PEANUT IN MALI: AN ANALYSIS OF ACREAGE RESPONSE AND MARKETING PERFORMANCE

by

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INTRODUCTION

1. The Need For The Study

Peanuts were formerly Mali's principal export. From 1961 to 1965, for instance, four products (livestock, cotton, fish and peanuts) contributed 80% of the total export earnings to Mali. Table 1 below shows their relative share of exports:

Table 1

	1961	1965
Livestock	11%	33%
Cotton	9%	17%
Fish	23%	20%
Peanuts	28%	16%

Source: Mail, OACV. Note de Presentation. December, 1977.

Peanuts drops from first place in 1961 to last in 1965.

The drop in absolute value is: from 1,392,349,000 FM in 1961 to 625,799,000 FM in 1966 and 540,000,000 FI in 1980.[1]

The overall pattern since 1972 has been one of fluctuations in production and marketing levels. As export levels dropped Mali's share of the world market dropped from 3.5 to 2.0 percent.

From a national perspective, land is not a limiting factor to increased agricultural production. Estimates are that cultivated area could

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[1] In 1961 and 1965, 1 U.S. dollar = 246.85 Malian Francs (Average Annual Exchange Rate). In 1980, 1 U.S. dollar = 4.00 Malian Franco (Average Annual Exchange Rate). Source: United Nations, Statistical Yearbooks 1967 and 1980.

be increased up to ten or more times its current level without major additional investment in land or water development.[1]

Considering the adaptability of peanuts to the soil conditions in Mali, peanuts are expected to maintain their importance in Malian agriculture; however, the economic benefits which could be derived from the peanut sector will be directly affected by national policy regarding taxation, marketings and pricing of the crop. In particular, the role of prices in providing necessary incentives to induce increased production and marketing should not be underestimated.

2. Purpose and Specific Objectives of the Study

The general purpose of this study is to analyze selected factors affecting Mali's ability to increase production and sales of peanuts. In specific terms the objectives of this study are:

1. to analyze factors affecting the supply of peanuts in Mali;
2. to analyze the current structure and conduct of the Malian peanut industry; and
3. to outline the principal ideas which may permit an evaluation of the efficiency of peanut price policy with respect to its impact on production, marketing, and export of this commodity.

3. Sequence of Analysis

In Chapter I an overview of the country's economic and structural potential with emphasis on agriculture is presented.

In Chapter II an analysis and performance of the marketing structure is presented.

In Chapter III an econometric model for the short-run supply response is developed.

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[1] Robbins and Garvey, Millet and Sorghum Price Policy, April 1972, p. 4.

Finally, in Chapter IV a summary of major findings, recommendations, and suggestions for further research are provided.

CHAPTER I

BACKGROUND CONDITIONS IN MALI

I.1. General Overview

Mali is located in the interior of West Africa. Most of the country lies in the West African savana region, a transition area between the coastal rain forest and the desert. The northern part of the country lies within the Sahara Desert.

Mali covers 1.2 million square km (California and Texas combined) in three zones--280,000 km^2 of desert (less than 200 mm annual rainfall) and a sudanic zone of 600,000 km^2 (over 600 mm annual rainfall).

Mali's current population is 6.8 million. Ninety-one percent of Mali's population works in agriculture, which accounts for 44% of the GNP and comprises 65% of Mali's exports. Mali's principal products are millet/sorghum, corn, rice, sugar, cotton, peanuts, and livestock.

The 1976-78 development plan adopts four long-term objectives for the rural sector, two of which relate to food and export crops. The plan's primary concern is the satisfaction of the nation's food needs, but near-equal importance is given to the extraction of a "maximum economic surplus" from the rural sector in order to provide for an increased rate of investment in the industrial sector. The principal source for this transfer comes from exports of agricultural commodities on the stated assumption that world and especially African demand will continue to increase. Mali's two main export crops, cotton and peanuts, are expected to make significant contributions to the economic development of the country. They are expected to provide Mali with foreign exchange and resources for investment in the industrial sector.

I.2. Land Resources, Land Use and Production

About 60 percent of Mali's 1.2 million square kilometers is unsuitable for agricultural use because that portion gets less than 200 millimeters of annual rainfall. Another four percent is committed to nonagricultural uses. More than 95 percent of the remaining 437 square kilometers either is used solely for livestock pasturage or is unused.

