

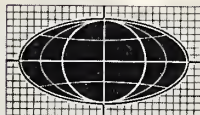
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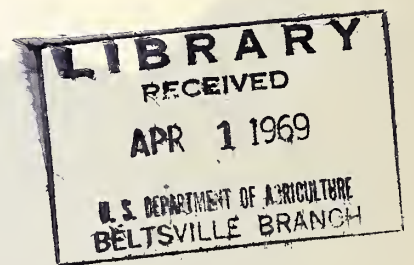
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A SURVEY OF

AGRICULTURE IN ETHIOPIA



ERS-FOREIGN 254



U.S. DEPARTMENT OF AGRICULTURE
ECONOMIC RESEARCH SERVICE
FOREIGN REGIONAL ANALYSIS DIVISION

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SUMMARY

Subsistence farming is likely to dominate Ethiopian agriculture for many years, but the foundation for modernization is being laid in several areas by the Government. Financial and technical aid, primarily from the United States but also from the United Nations and other sources, is contributing significantly to the Government's programs to expand, diversify, and modernize farm production. These programs include:

- Establishment of agricultural research institutions and of an extension service
- Formation of farm cooperatives
- Promotion of cultivation of cash crops by small farmers and of large-scale commercial farming
- Improvement of livestock management.

Proposals have been made to improve the land tenure system, especially the position of the tenant farmers, who generally must pay an excessive share of the output to the landowner, and often lack security of tenure.

Ethiopian and U.S. farm exports do not compete in the world market, nor are they likely to do so soon. Instead, the two countries' leading farm exports complement each other. Coffee accounts for 50 to 60 percent of Ethiopia's total exports, and the United States--Ethiopia's leading foreign agricultural market--imports 65 to 75 percent of the coffee. Many of Ethiopia's farm imports--mainly cotton, grains, and grain products--are financed largely under P.L. 480.

Considerable longrun expansion of Ethiopia's grain and livestock production is possible in the country's physical environment--enough to export. Ethiopia reportedly leads Africa in cattle numbers, but most are uncultured scrub cattle used for draft power.

Hides, skins, and other livestock products account for 14 percent of all exports, followed by oilseeds, 9 percent, and legumes, 8 percent. Grain, grown on a larger area than any other crop, is used almost entirely for food where, or near where, it is produced. The main grains grown are teff, sorghum, barley, and corn. Other crops, also grown mainly for domestic consumption, include sugarcane, cotton, and chat (a mild stimulant). Cotton output is expanding rapidly, but Ethiopia must still import lint for its mills.

Despite large areas of unused or underused fertile land, farm development is hindered by small unit size (3 to 5 acres); little use of improved seed, fertilizers, and pesticides; poor tools and equipment; and control of a large share of the land by absentee owners, the Government, the State Church (Coptic), and tribal groups.

Roads are few and in poor condition, and heavy import duties on trucks and fuel add considerably to the cost of motor transport. Rail freight rates are among the world's highest. Transportation to local markets is mainly by pack animals or on human backs.

Facilities for harvested products are much like those in other developing countries: mostly thatched, wickerwork sheds; insufficient electricity or refrigeration in rural areas; inadequate commercial storage and processing; and deficient marketing channels.

A SURVEY OF AGRICULTURE IN ETHIOPIA

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AGRICULTURE IN THE ETHIOPIAN ECONOMY

Agriculture is by far the largest sector of Ethiopia's economy. It accounts for about two-thirds of the gross domestic product, employs about nine-tenths of the labor force, and provides nearly all the export earnings--99 percent in 1966. Ethiopia's small manufacturing sector consists primarily of industries that process farm products. Ethiopia's agriculture, mainly of the subsistence type, furnishes nearly all of the country's food supplies. Consumption levels appear to be quite low in calorie terms, but relatively high in quality by African standards.

Coffee, produced mainly for export, is Ethiopia's principal cash crop and the mainstay of the entire modern sector of the economy. Ethiopia also exports sizable amounts of dry legumes and oilseeds, and has a small surplus of meat. Until the mid-1950's, Ethiopia was a small net exporter of grains, but has been a small net importer (mainly of wheat flour) during most of the past decade. Despite a marked expansion in cotton and sugarcane output since the mid-1950's, the country still relies on imports to meet a large share of its cotton needs for the relatively important textile industry, and for part of its sugar requirements.

Over most of the central highlands, agriculture consists mainly of the production of crops, primarily grains and dry legumes, and livestock raising is of secondary importance. Perhaps one-fifth of the rural population, however, consists of nomadic or partly nomadic herdsman, who subsist largely on livestock products. These nomads are concentrated mainly in the southeast and northeast.

Only a small part of the country's total farm production--probably no more than 15 percent--is marketed. About three-fourths of all farm production that enters commercial channels is carried to primary markets by pack animals and a large share of the rest is backpacked, generally to small, open-air markets (fig. 1), as an estimated four-fifths of the villages are not accessible by road. The volume of interregional trade in farm products is very small, but farm commodities for export account for a very large share of the goods carried by the transportation system. The high cost of internal transportation increases the price of farm exports, making them less competitive



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Figure 1.--Farm products in an open-air market in Addis Ababa, Ethiopia.

than they otherwise would be on the world market; it also substantially raises the cost of imported farm requisites.

PHYSICAL ENVIRONMENT

Location and Topography

Ethiopia is situated in the northeastern part of Africa known as the Horn. It is bound on the northeast by the Red Sea, on the west by the Sudan, on the south by Kenya and the Somali Republic, and on the east by the Somali

Republic and the French Territory of Afars and Issas (formerly French Somaliland). Including the former Italian colony of Eritrea, which was federated with Ethiopia in 1952 and was incorporated into it as a province in 1962, Ethiopia encompasses an area of some 472,000 square miles (1.2 million square kilometers). This is somewhat larger than the combined areas of Texas, Oklahoma, and New Mexico; however, with an estimated mid-1967 population of 23.5 million, Ethiopia is much more densely populated than those three States.

The country comprises several different physiographic areas, each with its distinct climate, vegetation, and type of agriculture. Elevations range from 116 meters (1 meter = 3.2 feet) below sea level to more than 4,600 meters above, but most of the area lies at altitudes of 1,000 to 3,000 meters (fig. 2). A vast area, known as the Ethiopian Plateau or the Ethiopian highlands, covers most of the western two-thirds of the country; it is divided by the Great Rift Valley into a western sector and a much smaller eastern sector. The plateau is interspersed with high mountain peaks and numerous river valleys; most of Ethiopia's crop production comes from this plateau. The adjacent lowlands, in the southeast and northeast, are largely arid or semiarid and are used by nomadic or seminomadic tribes for livestock grazing. A narrow, sun-parched coastal plain runs the entire length of Eritrea.

Ethiopia's largest rivers--the Blue Nile, Omo, Awāsh, and Wābi-Shabalē--are potential sources of irrigation water. Most of the others are of little actual or potential importance for agriculture. They flow through deep and often inaccessible valleys; during the rainy season they become rushing torrents, but they are often dry the rest of the year.

Climate

Ethiopia's greatly diversified climate makes it possible to grow a wide variety of crops, ranging from Tropical to Temperate Zone types. Although the country lies near the Equator, the climate of the plateau is modified by elevation so that most of the area has a mild to cool climate. Frost sometimes occurs at the higher elevations, but there is no prolonged cold season; given sufficient water, crops can be grown the year round over most of the plateau.

At Addis Ababa, the capital, the annual absolute maximum temperature is 85° F., and the minimum is 27° F. Maximum and minimum temperatures are respectively 90° and 33° at Jimā and 90° and 45° at Hārar. In the lowlands near the Sudan, maximum temperatures may be higher than 104° F.; in the Ogādēn (the low-lying region bordering on the Somali Republic), 113° F. Temperatures are as high as 120° F. in the semiarid section of the Dankalē lowlands, in the northeast.

Rainfall, which is unevenly distributed over most of the country, is the greatest natural limitation to Ethiopian agriculture. Even on the plateau, where in most places annual rainfall is above 40 inches, there are pronounced wet and dry seasons (fig. 3). Here, the period of heavy rainfall varies somewhat from one area to another, but it generally begins in April or May and ends in September. The dry season lasts from October through March,

although there may be 2 or 3 months of light rain beginning in February. The heavy rains are torrential; at elevations above 2,000 meters they may be accompanied by hail, which causes heavy crop loss. The highest annual precipitation occurs in western Ethiopia; in some places it reaches 79 inches a year. In the southeast it totals only 4 inches, and in the Dankalē area it is only 2 inches.

Ethiopians classify their agricultural regions by temperature and elevations as follows:

1) Moderate (Woina Dega) Zone: Elevations range from 1,800 to 2,500 meters, and temperatures from 85° to 60° F. This is the principal area for settled agriculture and crop cultivation. Crops grown here include teff and other grains, dry legumes, oilseeds, coffee, cotton, tobacco, and a wide range of vegetables.

2) Cold (Dega) Zone: Elevations range from 2,500 to 4,600 meters, and temperatures from 60° F. to near freezing. This zone is primarily mountain grassland, with many wooded areas; it is used for raising livestock and for cultivating teff, barley, wheat, dry legumes, and linseed.

3) Tropical (Qualla) Zone: Elevations are below 1,800 meters. Most of the vegetation consists of desert and thorn scrub, wooded savanna, and jungle. Humidity is very high near the sea. The zone is used mainly by nomadic tribes for grazing livestock and for sparse cultivation of corn, sorghums, and tobacco.

