganization of land use to a pattern in which such equipment could be an economic asset, the policy with individual African farms was to encourage ox-draft rather than tractors. The scattered, unstumped, inconveniently shaped plots, the sharply seasonal demand for farm equipment, and the problem of providing maintenance services militated against the economic use of tractors. It was desirable also to inculcate an appreciation of the usefulness of livestock in farming.

The policy adopted by the government to inculcate better systems of land use was to concentrate on persuading the most progressive and cooperative individual farmers and rural communities to try them and spread them by example.

A Master Farmer Scheme aimed at encouraging the most progressive individuals to become prosperous yeoman farmers. They were helped and advised by the government's extension services to qualify for a money bonus that was both inducement and assistance towards the cost of farm reorganization. Qualification required the adoption of specified farm improvements and was paid on the area improved.

There were two categories of Master Farmer, designated first and second class. Both were required to have their holdings in a single unit of not less than eight acres (considered a minimum economic size), to conserve their soil, rotate their crops, and adopt high standards of management. A first-class farmer must, in addition, keep livestock and integrate them with his crop husbandry, house and manage them satisfactorily, and apply their manure to his land. The farm plan was worked out with the farmer and he was given a copy of it.

The bonus paid was £2 and £1 per acre respectively for first- and second-class farmers. It was payable for three consecutive years, after which the reorganized farm was expected to be economically successful.

The Scheme was inaugurated in 1952, the first farmers qualifying in 1954. The statistical progress of the Scheme is depicted in Table 4.

The number of qualified farmers was disappointing, being an insignificant proportion of the whole. But a high standard was set and achieved, and the impact of their example was considerable and widespread.

A series of simple agro-economic surveys was made of a sample of farms of Master Farmers from 1956 onwards. Neither staff, the time available, nor the subjects themselves permitted detailed investigation. The average farm size was 25, 20, and 10 acres respectively in the northern, central and southern regions, reflecting the proportionate availability of land in each. Between a half and two-thirds of the farmed area was grass fallow. The net average profit in the central area, where dark-fired tobacco, peanuts, and maize gave ample income-earning opportunity, varied from £90 to £130 according to the season. This was derived from products sold off the farm and did not include those consumed on it, for which no value was assessed. The comparable figures for the northern and southern regions, based on fewer samples, were £45 and £60 respectively. Modest though these profits were, they represented considerable wealth compared with the average cultivator.

That more did not aspire to Master Farmer status was mainly due to the



TABLE 4.—MASTER FARMER SCHEME, 1954–60\*

Year	1st class	2nd class	Acres improved	Bonus paid (£)
1954 .....	1	52	500	510
1955 .....	8	117	2,103	2,262
1956 .....	10	170	3,012	3,196
1957 .....	13	269	3,484	3,770
1958 .....	21	386	4,719	5,169
1959 .....	20	439	5,000 <sup>a</sup>	5,500 <sup>a</sup>
1960 .....	15	730	6,277	6,535

\* Data from Nyasaland, Department of Agriculture, *Annual Reports*.

The numbers of qualified farmers include those whose bonus payments had lapsed.

<sup>a</sup> Approximate figures.

minimum acreage stipulation and the difficulty of consolidating fragmented plots, an exercise involving difficult negotiations with neighbors. Jealousy, lack of security, and (latterly) political opposition to the Scheme played a part. It was not politically possible, nor was it tactically desirable in the circumstances, to attempt to grant land titles to this chosen few.

Because of the acute shortage of land, particularly in the southern region, a Smallholder Scheme was introduced in 1959. This was in all respects similar to the Master Farmer Scheme except that the minimum qualifying acreage was five instead of eight. Seventeen farmers qualified in 1960, the first year.

An interesting specialized form of smallholding initiated on a trial scale in 1958 in a particularly densely-settled, high-rainfall area of the southern region (Cholo district), was the stall-feeding of cattle by Africans. Oxen (usually two) were kept permanently in simple stalls, bedded on maize stover, and fed on Elephant grass (*Pennisetum purpureum*) and banana stems. The first few beasts, sold to the Cold Storage Commission on a weight and grade basis, attained a rewarding standard, and their manure was invaluable in an environment where only intensive methods could pay. Loans to purchase oxen were available as soon as accommodation and food were assured.