This means that only about 1.8 million hectares, merely 1.5 percent of the total land area, is currently devoted to production. Of the cultivated land, 61 percent is in the southern part of the country that receives more than 800 millimeters of annual rainfall. Thirty-two percent is in the central part of the country, which receives between 500 and 850 millimeters of rainfall annually. About one-third of this is cropped under full irrigation or under uncontrolled to partially-controlled flood conditions. The remaining cultivated land is found in the Sahel, Lacustre and Sixth Region Zones[1] where rainfall is less than 500 millimeters per year. In these areas farmers often use irrigation or flood-recession techniques along rivers and around lakes or ponds.

Food grains occupy about 80 percent of the cultivated land in Mali, with the basic upland crops, millet and sorghum accounting for more than 67 percent. Next in importance after cereals are peanuts and cotton, using 13 percent and 6 percent, respectively, of the total cultivated land. Vegetables, cowpeas and specialty crops are grown on the remaining 2.5 percent.

Except for peanuts and cotton, production of the major crops remained stagnant throughout the 1960s. The country's total output of cotton has risen steadily over the past 10 years, the drought years excepted. Groundnuts

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[1] See 1974-78 Development plan, p. 37.

have been declining steadily and it is becoming apparent that Mali is losing whatever comparative advantage it may have had in that crop.[1]

I.3. The Development Operations

In the latter part of the 1960s, Mali in essence chose to adopt an intensive system of agricultural services centered on the priority promotion of export crops in a few regions considered favorable, which would contribute to a rapid growth of these export crops and of zones and populations which would produce them (see Maps 1 and 2 on pages 7 and 8).

The government's policy now, however, is to return to the integrated approach. Each operation is to become a rural development effort based on agriculture but also is concerned with such things as farm-to-market roads, functional literacy, village water supply, and human and animal health. At the same time there is to be emphasis on crops other than the one of original focus. To demonstrate this change, Operation Arachide (which is centered on peanuts) changed its name to Operation Arachide et Cultures Vivrieres (OACV).

The operations have largely supplanted the organization of agricultural services inherited from the colonial period. The old system, financed through the national budget, followed the government's administrative hierarchy.

One of the main advantages of participating is the ability to obtain farm implements and fertilizer on credit through the intermediary of the operation. There are other important advantages as well. One of them is the assurance of a relatively convenient market at a fixed (though perhaps low) price for a particular cash crop. Another is the availability of