Soils

Reddish-Brown Lateritic soils, among the most productive in Ethiopia, occur over much of the plateau region of western Ethiopia. They are deep, well-drained soils of medium acidity, with good moisture-holding capacity, and are fairly well supplied with most plant nutrients except phosphorus. The surface horizons are clayey and fairly high in organic matter. With application of lime and phosphorus they could produce good crop yields. On the high plateau and hill terrain these soils are associated with Grumusols, which occupy depressional areas.

Grumusols are dark-gray to black plastic clays, generally calcareous; they are well supplied with most plant nutrients, but are difficult to work because they are sticky when wet and hard when dry. Grumusols on flat areas, generally requiring drainage for successful crop production, are also associated with Reddish Brown soils along parts of the Sudan border and the central section of the Rift Valley.

In the southern half of Ethiopia, mainly east of the Rift Valley, there are much more extensive areas of Reddish Brown soils. These soils are neutral to calcareous and somewhat coarse textured, with a relatively low water-holding capacity, which limits their suitability for crop production.

Alluvial and associated soils, occurring in areas along the rivers, have a high potential for agriculture. West of the Rift Valley these soils are slightly acid and are loamy in texture; in some places they need drainage for

crop production. East of the Rift Valley they are mildly alkaline and loamy; they generally require supplemental moisture for satisfactory crop yields.

Although much of the plateau region has generally fertile soils, with a considerable potential for expanding crop production, perhaps half consists of shallow, stony soils which are suitable only for limited grazing, or of rocky areas without agricultural value. Much of the eastern part of the country is covered with Red Desert soils; these sandy soils generally receive insufficient moisture for crop production, and provide only sparse grazing.

LAND AND LABOR

Land Use

Available data on land use in Ethiopia provide only broad indications of prevailing land-use patterns. According to these data, about 55 percent of the country's total area is taken up by permanent grassland and 10 percent by cropland, bringing the area classified as agricultural land to nearly two-thirds of the total area of the country (table 1). Forests take up less than 7 percent of the remaining land; desert, other nonagricultural land, and bodies of water account for the rest.

Three-fifths of the cropland is sown to grain and half of this area is in teff. Coffee and false banana occupy almost all the land in permanent crops. Less than one-fifth of the cropland is fallow land.

Most of the cropland in Ethiopia is in the highlands or the river valleys; nearly all of the pastureland is in the vast lowlands of the southeast, in the Great Rift Valley, and in the plains of the northeast. About one-third of the country's total area consists of tree and shrub savanna, which is used primarily by nomadic and seminomadic tribes for pasturing livestock. A large share of the permanent grassland is believed to be potentially cultivable.

Size of Farms

Most farms in Ethiopia are small subsistence units that one family can cultivate with its own labor, traditional tools, and one or two draft animals. The typical farm is only large enough to produce food for the farm family, and to provide a small surplus for barter or sale and for meeting rental or tax obligations or both.

However, no overall breakdown of farms by size is yet available nor, so far as is known, has there been an estimate of the total number of farms. Surveys in four of the highland provinces indicate an average cropland area of about 1.2 to 2.0 hectares (1 hectare = 2.47 acres) per holding, not including grazing land. A holding generally consists of 3 to 5 parcels. In none of the surveyed provinces is the proportion of farms with more than 4 hectares of cropland larger than 10 percent of the total number of farms.

Table 1.--Ethiopia: Land use, 1964

Use	Total area	Percentage of total area	Percentage of agricultural land
	<u>1,000</u> <u>hectares</u>	-----	<u>Percent</u> -----
Agricultural land:			
Arable land:			
Grains	6,895	5.6	8.8
Dry legumes	762	0.6	1.0
Oilseeds	658	0.5	0.8
Other crops	419	0.4	0.5
Fallow land ^{1/}	1,955	1.6	2.5
Total arable land	10,689	8.7	13.6
Coffee and other permanent crops ^{2/}	963	0.8	1.2
Total cropland	11,652	9.5	14.9
Permanent grassland	66,759	54.6	85.1
Total agricultural land	78,411	64.2	100.0
Forest	8,000	6.5	---
Other	35,779	29.3	---
Total area	122,190	100.0	---

^{1/} Includes temporary meadows.

^{2/} "Other permanent crops" consist primarily of false banana trees.

Sources: (4, 11). In this table and the following tables, underscored numbers in parentheses refer to listings in the bibliography.

Percentage figures do not add to all totals because of rounding.

There are some large commercial farms in Ethiopia (fig. 4) but they take up only a small part of the total cultivated area. Most of these farms are foreign concessions or are operated on a partnership basis by Ethiopians and foreign investors. They mainly supply products for the processing industries or for export. The Ethiopian Government plans to promote the establishment of more of these commercial farms. A few of the larger farms have several thousand hectares and employ large numbers of workers.



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Figure 4.--A modern commercial farm in Ethiopia.
(Photo by Ethiopian Ministry of Information.)

Land Tenure

Types of land tenure are numerous, complex, and often little related to Western concepts of landownership. The right to the land varies according to region, local custom, and type of agriculture. Measurement and registration of rural land was first ordered in 1941, and by 1967 some 5 percent of the Ethiopian terrain had been measured; actual ownership of a large share of the unmeasured land is undetermined.

Much of the land is held by a few thousand individuals, most of whom have received it in return for services to the Government and for further services which they are required to render the Government. By custom, these landowners are entitled to receive certain services, as well as rent, from the families living on and working the land. Since the 1940's, some of the privileges of the landlords have been gradually reduced by law, though in some areas they have not been eliminated in practice.

Large areas, especially in the north, are held by tribal or kinship groups, whose members can claim a share of the land for cultivation, even after being separated from the group for generations. The Coptic Church ^{1/} has a right to land revenue over an amount of land which is variously estimated at between 25 and 40 percent of the country's area, but it has actual ownership of only a small part of it. The Government, which owns much of the idle land, also owns some cultivated land. In large areas of nomadic and seminomadic herding there is no ownership of land; here, tradition and custom govern the rights of usage.

Foreigners can own land only by permission of the Emperor. Generally, this permission is granted only to foreigners who have resided in Ethiopia for a long time or have rendered some specific service to the country. However, concessions are granted and long-term leases can be arranged.

About half of the Ethiopian farmers are believed to be tenants. The landowner, by law or custom, may claim up to three-fourths of the farm's

^{1/} Farmers in the central part of the country generally are Coptic Christians and, as such, adhere to the faith of the ruling classes and to the established religion of the Empire; people in the eastern and northern parts of the country are mostly Moslems, while those in the southwest belong primarily to local religions, generally termed pagan.

output and in addition may require the tenant to perform some work on the owner's holding without pay. The tenancy agreement may be terminated or the rent may be raised 4 years after the tenant has started working the land. The landowner generally does not participate in the management of the farm. Because of the small share of output remaining to them and the insecurity of their tenure, most tenants have little or no interest in increasing farm production, or making any improvement or capital investment on the land. Incentives are also lacking among farmers who work tribal or kinship land, since they have no permanent claim on the holdings they work.

Several laws have been proposed or adopted to improve the economic conditions of the tenants, to eliminate or at least reduce lack of security in land tenure, and to modernize the entire land-tenure system. A Ministry of Land Reform and Administration was created in 1966, but the first steps toward land reform in Ethiopia were taken in 1952, when the Emperor decreed the distribution of plots of Government land to the unemployed. A few thousand allotments have been made under this program and more Government land is likely to be distributed in the future. At present, however, the principal aim of the Government's land-reform policy appears to be improving the situation of the small tenant farmer, mainly by substituting a fixed rent in place of the present system of paying a share of the output. The Ministry of Land Reform has also made proposals for levying special taxes on idle land and for speeding up and improving the survey and registration of all holdings.

Farm Labor

Ethiopia's total labor force was estimated at nearly 11.5 million in 1965; about nine-tenths of these workers were engaged in agriculture, primarily in subsistence farming and herding. These activities continue to absorb most of the new workers entering the labor force every year. The agricultural labor force consists primarily of farm operators and unpaid family members.

In 1965, salaried workers in agriculture, including seasonal workers hired by commercial farms to work on such crops as coffee, oilseeds, cotton, and sugarcane, numbered 21,700, or 7 percent of the labor force in the modern sector of the economy. More than half of the salaried farmworkers were in Shawā Province; most of the rest were in Wallo, Tegrē, Arusi, and Eritrea Provinces. Seasonal workers are also hired by some of the wealthy landowners operating traditional farms and by a few of the small farms producing some crops for the market. These workers are usually hired through an agent who negotiates working conditions and salaries and is responsible for the worker's performance. Migratory workers engaged in picking coffee often travel hundreds of miles to get to the place of employment and are usually accompanied by their wives, who help with the work.

Labor productivity among Ethiopian farmers is generally low, largely because of the scarcity of inputs such as fertilizer, pesticides, and improved seed and the lack of modern farming equipment.

Among the main ethnic group--the Amhara-Tigrai--farming and herding tasks are divided according to age and sex. Men work in the fields (a practice not very common in traditional Africa) and thresh the grain; women cook the meals,

crush the grain, carry water, and gather fuelwood. Young boys and older men watch the livestock and protect the ripening grain from birds and animals. At harvesttime, however, the entire family generally works in the field. Among the nomads, there is usually no well-defined division of labor by sex or age.

FARM PRACTICES

Except on the few commercial farms, agriculture in Ethiopia is carried out primarily on a subsistence basis, with inadequate tools and generally primitive methods of cultivation. In such activities as seeding, weeding, and harvesting, Ethiopians are said to rank above most other African farmers, but it is difficult to bring about significant modernization of agricultural practices, partly because of widespread illiteracy among the rural population.