The background, objectives, and an outline of the attempt to introduce an improved land use system on a regional scale were mentioned in the earlier discussion of agricultural policy. Though it ended in failure, the attempt deserves a more detailed description here. The essence of the Scheme was the replanning of an area (preferably a catchment) to convert it from its haphazard scatter of fragmented plots into an orderly arrangement providing for the arable, forestry, and grazing needs of the inhabitants in accordance with the natural properties of the area. Each cultivator was to have a consolidated, conveniently shaped plot with road access.

This Scheme had its origin in the central region in 1954, when a number of cooperative village communities were persuaded voluntarily to accept a reallocation of consolidated holdings and a common rotation of proven suitability. Reactions varied with local leadership. However, a few successful, embryonic prototypes inspired the progressive southern chief Kuntaja to embark in 1956 upon an extensive plan of land reorganization in a comparatively densely settled part of his

area near Blantyre. This in turn gave rise to two similar extensive schemes in the central region.

In these large schemes land capability maps were prepared from aerial photographs and ground survey, culminating in land utilization maps apportioning the area to arable, forestry, and grazing purposes and setting out the framework of roads, drainage lines, dam sites, and other major features.

The first stage of development was the construction of this framework. The second consisted of the protection of arable land from erosion and the reallocation of consolidated holdings in it. Major broad-based conservation banks, on which farm access roads were sited, were constructed by mechanical equipment; minor conservation works were made by the individual plot holder.

Each cultivator was allocated a consolidated plot of the aggregate size of his former fragments, the actual siting of his new farm being decided by a committee of local elders, who were also consulted and informed about each feature and phase of the scheme. There was no compulsion or pressure by the government at any stage, and no attempt was made to interfere with traditional tenure systems. But it was hoped that, in time, an interest in title to the new holdings would emerge.

A feature of great importance was a simple crop rotation common to all participants in the Scheme. Since initially this sometimes occasioned some temporary inconvenience and agricultural imbalance, free issues of fertilizer were made in the first year, partly as compensation and partly to popularize its use.

A few statistics of the Kuntaja Scheme indicate its scope and scale. The area to which the chief had given planning permission was 82,000 acres. At the close of the Scheme nearly 18,000 acres had been planned in detail, of which over 3,000 acres of arable land comprising some 1,300 holdings had been reorganized. Twelve dams with an aggregate capacity of 131 million gallons had been built and 1,600 acres of communal grazing fenced.

Before reorganization the average yield of maize was two bags per acre. In subsequent successive years it was raised by the increasing effect of rotation, fertilizer, and better cultivation to 4, 7, and 8 bags per acre. Farm incomes were approximately doubled.

The pattern and progress were similar in the first big scheme (Kandiani) in the central region. But land reorganization succumbed to the political pressures of 1959 and the early sixties. This was a period of indiscriminate opposition to the government's plans; the inevitable difficulties of a great experiment were magnified and exploited, and the rumor spread that reorganization was a prelude to acquisition by Europeans. The land reverted to its former pattern and productivity.

During the late 1950's a demand developed for farm planning on the larger farms owned and occupied by Europeans, chiefly those engaged in tobacco production. Latterly, eligibility for loans was conditional on the progressive implementation of such a plan. The government set up a planning service, employing modern methods of air-photo interpretation, land classification, and full soil conservation practices. By the end of 1960, plans had been prepared for some fifty farms involving about 60,000 acres. Assistance was also sought in implementing the plans, and the government provided both an advisory service and

mechanical equipment for hire in the construction of conservation works, dams, and drainage ways.

#### POSTSCRIPT

The postwar years were all too short; activity was curtailed at the start by lack of finance and experienced personnel and at the end by political preoccupations. Yet much was accomplished.

Nyasaland's dependence on her natural resources was fully recognized, a sound policy for their development was evolved, and effective steps were taken to conserve them and use them to good advantage. Notably, much scientific knowledge of lasting practical value was accumulated and passed on to farmers with benefit both to the country's food supply and to its economy. And a highly efficient marketing organization was established that proved an effective incentive to increased crop production.

