PLANNING, AGRICULTURAL POLICIES, AND POLICY IMPLEMENTATION IN THE REPUBLIC OF THE SUDAN

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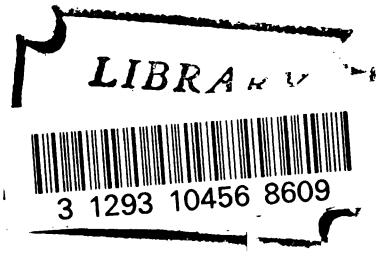

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Lawrence Witt
Major professor

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ABSTRACT

PLANNING, AGRICULTURAL POLICIES, AND
POLICY IMPLEMENTATION IN THE
REPUBLIC OF THE SUDAN

by Ahmed Abdullahi Osman

The process of economic development planning, the agricultural policies appropriate to the agricultural production targets and the instruments to implement agricultural policy are the subject of this study of the Sudan ten year plan of 1961/62-1970/71. The organization of the planning machinery, role of policy in planning, use of policy instruments to manipulate the level of investment, the process of target setting, and use of policy as a tool of implementation are emphasized.

Three hypotheses are examined namely: (1) An economic review of the plan and planning organization will identify limitations, and problems in the status, administrative location, and organization of the planning machinery, which make it very difficult to pursue a coordinated and effective program. (2) Targets for the agricultural sector have not been related to the prospective pattern of domestic and world demand. In consequence, the production policies implied by the plan do not always coincide with those implied by market

prices. (3) The performance of the agricultural sector during the first five years of the plan has been inadequate. The underlying causes of the inadequate performance are: (a) the planned targets have not been accompanied by supportive policies that create a nexus of incentives for producers that lead them towards fulfilling the planned targets. Thus, the implementation of the plan has been inadequate for several parts of the agricultural sector. (b) The implementation of the plan for the agricultural sector has given little attention to traditional agricultural, even though about seventy per cent of the gross domestic product originating in the agricultural sector is so derived. (c) This neglect of traditional agriculture underlies a substantial part of the lack of achievement of plan targets for the agricultural sector.

Review and analysis of the planning organization with reference to location, status, and operation established the first hypothesis. Demand projection based on FAO data demonstrate the underestimation of domestic demand, primarily because of failure to take into consideration both intermediate and foreign demand. This shortcoming had adverse effects on the balance of payments compared with the plan.

The record of agricultural performance in the first five years of the plan was more satisfactory for acreage than for yield, so that the record on total output was not

satisfactory. The record of crop area for pea-nuts has shown spectacular results in response to high export prices. The performance was least satisfactory for traditional agriculture, due partly to its low share of the total investment programme and partly due to inappropriate policies.

The extent of coordination and conflict among policies affecting agriculture was reviewed for infrastructure for growth, research, extension, education, taxation policy, price policy, marketing, land tenure and farm credit. They were examined particularly as they affected incentives for acreage expansion and the intensification of production.

This review makes it evident that several additional functions need to be performed, including perspective planning, better preparation of projects, an increase in the number and quality of trained personnel, and a broad coordination of policy and implementation among the ministries, and in case of agriculture, especially between the Ministry of Agriculture and those responsible for the plan.

Short term and long term recommendations for reorganization of the planning machinery, and to improve the process of policy formulation, coordination and implementation for the agricultural sector are made.

PLANNING, AGRICULTURAL POLICIES, AND POLICY IMPLEMENTATION IN THE REPUBLIC OF THE SUDAN

By

Ahmed Abdullahi Osman

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GLOSSARY OF TERMS

Feddan = 1.038 acres

Sudanese Pound £s = 2.83 dollars

Haffier = reserviour dug in the ground for water storage

Kantar of Cotton lint = 100 pounds of lint

Large Kantar of Seed Cotton = 315 pounds of unginned cotton; when ginned it produces a 100 pounds of lint and 215 pounds of seed. This measurement refers to long staple cotton.

Small Kantar = 100 pounds of unginned short staple cotton; equals 33 pounds of lint and 67 pounds of seed.

Ton = 2225 pounds

Gash is a seasonal river in eastern part of Sudan

CHAPTER I

INTRODUCTION

The Purpose of the Study

The present ten year plan for the Sudan 1961/62-1970/71 represents the first effort at comprehensive development planning. This thesis examines the present organization of the planning organization, the role of policy in planning, the use of policy instruments, plan strategy and target setting. The agricultural sector at the present stage of development of the Sudan, and for decades to come, has a key role to play. The strategy of the plan for development of agriculture, therefore, is analyzed in detail. The implementation of policy in relation to both commercial and traditional agriculture is crucial in making the plan work. The main purpose is to provide guidelines for future policy decisions on improvements, modification, and reforms in agricultural policy and its implementation, with the object of making a contribution to the future development of the Sudan.

Hypotheses to be Tested

The economic analysis and review of the ten year plan for the Sudan (1961/62-1970/71) will focus on the following

hypotheses: (1) An economic review of the plan and the planning process will identify limitations and problems in the status, administrative location, and organization of the planning machinery, and these considerations make it very difficult to pursue a coordinated and effective program. If verified, suggestions will be made on possible administrative changes. (2) The targets for the agricultural sector during the first five years of the plan have not been realistically related to prospective patterns of domestic demand and world trade. In consequence, the production policies implied by the plan do not always coincide with those implied by market prices. (3) The performance of the agricultural sector during the first five years of the plan has been inadequate, and the underlying causes for this inadequate performance are: (a) The planned targets have not been accompanied by supportive policies creating a consistent nexus of incentives for producers which lead them towards fulfilling the planned targets. Thus, implementation of the plan has been inadequate for several parts of the agricultural sector. (b) The implementation of the plan for the agricultural sector has given little attention to traditional agriculture, even though about seventy per cent of gross domestic product originating in agriculture is so derived. (c) The neglect of traditional agriculture underlies a substantial part of the low level of achievement of the plan targets for the agricultural sector. If verified, suggestions will be made on possible improved administrative and policy procedures.

Procedure and Format

Chapter I (this chapter) deals with the purpose of the study and hypotheses to be tested. Chapter II reviews the major features of economy of the Sudan. Chapter III deals with the present organization of the planning machinery, short-comings of the present system and explores the possible reforms that can be made to improve its effectiveness. The first hypothesis listed above will be reviewed. Chapter IV deals with the need and arguments for planning in less developed areas, role of policy in planning, instruments of policy, their use to manipulate the level of investment, and overall strategy. Chapter V deals with the criteria for the plan assessment and evaluation.

Chapter VI examines the present procedure for the formulation of targets, and how the demand projections for domestic consumption, intermediate demand, and world demand for export should provide guidelines for orientation of production policy. The second hypothesis comes into focus. In Chapter VII the plan strategy for the agricultural sector is reviewed. Chapter VIII and IX test the third hypothesis on the unsatisfactory performance of the agricultural sector in relation to commercial and traditional agriculture. They review the inadequate implementation policies in detail and analyze their repercussions on expansion of acreage and intensification. Chapter X provides both short term and long term recommendations for adoption of more appropriate policies.

CHAPTER II

FEATURES OF THE ECONOMY OF THE REPUBLIC OF THE SUDAN

Geographical Features

Location and Topography

The Republic of the Sudan has an area of one million square miles (approximately 2.5 million square kilometers), and is the largest country in Africa. It is equal to the area of the United States east of the Mississippi River. The country is bordered on the north by Egypt and Libya; on the east by the Red Sea, Eritrea, and Ethopia; on the west by Chad and Central African Republic; and on the south by Kenya, Uganda and the Congo. The main source of irrigation water is the Nile and its tributaries. The terrian is generally flat with a gentle slope downwards from south to north. This terrain has facilitated the irrigation of large areas, including the Gezira Scheme, by gravity flow. However, there are a few isolated mountainous outcrops such as the Nuba Mountains and Jebel Marra in the west and the Imatong in the south and scattered hills in the Red Sea area. The Sudan has a sizable outlet on the Red Sea; Port Sudan, the main port, located here handles most of the foreign trade of the Sudan.

The Climate

The climate is dry and arid, with temperatures fluctuating widely between mid-day and midnight, especially in the areas bordering the desert. Temperatures varying between 85° F and 115° F are typical in the Central Sudan. The areas of high altitudes, such as Erkawit, Jebel Marra, and Nagishot, are cold and suitable for development as summer resorts.

The rainfall in the area north of Khartoum is low, varying between zero and ten inches; it is not enough to support rainfed crop production. The central rainland belt stretches from the 15 inch rainfall line that crosses through Sennar-Kosti-El Obied-Genina and extends to the south to the 35 inch rainfall line. This zone represents a massive heavy clay belt with Savannah grass type of vegetation. The area is suitable for raising one crop annually and is considered to be the granary of the Sudan. However, water shortage in the dry season, labor shortage and relative high costs of labor, and poor transportation are some of the factors which, reportedly, hamper further development. Possibilities for mechanization of farming on a large commercial scale are suggested by agricultural technicians as a procedure for the development of such areas. Already, about one million feddans have been developed as commercial mechanized farms in this area. To the south of this area, the rainfall ranges between 35 and 60 inches and can support two annual crops. Problems in this heavy rainfall zone include the control of heavy weeds, drainage, and soil erosion.

Natural Resources

The natural resources of the country are mainly agricultural; land is plentiful. It is reckoned that about 105 million feddans are suitable for crop production, for use as pasture land, and for grazing. The areas suitable for forests are estimated to be double this figure. Of the total area of the country, one-third is desert. These figures are provisional, since only a small fraction of the country is soil surveyed. The soils along the Nile and its tributaries are heavy clay soils, while the soils of the south are lateritic soils and the least fertile in the country.

Little has been done in exploring for minerals. Deposits of iron and copper have been discovered in the western Sudan. The high cost of transport to Port Sudan is one of the limiting factors for their commercial utilization. Concessions have been given to foreign firms to explore the possibilities of oil in the Red Sea area and northern Sudan.

Population

The total population of the Sudan, according to the 1955-56 population census, was 10.26 million. The rate of population increase is 2.8 per cent annum, one of the high rates in Africa. The population at this rate of growth projects to about 14.1 million people for 1967, and is expected to double by the end of this century. The density of the population is about five per square kilometer compared with the average for Africa of about eight per square kilometer.

The population is not evenly distributed, with a relatively heavy concentration in the Northern, Khartoum, and Blue Nile provinces where the density is three times the average for the country. The greater proportion of the population tends to be young; this calls for increasing expenditures for education and health services and for investment in housing and other services in the coming decades. The problems of high population pressure on the land, with consequent high rents and land values, that plague many of the less developed countries, do not exist in the Sudan.

The General Chacteristics of the Sudan Economy

The Republic of the Sudan gained independence in 1956. It is ruled through a parliamentary system, with executive functions vested in the prime minister and cabinet. The functions of the head of the state are entrusted to a council of five elected by Parliament. The final Constitution is being drafted at present. The economy of the Sudan has most of the characteristics of the less developed countries. These include low per capita income, at present about £33 (about U. S. $93). The level of education is low; about 80 per cent of the population are illiterate. Health standards are also low, life expectancy being 40 years with a high infant mortality; about 15 per cent die in their first year.

The modern sector of the economy is composed of the Gezira Scheme, other government and private pump

schemes,[1] as well as the rainland mechanized crop production farms. It also includes modern transportation, industry, and commerce. The essential feature of this sector is the use of modern technology and its full integration into the market economy for the purchase of factors and sale of products. The traditional sector is composed mostly of types of farming using older methods, such as, the use of water wheels for irrigation, rainland shifting cultivation, and nomadic livestock production. Its interaction with the market economy is limited and mainly to dispose of surplus products. There is limited access to and use of modern technology. The modern sector of the whole economy contributes about 45 per cent of gross domestic product, while the traditional sector contributes the remaining 55 per cent, as of 1961/62.

Influenced mainly by the modern commercial sector, and with relatively few industries, the marginal propensity to import is high; the country engages heavily in international trade. Private saving and capital formation are low, with much private savings channelled into real estate, buildings, and import/export trade.

The economy is heavily dependent on agriculture; the combined modern and traditional sectors provide employment for 86 per cent of the population, while industry and mining

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[1]A pump scheme is a licensed irrigation project that is based on the use of mechanical pumps to draw water from the Nile or its tributaries. The size of such projects range from a few feddans to 30,000 feddans.

provide employment for one-half of one per cent, with 13.5 per cent employed in the tertiary industries. Agriculture is the source of 59 per cent of the gross domestic product, with another 2 per cent derived from industry, and 39 per cent from the tertiary industries sector. The traditional sector contribution is declining in importance, percentage-wise, while in absolute value its total output is increasing. This can be explained by the abundance of natural resources and the increasing population, such that everyone is assured part time or full time employment in the traditional agricultural production sector.

During the period 1955/56 to 1960/61, the modern sector grew at the rate of 6.5 per cent, while the traditional sector grew at the rate of 3 per cent. The overall gross rate of growth for the economy was 4.7 per cent. The rate of population growth is 2.8 percent; hence per capita income grew during this same period by about 1.9 per cent.

Agricultural Products and Trends

The total area under crop production is about 8.26 million feddans, including both irrigation and rain based agriculture. Development of additional land by irrigation in the decade or so before 1960, was limited by the Sudan's exhaustion of its share of the Nile water according to the 1929 Nile water agreement between the Sudan and Egypt. The 1959 Agreement has more than quadrupled the Sudan's share of the Nile water and enabled an expansion of irrigation agriculture.

Table 2-1. The Gross Domestic Product of the Sudan
(Per Capita in Sudanese Pounds)

GDP	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64	64-65	65-66	66-67
(1) Traditional	160.3	164.4	170.0	174.2	180.9	186.2	191.2	197.5	206.3	213.1	220.1	227.4
(2) Modern	123.9	148.2	137.9	144.3	165.2	167.6	204.3	205.1	200.7	213.6	227.3	241.9
Total	284.2	312.6	307.9	318.5	346.1	353.8	395.5	402.6	407.0	426.7	447.4	469.3
Population (in millions)	10.4	10.7	11.0	11.3	11.6	11.9	12.3	12.6	13.0	13.3	13.7	14.1
Per Capita Income in £	27.4	29.3	28.1	28.3	29.9	29.7	32.3	32.0	31.4	32.0	32.5	33.2

(1) Data for 1955-56 to 1962-63 are actual estimates, Department of Statistics.

(2) Data for 1962-63 to 1966-67 are based on Economic Planning Secretariat projections.

Source: International Bank for Reconstruction and Development, "The Ten Year Plan of Economics and Social Development of the Sudan" (1961/62-1970/71) Report No. AF-14a, 1962, page 13.

Table 2-2. Area Under Crop Production in the Sudan as of 1962

	Feddans
A. Irrigated Land[1]	
(1) Irrigated Gezira and Managil Extension	= 1,860,000
(2) Irrigated by Pumps	= 1,200,000
(3) Basin and Flush Irrigation	= 200,000
B. Rainland Cultivation[2]	
(1) Mechanized Farming Schemes	= 1,000,000
(2) Other Cultivation (Shifting)	= 4,000,000
Total	= 8,260,000

Source: [1]Ministry of Irrigation and H.E.P.
[2]Department of Agriculture--Sudan.

Cotton is the main cash crop for export; in the average year about one million bales of long staple cotton, and fifty thousand bales of short staple American-type cotton are exported. Cotton constitutes 60 per cent of the Sudan's foreign exchange earnings. This heavy dependence on one crop renders the economy highly vulnerable to international market disburbances, resulting in similar fluctuations in foreign exchange earnings, especially in years of synchronization between low yield and low prices and vice versa. Agricultural policy at present emphasizes the diversification of the economy by reducing the dependence on cotton through an expansion in the production of castor, coffee, horticultural products and the improvement of the livestock industry. Import substitution is

part of the policy to save foreign exchange, to finance investment goods, and to create employment; self-sufficiency in sugar, coffee, and rice is also planned. Experimental work has progressed well for Kenaf development as a fiber to replace the country's import of two million Sudanese pounds worth of sacks and baling material.

Oil seeds production, after World War II, mainly groundnuts (peanuts), sesame, and cotton seed, has expanded by leaps and bounds and has shown a steeply rising trend. This has been stimulated by the increasing demand for oil seeds, high and stable world prices, and the absence of world carryover of stocks. The oil seeds crops of the Sudan mature earlier than the West African crop; with priority in shipping exporters catch the market earlier. The European demand is mainly for seed, and hence, the oil crushing industry is limited to satisfying the local market. Dura (sorghum) is also becoming important as an export crop to the Middle East as food and to Europe as a feed grain. Gum-Arabic is the most important forestry product, and Sudan exports 85 per cent of the world supply; this product and sesame represent the main exports of the Sudan to the United States.

Livestock is also important in the Sudan. Efforts in the past were mainly concentrated on disease control, which led to a rapid increase in livestock numbers, creating pressure on pasture around water points. The modernization of the livestock industry has its technical, social and economic dimensions. The possible suggestions for livestock

improvement, include opening up of new land for pasture, pasture improvement, increasing water supply, improvement of livestock by breeding and selection, change in outlook on livestock as source of wealth, improving standards of management and placing emphasis on performance and quality rather than quantity. Industrialization of livestock products and the exploration of foreign market opportunities are both important and essential for an expanded industry. Too, procedures for the settlement of nomads is essential for any improvement of livestock production standards, as settlement is essential for developing of the pastures and for raising the levels of education and health, etc.

An essential feature of the agricultural sector in the Sudan is its fractionation, that is, the large number of agencies involved in the formulation of some aspects of the agricultural policy. In addition to the Ministry of Agriculture and Forestry, agricultural policy is implemented by agencies such as the Ministry of Animal Resources, Gezira Board under the Minister of Finance and Economics, sugar plantations and factories under the Minister of Commerce, Industry and Supply. This dispersed organizational responsibility is both a source of strength and a source of weakness. It is a source of strength in that the size of units are small and hence make the task of management and operation easier. It is a source of weakness because it is difficult to coordinate a national agricultural policy. The process of planning for the agricultural sector becomes more difficult as each of

these agencies submits separately its own proposals for development. The task of coordination and the burden on the central planning agency is increased. Under such a system, activities on the periphery of more than one department either suffer or become a source of dispute as to responsibility, and as to the appropriate means of implementation. Chapters VII and VIII will be devoted to the problems of the agricultural sector.

The Public and Private Sectors

The public sector in the Sudan is large and nearly dominates the modern sector of the economy. This is a relic of the past, as the private sector fifty years ago lacked the initiative, financial ability, and knowledge to generate any momentum. Development, therefore, had to be started and demonstrated in the public sector. Two public corporations are the largest influences--the Sudan Railways and the Sudan Gezira Board. The Sudan Railways has an internal monopoly of railroads and steamers and operates hotels and catering services, has the largest budget among the Government units, and is the largest employer of labor. The Sudan Railways labor union is the largest and dominates the central labor federation and follows an aggressive wage policy. The Sudan Gezira Board is the largest agricultural project in the world, often advocated as an example of an organization that can give the small farmer the economies of scale on both the product and factor markets. The total area of the project is about two

million feddans. The project is administered by a semi-autonomous board with its own charter enacted by a special act, the main purpose being to free it from the routine of government red tape, enabling it to operate as a commercial business. Similar boards, set up on the same lines, include the White Nile Schemes, Gash Board, Equatoria projects, Nuba Mountains Cotton Industry, Government Estates of the Northern Province. All these are mainly agricultural projects.

New and similar government institutions include the Sugar plantations and factories, hide and tanning industries, carton board industry, and fruit canning factories. These corporations function through one board, under the Minister of Commerce, Industry and Supply.

Private enterprise is mainly concentrating its activities in domestic and export trade and investment in real estate. After World War II, the high prices of cotton, especially during the time of the Korean War, led to investment in cotton production and the establishment of private ginneries. The mechanized crop production scheme of one million feddans are entirely developed by private enterprise; the government role is limited to the leasing of land and provision of roads, water supply, research, and advisory service.

The textile industry is the largest investment by private enterprise as part of the ten year plan for development 1961/62-1970/71. This includes two factories: the

Sudanese American Textile Mills with a capacity of 60,000 bales, with the capital contributed by local private enterprise and American investors; the second factory belongs to the Khartoum Spinning and Weaving Company with a capacity of 20,000 bales. It was established by Sudanese private enterprise, aided by a foreign loan from International Development Association.

Other industries operated by private enterprise include, cement, shoes, beer, cigarettes, crushing of oil, and soap, etc.

At the dawn of independence, the foreign concession act was revised; foreign capital was encouraged to participate with Sudanese capital and ensured remittance of capital and profits abroad. However, ownership of land by foreigners is not allowed under the land laws, but long term leases can be granted.

Foreign Trade

The dependence of the Sudanese economy on foreign trade is great, about 70 per cent of the revenue to the government budget is derived from import and export duties. About half of modern investment goods, one-fifth of the consumption goods, and one-twelfth of the raw materials are imported.

The marginal propensity to import is high; the rise in incomes and rapid increase in population lead to increases in imports for consumption, at the expense of using foreign exchange to import capital goods for development. Measures to

restrict imports tend to reduce the revenue to the government and hence saving and investment in the public sector. This dilemma is aggravated by the wide fluctuations in the level of cotton output and prices. The long term answer to this policy dilemma, at the national level, seems to be to expand exports and to expand import substitutes. Other suggested answers to the problem include the expansion of industries for light consumption goods so as to save foreign exchange for investment goods, and a reduction in dependence on export and import duties by reform of taxation.

The export trade figures in Table 2-3 reflect a slow decline in the dependence on cotton, mainly from expansion in exports of other crops, since cotton acreage and value of exports has increased. Oil seeds occupied an important place in expanding exports from 10 per cent in 1950 to about 22 per cent of foreign earnings. Dura (sorghum) is also becoming important for export as animal feed to Europe with fluctuations year to year, depending on the success of the rainy season, especially for the mechanized crop production lands.

Table 2-4 shows the rapid increase in the value of imports in the last decade to almost double their 1950/54 level. This rising trend in imports was accompanied by a change in the composition of imports. Consumption goods as a component of imports showed a relative decline, and this was offset by a proportionately larger increase in foreign exchange spendings on capital investment goods.

Table 2-3. Exports of the Sudan for Selected Years, 1950 to 1963, by Product Group (In Million Pounds and Per Cent)

Product	1950		1955		1959		1963	
	Value	Percentage	Value	Percentage	Value	Percentage	Value	Percentage
Cotton	22.9	71.3	30.4	59.2	40.1	62.4	45.5	57.8
Gum Arabic	2.7	8.4	4.8	9.4	5.9	9.2	5.7	7.2
Oil Seeds and Cakes	3.3	10.3	9.3	18.1	13.2	20.5	17.4	22.1
Cattle and Hides	1.6	5.0	1.9	3.7	2.2	3.4	2.3	2.9
Other Agriculture	1.6	5.0	4.9	9.6	2.9	4.5	7.8	10.0
Total	32.1		51.3		64.3		78.7	
Total		100.0		100.0		100.0		100.0

Source: Department of Statictice--Sudan Government Foreign Trade Statistics.

Table 2-4. Imports of the Republic of Sudan, by Groups (Millions of Pounds and Per Cent)

Products	Average 1950/54		Average 1955/59		Average 1960/63	
	£s	Per Cent	£s	Per Cent	£s	Per Cent
Consumer Goods	29.0	63.0	32.7	56.9	39.2	47.3
Raw Materials	8.5	18.5	11.0	19.7	17.6	21.2
Investment Goods	8.5	18.5	13.0	22.4	26.1	31.5
Total	46.0	100.0	56.7	100.0	82.9	100.0

Source: Department of Statistics, Sudan Government.

CHAPTER III

STRUCTURE AND PROBLEMS OF THE PLANNING MACHINERY

Historical Perspective

Prior to World War II, the Sudan had no machinery as such for development planning; capital expenditures were sanctioned as part of the current annual budget. In 1946, the development priorities committee was set up as a response, partly to the increasing awareness of the need for development, and partly to political pressure at the time. The committee was composed of the Financial Secretary as chairman with the Civil Secretary, the Director, Department of Economics and Trade, and the Manager, Sudan Railways as members. The committee decided an outline for what was referred to as the first five year plan of 1946/47-1950/51.

In 1949, this committee was superseded by the "Capital Expenditure Standing Committee" with the same composition as the former except that the Manager of the Sudan Railways was replaced by the Minister of Agriculture. The terms of reference of the committee were then "to consider all proposals for capital expenditure other than those of Sudan railways, local government, and commercial boards and to recommend which of such proposals should be included in the capital expenditure program." In essence, the terms of reference of the

Capital Expenditure Standing Committee were even more limited than those of its predecessor, as it did not include the statutory boards, including the Sudan Gezira Board or the Sudan Railways. These are the largest corporations in the country with the greatest impact on the economy.

In 1951, the Member Without Portfolio of the Governor General Executive Council was added to what came to be known as the Development Committee. The terms of reference were broadened to cover all the public sector and for the first time, a separate development office was set up in the Ministry of Finance and Economics; this new office issued the 1951/52 development budget as the first installment of the 1955/56 development plan.