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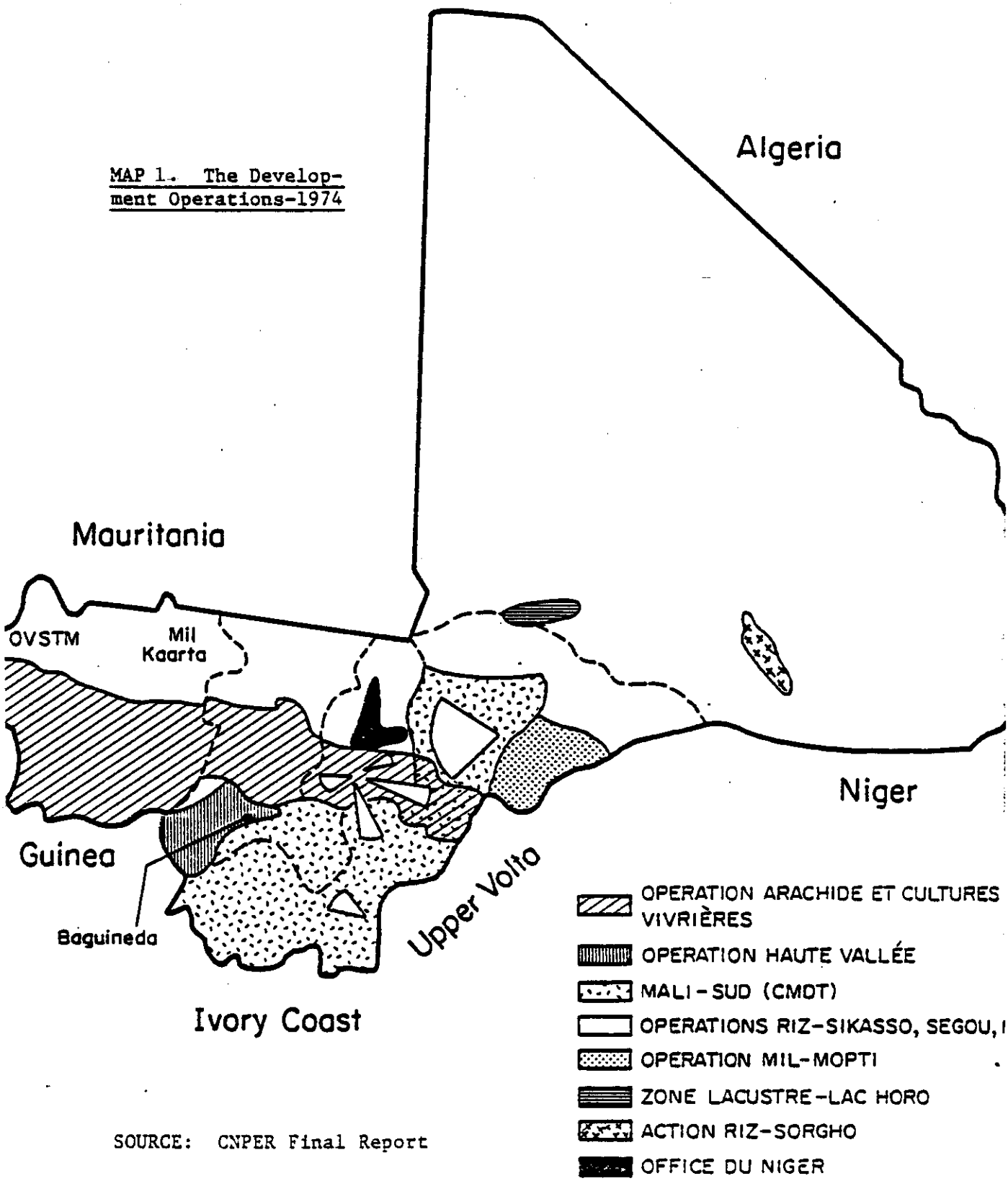
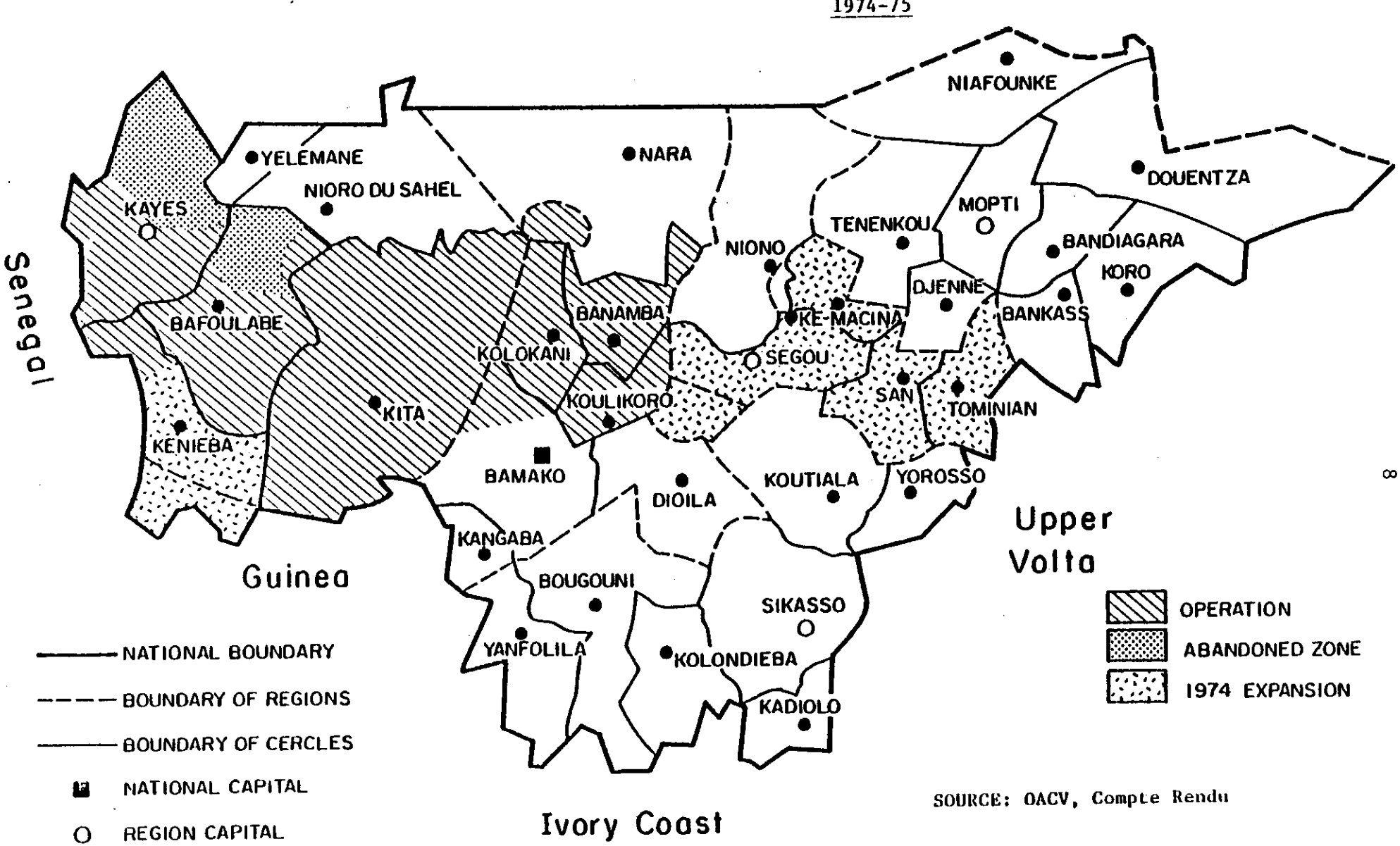
[1] Mali Country Department Strategy Statement (SDSS) -- AID p. 10.