But, looked at in the longer perspective of the country's future needs, the limitations of these achievements were painfully apparent. Nyasaland's export economy was still too dependent upon European enterprise; the real value of the average African farm income had risen very little and—most serious of all—the country as a whole was still living on the capital of its natural resources. Fundamental improvement in the pattern and practices of land use was on an insignificant scale. Indeed there was still no general recognition of the need for it, and the rapid rise in population threatened to produce a situation in which the remedy for these deep-seated problems would be still more difficult to implement. It is something perhaps that these problems were faced and possible answers to them made available for posterity.

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APPENDIX TABLE I.—MAIZE: PURCHASES AND SALES,  
VOLUME AND PRICES, 1944/45-1960\*  
(Bags of 200 lbs.)

Year	Purchases		Sales to local consumers		Export sales <sup>a</sup>	
	Number of bags	Price (s./d. per bag)	Number of bags	Price (s./d. per bag)	Number of bags	Price (s./d. per bag)
1944/45	75,000	4/2	75,000	...	—	—
1945/46	130,200	5/6	130,200	...	—	—
1946/47	103,300	5/6	103,300	...	—	—
1947/48	76,716		76,716	...	—	—
S.P. <sup>b</sup>		8/4		18/-		
C.P. <sup>b</sup>		5/6		13/-		
1948/49	71,559		71,062		—	—
S.P. <sup>b</sup>		8/4		16/7		
C.P. <sup>b</sup>		5/6		11/5		
1949/50	54,832	16/8	54,832	50/-	—	—
1950/51	114,773	16/8	82,171	30/6	10,709	43/-
1951/52	288,741	16/8	53,837	25/-	253,617	50/-
1952/53	499,127	16/8	44,444	25/-	434,637	47/3
1953/54	433,445	16/8	55,938	25/-	389,411	42/2
1954/55	543,298	16/8	65,220	38/-	446,317	34/6
1955	447,568	16/8	50,196	32/3 to 36/6	57,600	30/5
1956	337,232	16/8	64,347	32/3 to 35/3	357,753	26/7
1957	57,844	11/1	62,939	32/3 to 35/-	227,378	23/1
1958	128,000	11/1 to 42/-	102,493	30/- to 37/-	—	—
1959	58,327	16/8	38,037	35/-	55,807	28/6
1960	200,280	12/- to 26/-	22,693	32/6	85,884	31/3

\* Data from Nyasaland, *Annual Reports*, Agricultural Production and Marketing Board 1947/48 to 1960, and Department of Agriculture 1944/45-1946/47. Purchase by the statutory marketing organizations from 1947/48 onwards.

<sup>a</sup> Exports plus local sales cannot be compared with quantity purchased in any one year as a portion of each crop was not exported until the succeeding year. Average prices f.o.r. Limbe.

<sup>b</sup> Prices in the Southern Province (S.P.) and the Central Province (C.P.) were not the same for these years.

APPENDIX TABLE II.—RICE AND PULSES: PURCHASES 1945-60\*  
(Short tons)

Year	Rice paddy	Pulses	Year	Rice paddy	Pulses
1945	1,578	3,715	1953	4,331	3,458
1946	2,644	1,945	1954	3,218	2,432
1947	1,996	1,410	1955	7,202	6,347
1948	2,242	1,790	1956	4,173	7,943
1949	768	32	1957	3,561	7,341
1950	1,741	1,618	1958	4,568	6,035
1951	1,744	1,651	1959	6,769	3,881
1952	3,009	4,332	1960	7,500	6,320

\* Purchases in organized markets, excluding inter-African trade, from Nyasaland, Department of Agriculture, *Annual Reports*.

APPENDIX TABLE III.—DOMESTIC LIVESTOCK POPULATION, 1945-60\*  
(Thousand head)

Year	Cattle	Sheep	Goats	Pigs
1945	237	37	183	54
1946	...	...	...	...
1947	...	...	...	...
1948	267	46	233	80
1949	290	51	349	91
1950	264	39	260	53
1951	281	50	262	42
1952	279	49	297	56
1953	273	53	294	94
1954	292	53	323	82
1955	307	79	326	77
1956	318	67	355	77
1957	328	58	361	89
1958	343	62	413	82
1959	357	75	460	120
1960	357	69	443	72

\* Data from Nyasaland, Department of Veterinary Services, *Annual Reports*.