Despite the many handicaps, a foundation for improvement of farm practices has been laid in selected areas, largely with help from the United States but also from FAO (Food and Agriculture Organization of the United Nations). The Imperial Ethiopian College of Agriculture and Mechanical Arts, established in 1952, and a few other organizations (all established since then) have carried on research for improved varieties and strains of crops, and for the development of farm machinery and buildings suited to local needs. An Agricultural Research Institute was established in 1965. An Extension Service has been created, even though its activity is still somewhat limited in scope, and research is beginning to find application on the farm, primarily in the immediate vicinity of the research centers.

Crop Rotations and Cultivation Patterns

After centuries of cultivation the soils of Ethiopia are still in generally good condition, indicating that the rotation systems and customary cultivation practices have been generally satisfactory.

Crop-rotation patterns vary with location and types of soils. In areas of fertile soil and relatively level terrain the land is cropped every year: a leguminous crop is planted one year, and various grains the next 8 years; then the cycle is repeated. On less fertile and more sloping land a year of fallow may be substituted for a year of grain, or a crop of legumes may be planted during the 5th year of the 9-year cycle. In parts of the southwest, however, the fields may lie fallow for several years, even as long as 20. In some areas, after a long period of fallow, the ground is broken with a plow and the sod is gathered in piles and burned with small amounts of cow dung; the resulting ash is then spread over the field and plowed into the dirt.

In the highlands the planting of crops generally takes place in April or May, before the main rainy season; harvesting begins in October, after the rainy season ends. In a few areas, rainfall distribution or availability of irrigation water makes it possible to plant a second crop. Sometimes intercropping (generally sorghum and corn, or corn and dry legumes) is practiced, so that the farmer has a chance of harvesting at least one crop in case of adverse weather.

Contour plowing is common, and the ground is often left unharrowed to cut down on erosion. Terracing is practiced in a few areas in the highlands. Wind and water erosion of the soils is a serious problem in some areas, however.

Farm Equipment

Equipment in general use is very primitive (fig. 5). The plow is the principal farm implement on the plateau; the hoe is more common in the south. The typical plow only turns the top of the soil and the operation must be repeated several times to prepare the ground for planting. Spades and hoes of numerous shapes and sizes are used for a variety of chores.

Most of the seed is broadcast by hand. Grain is harvested with a sickle; the sheaves are then spread on the ground and threshed by driving oxen back and forth over them, or they are put in a pile and beaten with sticks. The grain is winnowed by tossing it into the air against the wind, which blows away the chaff. The grain is either crushed with wooden mortars and pestles, or ground with simple, hand-operated, stone mills.

Ethiopian farmers use donkeys, horses, mules, and camels almost exclusively as pack animals; oxen supply most of the draft power. Although the wheel was first introduced into the highlands in the mid-19th century, and Ethiopians became increasingly familiar with its use during the Italian occupation in the late 1930's, wheeled transportation is still little used by farmers. Carts and wagons and such equipment as waterwheels and windmills are, however, increasing.



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Figure 5.--Preparing the ground with oxen and a wooden plow. The two men at left are bringing extra plows to attach to the idle teams. (Photo by Africa and Middle East Branch, Foreign Regional Analysis Division.)

Tractors (their total number was estimated at a little over 1,000 in 1966) and some other mechanized equipment are increasingly being used on commercial farms and at experiment stations and on some demonstration plots. Toward the end of 1967, it was announced that assembling of farm machinery (initially, 200 tractors annually and some 600 other farm machines) would begin in Ethiopia. In general, Government programs aim at developing and promoting the use of improved traditional tools, rather than large-scale farm mechanization.

Fertilizer

Although Ethiopia has a large animal population, very little manure is used as a fertilizer except in eastern Sidāmo, where large amounts are applied to false banana trees. Most of the manure is made into cakes and used as fuel, or mixed with mud and used to plaster the walls and floors of the houses. Manure is also used to make tops for cooking pots. Crops are seldom grown for use as green manure.

Except on two or three commercial farms, which import supplies for their own use, consumption of chemical fertilizer is virtually nil. Very small amounts of organic fertilizer are produced locally by commercial slaughterhouses. The Government has initiated a modest program for the effective use of fertilizer, but no major increase in its use is likely to occur in the near future.

Improved Seed

As a rule, improved seed is not readily available to Ethiopian farmers. Most farmers save part of their crop from one season to provide seed for the next planting, without regard to quality or purity of the seed. A limited program for seed improvement was begun in the late 1940's, and some assistance has been received from the United States and FAO. Seed potatoes from the United States and hybrid corn have been introduced in very limited amounts. Small quantities of improved seed grain and pulses, as well as coffee seedlings and vegetable seeds, have been distributed in several localities. Ethiopia does not have an official seed certification agency.

Plant Pest Control

Insects and diseases cause enormous loss of crops in Ethiopia. Insects and rodents alone are said to destroy as much as 25 percent of the grain in storage, and birds reportedly cut sorghum yields by half in some areas. Locust invasions have at times destroyed the entire grain crop in large areas of the country, necessitating sizable imports of grain to ward off starvation of the local population.

While commercial farms and Government installations use small quantities of pesticides, the typical farmer is unfamiliar with their use and cannot afford the supplies and necessary equipment. Plant protection for most farms consists of having a boy chase birds and larger animals from corn and sorghum fields by means of a whip or slingshot.



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Figure 6.--Planes spraying insecticide during a locust-control campaign. Flagman guides planes from a termite mound.

As a start toward establishing a modern system of plant pest control, some research has been conducted in identifying insects and plant diseases, and a few pest-control demonstrations are being carried out. With assistance from the United States, FAO, and the United Kingdom, an agency has been set up under the Ministry of Agriculture for control of locusts (fig. 6), which are probably the country's most serious pest. Ethiopia is a member of the Desert Locust Control Organization for East Africa, an association grouping several East African countries, with foreign assistance and FAO coordination.

Irrigation

At present, irrigation is practiced only on small tracts of land bordering rivers and on some modern farms; the total irrigated area is believed to be about 50,000 hectares. Among commercial farms, two sugar plantations east of Addis Ababa and a cotton plantation northeast of Dasē have the most important irrigation projects. Small individual irrigation projects are located

mostly in northeastern Shawā Province and along the Red Sea coast at the mouths of rivers.

More than 24,000 hectares are under irrigation in the Awāsh River basin; recent surveys indicate that 560,000 hectares there and in the Blue Nile basin could be brought under irrigation. Other areas suitable for irrigation bring the total potentially irrigable area in Ethiopia to nearly 1 million hectares, or somewhat less than one-tenth of the total cropland; however, irrigation of the larger part of this area is not likely to take place for some time.

FARMERS' ORGANIZATIONS AND CREDIT

Cooperatives and Mutual Aid Associations

Ethiopia's first officially recognized cooperative was the Alemaya Farmers' Cooperative, a vegetable-marketing society, established in 1963 under the sponsorship of the agricultural college.

The Cooperative Societies Law, enacted in 1966, governs the establishment of new cooperatives and sets a minimum initial membership of 10 persons. As of mid-1967, 15 farmers' cooperatives, some with a membership of several hundred, had been registered.

Most of the groups that have been founded are producers' cooperatives, concerned mainly with the marketing of coffee. Plans for the cooperative movement envision multipurpose groups for purchasing agricultural supplies and providing services and credit. However, efforts to expand the cooperative movement are hindered by the high rate of illiteracy among the farmers, lack of transportation facilities from many producing areas to major market and export points, inadequate storage facilities on the farm and at commercial centers, and a shortage of trained personnel to assist in the formation and guidance of the societies.

Although farm cooperatives are just beginning to be organized, Ethiopian farmers practice mutual aid in various phases of their activities. There are five main types of mutual aid associations in the country. Three of them, Jihi, Ras Simosh, and Wonphel, involve the exchange or provision of labor for agricultural activities; two, Eder and Ekub, are mutual financial-aid societies.

Members of Jihi help one another on a voluntary and informal basis. In Ras Simosh, at the request of a needy farmer, the village chief summons help from other villagers. Wonphel is a formal cooperative association, in which the members are obliged to work for each other, generally in performing such typical farm chores as plowing, weeding, and harvesting.

Eder is a traditional social organization in which the members share funeral and other emergency expenses. Ekub is an informal, small savings association which provides capital for such items as bullocks, plows, and clothing, or for marriage expenses. In both of these groups, funds are collected from members at regular intervals; e.g., weekly or monthly.

Other types of cooperative enterprises include the transportation of crops to market, and the building of farmhouses and other facilities.

Farm Credit

The few banks existing in Ethiopia are located in the urban centers. Low-cost credit for farmers is scarce, and the small amount of institutional farm credit granted goes to a handful of larger farmers who can provide adequate collateral. In 1965, for instance, only 50 farm loans were made by the Development Bank, which is the only specialized source of agricultural credit. The average amount of these loans was the equivalent of US\$8,000 to coffee producers and nearly \$13,000 to other farmers. This kind of loan is not available to the typical farmer; on many small holdings, work oxen may be the only capital investment--and even they may belong to the landlord.

Small farmers generally depend on moneylenders for funds, or on relatives or friends. Loans from relatives or friends are made on an informal basis, with no definite schedule for repayment; often the farmer repays the loan by working on the lender's holding.

With adequate support services the mutual aid societies, Eder and Ekub, could become the basis of a farm credit program for small agricultural producers.