In 1954, the first national government reconsidered the composition of the committee and surprisingly made no change in its terms of reference. It also made no change in the status, functions and powers delegated to the development office located in the Ministry of Finance. The only change was the replacement of the British dominated membership with Sudanese ministers. The Minister of Finance and Economics became chairman with the Ministers of Agriculture, Irrigation and Hydroelectric Power, Public Works, Education, Health, Commerce, Industry and Supply, Communications and Interior as Members. Proposals by the new committee had to be sanctioned by the Council of Ministers and the Parliament before becoming effective.

Despite many changes in composition, terms of reference and membership of the committees, the budgetary approach based on individual projects was pursued. This approach lacked the sophistication of macroeconomic analysis, projection of rates of growth, and formulation of objectives and long term policy guides for the economy. What the different committees produced were more or less capital expenditure budgets limited to the public sector and sometimes only part of it. This cannot be considered as plans in the comprehensive meaning of today. In the fifties, the financing of projects from public saving and the lack of dependence on foreign borrowing and foreign aid did not press on those concerned the use of a more sophisticated approach.

In this period, it is clear that coordination did not pass much beyond the standard budgeting procedures of the national government. In fact, the actions of government itself (see below) verify the first hypothesis for the period before 1958.

The Present Organization

Dissatisfaction with the previous rates of growth and development, and the need for foreign borrowing to push development at a quicker pace prompted the government to reconsider the organization of the planning machinery. The resulting reorganization led to the creation of the Economic Council, Ministerial Development Committee, The National

Technical Planning Committee, and the Economic Planning Secretariat--the latter located in the Ministry of Finance and Economics. A Council of Ministers resolution was passed stipulating the composition and terms of reference, of each of the aforementioned committees and secretariat.

Economic Council

This council is headed by the Prime Minister with the Ministers of Information and Labor, Cabinet Affairs, Commerce, Industry and Supply, Foreign Affairs, and Finance and Economics. The terms of reference of this council include the formulation of government policy, endorsement of the development plan and its annual phases before submission to the Council of Ministers and Parliament.

The Ministerial Development Committee

This committee consists of the Minister of Finance and Economics as Chairman and the Ministers of Public Works and Mineral Resources, Interior, Local Government, Education, Health, Agriculture, Animal Resources, and Irrigation and Hydroelectric Power. Its terms of reference are to consider the proposals submitted to it by the National Technical Planning Committee and to submit to the Economic Council its views on such proposals and any recommendations for amendments, etc. In addition, it also considers progress reports submitted to it by the National Technical Planning Committee and considers measures that may be needed to overcome any

bottlenecks and any modifications that may need to be introduced in the plan at the review stages.

The National Technical Planning Committee (NTPC)

This committee is headed by the Governor of the Bank of Sudan; the membership includes the under secretaries for the same ministries as the Ministerial Development Committee, plus Commerce, Industry and Supply, and Labor. In addition, it also includes the Managing Directors of the Agricultural Bank, Industrial Bank, Gezira Board, Sudan Railways and Vice-Chancellor of the University of Khartoum. It also includes five qualified citizens to be appointed by the Council of Ministers to represent the private sector. The functions entrusted to the National Technical Planning Committee include the survey of natural and human resources of the country, the possibilities of augmenting such resources according to the requirements of the development plan, to prepare a draft plan allocated by years, and to indicate the conditions necessary for successful implementation of the proposed plan. The committee should also review progress in execution from time to time and should evaluate the results. This should be carried out within the framework of government policy. The committee was given power to set up subcommittees--a power not practiced by the committee.

Economic Planning Secretariat

The Economic Planning Secretariat functions under the Minister of Finance and Economics. It is responsible for

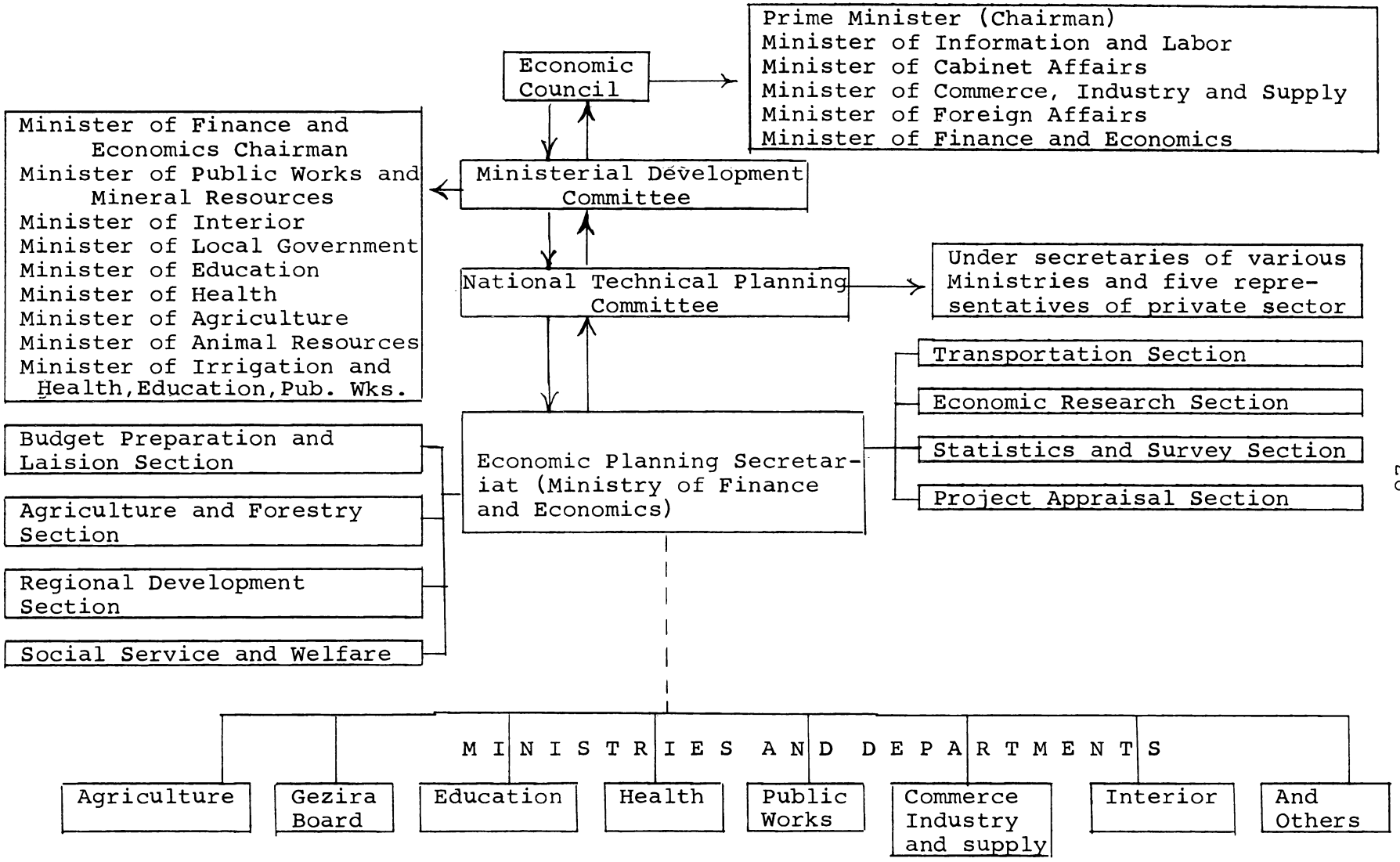
calling upon departments to submit their proposals, to study such proposals, to undertake needed additional macro studies, and to submit proposals to the National Technical Planning Committee, the Ministerial Development Committee, and the Economic Council. In addition, once a plan is sanctioned, it has the function of authorization of funds to the departments and control of expenditure, follow-up and reporting on progress and the evaluation of results on completion. It is also entrusted with the negotiation and conclusion of foreign aids and loans. The Economic Planning Secretariat also undertakes the secretarial work for all the planning committees. The quality of the work of all planning agencies depends on the ability to solicit the cooperation of ministries, the flexibility and quality of the staff in regard to training, experience, knowledge of the conditions of the country, and the ability to solicit the help of foreign experts and consultants. Chart I provides a generalized organization chart. We now turn to the effectiveness of this new organization.

Problems Related to the Organization of the Planning Machinery

Location

The present location of the Planning Secretariat within the Ministry of Finance and Economics has a number of drawbacks that have adverse repercussions on the efficiency of its operations. The Minister of Finance and Economics usually is not the minister with the highest seniority; nor does the

CHART I. Present Organization of the Planning Machinery of the Sudan



office have either the power or the prestige and influence of the Prime Minister on which the Planning Secretariat could capitalize, if located under the latter. The Secretariat has limitations in assuming sufficient power to enable it to formulate, coordinate, and implement policy, to follow up on implementation and to pinpoint responsibility. The location of the Planning Secretariat within the Ministry of Finance and Economics led to the creation of two posts of undersecretaries, one in charge of planning and the other for finance. An unhealthy rivalry may often lead to the shattering of the desired cooperation. Dr. Albert Waterston, noted this to be the case in the Sudan--

> Furthermore, as experience in Morocco, Nepal, and Sudan and other countries shows, it does not follow that there will always be better coordination between plan and budget if a planning agency is located in the Ministry of Finance. In Nepal, and the Sudan, the permanent undersecretaries in charge of the planning part of the Ministry of Finance were often at loggerheads with the permanent undersecretaries in charge of finance.[1]

Status

The experience of other countries in locating the Planning Agency in the Prime Minister's office seems to give the agency a super Ministry status, which enables it to be in a better position to coordinate policy, as such functions in fact are vested in the head of the executive branch of the government. Recent experience in the Sudan has been

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[1]Albert Waterston, Development Planning: the Lessons of Experience (Baltimore, Maryland: Johns Hopkins Press, 1965), p. 485.

with one post of undersecretary for the Ministry of Finance but with one deputy in charge of planning and the other in charge of finance. The deputy for planning finds himself dealing with Head of Ministries and departments of a higher status than his own, and this puts limits to what he can press upon them. An effective Planning Secretariat, therefore, must acquire a super status in relation to the other ministries to enable it to coordinate policy; this has been demonstrated by the experiences of a large number of countries that found it imperative to give their planning agencies such a status by location under the Prime Minister's office. Such countries include Pakistan, Japan, Ceylon, Poland, Ecuador, Venezuela, Mexico, Iran, Morocco, Sierra Leone, Singapore, Burma, Ethiopia, and Ghana. In case the Prime Minister cannot devote enough time to planning, a job of Deputy Prime Minister may be created for the purpose; this is the experience of Iran, Egypt, Turkey, Malaya, and Bolivia. In essence, the planning agency needs to acquire more status by entrusting it to a Minister of a super status over that of his colleagues. The same should be true at the civil service level and this, so far, has not occurred in the Sudan. Planning has not acquired such status in the Sudan, neither in the political system or in the administrative machinery, and this has put limits on its ability to formulate and coordinate policy.

Internal Organization of the Planning Agency

A planning agency would be most effective if by its internal organization it can ensure efficient operation of the agency and coordination of the activities of other ministries and units involved in the process of planning. This can be achieved if the agency is organized around a hard core of functional tasks and areas of specialization that can relate themselves to each other easily and efficiently. The present organization of the Planning Secretariat provides for the following sections; economic and financial resources, research, project appraisal, social services and welfare, budget preparation, regional development, agriculture, irrigation, and hydroelectric power, transportation, external aid, and general clerical and information. This type of organization reflects the project by project approach and is not suited for overall comprehensive planning based on a macro-analysis approval. It also creates a large number of fractionated sections that find it difficult to relate to each other and renders the process of internal coordination a difficult task.

The main weakness of the present organization in the Sudan is the lack of a strong planning section. The essential manifestation of this weakness is the lack of a perspective plan section entrusted with long term planning extending over a period of 20 to 25 years, based on projections of population, income, survey of natural resources, transport

network, and study of feasibility of projects. The lack of perspective planning puts the Planning Secretariat and the Ministries in the embarrassing situation of being called upon to produce a plan in a very short time. This is neither possible nor in the interest of the country. The hasty preparation of projects with little time for study and scrutiny fails to give consideration to the long term needs of the economy, nor does it ensure that the right order of priority is established. This may prove to be a costly process for the country in the long run. The present ten year plan could have been improved had it not been produced in a short time.

A planning unit should not attempt to do everything and must leave considerable scope to the planning units located within the Ministries and departments. A successful planning organization must include the creation of viable planning units in the important ministries. These units in most cases, tend to be more aware of their problems and tend to gain vast knowledge in their fields and represent a type of expertise that the planning agency would be well advised to draw upon.

Experience, in the Sudan as elsewhere, has shown that the membership of the planning committee tends to be dominated by Ministers and heads of departments. These are usually overburdened by other responsibilities, and usually have little time to devote to the intricate details at the

plan preparation and coordination stages. The operation through subcommittees attached to the National Technical Planning Committee will improve greatly the efficiency of the system and enable depth scrutiny of the proposal and coordination. Operation through subcommittees manned by the second line of civil servants will provide more time and effort for the study of the Secretariat proposals. These second line officials must keep in touch with their Ministers and heads of departments to be well informed on the progress of these committees and to keep in contact with progress at an early stage.

The above discussion suggests that coordination has improved, primarily as a consequence of the additional effort and personnel; still, a number of problems have been identified which are a function of either the administrative location and prestige of the planning activity or the partial effort of the Planning Secretariat in relation to the task.

Administrative Problems

When a country shifts from planning without a plan to planning with a plan, at least two changes are likely to take place. The first is the broadening of the concern of the central government with the level of performance of the economy, imposed partially by the planning process, but mainly because the political environment which pressed for economic planning now presses for results from planning. The second

change, the topic of this section, is the pressure for increased coordination among the agencies of the government, as budgets and programs affecting development are reviewed by a central or interagency committee concerned with planning.

A number of administrative decisions become essential if the system is to operate efficiently and smoothly. Decisions need to be taken on a number of issues, some operational and others clearly on policy. Operationally, these include the plan duration, system of classification of government accounts and coordination between the current and annual development plan, and more policy oriented issues include the allocation of resources, the determination of appropriate policy instruments and priorities. These issues tend to affect the plan strategy and tend to be affected by it.

The first administrative problem relates to the choice of the duration of the plan which should cover a period of time to enable completion of the key projects in the plan. The plan duration should not be stretched unduly in order to include a large number of projects to satisfy political pressure of the electorate. Plans covering long term periods, especially in a country like the Sudan where statistical data are lacking and where the economy is susceptible to internal and external disturbances associated with yields and prices of raw materials, especially cotton, may prove to be unrealistic for later years due to difficulty of making long term forecasts. A five to six year plan is considered to be the

most practical one, such that a series of three to four plans can be viewed as continuous links in a perspective plan. France, India, and Pakistan have limited themselves to a series of five year plans while Nigeria, Ghana, and Tanganyika have settled on six year plans. The longer the duration of the plan, the greater will be the need for revisions and reviews.

In the Sudan, the system of classification of government accounts is done by categories, such as personnel, transport, supplies and equipment, intermediate and secondary education. Hence the traditional budget in its present form does not lend itself to analysis in terms of costs and benefits and assessment in terms of its impact on development. Reform in this direction is urgently needed.

Apart from improving the budgeting system, there is considerable interdependence between the current budget and the annual plan, since decisions on which of the items should be included in each. Many cases are marginal, which with equal logic could be included in either the annual current budget or the annual phase of a plan. This would not be an issue if each ministry were fully committed to development and made all expenditure against a criteria of development. Even when some agency is not wholeheartedly pressing for development, it makes no difference whether a given development expenditure is in the current budget or in the development budget, if it is spent for this same purpose in the same

way regardless of the budget in which it resides. Decisions on changes in taxation affect the revenue of the current budget, while at the same time, have repercussions on consumption, saving in the public and private sectors, price structure and investment. Close coordination and cooperation is, therefore, essential at the stage of preparation of the annual budget and annual plan. Experience in the Sudan has not shown this so far. For example, the plan envisages that the current budget expenditure will not grow by more than 5 per cent per annum, yet this was exceeded from the first year of the plan, affecting adversely the level of saving in the public sector. Creation of new posts in government service has to go through the red tape procedures of the Central Establishment of the Current Budget; yet in many cases, projects are approved without creation of the necessary staff posts and authorization of current expenditure. Ministries and departments face many problems stemming from this lack of coordination which has affected adversely the implementation of projects.

The problem of resource allocation is also an important matter of concern; the desired level of output and the capital output ratio are used to determine the level of investment sector-wise. This method has the great drawback of heavy dependence upon the capital/output ratio which assumes that capital is the only crucial factor. Modern Schultzian and Schunpeterian theories assume that human

capital, technology and entrepreneurship are more important. The capital/output ratio is a weighted average for the whole economy while the marginal ratio is the more relevant. In addition, it assumes constant returns to scale, while an economy such as the Sudan is dominated by agriculture which is characterized broadly by diminishing returns to scale. The capital/output ratio tends to be overestimated if excess capacities exist in some sectors. In a period as long as ten years, it tends to undergo change and hence might be inappropriate for later phases of the plan. The conceptualization of the planning process and implementation in the Sudan has been on a project by project approach, which gives little attention to policy formulation and to rigorous use of the policy instruments. Dr. Albert Waterston comments in this respect are relevant--

> The project by project approach has serious shortcomings. Sometimes accompanied by economic policies and measures intended to promote development, the approach is nevertheless characteristic of governments without a clearly defined development philosophy or a long term outlook. There may be references to raising living standards, extending social services, stimulating exports or substituting for imports, but no real attempt is made to relate policy to investment or to stated objectives. Indeed, economic policies and measures are frequently at variance with objectives.[1]

Summary

The above review and analysis has shown that the location, status, and internal organization of the planning

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[1]Waterston, ibid., p. 62.

machinery of the Sudan has put limits on its access to power and influence with adverse repercussions on its ability to formulate and coordinate economic development policy. The process of planning has not acquired a key importance, either politically or administratively in the Sudan. It has not been meshed into the system of government to acquire the super status and prestige that enables it to play a major role in shaping, formulating, coordinating, and implementing government policy.

A number of problems and bottlenecks stemming from the present situation have been identified and discussed; suggestions for improvements and reform will be made in Chapter IX.

CHAPTER IV

THE PLAN STRATEGY

The State Role in Development Planning

Modern governments, irrespective of their political ideology, are engaged in some type of planning and are in some way preoccupied with economic growth and development. The drive for development and growth in most nations has become a social and political issue of high priority, and achievements in terms of higher rates of growth have become a source of national pride and prestige. The extent and scope of planning differ with political ideology as to the appropriate role and functions of the state. In countries where the values of free market operation and private enterprise are strong, i.e., the economies are based on free private enterprise, the economic role of the state may be limited largely to supplementing the free market mechanism by policy prescriptions, such as anti-trust, subsidies, tariff protection, foreign exchange control and fiscal and monetary policy. In centrally planned economies, production operations and decisions are carried on by the public sector that coordinates centrally both production and distribution. In mixed economies, certain activities are nationalized in

the public sector, while others are left for private enterprise, the activities of the latter being subject to regulation by government policy.

The free enterprise, "unplanned" economies depend on the price mechanism for reflection of consumers demand, for guiding the allocation of resources and for income distribution. These functions of the price mechanism are too complex to permit simultaneous achievement of goals in all respects. According to the operation of the price mechanism, the owners of scarce resources tend to be rewarded handsomely and those who happen to own the more abundant factors tend to end with lower incomes. What the income distribution should be for a society is an ethical value judgment, but for our purpose we cannot escape this problem, since it has repercussions on the rate of saving and investment which affect the rate of growth of the economy. We are faced here with the old paradox of how to combine efficiency and equity, and added to that, how to attain high rates of saving, investment and growth. We will dwell on this later at length; let us put it aside for the time being. The centrally planned economies tend to resort to administrative controls to guide the allocation of resources, since the allocative features of the price mechanism and consumers sovereignty are being limited. The effective operation of such a system requires a large planning machinery, and a high level of efficiency, very difficult to attain. The costs of such an elaborate machinery limits their use for a less developed country. Why should economic

development planning be undertaken in a less developed area? Is it not possible and feasible to rely on the competitive equilibrium to ensure efficient resource allocation to promote growth and development?

Those who strongly advocated policies of laisser-faire and nonintervention by government, starting with Adam Smith, have recognized that there are functions that can only be carried by the state; under this category Adam Smith included defense, justice, roads and communications. This brings us into the realm of the public goods--those commodities in which all consumers share in the consumption of each unit produced and in which consumption by some members of society does not affect the utility of subsequent consumers.[1] Therefore, every consumer has the incentive not to reveal his preference in the hope that others will shoulder the costs and he will be a free rider. Examples of such goods include national defense, public security, fire control, and malaria control, etc.

Modern society draws heavily upon the results of systematic research, not important in Adam Smith's time; such research investments (especially fundamental research) appear to fall into this same category of products. Research is characterized by heavy capital investment both in human and nonhuman capital and is subject to economies of scale

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[1]A. R. Prest and R. Turvey, "Cost/Benefit Analysis, A Survey," Economic Journal (December 1965), 683-735.

and decreasing costs (MC curve below AC curve). Such an activity under competitive conditions is not self-liquidating; hence to produce it at the optimum level it must either be subsidized or be carried in institutions that are supported by the public. This is essential for optimum allocation of resources for the accumulation of knowledge and technology.

One of the prerequisites of development is the investment in human resources by education and training to provide for the replacement of those who retire, and to respond to the expanding needs of the economy. The costs of education are high in terms of direct cost and the indirect cost of the opportunity foregone by not entering the labor market early. The individual firm has no incentive to invest in education to the optimum level, due to lack of assurance of appropriating the returns from such investments. Also, imperfections in the capital market respecting investment in education tend to keep investment below the optimum level. Training on the job is hampered by the fact that costs tend to exceed the value of marginal product. Therefore, education has either to be undertaken by public supported institutions or be subsidized by the state.

According to Solow,[1] Schultz,[2] and Dennison,[3] the

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[1]R. M. Solow, "Technical Change and Aggregate Production Functions," Review of Economic and Statistics Journal, Vol. 39 (August 1957), 312-320.

[2]T. W. Schultz, "Investment in Human Capital," American Economic Review, Vol. 51 (March 1961), 1-17.

[3]E. Dennison, "The Sources of Economic Growth in the United States," pp. 67-80.

high rates of growth in the United States can only be explained by the high rates of investment in technological innovations and in human capital.

The general equilibrium theory of perfect competition, in addition to the static assumptions, assumes perfect knowledge, perfect divisibility, and lack of interdependence between producers and consumers. These are highly restrictive assumptions and do not exist under real world conditions; there exists a considerable degree of lack of knowledge, in divisibility and considerable technological and pecuniary interdependence between producers and consumers. If industry A expands its capacity, this will lower the price of its product and benefit firms utilizing this product as a factor or for consumption, depending on whether the product is an intermediate or final product. Expansion of industry A also exerts external diseconomies on industries competing with A for factors. The repercussions of the expansion of industry A will also affect industries producing products that are complements or substitutes to the products of industry A. Assessing the effect of additional investment in industry A under static competitive equilibria fail to take into consideration consumer and producer interdependence through the factor and product markets in the form of the Marshallian consumer and producer surplus that result from investment in industry A.[1]

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[1]Tibor Scitovsky, "The Two Concepts of Externalities," Journal of Political Economy (April 1954), 143-151.

Assessing the profitability of industry A, considering the above mentioned externalities that result from investment in A, implies consideration of the social marginal net product of such investment which diverges from the private marginal net product of investment in industry A, with profitability based on the competitive equilibrium. Criteria for assessing the profitability of A based on the private marginal net return may not encourage investment in industry A and may not call for the level of investment that will optimise resource use. In this case, consideration of the social marginal net return calls for planning of industry A and all interdependent industries as one industry in order to take into consideration the interdependence and external economies and diseconomies they exert on each other. In a newly developing economy with a limited market and few industries, such externalities tend to be large and significant, hence justify an investment in centralized planning of development of such industries.[1]

Contrary to the static equilibrium models, investment takes place under conditions of disequilibrium and is characterized by large indivisibilities in the supply of social overhead capital, and these tend to exert external diseconomies. Diseconomies may discourage a single investment, but planning such services for a large number of industries,

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[1]Rodan P. N. Rosenstein, "Problems of Industrialization of Eastern and South-eastern Europe," Economic Journal (June-September 1943), 202-211.

such that each exerts economies on the others, may remove barriers to such investments. In addition, investments tend to have long gestation periods, and are risky in terms of the dangers of failure of projects or quick obsolescence due to being superseded by new technology. The cost of erroneous judgment, especially in large projects, may prove to be extremely high in terms of actual cost incurred and the opportunities foregone by choosing the wrong priorities. This is especially true in less developed areas where resources are limited and where knowledge of costs and returns are likely to be uneven. Investments require knowledge of future prices and such prices tend to be affected by the level of investment. Prices in less developed areas may not reflect the true opportunity cost due to immobility of factors and rigidities on the supply side; moreover, during the process of development, the quantities and qualities of factors and products may undergo change.

The assumption of perfect knowledge is also unrealistic. A central planning agency will be required to explore the possibilities of development over the long run, as a basis for priority allocation; this requires stock-taking of the natural resources of the country; and this, in turn, entails aerial photography, geological surveys, soil survey, survey of vegetation, pasture, and forestry, exploration of minerals, oils, underground water, irrigation and drainage possibilities. Collection of information on such socio-economic factors as population, national income, foreign trade,

employment, and prices, etc., is also required. Exploration of the possibilities of new investment and communication of such information to potential investors, both local and foreign, creation of incentives and removal of bottlenecks that hamper investment, entails both the creation of necessary institutions for catering to such functions and the training of the necessary personnel to man them.