MAP 1. The Development Operations-1974



SOURCE: CNPER Final Report



MAP 2. Opération Arachide et Cultures Vivrières, 1974-75

SOURCE: OACV, Compte Rendu

selected seed and fungicides. Still another is greater density and mobility of extension agents.

Instead of following administrative boundaries, the operations seek to define the limits of the field-level units by agricultural criteria as well as by the feasibility of providing extension services.

The operations approach changed the functioning of the agricultural services system in two important respects. First, the operations "are provided with financial and administrative autonomy in order to coordinate and utilize rationally all the means necessary to execute rural development programs."[1] Financial autonomy permits operations to obtain funding directly from foreign donors. In addition, some receive Malian revenue, not through the national budget, but through ad valorem taxes collected at the time a cash crop is sold for export or processing.

A second major change from the old system involves structure. Instead of following administrative boundaries, the operations seek to define the limits of the field-level units by agricultural criteria as well as by the feasibility of providing extension services.

I.4. Overview of the Agricultural Price Policy

In Mali, as elsewhere, agricultural price policy is seen as one means contributing to the achievement of numerous (though often conflicting) objectives. The CNPER final report specifies that in conformity with the goals of the plan price policy must:[2]

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[1]Article 2 of Ordonnance No. 22 of the Military Committee for National Liberation, March 24, 1972.

[2]CNPEP, Programme du Secteur, I. p. 23.

a. Encourage farmers to adopt animal traction equipment. Basic equipment is a prerequisite to increased agricultural productivity and subsequent technical development.

b. Focus on the great mass of farmers, those who have neither a large labor force, nor initial capital, nor income from other sources.

c. Give the government the ability to control markets in order that it may carry out its responsibility for income policy, for financing public services, and for providing food to towns and deficit rural areas.

These objectives express a government intention to maintain product-input price differentials in agriculture sufficient to induce traditional farmers to produce a marketable surplus, to save, and to invest in agricultural equipment. Moreover, together with the government's often-expressed desire to maintain consumer price stability in basic foodstuffs and equity among regions, the third objective implies that producer prices, particularly of export crops, should be set in such a manner as to generate government revenues through marketing or export taxes.