GOVERNMENT AGRICULTURAL POLICY AND FOREIGN AGRICULTURAL AID

Agricultural Policy

The Ethiopian Government considers agriculture the most favorable base for stimulating the country's economic growth. The general aim of its agricultural policy is to increase farm production in order to (1) meet the needs of an expanding population and an anticipated improvement in the level of living; (2) increase the output of raw material for existing and new agricultural processing industries; and (3) help reduce the deficit in the balance of trade by expanding and diversifying agricultural exports and reducing the need for agricultural imports. Activities aimed at improving the agricultural economy have been stepped up since about 1966.

Some measures adopted during the past several years, such as the enactment of the law on cooperatives, creation of the Ministry of Land Reform, establishment of the Livestock and Meat Board, initiation of the Regional Livestock Development Program, and creation of the Grain Corporation and the Oilseeds Development Company, as well as marketing and pricing regulations affecting certain farm products, are discussed elsewhere in this report. Other measures adopted by the Government include the decentralization of the Ministry of Agriculture in 1963-64 and the setting up of provincial offices, and elimination in March 1966 of certain privileges relating to land taxes. A bill imposing a tax on agricultural income was promulgated in November 1967.

In 1967, under AID (U.S. Agency for International Development) financing, a comprehensive economic survey of the agricultural sector was begun by the Stanford Research Institute for the Ethiopian Government to prepare a 15-year

plan for the development of a more market-oriented agriculture and of related industries.

The Ethiopian Government welcomes private foreign investment, especially in commercial agriculture, and the farm enterprises that have been established have made a significant contribution to the agricultural economy.

Foreign Aid

Technical and financial assistance from foreign sources is helping considerably in the development and modernization of Ethiopia's farm economy. Assistance has come from a number of sources, with the United States as the largest single donor. Technicians have been provided by more than 15 nations and various agencies of the United Nations. Because of the dominant role of agriculture in the Ethiopian economy, the agricultural sector has received a relatively large share of the foreign aid.

AID and its predecessor agencies have assisted in many phases of agricultural development. The country's one agricultural college was established with U.S. funds and personnel, and U.S. funds were used to transform the agricultural technical school at Jimā into an effective institution. Other phases of AID assistance include projects for livestock development, agricultural extension services, crop and livestock pest control, grain storage, and training agricultural manpower, in addition to financing the survey by the Stanford Research Institute mentioned above.

FARM PRODUCTION AND FOREIGN AGRICULTURAL TRADE

In Ethiopia, most crops are raised mainly or exclusively for subsistence, but coffee is produced mainly for export and some oilseeds and dry legumes are also exported. For lack of adequate statistics it is difficult to determine the share of agricultural production that comes from livestock raising, but livestock and livestock products normally make up about one-tenth of agricultural exports.

Crops

Grains, coffee, dry legumes, and oilseeds are Ethiopia's principal crops. Coffee is the principal cash crop, but grains (and to a much smaller degree, dry legumes and oilseeds) are more important in terms of area planted and value of output. Other crops of some importance are sugarcane, cotton, the false banana tree (grown mainly for food but also for fiber), and chat (a shrub whose leaves and twigs are chewed as a stimulant). Virtually no crops are grown in Ethiopia for use primarily or exclusively as feed.

Grains and other field crops are grown throughout the areas of settled agriculture, but practically all tree crops, such as coffee and the false banana, grow in the southern half of the country. In parts of the southwest where the false banana tree provides the staple food, grain and other field crops are not as important as on the rest of the plateau.

Available data on area and production of crops in Ethiopia are often incomplete and unreliable, as is the case for many developing countries. As a rule, published Ethiopian statistics have been used in this study. In some cases, however, these statistics have been supplemented with estimates by U.S. Government agencies and international organizations; these data too, have a wide margin of error.

Coffee--Although considerable progress has occurred in recent years in all sectors of the monetary economy, coffee remains its mainstay. In normal years, coffee accounts for 50 to 60 percent of the country's total exports, by value, and taxes on coffee are an important source of Government revenue. In addition, approximately one-fourth of the total population derives part or all of its livelihood from coffee production or related activities. Most of the coffee is grown by farmers engaged primarily in subsistence agriculture.

Annual harvested production of coffee, according to official USDA estimates, is currently around 100,000 metric tons (table 2), or nearly double the 1956-60 average. Actual production is difficult to determine, partly because a significant share of the coffee comes from wild stands and estimates of domestic consumption vary widely. At present, some of the berries picked fail to reach the market because of the poor condition of roads and the unfavorable local price the coffee may bring.

According to official Ethiopian statistics, published in the Government's latest Statistical Abstract, coffee production is about 50 percent higher than the amount estimated by USDA. On the other hand, quantities inspected by Ethiopia's National Coffee Board as reported in the Ethiopian Statistical Abstract averaged only 84,500 metric tons a year in 1963-66. That amount represents quantities available commercially for both the domestic and the foreign markets. Some Ethiopians believe that annual output could reach 400,000 tons if there were access roads to more of the wild stands.

Exports of coffee increased considerably through 1965, when they were double the 1956-60 annual exports. Though coffee prices had increased substantially from the low levels reached in 1961-63, the total value of coffee exports was only about seven-eighths higher in 1965 than the average for 1956-60. As the value of coffee began to fall again, minimum export prices were fixed by the Government in 1966; this, however, resulted primarily in a drop in exports in 1966 which continued in 1967, although the minimum export price had been lifted.

Under the International Coffee Agreement, Ethiopia was allocated a total export quota of 73,810 metric tons for the coffee year October 1967-September 1968. Additional sales may be made to countries not participating in the agreement; in 1966/67, these sales amounted to 4,962 tons. The United States buys between 65 percent and 75 percent of Ethiopia's annual coffee exports; consequently, not only do Ethiopia's export earnings depend heavily on a single commodity but on a single market as well. West Germany, Italy, and Saudi Arabia are other markets of some importance. Coffee exports are expected to continue to trend upward over the next several years, but will probably represent a smaller share of the country's total exports, due in part to anticipated potash exports, scheduled to start in the early 1970's.

Table 2.--Ethiopia: Coffee--harvested production and exports, 1956-60 and 1961-65 averages, and years 1961-68

Period or year	Harvested production <u>1/</u>	Exports <u>2/</u>
	- - - - - <u>1,000 metric tons</u> - - - - -	
1956-60 average . . .	57	44
1961-65 average . . .	89	68
1961	77	56
1962	86	62
1963	89	66
1964	96	70
1965	99	88
1966	92	73
1967	106	<u>3/</u> 68
1968	<u>3/</u> 102	n.a.

n.a. = not available.

1/ Harvest beginning November of previous year and extending into January of years shown.

2/ Trade for 1956-61, year beginning December 11 of previous years; from 1962, year beginning January 11 of years shown.

3/ Preliminary estimate.

Sources: (20) for production; (4) for trade.

Most of the coffee harvest comes from the southwest, where the trees grow well almost anywhere at elevations of 1,700 to 2,000 meters; Kefa and Sidāmo Provinces are the leading producing areas. Flowering of the trees takes place from mid-January until the end of April. The berries are harvested from November through January. Coffee grown in Ethiopia is of the Arabica variety. Arabica coffee is thought to be indigenous to Ethiopia, but it was introduced into Europe by the Arabs and thereby was named Arabica. The word coffee is believed by some to be derived from Kefa Province's name.

Coffee is attacked in Ethiopia by berry and stem borers, green scale, brown blight, and leaf rust, although widespread damage has never been reported.

Most of Ethiopia's coffee is grown on small farms or is gathered from accessible wild stands; in either case, the harvest by an individual farming unit is generally small. Perhaps one-tenth of total production comes from coffee plantations.

In Sidāmo, farmers shade coffee trees with false banana trees (fig. 7). Planted coffee trees in general receive a minimum of care on small farms, where improper harvesting and drying often result in a product of relatively poor quality. The berries are usually dried on the farm (fig. 8) and sold to local buyers, who resell their accumulated stocks through one or more middlemen to a wholesale trader or exporter's representative; many of these merchants operate processing factories. The coffee is then bagged and shipped to the final collecting centers. A large, modern bean sorting and mixing plant began operations in 1967.

Most coffee for export is transported by truck to Addis Ababa, and then by rail to the main port of export, Djibouti, in the French Territory of Afars and Issas. A relatively large amount is trucked to the Ethiopian port of Assab.



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Figure 7.--Ethiopian coffee trees shaded by false banana.



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Figure 8.--A pile of freshly picked coffee beans in foreground, ready to be spread on the ground for sun drying. In the background, the final dried product.

The national Coffee Board, established in 1957, supervises the coffee industry, but it has mainly been concerned with improving the quality of the product by means of instruction on the preferred methods of harvesting and processing. In view of the world market's oversupply of coffee, expansion of production in Ethiopia is not being promoted. No program to support producer prices for coffee is operated by the board or any other agency in Ethiopia.

Grains--Two-thirds of Ethiopia's total arable land is planted to grains, mainly teff, which, according to published statistics, accounts for nearly as much land as all other grains combined; sorghum, barley, corn, and wheat follow in that order. Most of the grain output is consumed as food by the producer and his family.

Total annual production of grains, which has reportedly increased during the past two decades along with the growth in population, is now estimated at some 5 million metric tons (table 3). However, Ethiopia has been a small net importer of grain in most years since the mid-1950's, whereas it was a small net exporter during and in the years following World War II. Although net imports of grain are generally small, imports of wheat, mostly as flour, were Ethiopia's leading agricultural import in 1966, ahead of cotton. A large part of the grain and flour imports comes from the United States under P.L. 480 (U.S. Public Law 480--Agricultural Trade Development and Assistance Act of 1954).