APPENDIX TABLE IV.—PEANUTS: PURCHASES AND SALES, WEIGHT AND PRICES, SHELLED BASIS, 1945-60\*

Year	Purchases <sup>a</sup>			Local sales <sup>b</sup>		Export sales		Value, <sup>c</sup> thou- sand £
	Short tons	d./lb.	Price, £ s.d./ton	Short tons	Price, £ s.d./ton	Short tons	Price, £ s.d./ton	
1945	2,342	1.5	12 10 0	1,066	...	1,276	...	48.0
1946	2,249	1.5	12 10 0	...	...	...	...	40.0
1947	1,861	2.0	16 13 4	...	...	...	...	30.0
1948	2,019	2.0	16 13 4	...	...	...	...	40.0
1949	—	—	—	—	—	—	—	—
1950	9	3.0	25 0 0	9	...	—	—	.2
1951	316	3.0	25 0 0	316	...	—	—	10.0
1952	4,837	3.5	29 3 4	...	...	...	...	235.0
1953	5,757	3.5	29 3 4	117	37 10 0	5,458	58 6 8	326.0
1954	7,310	3.5	29 3 4	346	58 6 8	6,955	58 5 6	426.0
1955	10,308	3.5	29 3 4	266	58 6 8	6,555	49 14 6	336.0
1956	9,758	4.0	33 6 8	179	58 6 8	12,891	54 18 6	716.0
1957	13,872	4.0	33 6 8	235	58 6 8	13,745	58 5 3	816.0
1958	12,785	4.0	33 6 8	201	51 8 7	7,874	57 7 3	463.0
1959	12,807	4.0	33 6 8	1,014	45 8 2	15,914	52 6 2	887.0
1960	20,629	5.0	41 13 4	213	58 11 5	18,779	59 14 9	1,134.0
Total	106,859	...	...	...	...	...	...	5,507.2

\* Data from Nyasaland, *Annual Reports*, Department of Agriculture 1945-52, and Agricultural Production and Marketing Board 1953-60.

<sup>a</sup> Purchases from African growers on Trust Land; estate production is negligible, and statistics are not available.

<sup>b</sup> Excluding sales for seed. The local soap factory generally used imported oils which were cheaper than the export parity of Nyasaland peanuts.

<sup>c</sup> From 1953 the value of local and export sales; earlier years approximated; values relate to year of export, not year of production.

APPENDIX TABLE V.—TEA: ACREAGE, PRODUCTION, AND PRICE, 1945-60\*

Year	Planted area <sup>a</sup> (acres)	Production (thousand lbs.)	London price <sup>b</sup> (s./d. per lb.)
1945	19,594	13,639	...
1946	19,807	13,987	...
1947	20,399	13,254	...
1948	20,616	14,304	...
1949	21,201	12,516	...
1950	22,661	15,407	...
1951	23,500	14,895	3/ 3.04 <sup>c</sup>
1952	23,657	15,578	1/ 9.16
1953	23,179	13,386	3/ 3.79
1954	24,726	17,183	4/ 6.93
1955	25,718	17,500	3/ 8.92
1956	26,186	20,800	3/ 1.55
1957	26,822	18,088	3/ 1.38
1958	27,381	23,293	3/ 2.70
1959	28,078	23,274	2/11.37
1960	28,728	26,079	3/ 3.74

\* Data from International Tea Committee, *Annual Bulletin of Statistics*, June 1964, pp. 6-8, 44, and earlier issues. Area adjusted to correspond with year of production.

<sup>a</sup> Total acreage; in bearing and newly planted.

<sup>b</sup> Annual average price at London auction; not available while auctions were suspended, and tea was sold to the Ministry of Food under contract.

<sup>c</sup> Average for all African teas.

APPENDIX TABLE VI.—TOBACCO: SALES AND PRICES BY TYPE, 1945-60\*

(Sales in thousand lbs. and prices in pence per lb.)