I.4.1. Agricultural Prices

Tables 2 and 3 on pages 11 and 12 present data which illustrate the agricultural price policies implemented in Mali in recent years.

As shown by the tables, official agricultural product prices have increased steadily since the mid-1960s. Between 1968 and 1974, millet-sorghum and rice prices doubled, peanut prices increased 67 percent and cotton prices 87.5 percent. Official input prices were also raised periodically. Equipment prices, rose somewhat in 1970s, remained constant through 1974, but the impact of world oil price changes was felt in 1975 when prices of plows, toolbars with attachments (multiculteurs), and ox carts increased by 74 percent, 50 percent, and 75 percent, respectively. Lesser increases in prices of fertilizers and other annual inputs occurred in the same year.

New and substantial price rises for agricultural implements and chemical inputs in effect for the 1976-77 agricultural season have changed this picture. Inputs now cost up to 200 percent more than they did in 1970. Since these new increases were not matched by product price rises, the historical relationships between official product and input prices have been altered. Table 2 below illustrates the rise in the prices of peanuts and other inputs.

Table 2

Comparison of the Costs of Inputs and Producer Price in 1966 and 1977 (M.F.)

	CAMPAIGN	
	1966 - 1967	1977 - 1978
Pair of Oxen	35.000	140.000
Donkey	2.500	60.000
Toolbars	15.300	23.000
Producer Price (Shelled Peanut)	24 MF/Kg	40 MF/Kg

Source: Assises du Commerce, Ministere des Finances et du Commerce, CMCE Tome II. Bamko 12-14 Avnl 1979.

From an international point of view, the data in Table 3 on page 12, show that producer prices in Mali are clearly lower than prices in other West African countries.

I.4.2. Establishment of Producer Prices

In Mali, two types of calculations have been performed at one time or another to estimate reasonable or just producer prices for agricultural products marketed under price controls. One set of calculations yields estimates of producer reference prices for each product based on border prices (Table 4

Table 3

Price Comparisons for Major Crops in Mali, 1976

Crop	Producer Prices (MF/kg)[a] Mali	Neighbors	Consumer Prices[a] in Mali (MF/kg)	Import Prices[b] (MF/kg)
.llet, Sorghum, Maize	32	36-37	51.3	40
.ce (paddy)	40	70-130	115.5[d]	55-70
anuts (in shell)	40	83	115-185[e]	54
tton	75	80-140	--	164
nat	100	250	--	--

fficial prices

mport prices are for processed products (e.g., cotton lint, milled rice) CIF alian frontier, converted to a raw product basis (1975 prices).

n general the higher prices shown are for Ivory Coast or Senegal; the low prices re for Upper Volta.

illed Rice.

ree Market price for shelled and roasted peanuts.

urces: BCEAO, Notes d'Information et Statistiques, January 1976, IER, Coubs Moyens de Production, Annexes. CNPER, Programme du Secteur I, pp. 39-46.

Table 4. Reference prices for 1974 - 1978, producer prices proposed and implemented 1974-75 and 1975-76.

Product	Calculated Reference Price[1]					Proposed Producer Price[1]		Actual Producer Price[2]	
	Malian Border Base[3]		Cost of Production Base						
	1974-1978	1976[4]	1974/75[5]	1975/76[5]	1976/77[6]	1974/75	1975/76	1974/75	1975/76
Seed Cotton	305	164	65/82	99/116	102	75	100	75	75
Peanuts (in shell)	65	54	38/43	47/52	58	40	50	40	40
Rice (paddy)	55-70	50	39/45	52/58	46	42	55	40	40
Millet, sorghum, maize	40-65	--	31/34	35/38	40	32	35	32	32

[1] CNPER, Programme du Secteur, I, pp. 23-32, 37-54 (particularly pp. 30, 31).

[2] Table 27.

[3] See text for method of calculation.

[4] Estimated by the authors, using as base January 1976 world market prices. Sources: BCEAO, Notes d'Information et Statistiques, No. 236, Feb. 76, pp. 10, 12; Marchés Tropicaux et Méditerranées, No. 1583, March 1976, p. 606.