Although Ethiopia has been a net importer of grain, quantities produced locally would probably be sufficient to meet domestic requirements if the grain could be moved economically and in large enough quantities from Ethiopia's grain-surplus areas in the interior to the deficit areas, mainly in the north. Because of the deficit areas' proximity to the sea and the inadequacy of transportation between the north and the interior, it has often been easier and cheaper to import grain than to move it within the country.

The Ethiopian Grain Corporation, a quasi-Government agency, is charged with promoting the improvement of grain marketing. The corporation, which was estimated to have handled between 3 and 5 percent of the grain entering commercial channels in 1966/67, is becoming increasingly capable of moving considerable amounts of grain, purchased directly from producers, from surplus to deficit areas. It is not intended, however, that the corporation should gain a monopoly over the grain trade, now consisting of several thousand merchants.

The wickerwork silos for storing grain (fig. 9) now in general use on farms do not provide adequate protection against weather and pests, and as much as a fourth of the grain stored on farms is lost. Adequate farm storage facilities would doubtless add considerably to Ethiopia's total food supply and would also add to the quantities of grain available for marketing, since supplies moving to market come almost entirely from production by subsistence farmers in excess of family needs.

Teff, or teff lovegrass (Eragrostis abyssinica), an annual indigenous grass with a tiny grain, is Ethiopia's principal and preferred food grain. Several species of teff are grown in other countries for hay or pasture. Although white teff is preferred in Ethiopia and has a higher market price than the red variety, most farmers plant mixtures of the two, partly because pure seed is not available to them. The grain can be grown throughout most of the country, even in areas with a relatively brief rainy period, because it has a short growing season. On the plateau the crop grows well at altitudes ranging from 1,700 to 3,000 meters. Planting generally takes place at the beginning of the big rains; the seed is broadcast by hand on plowed ground, and is covered by driving sheep back and forth over the area. Harvesting takes place mainly in October and November but lasts until April in the higher altitudes. Yields for the country as a whole average 5 to 6 quintals per hectare, but in some areas they are as high as 15 quintals. For use as feed, 20 to 25 metric tons of green fodder are obtained per hectare.



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Figure 9.--A typical Ethiopian farmstead among eucalyptus trees. Teff is stored in thatched structure at left; firewood is stacked in center; thatched huts at right are living quarters. (Photo by Africa and Middle East Branch, Foreign Regional Analysis Division.)

Most of the teff produced in Ethiopia is ground into flour at home, using a hand-operated stone mill; some is ground in crude mills on a custom basis, and a much smaller amount is ground by modern grinders. Teff flour is used to make a very popular flat, limp bread called injera.

Sorghums and millets are staple foods in the drier parts of Ethiopia. The combined production of the two is reported under sorghum in table 3, as separate data are not available.

Many kinds of grain sorghums (generally called durra in Ethiopia) are grown; a high percentage of the crop is the tall, crookneck type known as milo or milo maize in other countries. Some are dual-purpose types, providing other products as well as grain. Sweet-stalked sorghums are popular for their sugar content. Fiber sorghum or broomcorn provides straw for brooms. Forage sorghums, primarily the sudans, grow wild throughout the country.

Grain sorghum grows well in the low, hot zones of Ethiopia and at elevations up to 2,500 meters. The crop is planted from March through May. The varieties grown in the country generally require 7 to 8 months to mature. After the grain is threshed the stalks are used for fuel, as building material for fences and for walls of farmsteads, and as livestock feed. Sorghum, like other grains, is threshed by the hooves of animals, which are driven back and

and forth across the threshing area. Sorghum is used for making injera. It is also eaten roasted and is used to make a kind of home-brewed beer.

Pearlmillet (Pennisetum glaucum syn. P. spicatum; typhoideum) is grown on the Ethiopian Plateau. Most of it is used by the farm family to make mush or unleavened bread. Some is used industrially for making starch and alcohol.

Ragimillet (Eleusine coracana) is an emergency crop sometimes grown in extremely dry periods when other crops fail; it provides a small but dependable yield. It is sown in November and December, at altitudes of 900 to 2,000 meters, and is used for both food and forage.

The combined area in barley, corn, and wheat is about two-thirds the area in teff, but production amounts to about nine-tenths of the output of teff.

Barley is grown throughout Ethiopia at elevations of over 2,000 meters. The bulk of the crop is planted from May to July and harvested in November and December. Barley is generally ground into flour, but the grain is sometimes soaked in water, crushed, and mixed with other foods or used in soup. The grain is also widely used by farmers to make beer.

Wheat grows successfully in Ethiopia at elevations of 1,900 to 3,000 meters. The highlands south of Awāsh supply a large part of the needs of five commercial flour mills in Shawā. There were a total of 11 commercial mills in Ethiopia in 1966; in 1965, working at two-thirds of capacity, they reported a total production of nearly 38,000 metric tons of flour.

Durum, used in most countries for macaroni products, is one of the principal bread wheats in Ethiopia. Semihard wheat produces an excellent flour for home use and for pastries. All Ethiopian wheat is what is commonly called spring wheat, as the climate is not cold enough to grow the winter varieties common to the Temperate Zone.

Wheat is planted in June or later, during the rainy season, and is harvested in November and December, in the dry season; it is piled like cordwood before threshing.

Ethiopia's imports of grain and grain products consist mainly of wheat flour. The United States (through P.L. 480) and the United Nations (through the FAO's World Food Program) have supplied a considerable share of total imports. West Germany has provided most of the commercial imports.

Dry legumes--Production of dry legumes has been fairly stable in recent years (table 4). Ranking after grains as food, dry legumes are also important as exports, which go principally to Ceylon, Japan, the Arabian Peninsula, and West European countries.

Planting and harvesting seasons for dry legumes are similar to those for grains, except that chickpeas are harvested in February and March. Legumes are grown almost exclusively for food in Ethiopia. They are usually ground and made into a highly spiced paste called wot; sometimes pieces of meat are added to the paste. Wot eaten with injera, the local bread, is the national dish and staple food of most Ethiopians.

Chickpeas, the leading dry legume, are grown extensively on the plateau. Many varieties of dry beans are grown east of Addis Ababa. Broadbeans do well at higher elevations, and grow on poor soils where other crops do not thrive. The field peas grown in Ethiopia are the kind called Canadian field peas in North America; they are grown mostly in the northern and central parts of the plateau, sometimes as a catch crop. Field peas are usually eaten as a green vegetable but are sometimes used as a dry legume. The vines are fed to livestock.

Oilseeds and oil--Although oilseeds, in terms of value, are second among Ethiopia's export crops, their share in value of total exports is much smaller than coffee's, amounting to only 8 percent in 1966. Total production of oilseeds expanded in recent years (table 5). Exports increased 43 percent from 1956-60 to 1961-65, on the average, but have declined again since 1963; the principal foreign markets are Yugoslavia, Italy, Greece, and Japan. Most oilseeds are exported as seed. Exports of oil are negligible, but exports of oilseed cake expanded from 12,700 metric tons in 1958 to 30,700 tons in 1966.

Many kinds of oilseeds, both edible and inedible, are grown in Ethiopia, but nigerseed (also called nug, nueg, noog, or nuek) accounts for more than half the area in oilseeds and for about three-fifths of total production. Next in importance are linseed and sesame seed.

Nigerseed, an indigenous crop, is widely grown on the plateau; the country produces about 95 percent of the world output of this crop. Flax is grown in Ethiopia primarily for the linseed, which has traditionally been the major oilseed export, by value, but was surpassed in 1965 and 1966 by sesame seed.

Ethiopia, with an output of about 5,000 metric tons a year, is the major African producer of rapeseed. Other cultivated oilseeds include sunflower seed, peanuts, castor beans, cottonseed, and rapeseed.

Most of the oilseeds are grown by farmers producing primarily for subsistence. About four-fifths of the oilseed output for local consumption is crushed in traditional cottage industries. Small amounts go to modern mills for production of oil, soap, and oilcake.

In 1965 the Ethiopian Government set up the Oilseeds Development Company for promoting production and exports of nigerseed, linseed, and rapeseed. Minimum support prices are set by the company for these three seeds, if they meet certain standards of purity.

Sugarcane and sugar--Sugarcane is grown in many areas of Ethiopia, and stalks are frequently sold in local markets for chewing; however, two plantations in the Awāsh Valley, east of Addis Ababa, account for all the commercial production of sugarcane and refined sugar (fig. 10). Commercial production of sugar began in 1954. Output per year (September-August) expanded as follows (in thousands of metric tons):



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Figure 10.--Harvesting sugarcane at one of the two large cane plantations in the Awāsh Valley. (Photo by Africa and Middle East Branch, Foreign Regional Analysis Division.)

1954/55-1958/59 average	25.7
1959/60-1963/64 average	47.5
1964/65	61.7
1965/66	68.9
1966/67	76.9

The sugar is "plantation white," or 99.93 percent refined. Domestic production now meets most of Ethiopia's sugar needs. Plans are underway for establishing a new sugarcane plantation, with sugar production scheduled to start at the end of 1969. In the sugarcane plantations now in operation, 14 to 22 months are required between cuttings, which take place from November to July. Cane yields increased from 198 metric tons per hectare in 1962/63 to 215 tons in 1965/66. The sugar content of the cane is about 11 to 12 percent.

Inedible molasses produced as a byproduct of sugar refining is generally discarded in Ethiopia, but a small amount is used by the plantations to fertilize the cane.