In less developed areas at an early stage of growth, private enterprise lacks much of the initiative, ability and knowledge to generate the necessary momentum that can push a country to the stage of self-sustained growth. For this reason it is argued that the public sector must assume the leading role by creating the necessary institutions of development, exploring the country's resources, mobilization of saving and borrowing abroad and encouraging foreign capital investment by guaranteeing foreign loans and providing for the servicing of foreign debt. However, simply assuming this function does not ensure that the necessary momentum will be generated. The public sector does have opportunities to absorb uncertainties, but it must also provide initiatives and ability to inaugurate and carry out the programs; this certainly requires an aggressive, imaginative public service, often more competent in certain areas than their equivalents in developed nations.

The function of governments in the world of today are diverse and in some degree interdependent, which calls for

coordination and careful consideration of the repercussions of decisions and their consequences. The first and foremost function is that of maintaining peace and order. Other services include investment in social overhead capital, investment in human capital, investment in research and preliminary surveys for stock-taking of resources. Government can influence the attitudes to work, to thrift, to save and invest and to the adoption of new technology. The government can also influence the institutional setup of society; the creation of a legal framework that encourages saving and investment by local and foreign investors must be developed and revised from time to time. The government can influence the pattern of economic institutions, whether to encourage monopoly or improved competition, small or large business, cooperative or public operation of projects. The government through its tax policy can influence income distribution, saving and investment rates. In addition, it can also influence the income distribution through the price level by general monetary and fiscal policies, or through prohibition of exploitation, and measures to encourage conservation through changes in the rate of interest.[1]

The government has monopoly over the issue of money and can increase and decrease the money supply, can resort to deficit financing and can influence the rate of interest

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[1]W. A. Lewis, The Theory of Economic Growth (Homewood, Illinois: Richard D. Irwin, Inc., 1965) 376-419.

and saving and investment. The Keynesian model gives to government a key role in maintaining the level of investment and/or government expenditure, to maintain full employment, and to stabilize prices at that level. All these are policy prescriptions that the government can manipulate in undertaking its functions and achieving a certain rate of growth and development.

The Role of Policy in Planning

Modern planning, in essence, is the process of formulation and implementation of economic development policy by the government. If such policies embrace both the public and private sectors, as they should, then it is "comprehensive planning." If the government policy is outlined in a document showing the desired objectives and means to achieve such objectives, then the country has a plan. The United States, Netherlands, and West Germany, in this sense, are engaged in planning but have no plans, while countries like India, U.S.S.R., Pakistan, Egypt, and Sudan are engaged in planning and have plans.

The process of policy formulation is subject to a number of constraints that need to be taken as given. Such constraints include the resources that can be mobilized, the stage of development achieved, the aspirations of the people, the socio-economic and political environment, capacity and ability of the administrative machinery and continuity of the

development effort by the linkage of past, present and future. (With time, changes can be expected in the character of many of these constraints.) Ideally, the process of policy formulation starts by the delineation of objectives or aims of policy. The outline of such objectives is the function of the highest level in the executive administration. But, if such objectives are to be broadly acceptable there must be a series of interactions among the several levels of political leadership, and not excluding public support. If they are to be realistic, there must be a similar series of interactions with the planning organization and heads of ministries directly concerned with development. In this way, the costs and possibilities of social choices become better defined and refined, with general understanding of the requirements in money, personnel, and administrative procedures as implementation of various parts of the plan occurs.

In addition to the delineation of objectives, the process of policy formulation involves the choice of means or instruments of policy that are considered most instrumental in achieving the objectives. Such a choice necessitates the exploration of all possible means exhaustively and assessing the pros and cons of each, then selection of the most appropriate means. This is the essence of the rational decision making process. Once the means are explored, they must be expressed quantitatively in the form of operational targets or goals towards the achievement of which efforts must be

mobilized. These quantitative targets must be based on qualitative analysis of the underlying policy objectives and what policy instruments can achieve.

The formulation of policy objectives and choice of instruments of policy that are considered the most appropriate depend about the assumptions about the state of the economy and its behavior. Such assumptions must be stated explicitly. Planning entails also prediction of the future. Unless such assumptions are stated explicitly, much debate is likely as different people introduce implicitly differing assumptions about the behavior of the economy. These assumptions are the basis for the predictions of the future which are the characteristics of any planning; yet in a dynamic world there are bound to be divergencies between the world of reality, due to imperfect assumptions or to forces which were not anticipated.

Hence a plan needs to be reviewed periodically to consider the changes in assumptions, errors in prediction, problems and bottlenecks that may be faced during implementation. The success of a plan depends on the quality of the policies through which it seeks to implement, selection of the most appropriate means, the support it can command and the ability of planners. A large investment program without a clear policy strategy leads a country nowhere; in this connection, the experience of Professor W. A. Lewis with reference to Ghana is most illuminating.

> Ghana experience under the first development plan proves any proposition that policy is more important than expenditure. Very large sums of money were spent by the government, but since the industrial, agricultural, mining, and housing policies were inappropriate, very little increase in productive capacity resulted from the large expenditures. There was a remarkable increase in public facilities such as roads, schools, electric power, water supplies, and so on, but remarkably little increase in commodities. Considering also how much was wasted by overloading the building industry, one can say without hesitation the country would have made more progress if it had spent less and had better economic policy.[1]

The Sudanese Plan

The Plan Objectives

The ten year plan of the Sudan for the period 1961/62-1970/71 specifies five main objectives. These objectives are: (1) An appreciable increase in real income through a satisfactory growth of national production. (2) Broadening the structure of the economy. (3) A considerable increase in exports and import substitution. (4) Improvement of social conditions and services, including general and technical education and creation of sufficient opportunities for productive employment. (5) Maintenance of a relatively stable price level.

The projected quantitative targets for growth of the economy include doubling of national income in a period of 25 years. The growth of gross domestic product is envisaged to increase during the decade of 1960/61 to 1970/71 by 65.2

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[1]W. A. Lewis, "On Assessing a Development Plan," Economic Bulletin of the Economic Society of Ghana (May-June 1959). Quoted by Meier in Leading Issues in Development Economics (Oxford University Press, 1964), 523-528.

per cent, or 5.2 per cent per annum. The net national income is also conceived to increase by 24.9 per cent, and (after allowing for the population growth at the rate of 2.8 per cent per year) per capita income by 2.25 per cent annually.[1]

The second objective, broadening the base of the economy, specifies an expansion in the modern sector by raising its contribution to gross domestic product by the end of the plan from 47 per cent to 56 per cent. The plan also contemplates an expansion in manufacturing and mining; their contribution to gross domestic product is expected to quadruple by the end of the plan. Investment in agriculture is concentrated in the modern sector by an expansion of areas under irrigation and by an intensification of farming. This objective is complementary to the third objective of expanding exports and import substitutes. Expansion in exports is mainly in cotton, oil seeds, grain, and livestock. The expansion in import substitutes includes sugar, wheat, rice, coffee, and light manufacturing goods such as textiles, beer, tanning of leather, cigarettes, plastics, cardboard, matches, glass, cements, and paints. The share of agriculture in gross domestic product is expected to decline from 57 per cent in 1960/61 to 51 per cent by 1970/71.

The plan also proposes an expansion in education, health, housing and other services.

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[1]Economic Planning Secretariat, Ten Year Plan for Economic and Social Development (Sudan Government Printing Press), 1-20.

The use of the words "relatively stable price level" and "appreciable increase in production" may indicate either that comprehensive priorities to quantify fully the planning model were not developed, or that the objectives of the plan were not consistent. In a Keynesian macro model there may be conflict among high rates of growth, full employment, and an absence of inflationary pressures. Another element of compromise among objectives is suggested by the apparent choices between investments in commodity oriented types of production and investment in social services. In this respect, the ten year plan gives priority to productive schemes in the early years of the plan and to expansion in services in the latter part of the plan.

The strategy of the plan is based on a concentration of efforts and investment of the available limited resources in a limited number of projects in limited geographic areas rather than the dispersion of resources over a large number of projects spread over a wide geographic area. Such a concentration of effort is suitable for a country like the Sudan with a large area, scattered population, and a poor transportation system. The plan gives a key role to investment in the modern sector for new irrigation and settlement by building two dams at Roseires and Khism El Girba. These are expected to increase the irrigable land by about 972 thousand feddans in the early years of the plan period and to provide water for an intensification of farming in the Gezira and

other areas. Investment in import substitutes in manufacturing and agriculture has already been mentioned. It is projected that the modern sector will grow by 6.9 per cent per annum during the plan period, while the traditional sector will grow by 3.3 per cent, or by only 0.5 per cent above the general rate of population growth.

Macro Model of the Plan

The macro model of the plan is based mainly on a growth model that involves ten aggregate variables including income, consumption, saving, investment, exports, imports, net flow of capital, rate of growth of income, capital/output ratio and saving ratio. The model is based on a simultaneous equilibrium in a number of variables subject to satisfaction of a number of assumptions on the expected behavior of the economy and course the government policy would take.

The set of equilibria envisaged include the following variables:

1. Equilibrium between aggregate demand and aggregate supply such that no shortages or bottlenecks lead to inflationary tendencies in the economy.

2. Equilibrium between investment on the one hand, and saving plus foreign borrowing, aid and grants on the other (Table 4-1).

3. Equilibrium is also to be attained in the visible trade account over the plan period as a whole. Deficit in the invisible trade account is to be met by the foreign flow of capital, as loans, aid and grants (Table 4-2).

Table 4-1. Projected Gross Fixed Investment for the Sudanese Ten Year Period 1961/62-1970/71 (in Million £s)

Detail	61/62	62/63	63/64	64/65	65/66	66/67	67/68	68/69	69/70	70/71	Grand Total
1. Gross Domestic Product (at modest price)	423.1	431.7	447.4	467.8	489.2	512.2	540.6	570.7	602.7	637.2	5122.6
2. Consumption											
a) Private	338.1	354.3	365.9	382.7	400.3	418.5	440.0	464.0	489.6	517.1	4170.5
b) Public	37.8	44.0	46.2	48.4	50.8	53.3	56.2	58.8	61.9	64.9	522.3
3. National Saving (1-2)	47.2	33.4	35.3	36.7	38.1	40.4	44.4	47.9	51.2	55.2	
4. Net inflow of Foreign Resources	17.1	19.2	18.6	16.3	14.4	12.6	12.2	11.6	11.2	10.3	143.5
5. Drawing on Foreign Reserves	6.0	----	----	----	----	----	----	----	----	----	6.0
6. Plus Average (+) and/or decreased (-) in Cotton Stocks	+22.0	-8.1	----	----	----	----	----	----	----	----	13.9
7. Gross fixed investment (3+4+5) adjusted for change in 6	48.3	60.7	53.9	53.0	52.5	53.0	56.6	59.5	62.4	65.5	565.4

Source: Economic Planning Secretariat--Ministry of Finance and Economics, Ten Year Plan for Social and Economic Development, p. 68.

Table 4-2. Projection of Sudanese Balance of Payment for Ten Year Period 1961/62-1970/71 (in Million £s)

Details	61/62	62/63	63/64	64/65	65/66	66/67	67/68	68/69	69/70	70/71	Total
I Current Accounts											
1) Exports	67.6	77.3	73.0	75.6	77.4	80.9	86.0	91.1	96.1	101.8	---
2) Imports	83.8	92.0	86.1	85.4	84.5	85.3	89.3	92.5	96.2	100.2	---
Balance of Trade	-16.2	-14.7	-13.1	-9.8	-7.1	-4.4	-3.3	-1.4	-0.1	+1.6	-68.5
3) Net Invisible (excluding Govt. interest)	-7.5	-5.0	-5.5	-5.9	-6.3	-6.7	-7.2	-7.7	-8.2	-8.7	-68.7
4) Government Interest											
a) Receipts	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+15.0
b) Payments	-0.9	-1.0	-1.5	-2.1	-2.5	-3.0	-3.2	-4.0	-4.4	-4.7	-27.3
Total Deficit on Current a/c	-23.1	-19.2	-18.6	-16.3	-14.4	-12.6	-12.2	-11.6	-11.2	-10.3	-149.5
II Capital Account											
a) Inflow	17.9	22.9	22.6	18.9	16.7	14.3	14.3	14.4	14.8	14.8	171.2
b) Repayment on Foreign loans	-3.8	-5.0	-5.5	-4.5	-4.8	-4.4	-5.0	-6.1	-7.1	-7.9	-54.1
5) Official Capital Net	14.1	17.9	17.1	14.4	11.9	9.9	9.3	8.3	7.7	6.5	117.1
6) Private Capital Net	3.0	1.3	1.5	1.9	2.5	2.7	2.9	3.3	3.5	3.8	26.4
Total Net Capital Flow	17.7	19.2	18.6	16.3	14.4	12.6	12.2	11.6	11.2	10.3	143.5
Increase (-) or Decrease (+) Foreign Reserves	+6.0	----	----	----	----	----	----	----	----	----	6.0
											149.5

Source: Economic Planning Secretariat--Ministry of Finance and Economics, Ten Year Plan for Economic and Social Development 1961/62-1970/71, p. 52.

The attainment of the above equilibria are subject to a number of additional assumptions that are exogenous to the model.

(1) That the level of taxation before the plan will be maintained, and hence the plan does not incorporate an increase in tax burden.

(2) That the government expenditure in the current budget will not exceed a rate of growth of 5 per cent per annum.

(3) No restrictions on imports were foreseen at the time of the plan inauguration, though the possibility was not ruled out if the balance of payments worsen.

(4) The calculation of possible national savings in the public and private sectors were based on realization of average yields for cotton and other export crops and average prices of £s 11 per hundredweight for cotton.

The desired rate of growth of the gross domestic product is 6.9 per cent; assuming a capital output ratio of 3.4: 1 for the modern sector of the economy, then the desired rate of investment can be calculated according to Harrod-Domar Model as below:

$$\frac{\Delta y}{y} = \frac{I}{K} \qquad (1)$$

$\frac{\Delta y}{y}$ = Desired rate of growth (6.9)

I = Desired rate of investment

K = Capital/output ratio (3.4:1)

Substituting in

$$\frac{\Delta y}{y} = \frac{I}{K}$$

$$I = \frac{\Delta y}{y} \cdot K$$

$$I = 6.9 \times 3.4$$

The desired rate of investment = 23.4% of G.D.P. at factor cost.

Investment

A development plan must seek to mobilize the highest attainable level of investment, consistent with current consumption objectives, and to direct such investment funds to strategic sectors to generate high rates of growth, which lead, in turn, to subsequent increases in saving and investment until self-sustained growth is reached. This investment must be directed to the production of producer goods either directly within the country, or indirectly by producing export products to exchange for equipment to be used in the production of producer goods. At an early stage of development such producer goods include plows, fertilizer, insecticides, canning and processing plants, sugar factories and ginneries, etc. In the macro model previously described, the desired rate of growth of 6.9 per cent in the modern sector will require an investment ratio of 23.4 per cent of gross domestic product at factor cost. This investment target is modest if compared with that actually achieved in the period 1958/59-1960/61 when the level of investment was about 23.8 per cent of gross domestic product at factor cost (or 10 per cent of

gross domestic product in money terms). This indicates that the target is based on the extrapolation of the present trend. The total gross investment for the ten year period is about £s 565 million, of which £s 472 million are new investments and £s 93 million are earmarked for replacement. The public sector is expected to contribute 60 per cent and the private sector 40 per cent.

Investment is allocated between sectors on the basis of the desired level of output in each sector, using the capital/output ratio to determine the investment required to produce the desired increase in output. The details of sectoral allocation are shown in Table 4-3. Then, within each sector, projects are selected according to priority and until allocations for the relevant sector are exhausted. This is a very pragmatic approach. But considering the limitation of the data as to availability and reliability, it may be the best practical method. It has the advantage of giving more scope to the exercise of personal judgment and experience rather than the indiscriminate use of mathematical models that leave little scope for personal judgment. These personal judgments, of course, should draw on such statistical evidence and experience as is available, rather than upon political motivations. Reliance on judgment is especially needed, when the world of reality tends to diverge from these models that are often of the conditional normative type. In the future when the statistical collection procedure

Table 4-3. Sudanese Investment Program by Sectors for the Period 1960/61-1970/71[1] (Figures in Million Sudanese Pounds)

	Public Investment	Public Investment	Total	Percentage
(1) Agriculture	90.1	30.0	120.1	21
(2) Industry, Public Utility, Building, Civil Engineering and Mining	41.9	65.0	106.9	19
(3) Social services, Education and Health, and General Administration	90.0	60.0	150.0	27
(4) Transport and Distribution	63.0	32.0	95.0	17
Total	285.0	187.0	472.0	84
Replacement Investment	52.0	41.4	93.4	16
Total Gross Fixed Investment	337.0	228.4	565.4	100

[1]Source: Economic Planning Secretariat Ministry of Finance and Economics--Sudan. Ten Year Plan for Economic and Social Development 1961/62-1970/71, p. 65.

may be improved and expanded, and the interpretation of economy becomes too complicated to be handled by the human brain, then more sophisticated models must be used. Methods such as the Leontiff input/output Models, linear programming, can be used. But exercise of personal judgment must be the overriding criteria for some time to come.

The above-mentioned level of investment is to be met from savings in the public and private sectors and external sources of finance, including borrowing, aid and grants (details in Table 4-4).

Table 4-4. Breakdown of the Sudanese Investment Program According to the Sources of Finance 1961/62-1970/71

	In Million £s	Percentage
Public Saving	219.7	38.85
Private Saving	196.2	34.72
External Sources	149.5	26.43
Total	565.4	100.00

Source: Economic Planning Secretariat--Ministry of Finance and Economics, Sudan.

The Sudan's ten year plan requires only a quarter of its investment funds from foreign sources, while Ghana, Nigeria, and Tanganika in their present six year plans depend on foreign sources for 50 per cent or more.

Policy Instruments

A development plan is appropriate if the objectives of the plan reflect the needs of the economy. In this case the global level of investment and its distribution must be adequate to realize the desired rates of growth and sectoral targets. Policy has been defined as the art of the possible. In broad policy terms the selection of the objectives must be related to the available resources of finance, manpower, building capacity and construction and availability of time for study of projects in detail, as well as the relevant aspirations of the society. A development program to qualify for success must have consistent policy objectives; inconsistencies must be resolved at an early stage. Once the objectives are logically established, then the problem is reduced to the selection of the most appropriate means to attain them. In a comprehensive plan, the desired investment in the public sector tends to present few problems and can be met if the expected surplus in the current budget is realized, and if the sources of foreign borrowings, grants, aid, and revenue from additional taxation are correctly anticipated. The size of investment in the private sector may be a provisional estimate or guess; whether it will be forthcoming in the right amount, in the right place, and time or not depends on whether the policy applicable to the private sector is appropriate and induces local and foreign investment.

But policy instruments, as used here, refer to the techniques and attributes of policy through which government implements the plan, in detail and in total. Through the proper orchestration of policy instruments, the nation stimulates public and private decisions so that production, investment, consumption, and savings change in ways that bring the plan into fruition. Since the Sudan plan of 1961/62 to 1970/71 consists principally of a series of capital investment projects, primary attention should be given to policy instruments through which the government can influence the level of investment. These include changes in taxation, money supply, rate of interest, government expenditure, level of wages and wage laws, subsidies, price level, tariff, quota and other quantitative restrictions, granting of monopoly power, and protection of certain industries. In addition, the attitude and legislation towards foreign capital in regard to transfer of profits and remittance to origin are also crucial with respect to foreign investment. However, many of these policy instruments have far less leverage in developing nations than they have in developed countries.

The use of monetary policy by changing the money supply through open market operations by the government can influence the rate of interest and hence the level of investment. Unfortunately, most of the less developed countries, including the Sudan, tend to have population enclaves that operate with little use of money. The open market operation

version of the Keynesian model is not applicable, mainly due to the smallness of the money market and capital market. Central banks cannot expand and contract the money supply through open market operations. Money supply tends to vary with fluctuations in foreign exchange earnings, and these in turn are linked to fluctuations in the quantities exported and/or their prices. The central bank can do little to reverse such trends, though it can, to some degree, dampen such tendencies by restricting credit to commercial banks; even then, commercial banks often have large reserves from which they can lend. To a substantial degree the Sudanese economy is affected by the external environment; if modern economic controls are successfully applied by her trading partners few fluctuations occur; if they are not affective, then the modern sector of the Sudanese economy is correspondingly affected.

With graduated personal and corporate taxes applicable only to a limited sector of the economy, the government tends to have little scope, if any, for influencing of aggregate demand and/or investment through changes in the level of personal or corporate taxes. Since the greater proportion of taxes tend to be fixed and not related to the level of personal or corporate income, the economy lacks automatic stabilizers; the rigor of fluctuations tend to be violent and highly inflationary and deflationary during the expansion and contraction phases of the trade cycle, respectively.

Such phenomena tend to interfere with the level of investment, both directly through the availability of loanable funds and rate of interest, and indirectly through the effect on aggregate demand.

Direct subsidies as instruments of policy must be ruled out under present conditions in the Sudan, as inconsistent with established government policy. A policy of rapid growth and development must be based on the selection of projects with high profitability that lead to increased saving and investment and hence rapid growth. Such projects cannot develop a good case for governmental subsidization. In addition, questions relating to which industries should be subsidized, who should be the beneficiary of a subsidy, and the duration and continuity of the subsidy, are all subjective issues that are difficult to resolve in practice. Also, once subsidies are introduced into the system, then each industry would claim a dire need for a subsidy; the adoption of such a policy may open the door for unethical practices.

In making a choice among policy instrument, planners may select quantitative control measures or operate the price mechanism as an instrument of policy. The use of quantitative restrictions such as quotas and rationing as opposed to tariffs, tends to reduce government revenue, leads to high profits, creates a black market, distorts the allocation of resources and reduces the mobility of resources by protecting

inefficient enterprises. The effect of quota restrictions on the balance of payment can be predicted accurately and hence becomes the most effective policy instrument when the balance of payment is the overriding criteria. The same is true also when the welfare aspect of ensuring supply at a low price to the low income groups is the most important criteria, if the price before the imposition of quota can be enforced. However, and more commonly, quota restrictions in a number of countries have been misused and abused; for example, it has been a source of corruption in the rationing of import licenses, and becomes an indirect subsidy.

Classical economic theory has emphasized the role of price as the most efficient allocator of resources in both the factor and product market. But in the context of economic development, this may not always hold true. We have dealt earlier with the issues presented by the economies and diseconomies of scale, externalities, decreasing cost industries, etc. where the competitive price equilibrium does not ensure the most efficient allocation of resources. The price mechanism in the context of economic development (as in other contexts) tends to impose rewards and penalties. Industries that achieve higher rates of productivity as a result of technological improvement and/or overexpansion are penalized when supply exceeds demand and prices drop. The extent to which an industry is penalized depends on the income and price elasticities of demand for its product, cross

elasticities with other products and the level of price and availability of substitutes and complements. Agricultural products, being characterized with both low price and income elasticities of demand, tend to be penalized more than other products.

The price mechanism can be used as an instrument of policy provided there is full awareness of its limitations in the context of economic development. It is a major instrument for providing signals to the private sector. Attention must be given to the possibilities of making use of the penalties and rewards provided by prices, and deliberately creating rewards for furthering the cause of economic development. The development agency may, therefore, intervene to distort the price system to reward the strategic industries and to penalize the industries that have little effect on the future growth of the economy. It may also intervene to reduce risk and uncertainty, through price floors and ceilings, and in this way stimulate investments that otherwise might not be made. This device is more appropriate to agriculture than to strategic industries. Strategic industries, as defined by Kenneth C. Boulding and Pritam Singh, are the industries characterized by rapidly expanding demand, with great scope for technological improvement, and having significant linkage effect with other industries.[1] The price mechanism

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[1]Kenneth E. Boulding and Pritam Singh, "The Role of Price Structure in Economic Development," American Economic Review, Vol. 5/52 (May 1961), 28-38.

can also be distorted to influence income distribution in favor of those who save and invest.

The creation of a price structure consistent with the desired level of growth and development will stimulate growth in the strategic industries and discourage growth in the consumption-luxury-goods producing industries. This can be achieved more efficiently by the joint use of price, taxation policy, and grant of monopoly powers. Some distortion of the price structure may be used to favor capital intensive industries and, thereby, that sector of the economy with ratios to favor higher savings and investments. Selection of capital intensive methods, however, may entail less expansion of employment and an inequitable income distribution not in favor of the masses of the population. Thus, adoption of a price structure favorable to rapid economic development tends to impose penalties on the masses of the population, in terms of an unfavorable income distribution, higher prices for consumption goods, and less chances of employment due to adoption of capital intensive methods.

The extent to which such a policy can be pushed depends on the extent to which such groups are willing to accept sacrifice and are aware and able to make a choice between the present and the future. These issues can best be resolved through the political process. It is more difficult, but theoretically possible, to favor less capital intensive industries. Such industries would create more employment than

capital intensive industries, raise income levels to some degree for those employed, and still result in a somewhat inequitable distribution of income, and improved savings and investment ratios compared to an agriculture dominated economy. Probably, the rate of development would be less rapid than with capital intensive industries, but neither theoretical nor specific analysis is clear. Much depends upon whether the products are import substitutes, or require an expansion in internal demand as a market outlet.