[5] Cost of production with maintenance of input subsidies in effect in 1974/cost of production if subsidies were eliminated. Costs include labor charges, with labor valued at 500 MF/man-day.

[6] IER, Coûts Moyens de Production. Cost of production with input subsidies in effect for 1976/77 and with labor valued at 500 MF/man-day.

on page 13 gives an example). The procedure differs depending on whether the product is exported or imported. If exported, the value of local production, in raw product units, is calculated by subtracting from the FOB Malian border price all costs of handling, processing, marketing and transport to the frontier. If the product is imported, transportation costs to Mopti, a major town close to the geographic center, as well as OPAM[1] overhead, are added to the CIF Malian border price. An alternative method, used by IER in June 1976 for the annual price-fixing exercise, estimates production costs with some attempt at using farm budgeting techniques.

I.4.3. Current and Potential Supply-Demand Relationship

I.4.3.a. Domestic Demand

The 1974-1978 national plan[2] gives the following estimates:

- 15kg per capita per year or a total of 16,125 tons in the OACV zones (population: 1,075,00) and 9kg/capital/year or a total of 15,570 tons in other zones specializing in cereals as well (estimated population: 1,730,000). For the rest of the country, the average per capita consumption is 8kg per year or a total of 27,960 tons for a population of 3,495,000 people.[3]

- The processing firms, SEPOM and SEPAMA will respectively need 60,000 tons and 50,000 tons of shelled peanuts at the end of the plan and more in the future.

- Peanut oil is exclusively consumed in urban areas with a consumption of 4,000 tons in 1971/1972 or 7 kg/capita. Projections for 1978/1979 were 10 kg/capita or a total consumption of 8,000 tons. Domestic demand for peanut oil will be then lower than total production, this may help decrease the constant deficit in the trade balance by exporting more processed and thus more expensive products.

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[1] OPAM, Office Malien Des Produits Agricols, State owned marketing board for cereals.

[2] Plan Quinquennal de Developpement Economique et Social 1974-1977, Direction generale du plan et de la statistique, Presidence du youresmenent.

[3] Estimates are for 1978/1979.

- Peanut oil cake, estimates were that 5,000 tons will be needed in 1979 to be used for livestock feed.

In sum a total domestic demand of 169,655 tons for 1979 was projected by the plan, but only 126,000 tons was produced.

It was established in 1968 that processing firms work only at 40 percent capacity because they did not get enough shelled peanuts from the marketing agency SOMIEX. This agency was more export oriented.[1]

I.4.3.b. World Outlook

It appears from figure 1 and table 5 on page 16 that the current trend in world prices for peanuts and peanut products does not offer much hope for increases from that source that can be passed along to the Malian peanut farmer. As shown by figure 1 and table 1, world prices for peanut oil and peanut oil cake have fallen considerably since they attained peaks in October 1974 and December 1973, respectively. Shelled peanuts are now well below the October 1974 prices. The World Bank's projections (in constant dollars) show stagnation at the current level through 1980 for raw peanuts and a decline of two percent per year through 1980 for peanut oil. The outlook for peanut oil cake appears brighter because of increasing demand for it for livestock feed.

Nevertheless, the world peanut production in 1982/83 is now forecast at 17.7 million tons,[2] nearly a million below earlier indications, and 0.9 million below the 1981/82 crop.

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[1] Evolution de la Situation Economique an Mali depuis la devaluation de Mai 1967, Ministire du plan et de la Statistique, Republique du Mali, Mai 1968.

[2] Foreign Agriculture Circular, USDA, August 1982, p. 3.