Cotton--Production of cotton, a traditional crop in Ethiopia, has increased considerably since World War II in response to the needs of the expanding textile industry which, with its estimated 15,000 employees, absorbs

between one-third and two-fifths of the total labor force in the manufacturing sector.

Domestic production of lint cotton in 1967 was estimated at nearly 7,000 metric tons, or nearly three times that of a decade earlier. Nevertheless, cotton production does not meet the needs of the seven or eight existing mills, and a large part of their requirements are met by imports. The United States was the major supplier in 1965 and 1966. Imports from the United States are made through the P.L. 480 program. Imports from all sources for the latest years available are shown below (in metric tons):

1963	5,170
1964	7,190
1965	3,250
1966	4,508

Ethiopian exports of cotton fiber and processed cotton are negligible.

Small producers account for about four-fifths of the area in cotton, which is about 41,500 hectares (over 100,000 acres). Two large foreign concession holders account for a large share of the area in plantations. The large plantations produce cotton under irrigation, but most of the crop is rain-fed.

The country has a good potential for increasing the production of cotton, and several plans are being made or implemented for its expansion.

Vegetables--Per capita consumption of fresh vegetables is low in Ethiopia. Near the larger cities, some farmers grow vegetables as a cash crop. Sweet corn, tomatoes, potatoes, and fresh beans grow well during the dry season; root crops and leafy vegetables grow best in the rainy season. Where water is available, vegetables are grown the year round.

Commonly eaten fresh vegetables are potatoes, peppers, onions, beans and peas, and sweet corn. Many other vegetables, including artichokes, asparagus, cabbage, a kind of kale, garlic, and taro (grown in the south), are raised in Ethiopia.

Limited amounts of tomatoes and green vegetables are canned commercially.

Exports of fresh vegetables have a very good potential, as vegetables could be grown to supply the European winter market. Currently, very small amounts go to neighboring countries and Italy.

False banana--In parts of the south and southwest, the false banana (Musa ensete) replaces grain as the staple food. In Sidāmo, an average family reportedly cultivates from 300 to 500 trees and harvests one-third of them a year, or 15 to 20 trees per person.

Portions of the trunk, leafstalk, and roots of the banana tree are used to make a fermented, starchy flour. The time required to extract and prepare the material varies from a few weeks to a year; the longer the fermentation period the better the product. The flour is used to make a local-type bread. The banana-like fruit of the tree is useless.

Fiber from the tree is used to make rope and bags. One tree yields about 1 kilogram (2.2 pounds) of fiber; total annual fiber production is estimated at 12,000 metric tons.

Chat--Also called tchat, gat, or khat, chat (Catha edulis) is a green shrub which may grow into tree size. The juice from its leaves and tender twigs resembles adrenaline in its physiological action. It is popular among Moslem farmers of Ethiopia and in several nearby countries. The most common way of extracting the juice is by chewing the leaves, sometimes for several hours. Chat grows wild throughout most of Ethiopia, but commercial production is concentrated in the Hārar-Dirēdawā area.

Production of chat leaves is probably around 6,000 metric tons a year. Exports, once a relatively important source of foreign exchange, have been declining; they dropped from 5 percent of total recorded exports by value in 1962-63 to less than 1 percent in 1966. Most of the exports of chat go to East African countries and to the Arabian Peninsula.

Other crops--Leaf tobacco output was about 1,400 metric tons a year during 1964-66. Imports, manufacture, and domestic sale of tobacco are a Government monopoly. Imports in 1966, mostly of manufactured tobacco, were less than 300 tons; exports consisted of 60 tons of leaf tobacco. Use of tobacco is disapproved by the Coptic Church, and smoking is not very popular in Ethiopia.

Tea production in Ethiopia is small, but an excellent quality of leaf is grown in the west and south. The climate in many parts of the country is favorable for growing tea, and the crop is believed to have considerable potential. At present, imports of tea are relatively important.

Fruits and nuts grow wild in Ethiopia, but only prickly pears and limes are used to any extent. Planted fruit trees include citrus, bananas, mangoes, papayas, and avocados. The area in orchard fruits is estimated at less than 5,000 hectares and output at less than 60,000 metric tons a year.

A variety of herbs and spices grow wild and are cultivated in Ethiopia. The spices are used primarily to flavor wot. The most important of the spices grown is red pepper (berbere); production of some 90,000 metric tons a year meets domestic needs and provides a surplus for export. Red pepper is mainly a garden crop, often planted on steep or rough ground. Fenugreek is used for a flavoring as well as a baby food. Leaves and twigs of the gesho plant (Rhamnus pauciflorus) are used locally in the preparation of beer. Other spices and herbs grown in Ethiopia include caraway, cardamom, cayenne pepper, ginger, saffron, sage, tamarind, and thyme. Although some of these spices are exported in small amounts, imports of all spices frequently exceed exports in value.

Most of Ethiopia's needs for bag-making and cordage material are met by domestic output from false banana, sisal, sansevieria, and the leaves of the dum palm.

The dum palm, with a nut or fruit similar in shape to that of the oil palm, grows mostly in Eritrea. Industrial alcohol, about sufficient to meet the country's needs, is extracted from the husk of the nut. The kernel is used to make buttons or is crushed and mixed with oilcake for use as animal feed.

Livestock and Livestock Products

The raising of livestock is an important part of Ethiopia's agriculture, but its role varies with location and type of agriculture. Pastoralism is the principal or only economic activity of the nomads and seminomads, who, as already noted, make up perhaps a fifth of the rural population.

Number and breeds--Cattle are the most important livestock in Ethiopia (table 6). In the highlands, where crop farming is predominant, cattle are used primarily for plowing and equines serve as pack animals; here, the number of livestock is limited by the competition of arable land with available pastureland. Nomads and seminomads keep large herds of cattle, as well as goats, sheep, and, in the drier areas, camels.

Ethiopia's cattle population, estimated at more than 25 million head, is the largest reported for any African country. It is difficult, however, to determine the exact numbers, partly because of movement of so many of the herds and superstition in some tribes against counting of their cattle. Between 6 and 7 million of the cattle are believed to be working oxen. In the areas of settled farming, over a fourth of the total number of cattle are breeding cows; in the southern provinces the share is more than one-third.

Nearly all Ethiopian cattle are Zebus (Bos indicus) of various regional types; most of them are triple-purpose animals (work, meat, and milk). The Boran type, found in the south and southeast, is probably the best beef animal in East Africa, and offers good prospects for increasing beef production. The Fugara, Adal, Barca, and Black Highlands cattle are also found in Ethiopia. Ethiopian cattle have low yields of meat and milk. Live weight of adult cattle brought to the slaughterhouse is only about 280 kilograms (600 pounds) and carcass yield is about 48 percent; average milk production per cow is not above 500 liters (132 gallons) per lactation period. The regeneration rate of herds is poor, partly because of the low rate of calving among herds and partly because of the high mortality rate among calves. Also, calves are slow in reaching maturity; a heifer usually produces her first calf when 4 years old.

Some work has been underway, with U.S. and FAO assistance, to improve the quality of cattle in Ethiopia. Projects include the development of the Boran as a beef type and the Black Highland for milk production. A very few bulls, including Holsteins, Ayrshires, and Brown Swiss, have been imported by selected farms for crossbreeding with local cows. Friesian heifers, bred at four or five breed-improvement stations, have also been distributed. Frozen semen has been imported from the United States and the United Kingdom as a means of

Table 6.--Ethiopia: Number of livestock, 1959-63 average and years 1963-66

Kind	1959-63 average	1963	1964	1965	1966
----- <u>Thousand</u> -----					
Cattle:					
Total	25,008	25,147	25,270	25,425	25,604
Cows	7,546	7,279	7,310	7,340	7,373
Sheep	n.a.	11,482	11,638	11,800	11,971
Goats	n.a.	10,769	10,866	10,953	11,030
Donkeys	3,700	3,730	3,745	3,760	3,775
Mules	1,301	1,320	1,330	1,340	1,350
Horses	1,301	1,320	1,330	1,340	1,350
Camels	930	940	946	951	958
Poultry	<u>1/</u> 40,500	40,500	41,500	42,500	43,500

n.a. = not available.

1/ 3-year average.

Source: (4)

upgrading the livestock herds, and some Ethiopians have been trained abroad in methods of artificial insemination.

About 12 million sheep are found throughout Ethiopia from the semidesert area to the high elevations of the plateau. They generally are small animals, of mixed fat-tailed types, averaging 36 to 41 kilograms each. One thin-tailed type has long, black hair which is shorn and woven into cloth for home use; most of the other types produce no usable wool or hair, and are raised for meat only.

In the mid-1960's, goats in Ethiopia numbered perhaps 11 million head. These small, hardy animals can thrive on the sparse vegetation of the desert, and it is in these areas that most of them are raised. Goats are milked by the nomads in the east; elsewhere they are generally raised only for meat.

Donkeys, horses, and mules move a large share of the goods and produce in Ethiopia, as there are few roads suitable for motor transport or even carts. These animals are seldom used for field work. Donkeys, the most numerous of the equines, numbered nearly 3.8 million in 1966; they are small

animals, seldom weighing over 150 kilograms each. The hardy, indigenous horse shows some resemblance to the Arabian horse, but is much smaller. There were about 1.4 million horses in the country in 1966 and about the same number of mules. Jacks have been imported for raising mules, and some areas produce fairly good mules.

There are nearly a million camels in Ethiopia; most of them are kept on the desert. They are used as pack animals, for riding, and to provide meat and milk. In the desert, there may be several hundred camels in a herd.