Another policy instrument, the rate of interest, has limited usefulness. The Sudan, with its present economic organization, cannot influence the level of investment through the rate of interest by resorting to open market operations, due to smallness of the capital and money markets, and with a tax system depending for 70 per cent of its revenue upon export and import duties and taxes on property, crops, and to a very limited extent on corporate and personal graduated income taxes. In this area, too, the economy lacks automatic stabilizers.

The Sudan has adopted a number of policies to encourage private foreign investment. The Foreign Concessions Act in the fifties was revised to encourage foreign investment by ensuring transfer of profits and remittance to origin. Applying to both foreign and domestic new manufacturing industries are such items as tariff protection, tax exemption on imported equipment, corporate profit tax exemption for a number of years, and the lease of land at nominal prices.

Similarly, special trading privileges to induce investment have been provided to a number of firms. The Sudanese Coffee Trading and Production Company was granted a monopoly of the import of coffee and is allowed to charge a fixed margin provided that at least 50 per cent of its profits are set aside for coffee plantation development and coffee processing in the South. Also, when the Nile Cement Company could not raise the required capital by offering shares for public sale, the government purchased the unsold shares and provided the necessary guarantees for foreign loans up to the value of some of the imported materials. Monopolies, limited to certain zones of the country, were also granted to expatriate firms for the production and processing of tobacco. The Sudan Tobacco Company has an exclusive concession of tobacco production in Equatoria province and Northern Fung, while the Rothmans Company is limited to Dar Fur and Southern Fung areas.

Thus, Sudanese planners are left with few policy instruments to manipulate to achieve the desired policy objectives. The sophisticated policy instruments of fiscal and monetary policy cannot be used at present. The adoption of measures of tax reform and the creation of a capital market may go a long way toward widening the scope of choice available to planners. Of the broad package of macro economic policy instruments, only price policy is likely to have substantial leverage. Much reliance, therefore, has been placed

on specific devices which benefit a few firms and individual industries, along with the power provided through direct investments of public funds.

Some Problems Relating to Overall Policy Strategy

The Sudan plan entails heavy concentration on the modern sector of the economy and projects growth at the rate of 6.9 per cent of the gross domestic product of that sector, while the traditional sector is scheduled to grow at the same pre-plan rate of 3.3 per cent of gross domestic product in that sector, as indicated earlier. The plan, by adopting such schedules, in fact downgrades the welfare claims of two-thirds of the population, widens the regional disparity in incomes, and increases the backwash effect from the west and south in favor of the area between the two Niles, south of Khartoum and from Khartoum north, where most manufacturing industries are located. This presents a number of social problems in these areas, including pressure on services, housing, an increase in the incidence of crimes, etc.

It can be argued that the plan underestimates the role and possible contribution of the traditional sector to increasing the level of output, directly by the developing of new land and indirectly by increasing the yield obtained from the present cultivated land. With land an abundant and idle resource, it is possible that substantial production could be obtained with modest investments of physical capital. Modest investment in improved seeds, extension and advisory service,

transport, marketing improvement and available credit, could bring substantial short term returns, which would offset the long gestation period for a number of projects requiring substantial physical capital investments. Since capital and foreign exchange are the most limiting factors, and land the most abundant, these sources of cheap growth, if they do exist, can increase the near term productivity of the economy. The lack of discussion in the plan document of this issue suggests that little consideration has been given to this issue. Chapter VIII will return to this question.

The plan has also ignored several problems of international trade. Commodity problem studies should have preceded the formulation of the plan. Had this been done, it is likely that more attention would have been given to producing more commodities with an expanding demand, with high income and price elasticities. Such an analysis would have given more emphasis to livestock and livestock products (as compared with cotton), such that they would assume a leading role, or at least a more important role. Probably, horticultural products would have assumed a greater role also, through presenting some problems of marketing and processing that would need to be investigated and solved. This also will be discussed more fully in Chapter VIII.

The plan concentrates heavily on the production of raw materials for export in exchange for manufactured

industrial goods. This entails dependence on raw materials with notoriously low price and income elasticities of demand, subject to wide fluctuations in yield and/or price, and consequent fluctuating exchange earnings with which to pay for industrial goods with more or less stable prices.[1] It should have been anticipated, that this, over a long period of ten years, may result in balance of payment problems. This actually has taken place since 1961, and the plan does not show the possible policy prescriptions to deal with such a situation. Borrowing from the IMF, an increase in capital borrowings and loans from abroad, import control, or curtailment of some projects are some policy choices that should have been considered. This calls for built-in-flexibility in the plan from the start, as well as further diversification, as suggested above.

The plan also entails an unprecedently heavy investment of some 56 million Sudanese pounds per annum over the ten year plan period. While this can be expected to lead to inflationary pressures, the plan does not attempt to forecast this, or to prescribe a remedy to deal with such a situation, if it takes place.

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[1]Several studies reported and discussed by Harry Johnson, suggest that recent fluctuations in world prices are not as severe since 1950 as they were previously. Still for the Suadn heavy dependence upon cotton exports have a built-in tendency toward such severe fluctuations.

Summary

The Sudan ten year plan projects a 5.2 per cent annual expansion, or 2.25 per cent per capita. A substantial export expansion, mainly of agricultural raw materials is projected, along with diversification through the development of import substitution industries. The plan incorporates a series of investment projects totaling 565 million pounds over the ten year period. The discussion of policy instruments suggested that more of the standard Keynesian macroeconomic policy instruments have limited application in the present setting. Price policy, the flow of public investment funds, tariff policy and a number of specific firm and industry measures provide the government with some leverage to stimulate plan accomplishment.

This chapter has set the stage by outlining that policy formulation is the heart of the planning process. The role of policy in planning, the policy instruments and their use to manipulate investment were discussed in detail. The limited tools available to Sudanese planners are focused on.

CHAPTER V

THE PLAN ASSESSMENT

Evaluation of the Plan

Every plan has undergone several levels of assessment before it is published. During implementation, various parts of a plan are reviewed and assessed by the agency charged with implementation, the agency asked to finance the plan, and by various individuals and groups who attempt to judge a plan in relation to the needs of the economy. Despite the omni-presence of such an evaluative process, the great dearth of information on plan assessment is evident. Professor W. A. Lewis discusses evaluation in his article "On Assessment of a Development Plan." In this article he denies that there are objective criteria for a plan assessment, and affirms that economics has not yet designed such criteria. But the lack of such criteria would mean failure to pass judgment on a plan while the development of criteria can be used by planners to assess what should be the overriding issues to which a plan should cater.

The problem arises from the fact that planning is not an exact science, without established formulas for building

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[1]W. A. Lewis, "On Assessment of a Development Plan," Economic Bulletin of the Economic Society of Ghana (May-June 1959), 2-16.

a plan with respect to the nature of the plan policies, duration, size, level and composition of investment, priorities and linkage with the past and future plans. Differences among countries as to needs, aspirations, values and beliefs, philosophy of politicians and general electorate, and political maturity go a long way towards requiring that each country's plan embody certain unique characteristics. A plan is also affected by the previous accomplishment of a country, resource endowment, viability and efficiency of institutions in the public and private sectors, and existence of knowledge that provides means for a long look at the future. This adds to the problem of laying out specific criteria that will hold everywhere. Plans are often dominated in the end by political leaders, some of whom act like statesmen, while for others the motives of the politician dominate. Such motives are diverse, difficult to predict and vary with the situation, time, and place.

In spite of this, judgments are being made all the time. Probably the problem is that few principles and common denominators can be developed that can be applied in country after country. Much depends upon the reasonableness and the specific within country situations. Such considerations press towards general words and concepts; perhaps such words as consistency, comprehensiveness, feasibility and realistic are keynotes to the concepts of evaluation. We are, however, dealing with a specific country, Sudan, and it should be

possible to elaborate the criteria in more detail. The paragraphs that follow are an attempt to do so.

Criteria for Assessment of the Plan

(1) Does the plan represent an integrated cohesive program?

A well developed plan is a macro map of society, giving consideration to the role of private firms, consumers, and government activities, including semi official entities such as the Gezira Board, and the Sudan Railways. It should consider the relationship among industries so that the desired inputs of one industry are adequately provided for as the output of another industry, including those that are used or provided for by the government. Similar questions need to be answered positively for imports and exports, through the analysis of the foreign exchange situation. Disequilibria may result in inflation or foreign exchange shortage, or both. Are there actual or standby plans to meet such situations as they appear?

The present ten year plan of the Sudan does not represent an integrated cohesive program being dominated by the project by project approach rather than seeking to implement a coordinated policy. For example, in the agricultural sector, despite heavy emphasis on intensification, a proposal for a fertilizer factory was given a low priority, and was included in the list of projects to be considered if more funds become available.

(2) Are the levels of investment and plan targets feasible in relation to available resources and the recent performance of the economy?

A plan which proposes to increase land in cultivation or factory output by twenty-five or thirty per cent annually clearly requires an effort far beyond any recently achieved in the Sudan. It is not easy to say that a proposed four or five or six per cent is feasible or not. Still when aggregating the goals of various industries, agriculture, and government activity, it may become evident that the plan proposes to expand in all directions simultaneously and that such an aggregate of effort can not be sustained over a period of years. Reference to recent history and to current policies can provide benchmarks which identify the relevant ranges of feasible national effort.

(3) Are the priorities correctly applied?

One set of priorities requires the examination of the meshing of industries with each other, with the sources of raw material and with markets. Thus, are processing plants being built before or after the raw materials are to be available? Do the plans propose the intensification of agriculture before or after the fertilizer, improved seed, agricultural chemicals and other inputs are made available? Or are plants being built before the factor market has been created to utilize the product of a new industry? After considering the priorities arising from interdependence and complementarities, another type of priority to be considered is related to the

effect of the plan on the future and this includes:

a) Priority for productive projects that add to total output of commodities and thus guarantee an increase in gross domestic product, future saving and growth, and guard against shortages in commodities and consequent inflationary pressures. Stolper[1] advocates here that the criteria should be the profitability of the project and the surplus that may be created for reinvestment.

b) Priorities for education and training by investment in the human resource, since this tends to improve the quality of human resources and quality of implementation of future plans.

c) Priorities for research, exploration of natural resources, preinvestment surveys, and feasibility studies which are essential for current and subsequent plan formulation.

The Sudan ten year plan gives heavy emphasis to investment in productive projects; of the total investment in the agricultural sector, about eighty-one per cent is earmarked for productive schemes. The plan made no allocation for training, education and extension for the agricultural sector. The allocations are limited for formal education under the Ministry of Education. Of the total allocation for the agricultural sector, 1.15 per cent is allocated for research and

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[1]W. F. Stolper, "Planning Without Facts: Lessons in Resource Allocation from Nigeria's Development" (Harvard University Press 1966), 138-218.

one per cent for investigations and preinvestment surveys. This does not include the operating costs for research which are included in the current budget.

(4) Are the plan policies consistent, workable, complementary to one another?

The plan policies outlines in detail in previous chapters include the plan objectives, the instruments of policy, other policies for agriculture, industry, housing, mining, transportation, foreign trade, credit and banking, monetary and fiscal. These policies must pass the tests of consistency with one another such that clashes in policies are resolved and priorities established. The policies must also satisfy the test of workability under the practical conditions of the country. Policies must be complementary to one another, such that each complements and strengthens the other, so that their cumulative effect can achieve the desired result.

In the Sudanese plan, one of the great weaknesses is that little attention has been devoted to policy formulation and for rigorous use of policy instruments. Sectoral policies are not clearly delineated and much more is to be desired in this direction.

(5) Are the government policies appropriate to the private sector established in the plan?

The plan policies towards the private sector must create the incentives such that the desired level and composition of the private sector can be achieved. In more

general terms, a secure level of national income providing a growing demand for goods and a reasonable security of required raw material inputs are of paramount importance for the private sector. Other government policies may include creation of financial institutions such as the capital market and banking institutions, the establishment of tax concessions, exemption from import duties, grant of land leases, security to foreign capital and guarantees for transfer of profits and origin, etc. Policies to assurance that the private sector will respond in the desired amount with the desired activities is a real challenge for the plan implementation.

In the agricultural sector, government policy employed the grant of land leases, survey of credit through the Agricultural Bank, and price quarantees for short staple cotton in the Nuba mountains area.

(6) Does the plan give adequate attention to the creation and strengthening of institutions?

The less developed areas suffer from a lack of certain types of institutions; some of the existing institutions lack awareness of their responsibilities, and of how their activities are related to other institutions. Problems in this field include inadequately trained staff at top level posts, an inadequate number of staff, lack of clarification of terms of reference, lack of clearly delineated policy. Sometimes the lack of adequate funds to enable institutions to carry

their responsibilities is also an important obstacle. Examples of such critical institutional problems include the Planning Agency and Department of Statistics; both suffer greatly from lack of trained staff. The lack of institutions is exhibited in the virtual absence of agencies for undertaking economic research activities in the important ministries and departments, where a large part of the activities entail the making and implementation of economic decisions as in the Planning Secretariat, Ministry of Commerce, Industry and Supply, and Ministry of Agriculture, etc.

Very little attention has been given to institutional development of any sort; the attention that has been given is to institutions entirely in the central government, not in local government and not in the private sector.

(7) Does the plan provide a realistic approach to deal with the social and economic problems of backward areas?

In most of the economies of the developing countries, there are certain enclaves of backward areas that lag behind the growth of the rest of the economy. These areas tend to present problems that are social, political and economic. The planners are often faced with limited choices in respect to these areas; efforts to close the gap between these areas and the rest of the economy are often bought at the expense of a slower rate of growth for the whole economy. Neglect of such areas may lead to widening the disparity between regions and may act as a threat to national unity. Social problems

presented by unsettled, shifting cultivation, nomadic type of livestock rearing often are social and educational as well as economic, and require greater effort in the field of land settlement, involve programs that are costly, time consuming, slow to mature but have a high pay off in the long run. The extent to which a plan can deal with such challenges and design programs to deal with such problems with little effect in slowing down the rate of growth of the rest of the economy provides one of the real tests of a plan quality.

(8) To what extent does the plan provide for improvement of administrative and organizational ability?

Most underdeveloped economies suffer from shortages of manpower qualified to fill the high level posts and from too few technicians in the scientific and economic fields. The levels of existing administration and management are low. The process of economic development aggravates this problem as the needs in this field tend to multiply. First, there is the need for adequate members to replace those who retire; replacements must be trained to a higher level than their predecessors if existing standards are to be upgraded. Second, the plan requires additional numbers in the different fields. Third, a plan also must cater to the training of personnel for the coming plan if the country is to avoid being caught in a situation of training new personnel at the very time they are expected to be taking their jobs. In the agricultural field, as in other fields, a detailed program for training

must be provided to cater to both the public and private sectors' requirements, ranging from the farm level to the highly specialized research specialist. Many of the required personnel function scattered over a wide area; hence programs must aim ultimately to cover the need and provide national geographic coverage.

Even training is not enough; a disciplined civil service with traditions of public service is required, where promotions and moving up the ladder are based on merit and productivity and not based on political affiliation and kinship relations.

(9) Flexibility and adaptability to adjust for unforeseen conditions.

A plan is based on the available statistical information and on certain assumptions as to the expected behavior of the economy in the future. Statistical data, in the Sudan as in all less developed countries, tend to have a wide margin of error. The economy is subject to wide fluctuations associated with crop yields and shifts in world prices for raw material and such disturbances impose the need for complex assumptions that undergird the plan. Even so, the behavior of the economy in the future may deviate from the predicted course of behavior. All this necessitates a type of built-in flexibility in the plan and/or a second line of defense to fall back on in such cases. This may include provision for not starting all projects in the first year of the plan and

the transfer of groups of interdependent projects from one period to another. In addition, the economy needs to build adequate foreign exchange reserves for possible use in periods of emergency and to enhance the ability to increase foreign borrowings in time of emergency.

In the agricultural sector, flexibility to adjust to changes in national and international demand and to changes in cost is desirable. The ability to shift from one type of rotation to another rapidly enables taking advantage of opportunities as they occur.

(10) Does the plan provide a basis for periodic evaluation?

Two aspects of the development program appear particularly crucial, the formulation of a comprehensive overall program and the implementation of the specific projects. Of course, the steps in between must be logically related. This process of tying sectors to the overall program and the sector plans to specific projects is in fact a system of forward and backward linkages. Of course, certain aspects of the overall program are implemented through policy instruments dealt with in Chapter IV, i.e., in public policy which affect operations of the private sector or macro-economic environment. The part of the program which is expressed in projects (usually public) needs to be effectively implemented by public authorities. The part of the program which can be expressed in terms of projects must be detailed in terms of cost phases over the

years of the plan, time schedules for preparation of engineering plans, procurement of equipment, contracting, completion of construction and actual operations, and targets of output for the different phases of the project. Above all, delegation of responsibility must be specifically vested in appropriate and competent agencies. The part of the program entailing the use of policy must also be detailed in terms of the date of policy implementation and expected results. A plan prepared in such a way lends itself to periodic appraisal of results, review of progress, and the introduction of modifications, and thus provides a guide for the preparation of subsequent annual plans based on realities and achievements. It also provides a means for identification of bottlenecks and problems hampering implementation. This enables taking the necessary measures to overcome such problems.

(11) Linkage of the plan with the past plan and provision for future plan.

In the process of planning, we usually do not start with a clean slate. Usually, projects in the previous plan that are in arrears must be completed first. Such projects, if their previous financial allocations were not used, have little claim on the financial resources of the new plan, but the failure to complete such projects may jeopardize the implementation of the new plan. In many cases, the completion of such projects may require added expenditures due to rising costs. In this case, they represent a commitment that must be

completed and hence are a financial load on the new plan. If the previous plan was over-ambitious, the number of such projects probably will be large. This should be useful as a lesson, indicating the size of activity that can be handled in a given period of time.

The plan must provide certain succeeding elements in the succeeding plan. Programs for training, research, preinvestment surveys, feasibility studies, marketing research, strengthening the statistical machinery, etc. must be given attention in this plan to provide for the needs of the next plan. This is the function of perspective planning for which adequate funds, personnel and facilities must be provided in the plan.

(12) Centralization and Decentralization.

Whether to centralize or decentralize in planning, there is no simple answer or one choice. Certain decisions on policy or on the plan need to be centralized fall within the jurisdiction of the central government and cannot be delegated, including monetary and fiscal policy, foreign trade, taxation by central government, grant of monopolies, foreign borrowing, and relations with US-AID programs, United Nations and its specialized agencies programs (FAO, WHO, etc.). The central government has direct power in shaping the plan policies, size of the plan, and nature of its priorities. However, certain aspects of the program can be decentralized to the ministries and departments to reduce the burden on the

Planning Secretariat. Decentralization in the plan preparation and delegation of power for execution are also important if the resources and expertise of the ministries and departments are to be fully utilized. Once a plan is sanctioned the implementation functions must be delegated to those agencies that have the capacity and expertise to deal with them more efficiently.

Also, some projects must be small and limited to specific regions; such projects must be delegated to be executed by those regions. This last approach might treat such projects as an assistance program from the central government to provincial authorities. Certain criteria must be laid down to qualify for central government aid based on type of project, size of project, consistency with central government policy, extent of contribution of provincial authorities to match central government contribution. In the agricultural sector such programs may include studies to solve marketing problems of a localized crop, fertilizer distribution, local roads, forest planting, local extension units at the farmers' level, etc.

The central government contribution may be partly technical and partly financial. This process ensures mobilization of local efforts for the plan, has educative value, helps foster local leadership, and gives the local people pride in what they can achieve.

(13) Providing for the needs of the economy.

The plan must also take into consideration the short term and long term needs of the economy. Short term and long term needs may be inconsistent and not attainable simultaneously. Society in the short run may prefer an increase in consumption, more security, and equity in income distribution, while their long run needs may include a rapid rate of growth to reach self sustained growth, structural changes in the economy, conservation of resources to maximize resource use over time, and an improved level of living and well being in the future. The long run objectives of rapid rate of growth necessitate increased saving and investment and a selection of projects that are quite profitable and yield a large surplus to the current budget, and also increase saving in the private sector. The plan, therefore, must make compromises between the short term and long term needs. This process requires public discussion and active involvement of political leadership and political decision making.

(14) Consistency with the political values of society.

A plan, therefore, should be able to solicit the support of political groups, parliament, and public opinion to ensure the mobilization of the efforts of the nation for achieving objectives and targets consistent with the highest level of social efficiency. This can only be achieved if the values on which the plan is based are acceptable to the

majority. It is not likely that any program or policy in any country will be universally acceptable. Yet there needs to be a consensus that the plan, representing a major national commitment, is generally acceptable. Certain aspects of the plan are likely to create tensions with certain reference groups as the plan is implemented. Perhaps other aspects will reduce tensions with the same or similar reference groups. Does it appear that successful implementation of the plan will provide more gains than losses in the perceived value system of significant political groups, as they re-examine their values and hence attitudes towards the plan? Specifically in the Sudan, some consideration must be given to traditional agriculture, people in the west and south of the nation, who are likely to gain less from the plan. At the same time the cohesiveness and efficiency of the plan must not be destroyed or those in the modern sector in the center or north may object. Questions such as these can not be answered categorically; judgments on value positions and political importance must be considered. Political leadership must be consulted, understand the major implications of the plan operations, and feel that the broad goals of the plan are desirable. Thus, a national commitment and the will to develop can become part of the national politico-socio-economic environment.

Summary

A number of criteria appropriate to the assessment of the Sudanese plan have been identified and discussed. In one sense, they are a checklist against which a plan can be measured, in another sense they are a commonsense statement of the planning process, exposing the plan to a set of questions to which answers should be yes for a complete well-thought-out plan. Within this framework, we turn to the plan's commodity projections with emphasis on demand, and subsequently to the agricultural sector plan.

CHAPTER VI

THE DEMAND AND SUPPLY PROJECTIONS

This chapter will review the process by which agricultural commodity targets were developed, attempting to identify procedures that would have led to improved and more attainable targets. Thus, this chapter will test the second hypothesis: The targets for the agricultural sector have not been realistically related to the prospective pattern of domestic demand and world trade. The record of performance of the agricultural sector during the first five years of the ten year plan will be reviewed in the chapters that follow.

The Need for Demand Projections

In the process of planning, projections of aggregate demand over the plan period are essential and useful in making a number of policy decisions. Projections of demand are essential to guide the process of target setting for supply, commodity-wise, and for decisions on surpluses and shortages that can, in the best interest of the country, be handled through international trade. It is also important to project the shortages and surpluses that underlie the calculation of the trade account component of the balance of payments over the plan period. Failure to project the demand and to adjust

supply (production + imports) to it may lead to food shortages and increases in food prices. A rise in food prices increases the cost of living and leads to a wage price spiral; this inflationary pressure moves the terms of trade against the new developing industries and fixed income, salaried groups. This creates pressure for increases in salaries and/or cost of living allowances and wage escalation clauses. This, in turn, affects adversely saving and investment in the public sector. It also distorts the allocation of resources in the private sector, and ultimately jeopardises the rate of growth of the economy. All this could be avoided if reliable demand projections are made and if correct policy decisions are undertaken to adjust supply and other economic variables.

The Rate of Growth of Food Demand

The Sudan like other underdeveloped countries, is characterized by rapid population growth; the current rate of 2.8 per cent per annum is one of the highest in Africa. Rural population is growing at the rate of 2.5 per cent allowing for outmigration. Urbanization is proceeding rapidly, with a rate of population growth in urban areas of about 4 per cent. Considering overall income elasticities for food at 0.6 and 0.7 for urban and rural areas respectively, generalizing the recent 2.25 per cent annual increase in income to rural and urban areas, and assuming no further

change in prices, tastes, habits and age structure of the population, then the demand for food is growing at the rate of 4.2 per cent annually (for details of the calculation, see Table 6-1). This is comparable to the rate of growth of 3 to 4 per cent calculated by Dr. C. K. Eicher[1] of Michigan State University for Nigeria, based on FAO data projections in 1980. Dr. Eicher further suggests that such rates of growth could not be matched except by a few of the rapidly growing agricultural economies in their golden ages. Agriculture in the Sudan is, therefore, facing a tremendous challenge in the coming decades as a result of rapid growth in population and growth in income. This challenge was already set in perspective by Professor Lawrence W. Witt in his Presidential Address before the American Farm Economic Association in 1966 when he warned in the following statement:

> The food problem is critical. Population growth threatens to increase by the year 2000 in numbers equal to the present world's population. Agricultural science is facing tremendous challenges. If our profession can make a contribution, it must provide decision makers with reasonable and relevant assessments of the situation and program choices that lie within the capacity of our nation. The dominant role which each country must play in solving its own problem of population and food supply need to be clearly delineated.[2]

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[1]C. K. Eicher, "Transforming Traditional Agriculture in Southern Nigeria: the Contemporary Experience," unpublished paper presented to the annual meeting of the African Studies Association, Bloomington, Indiana, Oct. 1966, 26-29.

[2]Lawrence W. Witt, "Food," Presidential Address of the American Farm Economic Association, August, 1966; also, Journal of Farm Economics, Vol. 48, No. 5 (December 1966), 1077-1090.