Figure I

PRICES OF OIL SEED PRODUCTS, 1973-76

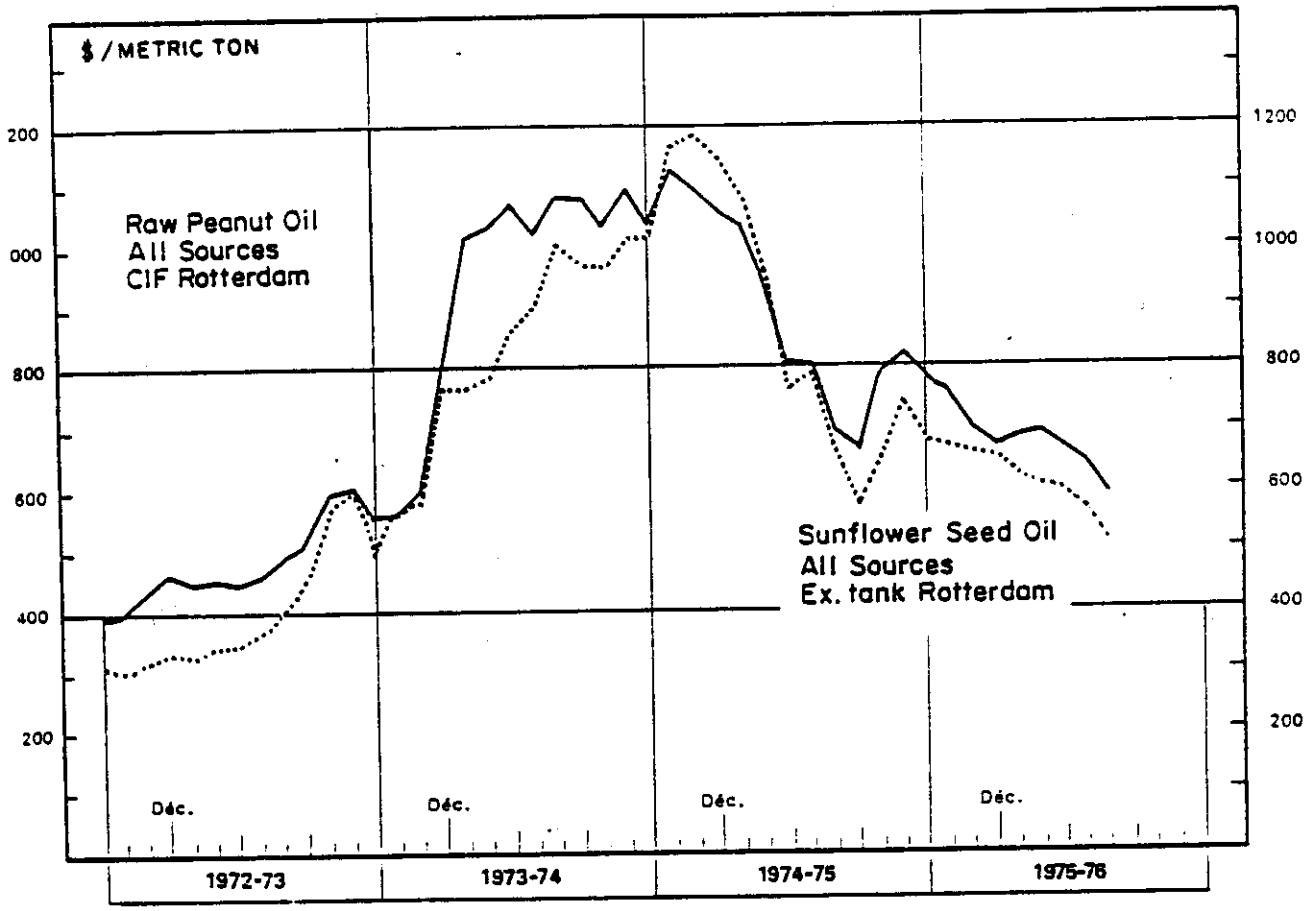

Table 5 -

Monthly Averages	Raw Peanut Oil All Sources (a)			Sunflower Seed Oil All Sources (b)			Peanut Oil Cake 50% All Sources (c)			Soy Bean Oil Cake 44% USA (a)		
	1973-74	1974-75	1975-76	1973-74	1974-75	1975-76	1973-74	1974-75	1975-76	1973-74	1974-75	1975-76
	U.S dollars Per Metric Ton											
Octobre.....	559	1 117	755	562	1 160	667	202	196	146	207	210	163
Novembre ...	592	1 088	708	577	1 177	657	208	182	139	223	179	152
Décembre ...	791	1 057	669	763	1 146	650	245	173	139	243	184	157
Janvier.....	1 012	1 031	683	764	1 078	623	229	149	135	221	156	160
Février.....	1 030	935	690	780	960	604	187	122	133	203	141	164
Mars.....	1 065	805	669	850	760	599	172	131	127	200	144	162
Avril	1 019	801	641	897	785	562	157	140	131	172	153	163
Mai	1 079	696	589	997	665	509	154	130	153	157	148	190
Juin.....	1 076	669		970	571		146	135		142	150	
Juillet	1 032	781		965	655		144	145		163	157	
Août.....	1 089	814		1 009	735		179	152		197	170	
Septembre ...	1 035	785		1 011	681*		173	153		184	169	
Average ..	*948*	*882*		*845*	*864*		*183*	*151*		*193*	*163*	