Year	Fire-cured		Air-cured		Burley		Flue-cured		Turkish		Total value (1,000 £)
	Sales	Price	Sales	Price	Sales	Price	Sales	Price	Sales	Price	
1945	15,114	5.89	3,532	7.41	—	—	1,937	12.03	—	—	576
1946	12,038	14.69	1,909	15.29	847	...	2,349	22.04	—	—	1,126
1947	19,439	9.94	3,385	9.74	1,158	...	2,424	22.80	—	—	1,218
1948	21,111	15.66	4,111	20.21	988	22.88	2,554	25.96	—	—	2,085
1949	18,213	20.1	3,109	29.4	1,051	26.68	2,903	25.86	—	—	2,332
1950	24,024	15.8	4,422	19.2	807	24.60	2,605	29.27	—	—	2,333
1951	25,394	11.60	5,348	16.0	1,354	22.8	4,043	30.32	—	—	2,217
1952	12,556	16.4	3,000	16.5	1,002	23.6	3,519	21.82	—	—	1,482
1953	24,362	13.85	6,286	16.5	1,691	22.71	3,735	25.46	—	—	2,392
1954	23,600	13.36	3,300	16.45	1,950	27.13	4,306	25.45	—	—	2,236
1955	14,800	19.21	2,320	20.81	2,020	26.95	3,694	27.16	—	—	2,030
1956	25,400	16.83	2,680	19.36	2,280	22.82	4,119	23.05	—	—	2,609
1957	25,500	19.03	3,030	24.72	2,170	34.97	3,015	27.02	1.8	—	2,991
1958	30,900	15.59	2,510	24.93	3,210	22.78	2,198	22.40	5.7	36.1	2,779
1959	26,401	11.61	5,425	23.24	2,749	22.22	2,251	28.19	17	33.5	2,320
1960	21,490	15.58	6,970	19.14	2,921	32.72	2,934	32.98	35	35.3	2,745
Total	340,342	14.7	61,337	18.5	26,198	24.5	48,586	25.4	59.5	34.8	33,471

\* Auction floor weights and prices except for Turkish. Data from Nyasaland, Department of Agriculture, *Annual Reports*.

APPENDIX TABLE VII.—TOBACCO: STATISTICS FOR AFRICAN REGISTERED GROWERS ON TRUST LAND, 1945-60\*

Year	Registered growers (number)	Area (acres)		Production <sup>a</sup> (thousand lbs.)	Yield (lbs. per acre)	Price to growers <sup>b</sup> (d./lb.)	Cash receipts (shillings per grower)
		Total	Per grower				
1945	67,900	62,200	.92	11,935	192	3.70	54
1946	57,400	58,000	1.01	8,639	149	10.79	135
1947	89,000	92,500	1.04	16,906	183	8.47	134
1948	100,300	90,200	.90	15,027	167	8.64	108
1949	83,300	94,300	1.13	15,672	166	7.91	124
1950	104,500	131,000	1.25	22,371	170	7.88	139
1951	92,200	140,000	1.52	23,999	171	5.87	127
1952	63,200	96,400	1.52	12,161	126	6.39	102
1953	68,300	94,900	1.39	24,498	258	8.11	243
1954	63,700	94,300	1.48	20,140	213	7.72	202
1955	50,200	78,900	1.57	12,293	156	9.05	185
1956	57,700	92,800	1.60	22,459	242	9.22	299
1957	62,100	108,700	1.75	22,218	204	11.02	329
1958	73,400	139,200	1.90	26,453	189	11.64	348
1959	74,000	145,400	1.93	28,470	196	7.82	248
1960	59,900	95,000	1.58	20,290	214	7.94	224
Average	73,000	101,000	1.38	18,900	187	8.37	181

\* Excluding tobacco raised by African tenants on private estates. Data for all types of tobacco from Nyasaland, Department of Agriculture and Agricultural Production and Marketing Board, *Annual Reports*.

<sup>a</sup> Weight purchased from growers.

<sup>b</sup> Price paid by the Marketing Board to growers at Board markets.