Table 6-1. The Rate of Growth of the National Demand for Food in the Sudan

$D = P + M_g$
D = rate of growth of the demand for food
P = population increase
M = income elasticity of the demand for food
g = rate of growth of per capita income

Assumptions:

D_r = demand by rural population (rate of growth)

D_u = demand by urban population (rate of growth)

P_r = rate of population increase for rural areas = 2.5%

P_u = rate of population increase for urban areas = 4.0%

M_r = income elasticity for food for rural areas = 0.7

M_u = income elasticity for food for urban areas = 0.6

g_r = rate of growth of income for rural areas = 2.25%

g_u = rate of growth of income for urban areas = 2.25%

$D_r = P_r + M_r g_r = 2.5 + 2.25 \times 0.7 = \underline{4.08}\%$

$D_u = P_u + M_u g_u = 4 + 2.25 \times 0.6 = \underline{5.35}\%$

since 12.8% of the population is urban

Overall weight average rate of growth for the demand for food = $\underline{4.20}\%$ per annum

Projections of Domestic Demand for Food for 1970/71

The 1961/62-1970/71 development plan has not given attention to the projections of demand for commodities in a comprehensive manner; the little that was done was piecemeal work covering some of the important commodities. The approach to such projections was based on an extrapolation of previous trends. Trend analysis may be reliable if the trend is smooth, steady, has no fluctuations, if it covers a long period, and if previous conditions are expected to prevail in the future. This is not true in the context of economic development. Geographical shifts in population, increases in the level of income, changes in relative prices, changes in tastes and habits, changes in food preparation and distribution all tend to affect the level of per capita demand for food. Also, the rate of population increase may rise, due to the more rapid decline in the death rate than in the birth rate; hence the time series approach may lead to unreliable results. Therefore, budget studies representing rural and urban projections are essential for a refined gauging of the elasticities of demand. Such elasticities are needed for calculating the per capita consumption in the future, taking into consideration the probable changes in per capita income. We will proceed to make new demand projections on this basis, comparing the results with those developed in the actual plan.

Since family budget studies do not exist for the Sudan, data for income elasticities of demand and per capita

consumption, as prepared by the FAO[1] for a group of countries at the same per capita level of income and stage of development as the Sudan, were used in this thesis for making demand projections. National demand projections for 1961/62, according to these data, were checked for accuracy by using the production data, plus imports minus exports; in most cases the aggregate demand did fit closely with production adjusted for exports and imports (see Table 6-5). The same FAO data for income elasticities of demand, along with the data for growth of population and income according to the ten year projections, were used to project the demand for eleven commodities for 1970/71. Estimates of income increases are based on the plan projections over the period 1961/62-1970/71; per capita income in rural areas is expected to increase from £s 25.82 to £s 31.40 and in urban areas from £s 65 to £s 80.3 Sudanese pounds. Urban population is expected to increase from 1.0 million to 1.8 millions, as shown in Table 6-2. The FAO data for income elasticities are shown in Table 6-3. The mathematical function used is as follows:

$$C_t = C_o \left[1 + \left(\frac{I_t - I_o}{I_o}\right) E_I + \left(\frac{P_t - P_o}{P_o}\right) E_P\right]$$

C_t = per capita consumption in 1970/71

C_o = per capita consumption in 1961/62

I_t = per capita income in 1970/71

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[1]FAO Agricultural Commodity Projections for 1970, Document No. E/CN/13/46 CEP 62/5.

I_o = per capita income in 1961/62

P_t = price in 1970/71

P_o = price in 1961/62

E_I = income elasticity of demand

E_P = price elasticity of demand

The projected per capita consumption for urban and rural areas for 1970/71 as well as for 1961/62 is shown in Table 6-4. Table 6-6 shows the projections for 1970/71 separately for both rural and urban population and, in addition, the demand for seed and feed.

A number of facts that verify the second hypothesis, as related to domestic demand emerge:

(1) Sorghum exports were projected to increase, over the preplan level of about 100,000 tons, but accurate demand projections indicate that the export surplus will decline to about 35,000 tons if the targets are met. Sorghum consumption by 1970/71 will reach 1,758,000 tons, an increase of 425,000 tons over the production (partly exported) of the preplan year 1960/61, of 1,433,000 tons. The target for production is an increase of 360,000 tons, thus leading to a 65,000 ton reduction in exports, mainly to Western Europe and the Middle East. The gap thus created, due to the expansion of demand, if actually realized will affect adversely the balance of payments,

Table 6-2. Population and Per Capita Income Projections for 1970/71 for Both Urban and Rural Population of the Sudan

Details	1961/62	1970/71
1. Population Projections 1970/71 (in millions)		
Total population	12.3	15.8
Rural population	11.3	14.0
Urban population	1.0	1.8
Ratio of urban to rural	8.8%	12.8%
Annual rate of growth of rural population		= 2.5%
Annual rate of growth of urban population		= 4.0%
2. Per Capita Income Projections (in Sudanese pounds)		
(1) Total gross domestic product	357,200	584,500
(2) Per capita income in urban areas	65	80.3
(3) Per capita income in rural areas	25.82	31.4
Annual rate of growth of per capita income		= 2.25%

Source: Economic Planning Secretariat--Ministry of Finance and Economics (Sudan Govt), Ten Year Plan for 1961/62-1970/71, compiled from pages 10-39.

Table 6-3. Coefficients of Elasticities (with respect to quantity) for Commodities in Respect of Rural and Urban Areas Based on FAO Projections for 1970/71 for Countries at Same Stage of Development and Income Levels as the Sudan[1]

Commodity	Income Elasticity in Rural Areas	Income Elasticity in Urban Areas
I. Cereals		
1) Sorghum	0.1	-0.1
2) Wheat	0.8	0.6
3) Rice	0.8	0.6
II. Animal Products		
1) Meat	1.3	1.1
2) Dairy products	1.1	1.2
III. Sugar & Beverages		
1) Sugar	1.2	0.8
2) Tea	0.9	0.8
3) Coffee	0.4	0.6
IV. Fruits & Vegetables		
1) Fruits	0.9	0.8
2) Vegetables	0.8	0.7
V. Fibers		
1) Cotton	1.3	0.8
VI. Fats & Oils	0.8	0.7

[1]Sources: Food and Agriculture Organization of the United Nations. "Agricultural Commodities Projections for 1970," FAO Commodity Review 1962 (Special Supplement), Document No. E/en/13/48cop/62/5.

L. M. Goreaux, "Demand Analysis for Agricultural Products," FAO Planning Studies No. 3, published 1962.

Table 6-4. Per Capita Food Consumption for 1961/62 and Projections for 1970/71 (In Kgs per year)

Commodity	Rural Areas 1961/62	Rural Areas 1970/71	Urban Areas 1961/62	Urban Areas 1970/71
I. Cereals				
1) Sorghum	100	102.16	90	87.88
2) Wheat	8	9.38	12	13.69
3) Rice	0.5	0.59	1	1.14
II. Animal Products				
1) Meat	25	32.02	40	50.34
2) Dairy Products	12	14.85	8	10.26
III. Sugar & Beverages				
1) Sugar	10	12.59	12	14.26
2) Tea	0.6	0.72	1.1	1.31
3) Coffee	0.5	0.54	1.5	1.71
IV. Fruits & Vegetables				
1) Fruits	2	2.39	4	4.75
2) Vegetables	5	5.86	10	11.65
V. Fibers				
1) Cotton	2	2.56	4	4.75
VI. Fats and Oils	5	5.86	8	9.32

Source: Food and Agriculture Organization of the United Nations. Document No. E/en/13/46/CEP/62/65 FAO Agricultural Commodity Projections for 1970.

Table 6-5. Demand Projections for Food for 1961/62 for the Sudan (in metric tons)

	Human Consumption Rural	Human Consumption Urban	Total Human Consumption	Seed	Feed	Grand Total
I. Cereal						
1) Sorghum	1,130,000	90,000	1,220,000	15,000	100,000	1,335,000
2) Wheat	90,400	12,000	102,400	800	---	103,200
3) Rice	5,650	1,000	6,650	10	---	6,660
II. Animal Products						
1) Meat	282,500	40,000	322,500	---	---	322,500
2) Dairy Products	135,600	80,000	143,600	---	---	143,600
III. Sugar & Beverages						
1) Sugar	113,000	12,000	125,000	---	---	125,000
2) Tea	6,780	1,100	7,880	---	---	7,880
3) Coffee	5,650	1,500	7,150	---	---	7,150
IV. Fruit & Vegetables						
1) Fruit	22,600	4,000	26,600	---	---	26,600
2) Vegetables	56,500	10,000	66,500	---	---	66,500
V. Fats & Oils	56,500	10,000	66,500	---	---	66,500
VI. Cotton Lint	22,600	4,000	26,600	---	---	26,600

These projections were made for 1961/62 to test whether the elasticities are true for the Sudan by comparing the above of Table 5-5 with production plus imports minus exports to arrive at domestic consumption and they did fit closely.

Table 6-6. Demand Projections for Food for 1970/71 for the Sudan (in metric tons)

Commodity	Human Consumption Rural	Human Consumption Urban	Total Human Consumption	Seed	Feed	Grand Total
I. Cereal						
1) Sorghum	1,430,000	158,000	1,588,000	20,000	150,000	1,758,000
2) Wheat	131,000	25,000	156,000	4,000	---	160,000
3) Rice	8,300	2,000	10,300	200	---	10,500
II. Animal Products						
1) Meat	448,300	90,700	539,000	---	---	539,000
2) Dairy Products	208,000	18,000	226,000	---	---	226,000
III. Sugar & Beverages						
1) Sugar	176,300	23,700	202,000	---	---	202,000
2) Tea	10,000	2,000	12,000	---	---	12,000
3) Coffee	7,520	3,080	10,600	---	---	10,600
IV. Fruit & Vegetables						
1) Fruit	33,460	8,540	42,000	---	---	42,000
2) Vegetables	82,040	20,960	103,000	---	---	103,000
V. Fats & Oils	82,000	16,700	98,700	---	---	98,700
VI. Cotton Lint	35,800	8,500	44,300	---	---	44,300

and also the underutilization of elevators built in Port Sudan to handle the "increased exportation" of sorghum.

(2) Self sufficiency in wheat is based on a domestic demand of 120,000 tons, while projections of demand for wheat show that consumption by 1970/71 will reach 160,000 tons, leaving a shortage of about 40,000 tons that needs to be imported. Also, this will tend to create a gap in the balance of payments.

(3) The annual sugar consumption by 1970/71 is estimated at 150,000 tons according to the plan, while demand projections (Table 6-6) show an annual consumption by 1970/71 of 202,000 tons, with a shortage of 52,000 tons that needs to be imported.

(4) Annual meat consumption is estimated to increase from 322,500 tons in 1961/62 to 539,000 tons by 1970/71, and dairy products from 143,000 tons to 226,000 tons. The plan gives no attention to estimation consumption for these two commodities, yet demand will grow rapidly due to the increase in population and high income elasticity.

(5) Demand projections for tea by 1970/71, according to Table 6-6, is estimated to reach 12,000 tons and coffee 10,600 tons while the plan is based

on static estimates of consumption for 1961/62 of 6,900 tons and 7,000 tons for coffee.

The lack of attention to the dynamics of demand and to the necessary family budget studies, etc., have affected adversely the quality of the plan. This has produced the wrong signals for guiding a number of policies, including production, marketing, foreign trade and foreign exchange. Also, by underestimating demand, especially for food, the possibilities of inflationary pressures are created that could not be detected at the time the plan was formulated.

The industrial demand for agriculturally produced raw materials including a number of newly established industries, have not been given much attention, and were not projected in detail, except for 80,000 bales of short staple cotton.

Foreign Demand

Another aspect of demand that received little attention has been the projection of foreign demand through study of international trade prospects for the different commodities, to identify those commodities that have prospects for an increasing demand, i.e., those Sudanese products with high income elasticities and expected to be in short supply in the world during the ten year period. Such a study would help to orient the production plan towards products with bright prospects and away from commodities that have low income elasticities and face competition from synthetics, or commodities that are in surplus and where the carry-over of stocks

threaten future prices. The use of such information would orient production towards commodities for which the trend of world prices is favorable. Failure to undertake and utilize such studies has led to a number of decisions for the production of commodities not highly valued in international trade and whose prices are not at a level that greatly encourage producers to achieve the desired targets. Examples of such decisions are:

(1) The production of long staple cotton lint has been planned to increase from 200 thousand tons to 300 hundred thousand tons; since domestic demand will mostly be met from the short staple cotton, this means an increase in export of a hundred thousand tons. Cotton faces increasing competition from synthetic fibers and this is especially true for the long staple cotton. Recently, the Sudan has been facing difficulty in marketing its cotton and has operated with larger stocks than before.

(2) Commodities such as livestock, fruits and vegetables that have high income elasticities and bright prospects for an expanding demand have received little attention in the plan. The country is now importing fruits and vegetables to the value of 500,000 Sudanese pounds annually. With more analysis of world demand and

price prospects, more appropriate policies to modernize the livestock industries and more incentives for expansion in horticulture would have received attention than in the planned program.

Supply Projections

Supply projections for 11 commodities are shown in Table 6-7. These are the targets set in the plan for the different commodities, based on production policy decisions and resource allocations to the agricultural sector. The policy decision to expand sugar, coffee, rice and wheat is maintained by tariffs to improve the balance of payments and to facilitate diverting increasing sums of foreign exchange to the financing of imported investment goods. The expansion in sorghum is desired to assure the main food supply for the population. The expansion in oil seeds such as groundnuts, sesame, and castor seed is based on an increasing ability of the Sudan to place these crops in the world market. The trend of the last decade is expected to continue.

The supply projections take account of additional acreage in each crop that can be developed during the ten years; this acreage, in addition to the previous areas under cultivation, are aggregated, multiplied by possible average yields (after considering changes in productivity) to obtain total supply projections. The details of supply projections are shown in Table 6-8.

Table 6-7. Projections for Aggregate Supply Commodity-wise for the Sudan 1961/62-1970/71 According to Ten Year Plan Projections

Commodity	1961/62 Acreage	1961/62 Yield in Tons	1961/62 Total Output	Additional Acreage to be Developed	1970/71 Total Acreage	1970/71 Yield in Tons	1970/71 Total Output	Remarks
Long Staple Cotton	724	0.20	145	276	1000	0.213	213	Seed Cotton
Short Staple Cotton	180	0.05	9	200	380	0.061	27	Seed Cotton
Sorghum	3566	0.4	1433	434	4000	0.45	1800	
Groundnut	471	0.41	192	374	845	0.47	400	
Sesame	694	0.25	177	506	1200	0.23	276	
Castor Seed	9	0.44	4	21	30	0.57	17.1	
Rice	4	0.75	3	15	19	0.68	13.3	
Wheat	39	0.67	26	30	69	1.39	96.3	
Coffee	4	0.25	1	15.3	19.3	0.26	5.4	
Tea	---	---	---	0.1	0.1	0.3	0.3	
Sugar	---	---	---	75	75	2.0	150	

Source: Economic Planning Secretariat--Ministry of Finance and Economics. Ten Year Plan for Economic and Social Development 1961/62-1970/71, pp. 82-110.

Table 6-8. The National Balance Sheet for Food 1961/62-1970/71 for the Sudan (in thousand tons)

Commodity	1961/62 Projected Demand	1961/62 Supply	1961/62 + Surplus - Shortage	1970/71 Projected Demand	1970/71 Projected Supply	1970/71 + Surplus - Shortage	Remarks
I. Cereals							
1) Sorghum	1335	1433	+ 98	1758	1800	+ 42	
2) Wheat	103	26	- 77	160	96.3	- 63.7	
3) Rice	6.6	3	- 3.66	10.55	13.3	+ 2.75	
II. Animal Products							
1) Meat	332.5	na	na	542	na	na	
2) Dairy Products	143.6	na	na	226	na	na	
III. Sugar & Beverages							
1) Sugar	125	---	- 125	202	150	- 52	
2) Tea	7.88	---	- 7.88	12.43	0.3	- 12.13	
3) Coffee	7.15	1	- 6.15	10.64	5.4	- 5.24	
IV. Fruits & Vegetables							
1) Fruits	22.6	na	na	42	na	na	
2) Vegetables	66.5	na	na	103	na	na	
V. Fats & Oils	64.5	380	+315.5	98.8	750	+651.2	Converted into oil seed equivalent. Percentage oil 45%.
VI. Cotton Lint	26.6	200	+173.4	44.4	300	+255.6	

Summary

The poorness of the estimates of demand for most of the important commodities made it likely that shortages or less surplus than anticipated would result; this would have repercussions on the balance of payments, and possibly cause inflationary trends in the economy. This situation already has occurred for a number of commodities, including sorghum, wheat, sugar, livestock and dairy products, fruits and vegetables, coffee, and tea.

The lack of attention to studies of world demand and world price prospects have resulted in the orientation of production towards expanding commodities such as long staple cotton, commodities expected to suffer increasingly from synthetic substitutes and surplus supply, and for which futur demand and price prospects are not bright. Furthermore, commodities such as livestock, fruits and vegetables have high income elasticities and good prospects for an expanding demand, yet have received little attention.

The demand for food is expected to grow about 4.2 per cent per annum. This calls for more emphasis on a national food policy that creates the necessary incentives to producers to induce them to expand and meet this rapidly increasing demand.

CHAPTER VII

THE PLAN STRATEGY FOR THE AGRICULTURAL SECTOR

Objectives

The ten year plan for 1961/62-1970/71 gives especial attention and high priority to the development of the agricultural sector. Agriculture at this stage is considered the sector that can generate and transmit growth to the rest of the economy. The main objectives laid out in the plan for the development of the agricultural sector include increasing exports to earn foreign exchange, and import substitution by domestic production of sugar, wheat, coffee, rice and fruits and vegetables. Another objective includes supplying the newly established industries with raw materials such as cotton, tobacco, sugar cane and fruits and vegetables to the canning industries. Improvement in the level of diet and nutrition is desired along with expansion of production to meet the increasing demand for food. Agriculture has been an important source of capital formation in the public and private sectors. The direct share of the government in the Gezira and other schemes plus taxes on exports and imported inputs have been important sources of government revenue. The plan envisages that expansion in government revenue from

agriculture can be achieved without resort to an increase in already high taxes.

The approach of the plan to achieve such targets is mainly through the development of new land. The rationale is that land is an abundant resource and hence more of it should be used. The plan envisages the development of 972,000 feddans as an extension of the Gezira and New Pump schemes. Irrigation water for such development will be possible through the building of both the Roseires and Khism El Girba dams. The plan also proposes the development of 800,000 feddans as mechanized crop production schemes to supply 80,000 bales of short staple American cotton to the new textile mills, in addition to the production of sorghum and sesame as rotational crops. Of the total area of 972,000 irrigated feddans, about 300,000 feddans is earmarked for development by the private sector, while the area of 800,000 feddans for mechanized farm development depends entirely upon the private sector. With the availability of irrigation water, it is proposed also to intensify the rotation in the Gezira scheme by cutting the area under fallow from a half to one-twelfth.

The characteristics of the plan strategy can be summarized in the following:

(1) Expansion in agricultural output is mainly based on horizontal expansion through the development of new land rather than through raising the level of productivity of the

already developed land through use of better seed, fertilizer, and other complementary inputs.

(2) The strategy neglects the use of policy instruments to create the incentives for raising the level of productivity of the proposed new land and the already developed land; hence the approach fails to push on all fronts. Failure to raise the level of productivity of already used factors through complementary inputs is one of the main drawbacks of the plan strategy.

(3) By neglecting traditional agriculture, the greater proportion of the agriculture is bypassed by the process of growth and development; hence, the plan does not provide for mobilization of the larger part of the agricultural sector.

Pattern of Investment

The share of agriculture from the total investment programme in the ten year period is shown below.

Table 7-1. The Share of Agriculture of the Total Investment in the Public and Private Sectors in the Sudan Ten Year Plan of 1960/61-1970/71 Compared to Period 1955/56-1960/61 (as percentage)

Period	Contributions of the Public Sector	Contributions of the Private Sector
1955/56-1960/61	27%	18%
1961/62-1970/71	24%	21%

Source: Economic Planning Secretariat--Ten Year Plan for Economic and Social Development 1961/62-1970/71, pp. 83-84.

One can ask whether the 24 per cent investment in agriculture compared to the 60 per cent of gross domestic product provided by agriculture represents an appropriate allocation, and whether it does not represent a lower priority for agriculture. But an allocation of sixty per cent clearly is too large, since structural changes are desired; moreover, some of the investments outside agriculture clearly will make positive contributions in strengthening agriculture. One can only say that the plan allocates a substantial investment to agriculture.

The pattern of investment, in Table 7-2, shows that investment is heavily concentrated in the productive schemes; 54.2 per cent is concentrated on irrigation and a further 31.28 per cent is earmarked for production schemes. Of the total investment about 92.33 per cent is made in modern commercial agriculture compared to 7.6 per cent to be invested in traditional agriculture. Research, plant protection, horticultural service, seed propagation, preinvestment surveys are starved for investment. Though operating costs for research and seed propagation are included under the recurrent budget, still the provisions allocated for them in the plan are meagre.

The investment in traditional agriculture is mainly in research, preinvestment surveys, rural water supply, and animal production. Though traditional agriculture produces 72 per cent of the total gross domestic product arising in

Table 7-2. Planned Investment in the Agricultural Sector for Ten Year Plan of 1961/62-1970/71
(All in thousand pounds and percentage)

Category of Investment	Public Sector Investment	Private Sector Investment	Total Investment	Percentage of Each Type of Investment
Irrigation	65,207	---	65,207	54.28
Production schemes	7,580	30,000	37,580	31.28
Research	1,390	---	1,390	1.15
Plant Propagation	520	---	520	0.43
Horticultural Service	590	---	590	0.49
Seed Propagation	360	---	360	0.30
Forestry	2,250	---	2,250	1.87
Preinvestment Surveys	1,193	---	1,193	0.99
Grain Storage	3,359	---	3,359	2.78
Rural Water Supply	5,818	---	5,818	4.88
Animal Production	1,855	---	1,855	1.55
Total	90,122	30,000	120,122	100.00

Source: Economic Planning Secretariat--Ten Year Plan for Economic and Social Development 1961/62-1970/71, compiled from pp. 82-110.

Table 7-3. Distribution of Investment Between Modern and Traditional Agriculture (In thousands of Sudanese pounds)

Type of Investment	Allocation for Modern Commercial Agriculture	Allocation for Traditional Agriculture	Percentage Allocated for Modern Agriculture	Percentage Allocated for Traditional Agriculture	Total Percentage per Type of Investment
Irrigation	65,207	--	54.28	--	54.28
Productive schemes	37,208	--	31.28		31.28
Research	700	690	0.58	0.57	1.15
Plant protection	520	--	0.43	--	0.43
Horticultural services	590		0.49		0.49
Seed propagation	360		0.30		0.30
Forestry	2,250		1.87		1.87
Preinvestment surveys	380	813	0.32	0.67	0.99
Grain storage	3,359	--	2.78	--	2.78
Rural water supply	--	5,818	--	4.88	4.88
Animal production		1,855		1.55	1.55
Total	110,946	9,176	92.33	7.67	100.00

Source: Economic Planning Secretariat--Sudan Government Ten Year Plan for Economic and Social Development 1961/62-1970/71, pp. 82-110.

agriculture, its share of investment in the agricultural sector is only 7.67 per cent of the total investment.

Production Targets

Table 7-4 shows the production targets for the plan for modern commercial agriculture for the year 1970/71 compared to the year 1960/61 (the preplan year) and expected increases in output for the eleven important commodities provided for in the plan.

Policy Measures to Achieve Targets

The achievement of targets in modern commercial agriculture is mainly based on the following policies:

(1) Increase in the acreage cropped by developing new land for the purpose, either in the public or private sector. It is proposed under the plan to expand the area under irrigation by 972,000 feddans. It is also planned to expand the area under mechanized crop production by 800,000 feddans. This also holds true for coffee and rice in the south.

(2) Intensification of cropping in the Gezira scheme by cutting the area under fallow from fifty per cent to one-eighth and by introducing wheat and groundnuts in the rotation as subsidiary cash crops.

(3) Price policy has been given little role in the creation of incentives, except for short staple American Cotton

Table 7-4. Production Targets Under the Sudanese Ten Year Plan of 1961/62-1970/71

Crop	Type of Agriculture	1970/71 Target from New Land			1970/71 Target from Cultivated Land			Total Target for Increase in Output
		Area	Yield	Total Output	Area	Increase in Yield	Total Output	
1. Sorghum	Traditional and modern	400,000	0.45	180,000	3,515,730	0.05	175,750	360,000
2. Wheat	Modern	120,000	0.60	72,000	--	--	--	72,000
3. Sesame	Traditional	604,000	0.22	132,880	694,000	0.04	27,760	160,640
4. Ground-nut	Traditional and modern	527,000	0.47	247,690	471,000	0.06	28,260	275,950
5. Castor seed	Modern	21,000	0.57	11,970	9,000	0.13	1,170	13,140
6. Sugar	Modern	30,000	5.00	150,000	--	--	--	150,000
7. Long Staple Cotton	Modern	324,000	3.63	1,176,120	680,000	0.47	319,600	1,459,720
8. Short Staple Cotton	Traditional and Modern	200,000	1.63	326,000	180,000	0.53	95,400	421,400
9. Cotton Seed	Traditional and Modern			1,002,080	--	--	276,600	1,278,680
10. Rice	Modern	15,000	0.68	10,200	4,000	0.18	720	10,920
11. Coffee	Traditional and Modern	15,000	0.26	3,900	4,000	0.01	40	3,940

N.B. (i) Area in feddans--yields and output in tons except cotton; (ii) Long staple cotton in big Kantars of 315 lbs unginned cotton; (iii) Short staple cotton in small Kantars of 100 lbs unginned cotton.