Hogs number only about 12,000 and are practically all located in the vicinity of Addis Ababa and Asmara, where they are raised mainly for consumption by the foreign residents of these cities, since few Ethiopians eat pork.

Poultry, mainly chickens, numbered an estimated 43.5 million in 1966. Most farm families in settled areas keep from 4 to 10 hens and may derive a little cash income from the sale of eggs. Native chickens are small and the average output of eggs per hen is 25 to 40 per year, compared with over 200 in the United States. Some chicks (Brown Leghorns, White Leghorns, Rhode Island Reds, and New Hampshires) have been imported and distributed to farmers by the extension service. Work has also been done on upgrading the native types of chickens through adequate feeding and better management.

Honeybees are kept by many Ethiopian farmers, and honey is a traditional sweetener in the Ethiopian diet. Wild bees provide perhaps half of the honey produced. The honey is usually collected by smoking out the hive; this is an unfavorable practice as it kills the bees and lowers the quality of the honey and wax.

Livestock management--Livestock in Ethiopia must subsist almost entirely on natural pastures and stubble, but working stock receives some supplemental feed during heavy work periods. Feedstuffs used include corn and corn fodder, grain sorghum, pea and bean vines, and grain straw. Limited amounts of byproducts from grain mills and oilseed-crushing operations are also fed to the animals. Temperatures are moderate in most of the country so that grass and other forage can grow throughout the year, but vegetation dries up in the dry season and the feed supply becomes critical; during these periods, there is loss of weight in adult animals and frequent death among young ones. Water for livestock is generally scarce, especially during the dry season; few wells or ponds have been provided. In some regions the number of animals far exceeds the grazing capacity of the land. Areas around water sources may be greatly overgrazed while other areas remain unused. Constant grazing does not permit the recovery of the natural grassland.

Most cattle suffer from a lack of salt, which is a luxury even for the average farmer's own use.

Fences are rare in Ethiopia, even around crops, although thorny bushes are sometimes grown as barriers. Livestock are privately owned, but they are grazed on a communal basis and are allowed to run together and to breed freely. One herder, often a small boy, may take care of the stock of perhaps 10 owners; at the end of the day the cattle are returned to each farmer's corral near his

home. Ownership of large numbers of animals, especially cattle, is a matter of prestige; consequently, herds are not culled of old or the poorer grade animals.

Among the nomadic and seminomadic tribes there is often competition between groups for available water supplies and grazing. These pastoralists sometimes move their herds across the border to nearby countries in periods of drought.

A Regional Livestock Development Program has been established, with AID's assistance, to develop commercial livestock production and marketing in parts of southern Ethiopia. The plan calls for distribution of breeding stock to selected cattlemen, and provision of various facilities and services for the livestock industry.

Improvement of livestock and livestock products (except milk) is one of the functions of the Livestock and Meat Board, established by the Government in 1964.

Rinderpest, contagious pleuropneumonia, anthrax, blackleg, hemorrhagic septicemia, and liver flukes are widespread among cattle. Internal parasites are especially serious because the poor condition of most of the animals weakens their resistance to the organisms. A million lambs and kids are estimated to die yearly from internal parasites, and there is a regular loss of horses, mules, and camels from African horsesickness and trypanosomiasis. Annual mortality of sheep and goats is estimated at 2 million animals. In some small areas of the country, active programs for the control of animal pests have been carried out.

The Department of Veterinary Services of the Ministry of Agriculture has prepared an immunization plan which, if successfully carried out, will provide within a decade country-wide protection to animals against rinderpest and pleuropneumonia. The program also calls for early detection of other diseases such as foot-and-mouth disease, anthrax, blackleg, and pasteurellosis, and for work against trypanosomiasis, tick-borne diseases, tuberculosis, brucellosis, and rabies.

Livestock products--Beef, mutton, and goat meat are the principal meats produced and eaten in Ethiopia. Chickens, camels, and game also provide some meat. The large livestock population should permit a relatively high per capita consumption of meat; however, so much of the supply comes from sources outside the slaughterhouses that estimates of total annual meat production vary from about 370,000 to 580,000 metric tons.

Annual exports of beef have been increasing in recent years--from 1,756 metric tons in 1963 to 4,141 tons in 1966; exports of other kinds of fresh meat are negligible. Exports of small amounts of canned meat and meat preparations began in 1962. Recorded exports of live animals in 1963-66 averaged (in meat equivalent): cattle, 1,000 tons; sheep and goats, 600 tons; and poultry, 45 tons. Live animals go mainly to Saudi Arabia; the United Arab Republic (Egypt) and South Yemen are the only other markets. Frozen meat is sold to Spain, Gibraltar, Bulgaria, and Egypt. Canned meat goes mostly to Israel and Italy.

Milk production comes mainly from cows, but goats and camels are milked to some extent in desert areas.

Estimates of the production of cows' milk range from 700,000 to 2 million metric tons a year. Most of the milk that is not used fresh goes into ghee (clarified butter), which is usually consumed by the farm family but in some areas is sold to traders in small amounts. Part of the milk output is used to make a cheese-like product, mainly for home use. Adult Ethiopians generally do not drink milk.

Dairying takes place, on a small scale only, in the vicinities of Addis Ababa and Asmara. Production of pasteurized milk reached 3,200 metric tons in 1963/64, and has apparently been increasing since then. FAO and the United Nations Children's Fund have assisted in a project to collect, treat, and distribute milk in Addis Ababa.

Dairy products make up less than 1 percent of total imports, by value. Ethiopia is normally a small net exporter of ghee, but very little ghee was exported in 1966, whereas more than 2,000 metric tons of butter were imported, mainly from the Netherlands.

Hides and skins accounted for more than three-fourths of the value of livestock and livestock products exported in 1963-66. In 1966, exports were as follows: hides, 10,065 metric tons; goatskins, 4.8 million pieces; sheepskins, 3.4 million pieces. Only a small share of the hides and skins are obtained from slaughterhouses, and a large proportion are dried on the ground. The export value of these items could be increased considerably through better methods of preparation. Some improvement is being instigated by the Livestock and Meat Board. Hides and skins are used in Ethiopia for various types of bags, mats, and rugs, and are made into footwear, pack saddles, harnesses, and thongs.

Annual production of eggs averaged about 72,000 metric tons in 1962-65. Combined exports of shelled and liquid eggs generally average 500 to 1,000 tons a year. Some large eggs, called "Point Four" or "American," are used locally for hatching.

Civet, a musk-like substance obtained from the civet cat (Civettictis civetta), is used in making perfume. The animals are either bred or hunted. Civet exports are small and of virtually no significance to the Ethiopian economy, but they are of some importance in the perfume trade.

Trade Patterns

Ethiopia's exports consist almost entirely of agricultural products. During 1960-66, coffee alone accounted for 57 percent of the total value of exports; livestock products (mainly hides and skins) 14 percent; oilseeds (primarily sesame seed and linseed) 9 percent; and dry legumes 8 percent (table 7).

The United States is by far Ethiopia's leading market for agricultural products, mainly because of its heavy purchases of Ethiopian coffee. In 1966,

Table 7.--Ethiopia: Principal agricultural and total exports, 1960-66 ^{1/}[Value, c.i.f., in million Ethiopian dollars ^{2/}]

Commodity	1960	1961	1962	1963	1964	1965	1966
Coffee	104.8	93.6	107.1	110.9	158.8	188.1	155.7
Hides and skins	19.3	25.1	24.7	22.0	21.5	22.8	36.3
Other livestock products :	5.7	3.6	2.4	4.6	9.0	11.4	10.6
Oilseeds	16.7	14.7	19.6	28.3	26.6	24.8	21.8
Dry legumes	22.1	17.8	16.3	15.5	13.4	14.9	21.1
Total principal agricultural exports :	168.6	154.8	170.1	181.3	229.3	262.0	245.5
Total exports	192.6	188.6	196.2	219.5	259.2	283.0	269.2

^{1/} Trade for 1960-61, year beginning December 11 of previous years; from 1962, year beginning January 11 of years shown.

^{2/} Eth\$1.00 = US\$0.40.

Sources: (5); (4), 1965; and (8), 1966.

Table 8.--Ethiopia: Agricultural exports, by commodity and country or area of destination, 1966 ^{1/}[Value, f.o.b., in million Ethiopian dollars ^{2/}]

Commodity	United States	EEC		Near East	Other Asia	Africa	United Kingdom	Other	Total	Share of total, by commodity
		Italy	Other	^{3/}		^{3/}				Percent
Coffee	113.4	5.8	10.0	7.6	4.4	5.0	2.1	7.4	155.7	58.7
Hides and skins :	2.9	10.6	6.8	1.3	0.1	0.3	7.4	6.9	36.3	13.7
Other livestock products . . :	0	3.3	0.5	3.6	0	0.9	0	2.3	10.6	4.0
Oilseeds	2.7	2.1	1.9	5.9	5.7	1.0	1.4	1.1	21.8	8.2
Dry legumes	^{4/}	0.4	5.5	5.0	5.6	2.8	1.4	0.4	21.1	8.0
Other	1.0	2.6	4.6	6.6	0.2	1.5	0.1	3.1	19.7	7.4
Total	120.0	24.8	29.3	30.0	16.0	11.5	12.4	21.2	265.2	100.0
Percent of total, by destination . :	45.3	9.4	11.0	11.3	6.0	4.3	4.7	8.0	100.0	...

^{1/} Year beginning 11 January.

^{2/} Eth\$1.00 = US\$0.40.

^{3/} United Arab Republic included in "Near East."