APPENDIX TABLE VIII.—COTTON: PRODUCTION, PRICES, AND EXPORT VALUES, 1945-60\*

Year	Production				Prices of lint cotton		Value of exports (1,000 £)
	Seed cotton ( <i>short tons</i> )			Lint ( <i>bales of 400 lbs.</i> )	f.o.b. Beira <sup>a</sup>		
	African land	Private estates	Total		1st grade ( <i>d./lb.</i> )	2nd grade ( <i>d./lb.</i> )	
1945	4,445	716	5,161	8,600	...	...	116.9
1946	5,340	1,000	6,340	10,565	...	...	128.2
1947	6,015	1,037	7,052	11,755	...	...	192.5
1948	8,138	999	9,137	15,230	...	...	369.1
1949	1,424	354	1,778	2,965	27.35	16.00	218.4
1950	5,742	876	6,618	9,927	35.00	25.00	335.1
1951	2,368	283	2,651	3,977	45.00	22.75	330.0
1952	7,705	745	8,450	12,675	38.25	26.00	743.8
1953	9,733	1,055	10,788	16,182	32.50	22.38	788.4
1954	7,178	623	7,801	11,488	31.00	23.30	556.7
1955	8,589	990	9,579	15,407	29.53	25.10	728.4
1956	3,233	202	3,435	5,150	28.87	21.70	244.8
1957	4,288	346	4,634	6,816	27.82	22.87	299.3
1958	5,513	608	6,121	9,317	24.83	20.14	354.2
1959	10,029	731	10,760	15,649	23.69	17.49	594.2
1960	12,515	1,051	13,566	20,354	24.58	18.48	802.3
Total	102,255	11,616	113,871	176,057	...	...	6,802.3 <sup>b</sup>

\* Data for production and prices from Nyasaland, Department of Agriculture and Agricultural Production and Marketing Board, *Annual Reports*.

Value of exports compiled from Customs returns.

<sup>a</sup> Prices obtained by the Marketing Board for African cotton; prices for estate cotton are not available.

<sup>b</sup> Sales of cottonseed totaled approximately £ 410,000 in addition.



APPENDIX TABLE IX.—COTTON: STATISTICS FOR AFRICAN GROWERS ON TRUST LAND, 1945-60\*

Year	Growers (number)	Production of seed cotton			Price to growers (d. per lb.) <sup>a</sup>		Cash receipts (shillings per grower)
		Total (short tons)	Per grower (lbs.)	Per cent 1st grade	1st grade	2nd grade	
1945	36,200	4,445	245	...	19/16	...	32
1946	36,900	5,340	288	...	21 1/16	...	64
1947	34,800	6,015	346	...	3	...	86
1948	45,700	8,138	356	...	3	...	88
1949	23,700	1,424	120	90	3	3/4	28
1950	38,500	5,742	298	86	3	1	65
1951	31,300	2,368	150	92	4	1	47
1952	41,700	7,705	370	90	5	1	141
1953	46,900	9,733	415	82	5	1	147
1954	43,800	7,178	330	84	5	1	120
1955	44,500	8,589	385	72	5	2	133
1956	31,200	3,233	207	61	5	2	66
1957	23,700	4,288	362	76	6	2	151
1958	26,200	5,513	420	82	6	2	202
1959	28,800	10,029	695	87	6	2	317
1960	35,300	12,515	710	86	6	2	322
Average	35,600	6,400	360	...	...	...	...

\* Data from Nyasaland, Department of Agriculture and Agricultural Production and Marketing Board, *Annual Reports*.

<sup>a</sup> Paid by the Marketing Board for seed cotton.

APPENDIX TABLE X.—TUNG: ACREAGE, PRODUCTION, AND PRICE, 1945-60\*

Year	Area (acres)		Oil production (long tons)	Price <sup>a</sup> (£ per long ton)
	Planted	Bearing		
1945	10,132	...	87	249
1946	11,361	...	115	238
1947	12,668	5,894	222	236
1948	15,633	7,403	216	155
1949	16,938	8,405	295	151
1950	18,116	11,390	312	188
1951	17,801	13,182	310	191
1952	18,137	13,788	765	165
1953	20,566	15,945	389	127
1954	21,508	16,377	913	132
1955	19,429	15,339	868	155
1956	18,966	14,885	867	160
1957	18,794	16,032	1,215	100
1958	17,690	16,100	784	72
1959	16,060	14,274	1,341	115
1960	15,874	15,069	1,094	115

\* Data from Nyasaland, Department of Agriculture, *Annual Reports*.

<sup>a</sup> Selling price, f.o.b. Beira.

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