Source: Economic Planning Secretariat--Ministry of Finance and Economics--Ten Year Plan for Economic and Social Development, p. 94.

in the Nubian mountain area where prices are announced annually in advance and a reserve fund system is operated with the purpose of reducing price fluctuations and uncertainty.

As regards traditional agriculture, the policy to be adopted is laid down in the plan text from which the following is quoted:

> The increase in production of the traditional part is envisaged to take place through the effort of producers in response to increased demand for agricultural produce from consumers and processing industries aided by public investment in infra-structure like transport and communication, in the development of rural water resources consisting of haffiers, dams, and water yards and the extension and improvement of agricultural services leading to increased productivity. It might be mentioned that a rising trend in the production of the traditional sector was already evident in the period preceding the plan and the estimates of production of some of the crops during the plan period are based on the extrapolation of these past trends.[1]

In the following two chapters we will consider the implementation of agricultural objectives, considering both modern and traditional agriculture, and on the basis of the first five years, test the hypothesis that accomplishments have been limited due to inappropriate policies and the neglect of traditional agriculture.

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[1]Economic Planning Secretariat (Ministry of Finance and Economics) Ten Year Plan for Economic and Social Development (1961/62-1970/71), Sudan Government Printing Press, p. 85.

CHAPTER VIII

THE IMPLEMENTATION OF THE PLAN FOR MODERN COMMERCIAL AGRICULTURE

In this chapter, we shall examine the third hypothesis about the performance of commercial agriculture during the first five years of the plan. First, we shall indicate the actual production of modern agriculture for the 1965 and 1966 harvests, compared with the preplan year and plan projection; then, the policy instruments will be examined for appropriateness and consistency in creating producer incentives. We shall show that a main cause for inadequate performance is that targets were not accompanied by appropriate policies to create the incentive for producers to respond in the desired direction. Such inappropriate policies will be identified, and their effects on performance analyzed. In Chapter X, we shall make recommendations for more appropriate policies.

The Characteristics of Modern Commercial Agriculture

Modern commercial agriculture in the Sudan, apart from the use of land and labor, is characterized by the intensive use of capital in the form of modern irrigation facilities, buildings, machinery, ginneries, etc. It is also characterized

by the application of new technology with moderate access to the results of modern research, and the use of such inputs as fertilizer, improved seed and insecticides. Specialization, division of labor and economies of scale have gone a long way in reducing costs and increasing returns. The abundance of land, as a factor of production, makes it possible to lease large areas, while awareness of the economies of scale has increased recently the trend towards large scale units to overcome indivisibilities. Modern commercial agriculture is fully monetized and integrated into the factor and product market.

Modern agriculture produces nearly all the wheat, castor beans, long staple cotton, legumes, cotton seed, and the newly introduced sugar cane. Some sorghum is produced by modern methods, but the bulk of this crop is produced under conditions of traditional agriculture. Some cotton seed (from short staple cotton) is produced by traditional methods. Also, traditional agriculture produces nearly all of the livestock products, although with time, as the rain fed pastures become irrigated and the nomads are settled, it is expected that sheep and cattle production will become more intensive and take on modern commercial characteristics.

In terms of acreage, sorghum and sesame are the most important crops with 3,515,000 and 694,000 feddans respectively in 1960/61. Long staple cotton is the most important crop of modern agriculture with 680,000 feddans; its economic

value is substantially greater than sesame and sorghum, and, of course, preeminent in export value. Other crops and their areas in feddans as in 1960/61 declining order: groundnuts (471,000), short staple cotton (180,000), wheat (39,000), sugar cane (15,000 beginning in 1962/63), and castor seed (9,000). The total area for these indicated crops was 5,588,000 feddans in 1960/61, 6,716,000 in 1965/66, and is projected to rise to 7,814,000 by 1970/71.

The Production Record During The First Five Years of the Plan

Indexes of acreage, yield, and total output in the fourth and fifth year of the plan for the five crops important in commercial agriculture are shown in Table 8-1. Acreage and output show moderate increases, yield is somewhat mixed. The past performance, and in relation to the plan, is summarized below.

Area Cropped

The development of new land in the first five years of the plan has been moderate. The area in long staple cotton, scheduled to increase by 48 per cent, increased by 20 per cent, leaving another 28 per cent of the base unfulfilled. The wheat areas increased sharply, showing an increase of 272 per cent leaving only a further 36 per cent of base acreage not yet fulfilled. The increase in 1956/66, moreover, appears not to have been at the expense of other products of commercial agriculture, since acreage in these

Table 8-1. Indexes of Areas, Yield, and Total Output for 1964/65, 1965/66 and Targets for 1970/71 in Relation to 1960/61 as Base, and Increases Over Base Achieved and Unfulfilled Part of 1970/71 Targets

Commodity	1960/61			1964/65			Increase Over Base			1970/71			Increase Over Base Not Yet Fulfilled		
	Area	Yield	Output	Area	Yield	Output	Area	Yield	Output	Area	Yield	Output	Area	Yield	Output
Fourth Year 1964/65															
Long Staple Cotton	100	100	100	118	101	119	18	1	19	148	115	170	14	14	51
Cotton Seed	100	100	100	-	-	125	-	-	25	-	-	182	-	-	57
Wheat	100	100	100	150	95	142	50	-5	42	408	91	377	258	1	225
Sugar	-	-	-	100	107	107	00	7	7	200	178	357	100	71	250
Castor Seed	100	100	100	198	76	150	98	-24	50	333	128	429	135	52	279
Fifth Year 1965/66				1965/66											
Long Staple Cotton	100	100	100	120	109	131	20	9	31	148	115	170	28	6	39
Cotton Seed	100	100	100	-	-	134	-	-	34	-	-	182	-	-	48
Wheat	100	100	100	372	58	215	272	-42	115	408	91	377	36	33	162
Sugar	-	-	-	100	107	107	00	7	7	200	178	357	100	71	250
Castor Seed	100	100	100	226	111	250	126	11	150	333	128	429	107	17	179

N.B. - Sugar is not produced in 1960/61; Base year is 1962/63.

Source: Appendix Tables 1 and 2.

crops held their own or slightly increased between the fourth and fifth year. Wheat expansion is mainly due to its introduction in the Gezira by cutting the area under fallow in the rotation, as a result of availability of irrigation water from the Roseires dam for intensification of the Gezira rotation. About half of the scheduled area for sugar cane was in production by 1964/65. The area in castor seed more than doubled, achieving somewhat more than half of the scheduled increase.

The land devoted to these five crops increased by more than a third, or slightly over half of the projected expansion. Even so, the land development record must be judged as unsatisfactory considering that the plan gave special priority to production projects in the first five years of the plan.

Yields

All of these crops are grown under irrigation, and thus are less subject to yield variation due to rainfall shortages. However, a hot winter affects wheat adversely and the Gash River flooding affects castor seed. Yields for long staple cotton and sugar cane show modest increases of one and nine per cent for 1964/65 and 1965/66 over the 1960/61 levels for cotton, and seven per cent for sugar. The great importance of cotton in quantity and for export argues that the yield increases in 1965/66 must be maintained and further increased. Hopefully, farmers' experience with sugar cane

will lead to substantial improvements in yield. The yield record for wheat in 1965/66 of 42 per cent below the preplan year raises questions as to whether the projected yield maintenance by the end of the plan is realistic for the hot areas of central Sudan. Only in the fifth year have castor yields been over the preplan record, raising the same question of realism.

The weather conditions in the fourth and fifth year appear poorer than average. Even so the yield record must be considered as unsatisfactory. There is little indication that intensification or a dynamic process of yield improvement has been inaugurated.

Output

Production of each of these crops has expanded more rapidly than population, due to average increases for wheat and castor, and to yield improvement for long staple cotton and cotton seed. Thus, there were more of these crops in total and per capita in the fifth plan year. Relative to 1970/71 targets, however, total output was less satisfactory than either area planted or yield. Any deficiency in either of the last two items are compounded for total output.

Apparent Reasons for Unsatisfactory Performance

Nearly all of the attained and scheduled expansion of modern agriculture in the Sudan is based upon an increase in the land area cultivated. And this land area, in turn,

depends upon the development of irrigation facilities. Therefore, the successful expansion of agriculture is closely related to the completion of new irrigation and water control projects. In the public sector, that carries major responsibilities for irrigation development, the main factors affecting adversely the development of new land can be summarized in the following: (1) The lack of adequate preinvestment surveys and of adequate preparation of projects. Instead of proceeding directly to implementation, much time is lost in the preparation of project details and necessary preliminary investigations. The lack of adequate preinvestment surveys is mainly due to the lack of a perspective planning section to which such studies could be entrusted. (2) The delay in the preparation of adequate preinvestment surveys also affected adversely the negotiation of foreign loans, which, in turn, further delayed new land development, both under irrigation and in mechanized rainland cultivation. (3) A shortage of skilled and well-trained personnel in both the central planning agency and the ministries and departments is one of the reasons underlying both factors (1) and (2) listed above. Another reason is the lack of an efficient organization of the central planning agency and planning units of the key ministries; this affected adversely the planning process, especially policy coordination and implementation.

Some increases in production are and can be obtained from improvements in yield. Yields depend upon weather, and

man's ability to overcome handicaps or to utilize nature more effectively. Increasingly, modern agriculture involves an intensification of production. Such an intensification may be based upon new varities, improved water (or climate control), new additional non-farm produced inputs, improved insect and disease control and a variety of cultural practices. In general, the application of such practices depends upon an increase in the farmers knowledge and willingness to adapt, and these, in turn, stem from research, from price and cultural stimulations and from a variety of public and private policies. Most of the rest of this chapter will analyze these policy instruments.

It should be noted that the performance for cotton was better than all crops because research, supply of non-farm produced inputs, marketing and income stabilization measures in the Gezira, and other government schemes are geared to serve cotton production. The overall record of achievement for commercial agriculture is better than that for traditional agriculture because the farmer operates under a more settled type of agriculture, has access to new technology and is better integrated into the factor and product markets. But, it appears that still better performance could be achieved, if more appropriate policies that create the necessary incentives for expansion in output were conceived as an integral part of the planning process.

Repercussion of Failure to Meet Targets

The limited growth of agricultural production has had adverse effects on progress in overall economic development. Growth is less rapid than anticipated and the foreign exchange situation is more critical, the latter because both farm exports and agricultural import substitution were smaller than contemplated. The government, because production expansion was limited, faced the threat of shortage of some commodities and consequent inflationary pressures, or the necessity to import commodities and, thereby, reduce the possibility imports of capital goods needed for development. Inflationary pressures could distort prices and lead to a rise in costs, and this would lead to a need to revise downward the total investment program. Reduced capital imports have the same effect, more directly, by slowing down, or curtailing completely, certain projects which require capital goods imports.

More specifically, the agricultural commodities most directly affecting foreign exchange in this period were cotton, sugar and sorghum. Exports of cotton were less than anticipated, especially for the 1964 harvest, as a consequence of low yields with resulting substantial reductions in foreign exchange earnings. For sugar 150,000 tons were projected, but only 45,000 tons were actually produced; thus, the balance of 105,000 tons had to be imported and continues to be imported, with substantial effects on the balance of payments.

Sorghum, mainly a product of traditional agriculture, was projected as an export crop, at about 100,000 tons annually. Instead, by the sixth year sorghum was being imported.

The lessons of this experience suggests that in the future more emphasis should be given to the following: (1) Giving more attention to formulating realistic targets based on technically and economically possible production possibilities; (2) Formulation and implementation of appropriate policies that will ensure target fulfillment by farmers through the necessary opportunities and incentives. Such policies will be examined in detail below, for modern agriculture.

The Production and Distribution of Agricultural Knowledge

In recent years the concepts of "adaptive research," diffusion of technical knowledge and "human capital" have become widely used in the literature in agricultural development. In a number of countries "packages of inputs" have been developed to transmit to farmers a combination of traditional inputs, physical capital, and tested innovations. Much of this effort is geared to the intensification of agriculture, to the increase of production per man and per unit of land area. But similar problems of information transmittal apply as nomads are induced to settle and raise crops on irrigated land, as farmers on rainfed land shift to irrigated land and even as settled farmers take on new crops and expand

acreage cultivated. Thus, first attention is directed to Sudanese policy with respect to agricultural knowledge; later in the chapter, tax and price policy, institutional services and marketing will be discussed.

Research Policy

A national research strategy has not been well articulated. Partly by default and partly through a mercantilist view of the importance of exports, research has been geared to serve commercial agriculture and particularly long staple cotton. Food crops and fruits and vegetables have received little attention. Technical research is emphasized; economic research is limited, with little integration of the two. It can be argued that in the Sudan, and in many other developing countries, technical innovations should precede economic research, but this argument is invalid when establishing a new industry such as sugar. The lack of adequate research, especially in the economics of the sugar industry, have led to or permitted the development of a high cost, low return industry, unable to meet its targets, with consequent less than projected savings in imports and balance of payments.

Among Sudanese farmers, the producers of cotton are more closely related to the research institutions, partly, as we shall see, because of the special arrangements in the Gezira irrigation project, but which also has certain built-in shortcomings. It is doubtful whether there are demonstrated research findings for other crops that can lower

appreciably the yield variation or lead to 20 per cent increases in productivity, and little effort is being made to create such innovations.

More generally, the emphasis on expanded area, as opposed to intensification, leads to a low priority on research. The allocation of funds for research in the capital budget program is only 1.15 per cent of the total investment in the agricultural sector, the allocation in the current budget is only slightly over a million pounds. Both these allocations came to about 0.4 per cent of gross domestic product arising in agriculture. Historical experience in the advanced countries suggest that the spending of research should press towards about three to four per cent of the gross domestic product arising in the agricultural sector. This amounts to seven to ten million pounds annually at the present stage of the Sudan development. There is doubt, however, if the absorptive capacity of the present research establishment of trained staff, ability to establish new research institutions and to develop more effective strategy is sufficient to utilize such large sums for some time to come. The long-term objective should be to achieve gradual increase over a period of time. Even the criteria of relating research expenditure to gross domestic product used by Nelson[1] is questionable. Further studies to verify the rate

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[1]R. R. Nelson, "The Simple Economics of Basic Scientific Research," Journal of Political Economy (June 1959), 296-306.

of return for investment in research in the Sudan using criteria such as the benefit/cost, and rate of internal return etc. Such studies will lead to better allocation of resources for research. Little consideration has been given to the future expansion of research effort. The scattering of small allocations makes it difficult to develop an integrated and coordinated research policy. Yet, a development program not based on adequate technical and economic research is a hit and miss type of exercise.

The present weaknesses in research policy can be summarized in the following: (a) Lack of adequate national coverage for the different climatic, soil and natural conditions through the establishment of research stations and substations. The need is more urgent for adaptive research that can capitalize field trials that can supply the necessary basic data. Meanwhile, progress in the establishment of well-equipped research stations should be pursued with vigor. (b) Lack of integration of economic research, especially farm management planning that projects rotations and on policies which create incentives for the adoption of innovations. Such studies should provide leverage for improved target setting. (c) The lack of development of an extension service that can carry the message from the research station to farmers and reflect back their problems. At present, the limited research results available are buried in the archives of the research division. The lack of application of the

results of research has been one of the main reasons for a lack of appreciation of the benefits of investment in research. (d) The lack of a long term policy for research and the lack of assessment of personnel needs and providing for their training as an integral part of the ten year plan. This, in the future, may prove to be a bottleneck for expansion in research programs.

Extension Service

The major extension type of activity is that carried on by the Gezira Board. The Ministry of Agriculture is the next important group, followed by a variety of small scale efforts supported by private entities such as the tobacco companies.

The Gezira scheme since the days of the Sudan Plantation Syndicate, has employed a type of field staff with little background in agriculture. The Board, as it took over the Gezira, unfortunately, followed the same pattern. The relationship with the tenant is one of giving orders; the title given to the field staff, i.e., Agricultural Inspector provides an explanation of the nature of the duties. The interest is mainly one of seeing to it that the instructions are carried out at the specified time. The field staff, therefore, has a type of knowledge that is limited to the crops of cotton, sorghum and legumes. This has created two problems. The first is the opposition by such staff to any change in the type of cropping, because of their lack of flexibility

to changes in cropping which an agriculturally trained man would have. Moreover, they do not use a combination of extension, education and persuasion as a means to convince farmers.

New varities and other innovations applicable on a broad basis can be transmitted by fiat from the Director to the Inspector to the tenant farmer, provided the use of the new techniques is visible and not dissimilar from existing practices. Innovations that apply to one farm but not another are much more difficult.

The Ministry of Agriculture field staff, though agriculturally trained, are required to perform many administrative duties, such as licensing of agricultural schemes, enforcing tenancy regulations, and Nile pump control regulations. These responsibilities are a major factor turning them into administrators rather than technicians to advise farmers.

The lack of an extension service that can transmit information to the farm level has been one of the bottlenecks to communicate the message from research to the farmer and, vice versa, to help to identify researchable problems. This has been a barrier to the transmission of new techniques and to other means for upgrading the level of farm skills. The plan has not developed an appropriate policy for the establishment of a true extension service; no allocations for the establishment of new extension units has been made. Such efforts are now limited to a few units under US-Aid.

Personnel Resources

Research and extension programs depend upon trained personnel. They are created and become effective in consequence of substantial effort over a long period of time, including adequate salaries, prestige, and responsibilities for such institutions and personnel therein. The current problem of producing and marketing of farm products should be a major concern of such institutions. However, a nation clearly embarked on a continuing development process also requires perspective planning, this in turn, requires much data and new information on alternative lines of activity and allocations of resources. Such research is virtually nonexistent.

Finally, the strengthening of research and extension institutions requires a positive policy to train future research and extension workers. Some stimulation to today's students can occur as the presently trained staff in such institutions receive financial and social recognition. Small scholarship may stimulate more students to become trained in disciplines related to agriculture. But, it appears that further efforts are needed, including scholarships abroad, special in-service training programs and agricultural development administration training centers which prepare people for careers in the creation and diffusion of knowledge. Such investments in human capital, properly allocated and utilized, can be very productive. Moreover, such investments are complementary to the development of personnel to adequately deal

with the implementation of tax, price, marketing, and other policies to stimulate agriculture.

Taxation Policy

An adequate tax system in a developing country, as the Sudan, must provide for increased saving in the public sector to provide non-inflationary means of financing government investment, be equitable in income distribution, and provide incentive for intensification and expansion in production in agriculture. Taxation and price policy can be coordinated in such a way as to create penalities and rewards and encourage expansion where it is desired to do so and lead to contraction where this is desired.

Sudanese taxes on commercial agriculture include both the central government and local government taxes. The central government levies both an export tax on the product and an import tax on the imported inputs. Such taxes are variable and are subject to change. The export tax on groundnut, sesame, and other oil seeds is 15 per cent of the export price. The export tax per 100 pounds of cotton lint and per ton of sorghum is one Sudanese pound. The export tax on farm machinery is 20 per cent and 15 per cent on fertilizer and insecticides, and these are imported factors. Since producers acting rationally equate the cost of the input and value of its marginal product, lowering the price of the product lowers the value of marginal product and hence less of the

factor is used; hence the levels of yield are lower. A tax on the factor, such as machinery, fertilizer and insecticides, increases the price of the factor and hence less of the factor is used. The effect of these two types of taxation is to discourage intensification in production to boost the level of yields, to increase costs, to reduce returns, and to create a lack of incentive for an expansion in output. By increasing costs and reducing returns, it reduces the country's ability to compete in the world market; it further reduces the business profit tax revenue and share of the government from government schemes, and hence saving and investment in the public sector. Society ends with a smaller total product. The surplus for export is also reduced and the country receives less foreign exchange earnings. If such taxes are abolished and replaced by a land tax or business profit tax, the adverse effects can be mitigated, as only the surplus will be taxed and such taxation has much less effect on resource allocation.

Farmers in the mechanized crop production schemes, as well as tenants in the Gezira and pump schemes are taxed on crops other than cotton; such taxes vary from one area to another and range between seven per cent of the gross value of the crop to one-eighth. A system of taxation which is related to the gross value of the crops, is an obsolete system. Conceivably, under such a system in a year of poor crop, the farmer may be paying more tax than the surplus earned after evaluating his labor at current market rates.

Such a system does not create incentives for expansion in production. Taxes related to the gross value of the crop are a function of both the level of yield and price; in the absence of a price policy, such a system of taxation adds to uncertainty and interfers adversely with the allocation of resources.

In case of the cotton pump schemes, a tax of four per cent of the gross value of the cotton crop after deduction of joint costs is paid to the local authorities. Such taxes are deductable from business profit taxes payable to the central government. Therefore, the scheme owner ends with payment of a business profit tax and the system merely distributes the tax between the central and local government.

Another aspect of the taxation system, is that the greater part of the taxation, that part related to the gross value, accrues to the local government authorities, and this is especially true for the mechanized crop schemes and pump schemes. The central government undertakes the greater part of the investment in infra-structure such as dams, tree clearance in the mechanized area, roads, and water supplies, as well as other investments. The share of the central government in tax receipts is relatively low, and unless the central government can capture an adequate return for its investment, this system will jeopardize the raising of foreign loans to finance future development. Hence both tax reform and redistribution of the tax revenues between the central and local government are needed.

One of the assumptions of the ten year plan has been no change in the level of taxation, and by ignoring the long overdue tax reform, implementation with regard both to the level of yields and to total output has been adversely affected, through tax interference with resource allocation.

Price Policy

A price policy in the context of economic development can be used to achieve a number of objectives, which include the reflection of demand to producers, shifts in resource allocation, the creation of incentives to produce a given output, a reduction in undesirable fluctuations and the elimination of cycles in production, changes in income distribution and changes in the terms of trade between agriculture and industry.

Modern agriculture is more responsive to price changes than traditional agriculture, and shifts in cropping and areas under the different crops in the mechanized schemes and pump schemes usually take place. However, in the Gezira scheme, where decisions are more centralized and rotations are decided by the board in consultation with farmers, the responsiveness may be more sluggish, since an administrative bureaucracy will need some time to adjust; and probably also, there is too large a role for technicians and too small a role for economists.

The Sudan government has adopted a neutral price policy and does not operate storage programs, so that laissez-faire

prevails. In the absence of a positive price policy, there is greater scope for internal and external forces to create price uncertainty, both internal and external capital rationing, interferes with resource allocation, create barriers to adoption of new technology, discourage specialization and realization of economies of large scale operations. However, a positive price policy can also underpay farmers for their product, establish regional barriers to trade, discourage investment and lead to other kind of inefficiencies. Thus, a positive price policy may contain a variety of stimulating and discouraging impacts upon agriculture. The effectiveness of a price policy depends on how well it is articulated.

In the mechanized crop production schemes, farmers are mostly part time farmers, most of the investment is in the form of farm machinery, and little investment is tied to the land. In years when sorghum prices are low, they liquidate their operations for a year or two until prices improve and this further intensifies such fluctuations. The land rent in such schemes is a nominal ten pounds per farm of one thousand feddans (about twenty-eight dollars), which make farmers losses,by laying aside their operations, negligible.

The lack of a price policy and absence of strategic storage programs for grain and the possibilities of years of poor crops, especially for sorghum, may lead to shortages and the need for importation of sorghum, as happened in the

1966/67 season when sorghum had to be imported from the United States. The fluctuations in sorghum production are usually greater for the part produced under mechanized agriculture, which is the smaller fraction.

In the Sudan, high food prices are considered to be inflationary and are strongly opposed by the urban population and trade unions and these have more political power than justified by their numbers. The government is also interested in low food prices to reduce payment from the treasury as cost of living allowances, which otherwise would decrease saving and investment in the public sector. Whenever farm prices improve, committees are set up to look into lowering the cost of living; usually such committees come out with decisions to encourage expansion in production through the leasing of more land, increasing the supply of credit and other services without direct interference with the level of prices.

The exploration of the possibilities of a national marketing scheme for cotton, coupled with a price policy, has revealed a number of problems that need to be sorted out. These include the need for large amounts of capital to finance a storage program, both for the public and the private sector; difficulties in forecasting future price trends, and the possibilities that the government may take losses under such a system. The threat of such losses and the tying up of a large amount of capital in stocks may be at the expense of savings and investment in the public sector. Probably, trying

to make a start with cotton has been unfortunate in view of the large size of the crop and its high proportion of total output and the fluctuations in world prices. A better start could be made in the food crops until a price policy is refined and tested gradually with time.

In the absence of a price policy, producers of rice and coffee that are produced as import substitutes are selling in a sheltered market equal to the world market plus the import duty. This is creating incentives in the short run for an expansion in production. But when a surplus over the domestic consumption is produced, competition for the internal market will decrease the price to the world price level and discourage expansion in production. An import substitution policy without a price policy may prove to be self-defeating in the long run.