^{4/} Less than Eth\$50,000.

Source: (8).

Table 9.--Ethiopia: Principal agricultural and total imports, 1960-66 1/

[Value, f.o.b., in million Ethiopian dollars 2/]

Commodity	1960	1961	1962	1963	1964	1965	1966
Grains and preparations . . .	3/	3/	2.4	2.1	3.5	6.2	12.7
Cotton, lint . . .	9.4	6.5	6.8	7.2	9.8	4.5	6.5
Sugar and preparations . . .	3/	3/	1.9	1.0	1.0	2.6	5.0
Dairy products . . .	1.5	1.5	1.8	1.6	1.9	3.7	3.6
Fruits, nuts, vegetables, and preparations . . .	3/	3/	1.9	2.1	2.0	2.3	3.0
Tea	1.7	1.5	1.7	1.7	1.9	1.6	2.6
Total principal agricultural imports	3/	3/	16.5	15.7	20.1	20.9	33.4
Total imports	219.3	235.6	257.3	276.1	307.6	375.7	404.3

1/ Trade for 1960-61, year beginning December 11 of previous years; from 1962, year beginning January 11 of years shown.

2/ Eth\$1.00 = US\$0.40.

3/ Comparable data not available.

Sources: (5); (4), 1965; and (8), 1966.

Table 10.--Ethiopia: Agricultural imports, by commodity and country or area of origin, 1966 1/

[Value, c.i.f., in million Ethiopian dollars 2/]

Commodity	EEC		Other		Eastern		Total	Share of total, by commodity
	United States	West Germany	Other	Western Europe	Asia	Europe		
Grains 3/ . . .	3.8	3.9	1.5	0.5	0.9	0.7	12.7	32.0
Cotton	5.4	0.1	0.3	0.1	0.5	0	6.5	16.4
Sugar 3/	4/	0.2	0.4	0.4	0.3	3.4	5.0	12.6
Dairy products	0.2	0.1	2.6	0.6	4/	4/	3.6	9.1
Fruits, nuts, and vegetables 3/ . . .	0.2	0.3	0.7	0.2	1.4	4/	3.0	7.6
Tea	4/	4/	4/	0.1	5/ 2.5	4/	2.6	6.5
Other	0.5	0.5	1.3	1.1	1.9	0.1	6.3	15.8
Total	10.1	5.1	6.8	3.0	7.5	4.2	39.7	100.0
Percent of total, by origin	25.4	12.8	17.1	7.6	18.9	10.6	100.0	...

1/ Year beginning January 11.

2/ Eth\$1.00 = US\$0.40.

3/ Includes preparations.

4/ Less than Eth\$50,000.

5/ Mainly Ceylon (2.4).

Source: (8).

it took 45 percent of total Ethiopian agricultural exports, by value, and 73 percent of all Ethiopian coffee exports (table 8). In the same year, one-fifth of total Ethiopian farm exports went to EEC countries (including Italy, the second largest single market); the EEC countries were important markets for livestock products, oilseeds, and dry legumes. The United Kingdom took mainly hides and skins. Near East countries are outlets for coffee, livestock and livestock products, oilseeds, and dry legumes.

Ethiopia's agricultural imports are generally small in value, compared with agricultural exports. Cotton is normally the leading import but is exceeded by grains and their preparations in some years (table 9). Sugar and dairy products are other farm imports of some significance.

In 1966, agricultural products made up less than 10 percent of Ethiopia's total imports. Grains and grain preparations were the principal agricultural import, accounting for 32 percent of the total value (table 10). Cotton accounted for another 16 percent and sugar for 13 percent. The shares of grains and sugar were considerably higher than in most of the past several years and, conversely, cotton's percentage share was lower. The larger-than-usual grain imports were partly necessitated by adverse weather conditions, while larger sugar imports were made in anticipation of a demand somewhat greater than that which actually materialized. Imports of dairy products and tea were also sizable. The United States is one of the leading suppliers of Ethiopian farm imports. In 1966, it supplied one-fourth of total farm imports, by value. It was the leading supplier of cotton and was second to West Germany for wheat and flour. West Germany (the second leading single source of imports) and other EEC countries supplied almost 30 percent of total farm imports. Dairy products came mainly from Western Europe, sugar from Eastern Europe, and tea from Ceylon.

The closing of the Suez Canal in 1967 has had some disruptive effects on Ethiopia's foreign trade but apparently has not directly caused significant drops in exports, or changes in trade patterns. Coffee exports have been rerouted around the Cape of Good Hope, through the use of coastal freighters which carry the coffee to ships calling at Mombasa, Kenya, or at Malagasy ports. Costs of shipments are higher but are being absorbed and spread among the large number of Ethiopian producers. At the end of 1967, exports of fresh vegetables for the European winter market were transported by sea to the Jordan port of Al 'Aqabah. From there, they were trucked to Beirut, Lebanon, for transshipment to their final destination.

U.S. Trade with Ethiopia

U.S. agricultural exports to Ethiopia are insignificant compared with its agricultural imports (tables 11 and 12). Most of these exports were made under various assistance programs of the U.S. Government, mainly under P.L. 480.

Cotton accounted for 54 percent, by value, of all U.S. agricultural exports to Ethiopia in 1960-67, and grains and preparations for 28 percent. Cotton exports were financed mainly under P.L. 480, Title IV (long-term supply and dollar credit sales). In December 1967, an additional \$2.4 million

Table 11.--U.S. exports to Ethiopia, 1960-67

In thousand U.S. dollars

Commodity	1960	1961	1962	1963	1964	1965	1966	1967
Cotton	2,129	1,014	1,963	1,725	626	1,447	1,805	1,043
Dairy products	138	216	331	206	87	128	85	180
Grains and preparations	43	1,384	156	493	270	613	2,531	503
Food for relief or charity	0	116	206	179	174	265	292	80
Other agricultural	59	127	121	141	160	158	284	264
Total agricultural	2,369	2,857	2,777	2,744	1,317	2,611	4,997	2,070
(Under P.L. 480 and other assistance programs)	(703)	(2,135)	(1/ 2,882)	(1,193)	(479)	(1,950)	(3,531)	(1,140)
Nonagricultural	4,962	8,030	20,456	9,277	11,150	18,390	10,621	20,564
Total exports	7,331	10,887	23,233	12,021	12,467	21,001	15,618	22,634

1/ Seeming excess over total agricultural exports may be due to lags in reporting or other reporting discrepancies.

Sources: (18) and (19).

Table 12.--U.S. imports from Ethiopia, 1960-67

In thousand U.S. dollars

Commodity	1960	1961	1962	1963	1964	1965	1966	1967
Coffee	24,669	29,453	26,577	31,953	49,442	59,747	40,666	47,535
Hides and skins	1,102	778	1,130	1,150	1,696	1,664	1,607	1,655
Beeswax, crude	286	269	317	275	338	333	424	527
Sesame seed	0	0	0	269	476	784	1,436	348
Other	160	120	188	125	281	170	270	380
Total agricultural	26,217	30,620	28,212	33,772	52,233	62,698	44,403	50,520
Nonagricultural	757	786	1,247	1,493	959	831	604	604
Total imports	26,974	31,406	29,459	35,265	53,192	63,529	45,007	51,124

Source: (18).

long-term credit was granted for the purchase of American cotton. Shipments of grain have been mainly under Title II (emergency relief and economic development).

Coffee is by far the dominant U.S. import from Ethiopia, accounting for 92 to 96 percent of total agricultural imports, by value, annually during 1960-67. Hides and skins rank second. Imports of sesame seed have become relatively important in recent years, but dropped drastically in 1967.

Trade Regulations

Licenses are required for all Ethiopian exports, farm and nonfarm alike, but not for imports except for arms and ammunition. Foreign exchange permits for payment of imports are generally granted freely; nevertheless, by withholding issuance of the foreign exchange permit the Government can control the volume and origin of imports and, on occasion, it has done so. Highly protective duties are imposed on a number of items, including meat, sugar, and wheat flour; other flour and all grains enter duty free.

The Ethiopian customs tariff, unlike that of most African countries, does not grant preferential treatment to products from any particular country. Imports or exports, or both, of certain agricultural products are subject to quality controls and sanitary certification. Imports of tobacco are a Government monopoly.

AGRICULTURAL PROSPECTS

For lack of adequate data it is difficult to define, in statistical terms, past rates of increase in farm production; nevertheless it seems that in normal years during most of the past decade, food output has more than kept pace with the increase in total population.

Increases in the area in crops and in the number of livestock have been primarily responsible for the rise in agricultural production; yields per producing unit have remained fairly stable. Production of certain cash crops has increased much more rapidly than total farm production, having about doubled in the case of coffee and nearly tripled in the case of cotton. Sugar output has risen rapidly since 1954, when commercial production began.

In the long run, Ethiopia has a good potential for greatly expanding yields per unit of land and livestock by means of widespread adoption of modern farming techniques--which is not an easy task. In addition, relatively large areas of presently unused land could be brought under cultivation.

In general, experts familiar with Ethiopia's farm resources and potential agree that the country could become a major world food exporter. This opinion, however, has been expressed periodically for several decades, and past production performance would seem to indicate that Ethiopia's agricultural potential will not be realized in the near future.

In the short run, assuming normal weather conditions, there is likely to be a high rate of growth for cotton, sugar, meat, dairy products, and possibly

oilseeds. In the case of coffee, output could easily be expanded but the oversupply of this crop on the world market is a limiting factor. It is not likely that the general level of production for grains and dry legumes will do more than keep pace with population increases for the next few years.

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