Institutional Arrangements

Land Tenure

The share-cropping system in the Gezira and cotton pump schemes give the board or the scheme owner a percentage share of the proceeds of cotton, while the total output of sorghum and legume accrues to the tenants. Therefore, a clash of interest is created between the tenant and the board or scheme owner. The operation of a joint account for cotton tends to mitigate this effect, but does not eliminate them. The tenant has a substantial incentive to shift inputs of fertilizer, etc., to the crops where he obtains one hundred

per cent of the product. The factor, such as water, supplied by the government and/or board for such crops, tends to be used by the tenant to the point that will maximize total output since they are available free to the tenant. For the board and government such inputs are chargeable against the cotton crop, which increase its costs and reduces its returns. The tenant likewise, in applying his inputs to the cotton crop, tends to do so to the point where marginal factor cost equal forty-two per cent of the value of marginal product.[1]

Such being the case, the present tenure system interfers, adversely, with the allocation of resources, discourages intensification, increases cotton costs, and reduces returns. Society ends with less total product. The result is less surplus for export and hence less foreign exchange earnings. The high cost also reduces the ability to compete on foreign markets. This also reduces the government share by way of the business profit tax from the private schemes and hence reduces saving and investment in the public sector. The apparent answer is to introduce reform in the share-cropping system that ensures equal shares for all crops and extension of the joint account system to all crops.

The system of tenure in the mechanized crop production schemes grant short term leases, varying from one to five

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[1]Gezira Share-cropping System: Cotton is shared according to: Government 42 per cent, Tenant 42 per cent; Board 10 per cent, and two per cent for each of Tenants' reserve fund, Social Development fund, and local government. All sorghum, legumes, etc., accrue to the Tenant.

years with nominal rents of one piaster per feddan (3.3 cents). The lack of security of tenure discourages investment in land and encourages wasteful land practices. It also creates an unstable type of farming; if prices drop, operators may liquidate their operations for a year or two. The farmers in these areas are part-time farmers. Fixed assets are in the form of farm machinery, that can be disposed of with slight loss, or stored for a year or two until conditions change. Rents are nominal. These factors make it easy for a farmer when prices are low to liquidate their operations for a year or two until conditions change. Supply in this type of farming is completely reversible.

Farm Credit

The Agricultural Bank, a public institution, provide loans for commercial agriculture at the rate of six per cent for operating costs and eight per cent for long term capital investment type loans. Its capital of five million pounds is inadequate to meet the needs of modern commercial agriculture, and hence, loans are raised in addition from commercial banks and foreign financing institutions. With the drop in the price of cotton after the Korean war, the flow of capital from commercial banks and foreign sources has been limited. The Agricultural Bank, being a new institution, has limited its dealings to financing the operating costs for the already established schemes, while making a start in providing capital for the mechanized schemes, rice and coffee development.

To qualify for capital loans, the farm operator must provide not less than thirty per cent of the capital requirements of his project from his own resources.

The plan entails the channelling of some of the foreign loans through the Agricultural Bank to meet the requirements of the private sector. The delay in negotiating and concluding these loans has affected adversely the development of new land in both the mechanized and private pump schemes.

Marketing Policy and Marketing Institutions

The Gezera scheme has its own marketing organization for cotton lint and cotton seed, and also markets the cotton lint and seed of the other government schemes. The crop is sold in open auctions in Khartoum, or may have been sold earlier against a future contract at the Liverpool future market. The private cotton growers market their crop on their own through sale to exporting firms or the agricultural bank. Due to their need for cash, they usually undercut the prices of the Gezira board to sell first. The lack of a national marketing institution is a major drawback. Grades and standards for cotton are well-developed and private ginneries are regulated; the prices charged by the ginneries are fixed by the government.

Crops other than cotton are marketed in the same auction markets in which traditional farmers sell; this will be dealt with in Chapter IX.

The Returns from Commercial Agriculture

One word of caution must be made before concluding this chapter. Commercial agriculture in the Sudan is highly profitable, and private enterprise applicants to enter farming for the new schemes both in irrigation and mechanized farming far exceed those provided for in the plan. Data to give an example of the return for capital investment for the scheme owner after evaluating his labor at current rates for three types of investment are given in Table 8-2.

Summary

In this chapter, the part of the third hypothesis on the unsatisfactory performance of commercial agriculture in the first five years of the plan was tested. Data for five important crops revealed that acreage development, yields, and total output showed an unsatisfactory performance, considering that the plan has given special attention to productive schemes in the first five years.

The reasons for the delay in land development are the lack of perspective planning, lack of preinvestment surveys, and inadequate preparation of projects. This had delayed the negotiation of foreign loans and retarded the flow of foreign capital. The underlying causes for this delay are inefficient organization of the planning secretariat and the planning units of the key ministries, and a lack of adequately trained staff.

Table 8-2. Returns for Capital Investment in Modern Commercial Agriculture in the Sudan

Type of Farm	Annual Returns £s	Total Investment £s	Return on Investment £s	Remarks
Mechanized Crop Production Scheme[1]	2,740	7,500	36.66%	Scheme of 1,500 feddans growing sorghum, cotton, and sesame mechanically
Coffee Farm[2]	9,050	61,000	14.60%	Project of 400 feddans growing coffee inter-cropped with groundnuts
Cotton Scheme[3]	18,000	150,000	12.00%	Cotton Scheme of 9,000 feddans growing 3,000 feddans of cotton

Source: [1]Unpublished Loan application made jointly by the Economic Planning Secretariat and Department of Agriculture to I.B.R.D., 1964.

[2]Unpublished Submission made by the Planning Secretariat to the Kuwait Develop-Fund, 1964.

[3]Report on Tenant/License relationship--Department of Agriculture (unpublished), 1959.

Targets for yields in some cases were set at an unrealistically high level; appropriate policies to achieve such yield targets were not formulated and implemented. In particular, policies in the fields of production and distribution of knowledge, i.e., research, extension, and personnel training are inadequate. An obsolete taxation system, and the lack of price policy have interferred adversely with the allocation of resources and created few incentives for intensification to achieve higher yields. Institutional policies of land tenure, farm credit and marketing also interfere with output expansion. The interaction of all these factors has created barriers to the achievement of targets for total output, as the effect of lack of achievement of acreage targets and yield targets are compounded. This had adverse effect on the rates of growth for the agricultural sector and subsequently the whole economy.

CHAPTER IX

THE IMPLEMENTATION OF THE PLAN IN RELATION TO TRADITIONAL AGRICULTURE

In this chapter, we shall examine the third hypothesis on the inadequate performance of traditional agriculture. The three parts of the third hypothesis will be focused on: The neglect of traditional agriculture, the lack of appropriate policies that create incentives to producers, and repercussion of inadequate performance of the traditional agriculture on overall performance of the agricultural sector, and the whole economy will be identified and analyzed in detail.

In chapter X, recommendations for improved administrative procedures and coordination of policy instruments shall be made.

Characteristics of Traditional Agriculture

Traditional agriculture is the largest component of the agricultural sector, constituting seventy-two per cent of the total gross domestic product originating in the agricultural sector. The main inputs in traditional agriculture are land and labor; capital is a minor input mostly in the form of simple hand tools. It is characterized by a slow rate of

growth, a paucity of available new ideas, slow acceptance of such new ideas, and limited communication of technical knowledge. Yields, apart from fluctuations associated with the weather, pests and diseases, have remained nearly constant. In the Sudan, the yield of American cotton under conditions of traditional agriculture has remained constant for twenty years (see Table 9-1). The pattern of production is geared to meet the family needs plus a surplus for market sale to meet the cash needs in purchasing non-home-produced consumer goods, in paying taxes, etc. There is relatively more integration into the product market than into the factor market.

New technology is not adopted due to the lack of the knowledge of its potentialities, very limited education, and the lack of demonstration of its effect. Traditional farmers shy away from trying new methods due to risk and uncertainty; hence, adoption requires education, training and demonstration. The level of investment in traditional agriculture is low because savings are low, and savings are low because incomes are low. Savings are accumulated in livestock, where numbers rather than quality counts; this is true for the well-to-do. Traditional peoples are coming in contact with new culture, new wants emerge every day--bicycles, transistor radios, and what not. Under such conditions saving and investment for the majority is meaningless because neither the means nor the desire to save exist. In a nutshell, Professor T. W. Schultz

Table 9-1. Area, Production and per Feddan Yields for American Cotton Under Traditional Agriculture in the Kordofan Province in the Sudan (1942/43-1961/62)

Year	Area in Feddans	Total Output in Metric Tons	Average Yield per Feddan	Average Yield as Moving Average for Three Years
1942/43	25,390	2,010	0.079	---
1943/44	13,950	2,427	0.174	0.136
1944/45	19,000	2,973	0.156	0.171
1945/46	4,426	0,804	0.182	0.151
1946/47	2,600	0,298	0.115	0.160
1947/48	22,787	4,201	0.184	0.146
1948/49	65,806	9,082	0.138	0.147
1949/50	76,030	9,029	0.119	0.121
1950/51	116,872	13,434	0.115	0.144
1951/52	159,000	31,371	0.197	0.165
1952/53	152,111	27,723	0.182	0.188
1953/54	162,184	29,989	0.185	0.181
1954/55	231,360	40,872	0.177	0.186
1955/56	149,966	29,269	0.195	0.170
1956/57	126,938	17,476	0.138	0.180
1957/58	170,275	35,431	0.208	0.160
1958/59	198,300	26,562	0.134	0.155
1959/60	143,000	17,769	0.124	0.140
1960/61	161,000	26,311	0.163	0.134
1961/62	206,000	25,793	0.125	---

Source: Agricultural Statistics, Department of Agriculture, May 1964.

has summarized the attributes of traditional agriculture in the following:

> The critical conditions that generates this type of equilibrium are as follows; (1) the state of arts remain constant (2) the state of preferences and motives for holding and acquiring sources of income remain constant, and (3) that both of these states remain constant long enough for marginal preferences and motives for holding and acquiring agricultural factors as sources of income to arrive at an equilibrium with the marginal productivity of these sources viewed as an investment in permanent income streams.[1]

The Performance of Traditional Agriculture in the First Five Years of the Plan

Indexes of acreage, yield, and total output in the fourth year, 1964/65, and fifth year, 1965/66, of the plan are shown in Table 9-2 in relation to the base year 1960/61 (the pre-plan year) for traditional agriculture. Actual data for acreage is shown in Appendix Tables I and II. The performance, as gauged by the fourth and fifth years, can be summarized as follows.

Acreage

The changes in acreage were not consistent for the different crops. Acreage in sorghum declined from 3,515,000 feddans in the base year 1960/61 to 3,373,000 feddans in 1964/65, a decline of four per cent from the base (from 100 to 96 per cent). In 1965/66 sorghum acreage increased to

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[1]T. W. Schultz, Transforming Traditional Agriculture (Yale University Press, 1965), p. 71. (Paperback)

Table 9-2. Indexes of Acreage, Yield, and Total Output for 1964/65, 1965/66 Compared with Base 1960/61 and Percentages Fulfilled, and Unfulfilled in Relation to 1970/71 (Taking 1960/61 as Base Period)

Crop	1960/61			1964/65			Increase Over Base			1970/71			Unfilled Part of Target		
	Area	Yield	Output	Area	Yield	Output	Area	Yield	Output	Area	Yield	Output	Area	Yield	Output
Fourth Year of the Plan, 1964/65															
Sorghum	100	100	100	96	83	80	-4	-17	-20	111	110	125	15	17	45
Sesame	100	100	100	172	84	145	72	-16	45	187	120	226	15	36	81
Groundnut	100	100	100	177	83	146	77	-17	46	212	115	245	34	32	99
Short Staple Cotton	100	100	100	156	122	189	56	22	89	211	147	310	55	25	121
Fifth Year of the Plan, 1965/66				1965/66											
Sorghum	100	100	100	97	78	76	-3	-22	-24	111	110	125	14	32	49
Sesame	100	100	100	146	86	126	46	-14	26	187	120	226	41	34	100
Groundnut	100	100	100	212	75	159	112	-25	59	212	115	245	00	35	86
Short Staple Cotton	100	100	100	161	111	179	61	11	79	211	147	310	50	36	131

N.B. - For detail see Appendices I and II.

3,419,000 feddans but did not reach the base level; the extent of decline dropped to three per cent of base (from 100 to 97). For oil seeds, the behavior of acreage was mixed. Sesame showed an increase in the fourth year but declined in the fifth. Groundnuts showed a spectacular trend, and by the fifth year, the ten year target was achieved. The area in sesame increased from 694,000 feddans in the base year to 1,193,000 by the fourth year, an increase of 72 per cent over base. By 1965/66, the fifth year, the acreage of sesame declined to 1,013,000 feddans which reduced the increase over base to 46 per cent. Groundnut plantings increased from 471,000 feddans in the base period to 831,000 feddans by the fourth year (1964/65), and reached 999,000 feddans by the fifth year (1965/66), increases over the base of 77 per cent and 112 per cent respectively. American short staple cotton has shown an increasing trend. The area increased from 180,000 feddans in 1960/61 to 280,000 by 1964/65 and to 290,000 by 1965/66, an increase of 56 per cent and 61 per cent over base, respectively. This suggests that substitution has taken place with sorghum (the staple food crop) giving way to other cash crops. This is especially true for oil seeds.

By the fourth year the unachieved percentage of targets over base for sorghum, sesame, groundnut and American cotton were fifteen per cent for sorghum and sesame and thirty-four and fifty-five per cent for groundnut and short staple cotton

respectively. By the fifth year the unachieved target as percentage over base for sorghum, sesame and American Cotton were fourteen, forty-one and fifty per cent over base respectively. As mentioned earlier, the acreage target for groundnut was achieved by the fifth year. Though no Sudanese prices for these crops could be obtained, prices of groundnut C.I.F. British ports have shown an increase from LE 59.7 in 1963 to the level of LE 65.7 by 1964 and reached LE 76.1 by 1965. In the same period, export prices of sorghum showed little change. The overall picture shows that of the total projected increase in acreage for the four most important crops of about 1,730,000 feddans only about 860,000 or fifty per cent of the projected increase has been developed by the fifth year. Groundnut progress has been excellent. Overall, the land development situation can be judged as reasonably satisfactory, but a final judgment can only be passed after considering yields and total output.

Yields

Sorghum yields were seventeen per cent and twenty-two per cent below base in the fourth and fifth year, leaving twenty-seven and thirty-two per cent of target over base unfulfilled by the fourth and fifth years. Sesame shows levels of yield of sixteen and fourteen per cent below base in 1964/65 and 1965/66, leaving thirty-six per cent and thirty-four per cent of yield targets unfulfilled by the fourth and fifth years. Groundnuts show yields of seventeen per cent

and twenty-five per cent below base unfulfilled by the fourth and fifth years. Short staple cotton yields show an increase of twenty-two per cent and eleven per cent over base in the fourth and fifth years leaving twenty-five and thirty-six per cent of the target over base unfulfilled.

The poor performance in yield, except for cotton, is mainly due to the instabilities of shifting cultivation, lack of supply of improved seed, very limited use of fertilizer and insecticides, lack of extension and education and inappropriate taxation, price and marketing policies. These policies will be discussed later in detail. Cotton yields show better records because of the supply of improved seed, better control of pests and diseases and annually guaranteed prices announced to farmers in advance of planting. The overall record of yields has been most unsatisfactory for sorghum, sesame and groundnuts and to a lesser extent for short staple cotton.

Output

Total output of sorghum dropped by twenty per cent in fourth year, and by the fifth year, dropped by twenty-four per cent in relation to the base. As a result, by the fourth year forty-five per cent of the base remained unfilled and by the fifth year the proportion unfulfilled was forty-nine per cent. This resulted in grain shortages and the need for imports during the sixth year. For sesame, total output by the fourth year increased by forty-five per cent leaving

another eighty-one per cent of the base unfulfilled. By the fifth year, the sesame output record showed an increase of twenty-six per cent leaving a target increase of 100 per cent of the base unfulfilled. Groundnut output increased by forty-six per cent and fifty-nine per cent in relation to base in the fourth and fifth years respectively. This left ninety-nine per cent and eighty-six per cent of target in relation to base unfulfilled. For short staple cotton, output was eighty-nine and seventy-nine per cent over base in the fourth and fifth years. This leaves a further 121 and 131 per cent of the base unfulfilled by the fourth and fifth years, respectively.

Livestock, especially cattle, sheep and to a lesser extent camels, are important products of traditional agriculture, both for local consumption and for export. The value of livestock exports ranges between three to four million Sudanese pounds. Data referring to the production of livestock, increase in numbers or market output are not available for the Sudan for the first five year period. Hence performance of livestock in relation to crops could not be gauged. Since most farmers have a few animals for power (and a little milk), it is possible though not probable, that some declines in crop production have been offset by increases in livestock production. Since some pasture lands are being converted to crop land, and since overgrazing is reducing the quality of the pasture, there is little reason to believe that the livestock industry has expanded very much, if at all.

The common attitude to count wealth in terms of numbers of livestock and the improved control of diseases, have increased livestock numbers beyond the carrying capacity of the pasture and water resources. The loss of animal condition in the dry season is great, resulting in considerable waste. Yet, livestock products are characterized by high income elasticity and an expanding domestic and world demand. The ten year plan largely has ignored the modernization of the livestock industry, and hence investment was not directed to a very promising commodity.

The above comments suggest the following conclusions for the performance of traditional agriculture during the first five years of the plan.

(1) Acreage performance was mixed, poor for sorghum, excellent for groundnuts and moderately satisfactory for sesame and American cotton. (2) The levels of yield deteriorated remarkably from the preplan level for all four crops except for short staple cotton, for which modest yield increases were recorded. Poor yield performance in relation to targets has been the main underlying cause for unsatisfactory overall output performance. (3) The overall output record for the four crops showed very little increase in output and more than two-thirds of output target, in most cases, remained unfulfilled. (4) Considering that traditional agriculture contributes about three-quarters of total output originating in agriculture, its unsatisfactory output performance in the

first five years of the plan is the underlying cause for overall unsatisfactory performance for the agricultural sector.

This unsatisfactory performance of traditional agriculture can be attributed to a number of factors, the interaction of which lead to the performance outlined above. These factors include the following:

(1) The inadequate share of traditional agriculture in the total investment program. While traditional agriculture contributes seventy-two per cent of total output, its share of the agricultural sector investment program for the ten year period is only eight per cent. This investment is mainly concentrated in rural water supplies, livestock disease control, and the establishment of a new research station. The potentials of these investments are not realized, mainly due to the lack of complementary investment.

(2) The lack of appropriate coordinated policies that might be treated as a package program, each supporting the other. Such a package would include infra-structure services, research, education and extension, taxation, price policy, credit, land tenure and marketing. The lack of such policies and their effect on the plan will be dealt with in detail below.

Lack of Adequate Infra-structure for Growth

The inadequate infra-structure for growth consists mainly of the absence of all weather roads and poor domestic water supply in the dry season, especially in the control

rainlands. The transportation system is inefficient; hence cost of transport is high. High cost of transportation reduces the price of the product, increases the price of non-farm produced inputs, narrows the size of market, discourages the division of labor and the utilization of the economies of scale, and delays the integration of the regions into the national economy. The shortage of water during the dry season forces water hauling for long distances, which increases costs, reduces returns, and creates disincentives for expansion in production. The lack of an adequate infra-structure for growth in the central rainland exerts external diseconomies on the individual firm. Such types of investments are capital intensive, lumpy, and due to indivisibilities, are none or all types of investment. Since the social marginal benefit exceeds the private marginal benefit, the individual firm can not capture all the benefits, and hence has limited incentive to make such investments. Therefore, it becomes the function of the state to provide such types of investment.

The infra-structure must be forthcoming in the right amount, place, and time if incentives are to be created for the individual firm.

Production and Distribution of Knowledge

Research Policy

We have already, in Chapter VIII, dealt with the inadequacy of the national research policy and the inadequate

size of the allocation for research for the agricultural sector. Traditional agriculture has received a meagre share of the research effort; out of seven research stations and substations in the country only two are located in areas of traditional agriculture. One of these, in the Nubia, is exclusively for short staple cotton research, the other, in the south does research on a number of crops. Research attention has been given mainly to commercial agriculture, though when posts in research are vacant, these vacancies are being shifted to traditional agriculture. Research on food crops has received little attention; the mercantilist approach leads to concentration on export crops, especially cotton. The unstable shifting agriculture, the lack of use of modern non-conventional inputs, the limited knowledge on better cultural practices, are some of the underlying reasons for poor yield performance. This is compounded by inadequate research and poor communication of research results to farmers. The ten year plan includes a research station to be located in the west. The establishment, equipping and staffing of such a station involves a long time lag, meanwhile, the concentration on field trials that can yield quick results has been ignored.

Education

Agricultural education is limited to the school of Agriculture of the University of Khartoum and the Shambat Post-Secondary Agricultural Institute. Both provide trainees to man the higher echelon of the government service in the

Ministries, department, and boards. Early efforts to establish training centers at Borgieg in the north and Yambio in the south did not succeed, as the trainees were looking for government employment instead of returning to work with their families or to farm on their own. Formal education follows the same curricula for urban and rural areas. The result of the inadequate policies for agricultural education has been the lack of development of agriculture as a profession, low standards of farm management, and a lack of knowledge of the possibilities of improving the level of farming and farm skills. This stagnation in the level of technology and a depressed level of farming continues, as there is little change in the quality of human resource from one generation to another.

Extension

Extension policy was already discussed in Chapter VIII. Traditional agriculture had little access to extension with very little information filtering down to the farm level. The lack of an extension service has been the main reason for the lack of communication of the few research results available to the farm level and a lack of reflection of the problems of farmers back to research workers. Diffusion of knowledge has therefore been very limited; hence the level of technology remains stagnant and yield deteriorates rather than improves. The full potential of investment in research will not be realized without complementary investment in extension.

Taxation Policy

Traditional agriculture is taxes by both the central and the local government. Central government taxes consist of export taxes on crops and tariffs on imported inputs, at the same rates as for commercial agriculture. Local government taxes are assessed on the gross value of the crop marketed. The effect of this taxation on resource allocation and incentives was dealt with in Chapter VIII in detail. However, the taxation system presents unique inequities for traditional agriculture, including the following: (1) The tax exemption for traditional agriculture is the amount consumed by households, while for other producers in commercial cotton schemes, the tax exemption is £s 300 (about $840). If the same principle were applied to traditional agriculture, most of these farmers would not be subject to taxation. (2) Commercial cotton scheme owners pay a local tax of four per cent of the value of the cotton crops, which is deductible from the business profit tax to the central government; hence, in effect, they pay a business profit tax only. The tax deductions are transferable from year to year. The system only distributes the tax between the local and central government. (3) The incidence of indirect taxation on sugar, and the excise and import taxes on consumption items, are related to the amount consumed rather than income. To maximize the tax revenue, heavy taxes are imposed on commodities with an inelastic demand. Hence, traditional farmers are

heavily taxed and this reduces their capacity to save and invest in agriculture.

Another aspect of the taxation policy, not discussed before, is the escalation of export taxes when the export price of a crop rises and the de-escalation of taxes when the world price of a crop drops. This holds back expansion when it is desirable to do so and discourages contraction when this is desirable. As a result, this tax interferes adversely with resource allocation by distorting price ratios between crops and the possibilities of substitution. As a result, the country, over the business cycle, may end with less foreign exchange than would be the case in the absence of such a taxation system, given that supply is somewhat elastic for individual commodities.

The system of taxation, as outlined above, was described by Professor T. W. Schultz when he referred to the taxation system of the less developed areas as "the death of agricultural development."[1]

Price Policy

The implications of the absence of a price policy has been discussed previously in detail in Chapter VII. However, the establishment of guaranteed prices for short staple cotton

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[1]T. W. Schultz, "Comment on Taxation Policy," Agricultural Development and Economic Growth, edited by H. M. Southworth and B. F. Johnston (Cornell University Press, 1967), 65.

that are announced annually before the planting season and the operation of a system of reserve funds in which payments are made when prices are low, does represent a positive price policy. This has produced a type of stability of prices, within a range, and is one of the reasons for better performances relative to targets, for short staple cotton. However, the system is limited to traditional farmers in the Nuba mountains and in the south who are growing cotton on a share cropping basis with the government. The system also has a drawback in a malallocation of resources over time by not reflecting the world price to producers; this depends on the extent of range within which prices are stabilized.

In traditional agriculture, where there is no centralized management for decisions and no centrally determined rotation as in the Gezira, the lack of a price policy may lead to unanticipated increase in the production of some commodities at the expense of others. The specific plan targets may be met in total but not in detail. As already apparent in the first five years performance, an unanticipated increase in the prices of oil-seeds in relation to sorghum led to substitution of groundnut for sorghum and a consequent food shortage. This can be troublesome for some aspects of the plan, but it should be recognized that the shifts in production pattern may represent an improved allocation of resources, and may signal to the planners that their target mix was not appropriate.

Another aspect of the price policy deals with inputs. For commercial agriculture, inputs such as fertilizer and insecticides are imported in bulk by the Gezira scheme and large scheme owners and, according to the tenancy regulations, are charged to the joint account at cost. For traditional agriculture, such inputs are not available in the remote areas unless contracted in advance and the intermediary may charge high rates for small lots. A policy to make such inputs available to farmers in traditional agriculture at moderate prices needs to be developed.

Marketing Policy

Farmers in traditional agriculture are small, scattered geographically, and find it unprofitable to undertake all the stages of marketing. National policy has concentrated on the improvement of marketing for the cotton crop, while other crops are neglected. Export firms undertake to purchase the crop at the main auction centers. The poor transport system results in tying up large amounts of capital in stocks awaiting rail transportation to Port Sudan. This often leads to stifling competition by reducing the number of potential competitors. The lack of adequate storage facilities and insurance coverage on such stocks adds to the problem. Therefore, even though an auction market exists, competition is not as vigorous as it should be.

The lack of development of adequate research in marketing, the limited training of personnel, the poorness

of the market intelligence services, the absence of grading standards, inadequate storage facilities, the lack of credit and of farmers' marketing institutions are some of the pressing problems hampering efficient marketing.

The plan has given no attention to the development of a marketing strategy for food crops and for export crops other than cotton. High marketing costs depress the price to producers and reduce incentives for an expansion in output.

Institutional Arrangements

Land Tenure

Abundance of land and low population pressure support the development of tribal communal tenure. The absence of individual ownership and freehold system stimulates wasteful Land practices; land in the marginal areas bordering the desert were overgrazed and overcultivated leading to soil erosion; large areas have been lost to the creeping desert. Due to the absence of freehold ownership, individuals maximize their short run returns and move to new land. This is a wasteful system and society and future generations stand to lose. The cost of such practices in the long run may prove to be very high. The avoidance of settled agriculture and rotation farming stemming from the lack of incentives for adoption of soil conservation practices, often is one of the reasons for the decline in yields.

Expansion in irrigation schemes and mechanized farming is pushing traditional agriculture away from the areas more accessible to the railway lines and water supply. This inflicts losses on traditional farmers by increasing their costs of transportation, thus reducing their economic rent as they move towards the extensive margin of cultivation. A long term program of land use, land settlement, and long term leases is necessary to create incentives for soil conservation practices and settled rotation of farming, which could improve levels of yield.

Farm Credit Policies

The capital market is least efficient for traditional agriculture. The Agricultural Bank (a public institution) does not provide credit for farmers in traditional agriculture. Due to security requirements, its services are geared to serve established farm owners.

Moneylenders provide loans against a mortgage of the crop at very low prices (almost half the market price), and loan proceeds are usually made in kind at prices higher than market prices. Rates charged are high because moneylenders are few in each village, and because the risk of failure to repay is high. The chance of a crop failure in the marginal rainlands is about one in five. Failure to repay in one year may lead to permanent indebtedness; the farmer may be forced to continue his transactions under such a system permanently.

The high rates charged lower the net price of the product; since farmers equate the cost of the input and the value of marginal product, this reduces incentives for expansion in output and discourages intensification to achieve higher yields. Higher prices for the purchased input result in using less of it, resulting in the same lack of incentive. The poor functioning of the capital market discourages incentives for intensification and an expansion in output.

The Losses Inflicted on Traditional Agriculture By Growth in the Rest of the Economy

Farmers in traditional agriculture are suffering from low incomes related to a low level of productivity and caused by a low level of technology and overtaxation. There is a little relief in some areas in the form of plowing back part of the tax revenue in water supply improvements, formal education, and health services.

People in traditional agriculture, with their limited resources, compete with modern mechanized large scale farming. Mechanization also has depressed the seasonal demand for labor; if mechanized operations continue to expand, the demand will be drastically reduced. Labor drawn from traditional agriculture, if not settled on the land, may shift to towns and increase the pressure on housing and other services, increase unemployment, and raise the incidence of crime. With the growth of industries concentrated around Khartoum North, such migration will strip the countryside of the young,

educated, and energetic, who will respond to the selective process of migration.

The desire for increased public savings to finance large development projects led to "non-pareto" better decisions on taxation and the distribution of investment and services financed by taxes. The burden of the tax has fallen heavily on traditional agriculture, while others benefit. Growth in the rest of the economy was a costly process for farmers in traditional agriculture. This growth has inflicted economic, social, and political losses on traditional agriculture. In addition to heavy taxation, these losses show up as poor services, migration and loss of opportunity for income improvement. The projected rate of growth for traditional agriculture is 3.3 per cent while population is growing at 2.8 per cent, which barely keeps pace with population growth, whereas the rest of the economy is growing at a gross rate of 6.9 per cent because investment is concentrated in that sector. Due to lack of fulfillment of targets the 3.3 per cent may not be achieved; thus, growth in income in traditional agriculture may lag behind population growth. Except for the few who may find chances to settle on the new irrigation projects, the remainder of those in traditional agriculture are liable to suffer from increased frustration and widening income disparities. This has undesirable political repercussions. Hence traditional agriculture is entitled to better treatment in the economy to redress the

losses inflicted upon it. This can only be achieved if opportunities are improved. In the long run, this can be done only by modernization of traditional agriculture. This modernization can be achieved by allocating appropriate kinds and amounts of investment and by formulation and implementation of appropriate policies.

Summary

The examination of the performance of traditional agriculture in the first five years of the plan has established the following: (1) The fulfillment of targets has shown unsatisfactory performance with a large gap between targets and actual performance. The gap is even greater for yield and total output as compared to acreage; yields for all crops examined, except cotton, deteriorated from the preplan year, with substantial depressing effect on total output. (2) The unsatisfactory performance is mainly due to the followings: (a) The meagre share of traditional agriculture in the total investment program. (b) The lack of formulation and implementation of appropriate policies as related to infrastructure, research, education and extension, taxation, price policy, marketing, land tenure, and farm credit. The lack of such policies has failed to create incentives for raising the level of productivity and output. (c) Both (a) and (b) above indicate a considerable effect on traditional agriculture. Due to the large contribution of traditional agriculture to

total output in the agricultural sector, this effect leads to an unsatisfactory overall performance for the agricultural sector.

The unsatisfactory performance of the agricultural sector had adverse repercussions on the rate of growth of the economy, saving and investment in the public and private sectors, balance of payment and ability to compete in foreign markets.

CHAPTER X

RECOMMENDATIONS

In this chapter, we shall make recommendations for changes in the pattern of planning activities and in the policy implementation of planning objectives. The intent is to develop a series of activities which will correct the weakness of the present program, as indicated by several hypotheses examined in this thesis. These recommendations will be divided between short term recommendations--those capable of influencing accomplishments under the present plan--and long term recommendations--those which reorganize the planning machinery and improve the process of policy formulation and implementation.

To recapitulate, six propositions were set forth and verified in this thesis. With appreciable modifications these are:

(1) The organization of the planning machinery of the Sudan as regard location, status and internal organization proved to be inadequate; such limitations made it difficult to pursue a coordinated and effective program.

(2) The targets for the agricultural sector were not related to domestic demand nor to the prospects

of international trade. This led to underestimation of domestic demand, and also, underestimation of targets for import substitution with adverse repercussions on the balance of payments. It also led to continued production of commodities for export not highly valued by international trade.

(3) The expansion of Sudanese agriculture has depended primarily upon an increase in the area under cultivation including an expansion in irrigation. This expansion has more than kept pace with population growth, though not equally for all commodities. However, the performance has not been satisfactory in relation to the plan targets particularly for yields.

(4) Planned targets were not accompanied by appropriate policies that create the necessary incentive for boosting yield and output.

(5) Implementation of the plan for the agricultural sector has neglected traditional agriculture. This neglect was manifested in its low share of the investment program and almost total absence of appropriate policy instruments.

(6) Since traditional agriculture contributes seventy-two per cent of the gross domestic product originating in the agricultural sector, its

unsatisfactory performance is almost equivalent to an unsatisfactory performance by the agricultural sector. This unsatisfactory performance of the agricultural affected adversely the growth of the economy.

These weaknesses, as elaborated in this thesis, lead to the recommendations presented in the rest of this chapter.

Short Term Recommendations

The principal criterion for new effort, during the second five years of the plan, is the creation of incentives which will stimulate an increase in yields. These would be in addition to current efforts to increase the area in cultivation and under irrigation. For the short term, emphasis must be given to the identification of known research results that can be applied and clearly will increase production. Research results from past or current work, sometimes published and sometimes not fully completed, need to be drawn upon aggressively for results that can be applied. Research results and new varieties of crops, etc., established in other countries can be introduced without much time lost in testing. Groundnut varieties from Nigeria, fruit and vegetable varieties from Egypt are examples in point. For new varieties, time can be saved by a one-year testing of imported varieties before their application, rather than longer term testing of Sudanese created strains and varieties.

In the short run, with the cooperation of the few extension units already established, programs for the existing field staff and Gezira inspectors can be made to explore means to increase productivity. Seminars and conferences to discuss such possible efforts, by commodities, to discuss implications of tax reductions, price policy etc., should be arranged. Opportunities for the field staff to reflect their problems to research technicians also need to be provided.

In taxation policy, it seems appropriate to emphasize elimination of taxes on imported inputs to create greater incentives for intensive farming. This is possible in the short run in view of the small revenue that accrues to the treasury from such taxes. A policy to deal with other aspects of taxation policy will be dealt with under long term recommendations.

The supply of modern inputs, such as fertilizer, and the price at which they are available to the traditional farmer need to be reconsidered. The possibilities of subsidizing such inputs should be explored by trying the system on a small scale in a specific area, to explore the response of farmers, the effect on productivity and the costs to the treasury; information is needed to determine whether the system can be applied on large scale in the subsequent plan.

The possibilities of a positive price policy for other crops need to be investigated such that in the next plan, a

start can be made in using price policies as a development tool. Steps need to be taken now to set up a "task force" to investigate such possibilities, and to explore the crops for which such a system can be applied in the form of minimum guaranteed prices. Such studies should explore the importance of the crop, supply elasticity, storage problems, training of personnel etc. Experiences of other countries in the same stage of development with similar successful programs need to be drawn upon.

In the field of credit, the possibilities of raising the capital of the Agricultural Bank to meet the needs of commercial agriculture should be pursued in detail. Funds can come from government resources or from foreign loan or both. New procedures to channel credit to traditional agriculture need to be identified, and might be applied on a trial basis in selected areas--such results to be applied in the next plan.

Reform of land tenure in the Gezira needs a task force to examine possible revisions of the present tenure system, probably readjusting the sharing system. Because such changes may be resisted, it would be advisable to apply it on a small scale to test it before applying it generally, especially in sensitive areas like the Gezira. The new system should be tested for a number of criteria. Such criteria should include equity and justice, efficient resource allocation and increase in productivity.

Attention must be given to an economic investigation of the livestock industry to identify the possibilities for its improvement to stimulate greater production. The purpose of such an investigation should be to prepare some information for policy formulation when considering the next plan.

Long Term Recommendations

Policy Recommendations

A long term policy for research needs to be formulated; this should estimate the national requirements for research stations, personnel, equipment and funds. A vigorous training program for research workers needs to be inaugurated. As funds and resources are made available to put the long term program into effect, emphasis still should be concentrated on adaptive research that can give quick results for application under field conditions. In planning such research, economists and especially farm management planning specialists, must be involved in the design of such trials and in identifying the bottlenecks that hamper farmers in adopting such improved practices. Policy instruments must be manipulated so that incentives are created to overcome such bottlenecks.

Tax reform is an urgent requirement. Studies need to be made to explore new sources of taxation to replace the present obsolete taxation system related to the gross value of the product; the removal of inequity in the taxation of traditional farmers is also important. Equitable distribution

of the tax between local and central government also needs special attention. Tax reform has many implications, including its effect on government budgets, local government, creation of an elaborate tax collection machinery (the present tax collection does not involve such an elaborate administrative machinery), and the cost of tax collection in relation to revenue. Therefore, careful studies and drawing on expert knowledge is important.

A policy for personnel training to meet the needs of the public sector, stemming from national manpower requirements, need to be given special attention. The country needs personnel training for research, extension, economics, statistics, policy and planning, and for many other needs. Consideration of the personnel needs of the private sector are equally important.

Conferences and workshops to bring together research workers, extension staff, other administrators, and farmers to discuss problems and to interact with each other may prove to be highly rewarding.

In view of the rapidly expanding population and rising incomes, the demand for food will be growing at the high rate of about 4.2 per cent per annum. The development of a national food policy needs to be given special attention. This should entail the creation of incentives to producers through the policy instruments of price policy for factors and products, changes in the tax system, marketing, land tenure, etc.

Livestock production must assume an increasing role partly to meet the increasing domestic demand and to continue to earn increasing amounts of foreign exchange. With abundant land, the Sudan, through investment in research, the improvement of pasture, and the industrialization of livestock products, may be able to develop an industry supplying the expanding world market. Research should seek to identify the potentials and ways to attain them. Citrus, pineapple, and bananas all do well under Sudanese conditions. Research (both technical and economic) needs to be conducted to determine the possibility of expanding production of fruits and vegetables to replace present imports of £s 500,000 and for further expansion for export in the future.

Research with the object of economizing in the use of irrigation water to enable bringing more land under cultivation should be another approach to expand food production.

Reorganization of the Planning Machinery

Planning, to be effective, must be an integral part of the political process of government; the planning agencies must acquire the status that will enable them to formulate and coordinate government policies. Previous discussions have shown that, so far, this has not been the case in the Sudan. Neither the location, nor the status of the planning agencies has helped them to assume such a function. Changes and modifications need to be introduced to enable them to do so.

The present system of having both an economic council and a ministerial development committee tends to represent some duplication. The creation of one ministerial development committee headed by the Prime Minister is enough. The present National Technical Planning Committee should be maintained but should not be dominated by the Civil Service; the representation of non-government elements need to be enhanced.

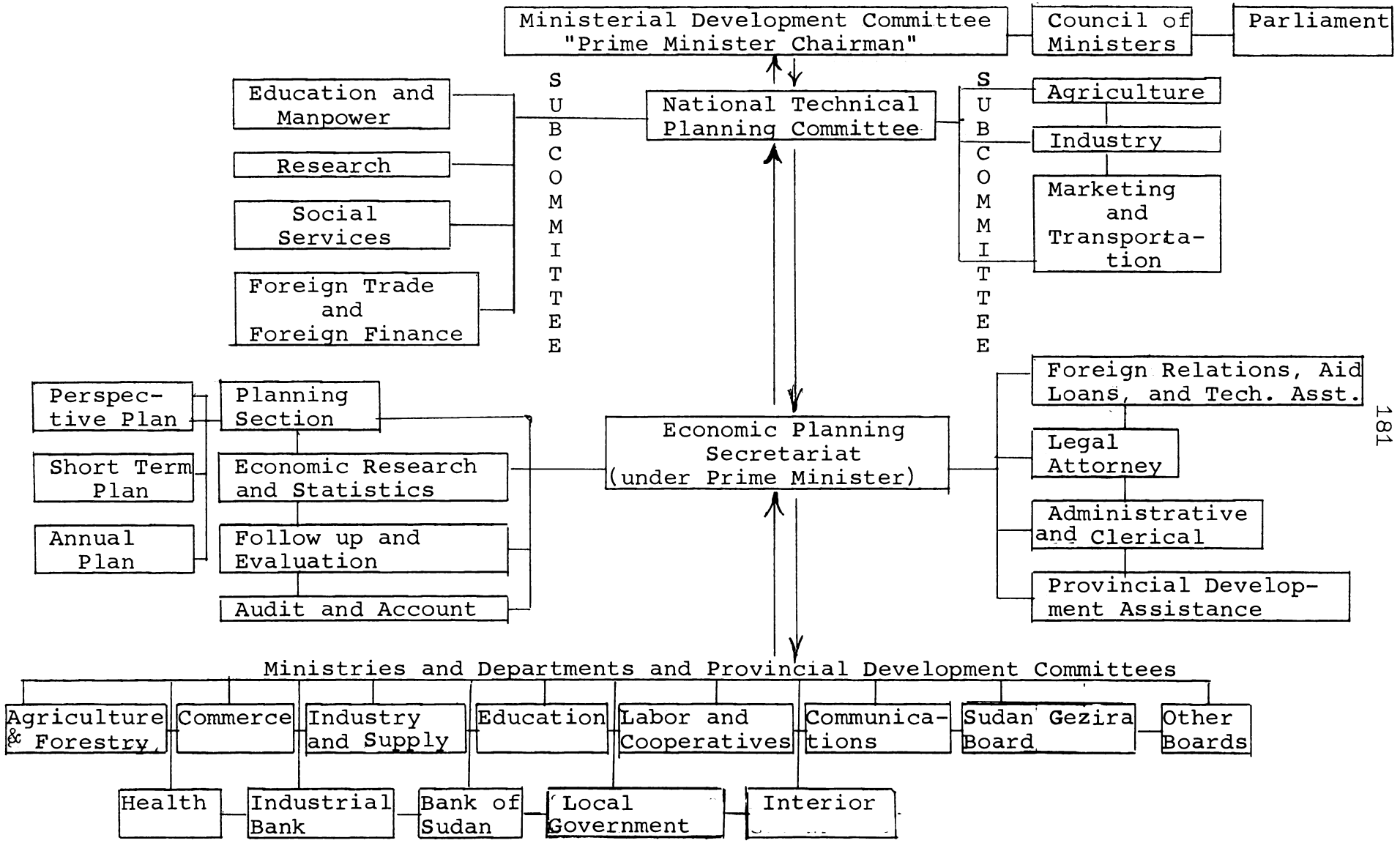
The National Technical Planning Committee needs to operate through specialized committees. Suggestions for such committees include Agriculture, Industry, Marketing and Transportation, Education and Manpower, Research, Social Services and foreign trade and foreign finance. The economic planning Secretariat needs to be transferred from the Ministry of Finance to a position under the Prime Minister. The planning Secretariat needs reorganization, and probably should entail the following: (1) a planning section, with subsections for perspective planning, short term plan, annual plan; (2) economic research and statistics; (3) follow-up and evaluation; (4) foreign relations (aid, loans and grants); (5) provincial development assistance; as well as; (6) section for legal attorney; (7) accounts and audit, and (8) administrative and clerical. The planning units in the ministries and departments also need to be strengthened and adequately staffed. Such units should work closely and in harmony with the central planning agency. This proposed reorganization is

laid down in Chart II. Decentralization by the establishment of provincial development committees with delegated power to deal with local small scale projects must be considered. At the start limited functions must be granted and, as ability to handle more is proven, more power can be delegated. Such projects can be treated as technical and financial assistance programs from central to provincial authorities. Such a system has educative value, helps create leadership and reduces the burden on the central government.

The planning agency should try to shift completely from the present dominant project by project approach. The emphasis should be on formulation, coordination and implementation of policy. The planning agency should not attempt to do everything but should aim at supplementing the market mechanism by giving priority to the type of investment that is not expected to be forthcoming from the private sector, i.e., investment in social overhead capital, research, education, and the production of the public goods. It should also work through creating incentives to influence and direct the private sector investment and to encourage foreign investors, guarantee their capital and ensure transfer of profits. This can be achieved if the policy instruments are manipulated to ensure that such incentives are created for the private sector.

In making decisions on the pattern of investment, studies on the projections of domestic demand and international

CHART II. Proposed Organization of the Planning Machinery in the Sudan



trade prospects must provide the guidelines for policy decision. This will ensure that the country will not end up with products not highly valued by international trade which represent mis-use of resources.

Economic development requires institutional change in the functions of already established institutions and the creation of new institutions. The legal framework of the country, land ownership and land tenure systems, and business profit tax laws require changes so that incentives are created to further the cause of economic development. The creation of a capital market, new banking institutions and insurance to mobilize private savings to further the cause of economic development is also an urgent requirement.

In the next plan special emphasis must be given to the process of target setting. One refinement must be the assessment of demand by making projections based on domestic demand for consumption, intermediate demand for new material and possible exports based on world demand. In making supply projections, experts in research, farm management planning, policy, agricultural engineering, etc., must work as a team to select for the different areas possible rotations based on results of research. Then they must consider bottlenecks hampering implementation and recommend policy measures to be included in the plan to overcome such obstacles. This is a backward and forward exercise until the best fit is obtained between demand and supply after allowing for exports and imports.

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APPENDICES

APPENDIX I. Areas, yields and total production for the important crops in the Sudan 1960/61 to 1965/66 and targets for 1970/71.

Crop	1960/61			1961/62			1962/63		
	Area in Feddans	Yield tons/ feddan	Total Output	Area	Yield	Total Output	Area	Yield	Total Output
Sorghum	3,515,000	0.408	1,433,000	3,757,488	0.381	1,434,000	3,757,488	0.338	1,266,000
Wheat	39,000	0.666	26,000	40,704	0.638	26,000	43,248	0.670	58,512
Sesame	694,000	0.183	127,000	1,048,128	0.221	232,000	829,344	0.171	142,000
Groundnut	471,000	0.407	192,000	503,712	0.296	149,000	742,848	0.308	229,000
Castor Seed	9,000	0.444	4,000	15,264	0.262	4,000	15,264	0.328	5,000
Sugar	---	---	---	---	---	---	15,000	2.80	42,000
Long staple cotton	680,000	3.16	2,149,000	700,000	5.58	3,906,000	715,000	3.85	2,751,000
Short staple cotton	180,000	1,11	200,000	231,800	1.27	294,000	270,000	1.48	399,000
Cotton Seed	---	---	209,732	---	---	379,821	---	---	281,124

APPENDIX I - Continued

Crop	1963/64 Area in Feddans	1963/64 Yield tons/ feddan	1963/64 Total Output	1964/65 Area	1964/65 Yield	1964/65 Total Output	1965/66 Area	1965/66 Yield	1965/66 Total Output
Sorghum	3,503,088	0.384	1,348,000	3,373,000	0.337	1,138,000	3,419,000	0.320	1,094,000
Wheat	58,512	0.530	31,000	58,500	0,632	37,000	145,000	0.386	56,000
Sesame	1,264,368	0.138	174,000	1,193,000	0.154	183,700	1,013,000	0.158	160,000
Groundnut	905,664	0.319	289,000	831,000	0.337	280,000	999,000	0.305	305,000
Castor Seed	17,808	0.393	7,000	17,800	0.337	6,000	20,400	0.491	10,000
Sugar	15,000	3.00	45,000	15,000	3.00	45,000	15,000	3.00	45,000
Long staple cotton	760,000	2.23	1,701,000	800,000	3.20	2,562,000	815,000	3.45	2,814,000
Short staple cotton	260,000	1.05	273,000	280,000	1.35	378,000	290,000	1.23	357,000
Cotton Seed	---	---	176,250	---	---	262,500	---	---	288,125

APPENDIX I - Continued

Crop	1970/71 Target		
	Area	Yield	Total Output
Sorghum	3,915,000	0.450	1,788,750
Wheat	159,000	0.600	98,000
Sesame	1,298,000	0.220	287,540
Groundnut	998,000	0.470	467,950
Castor Seed	30,000	0.570	17,140
Sugar	30,000	5.00	150,000
Long staple cotton	1,004,000	3.63	3,644,720
Short staple cotton	380,000	1.63	621,400
Cotton Seed	---	---	380,900

N.B. = (i) All areas in feddans
(ii) Yield and output are in metric tons except cotton.
(iii) Long staple cotton in big Kantors of 315 pounds unginned cotton.
(iv) Short staple cotton in small Kantors of 100 pounds unginned cotton.

APPENDIX II. Indexes for acreage, yield and total output for the important crops in Sudan for the period 1960/61 to 1965/66 and for target for 1970/71 taking 1960/61 as base.

	1960/61			1961/62			1962/63			1963/64		
Crop	Area	Yield	Total Output	Area	Yield	Total Output	Area	Yield	Total Output	Area	Yield	Total Output
Sorghum	100	100	100	107	93	100	107	83	88	100	94	94
Wheat	100	100	100	104	96	100	111	101	112	150	80	119
Sesame	100	100	100	151	121	183	120	93	112	182	75	137
Groundnut	100	100	100	107	73	78	158	76	119	192	78	151
Castor Seed	100	100	100	170	59	100	170	74	125	198	89	175
Sugar Cane	---	---	---	---	---	---	100	100	100	100	107	107
Long staple cotton	100	100	100	103	177	182	105	122	128	111	71	79
Short staple cotton	100	100	100	129	114	147	150	133	200	144	95	137
Cotton Seed	---	---	100	---	---	181	---	---	134	---	---	84

APPENDIX II - Continued

Crop	1964/65 Area	1964/65 Yield	1964/65 Total Output	1965/66 Area	1965/66 Yield	1965/66 Total Output	1970/71 Target Area	1970/71 Target Yield	1970/71 Target Total Output
Sorghum	96	83	80	97	78	76	111	110	125
Wheat	150	95	142	372	58	215	408	91	377
Sesame	172	84	145	146	86	126	187	120	226
Groundnut	177	83	146	212	75	159	212	115	245
Castor Seed	198	76	150	226	111	250	333	128	429
Sugar Cane	100	107	107	100	107	107	200	178	357
Long staple cotton	118	101	119	120	109	131	148	115	170
Short staple cotton	156	122	189	161	111	179	211	147	310
Cotton Seed	---	---	125	---	---	134	---	---	182

N.B. Actual data on which indexes are calculated is shown in Appendix I.