(a) - CIF Rotterdam. - (b) Ex. tank Rotterdam. - (c) CIF Hambourg. *Revised Figure

SOURCE: Banque Centrale des Etats de l'Afrique de l'Ouest, Notes d'Information et Statistiques, No. 240, June 1976.

I.4.3.c. Malian Peanut within the STABEX[1] System

In 1975 the Lome I Stabex scheme was presented by the EEC[2] as a major breakthrough in development assistance. It was the first concessionary export earnings stabilization scheme and was seen as one of the most significant innovations in ACP[3]-EEC cooperation.

The STABEX has the aim of avoiding the harmful effects of unstable export earnings, thereby helping the ACP states to achieve stability, profitability, and sustained economic growth.

Originally some twelve product groups[4] exported by the ACP were eligible for STABEX and seven more were added in 1977. Within those nineteen is: groundnuts (shelled, unshelled, oil and oil cake).

Eligibility for STABEX is decided by reference to two thresholds or floors. First of all, ACP states can only benefit if their export receipts from an eligible commodity add up to a minimum proportion of their exports to all destinations. This dependence threshold is set at 2.5 percent for the least-developed, island and land locked states[5] and 7.5 percent for the others (except for Sisal at 5 percent).

There is secondly a trigger threshold calculated for each country's exports and setting the basis for compensation. STABEX transfers are triggered when earnings from exports to the EEC of an eligible product are less than the average figure by at least 2.5 percent for the least-developed, island and land locked states or by 7.5 percent for the other ACP.

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[1]The Export Earnings Stabilization System (STABEX)

[2]European Economic Community (EEC)

[3]African Carribean and Pacific (ACP) States

[4]For more details on the STABEX system see: Carol Cosgrove Twitchett, A Framework for Development: The EEC and the ACP, 1981, London, George Allen and UNWIN. Frey Wouters, The European Community and the Third World: The Lome Convention and Its Impact, New York: Praeger, 1980.

[5]Mali belongs to this group.

Once it is established that the fluctuation threshold has been passed and the scheme triggered into operation, the difference between the level of reference and the actual receipts becomes the basis for the transfer.

The transfers fall is due for repayment within five years when the value of exports rises higher than the trigger threshold and the quantity exported is at least equal to the average quantity calculated in the reference period of the previous four years. In effect for most ACP states, STABEX transfers are useful interest-free sources of foreign exchange.

It is worth noting that while repayable in principle, in fact for least-developed ACP states, STABEX transfers are in the form of "non-reimbursable loans."

CHAPTER II

ANALYSIS AND PERFORMANCE OF THE MARKETING STRUCTURE

Peanuts marketing in Mali is the responsibility of two state enterprises, The Operation Arachide et Culture Vivrieres (OACV) and the Societe Malienne d'Importation et d'Exportation (SOMIEX). OACV is responsible for getting enough trucks to buy and collect peanuts at the village level and then to transport them from the buying points to the spots ("seccos") where they are delivered to SOMIEX and to the Societe d'Exploitation des Produits Oleagineux du Mali (SEPOM) and to the Societe d'Exploitation des Produits Agricoles du Mali (SEPAMA).

SEPOM and SOMIEX are respectively state processing and exporting firms. SEPAMA is a private processing firm.

The OACV operation was created in 1967, the year after the amount of peanuts marketed in Mali had slumped to a disastrous level. Operation Arachide (as it then was called) focused initially on developing the production and marketing of peanuts in a limited area of five cercles which were considered to be the most promising.[1] The French agricultural extension agency BDPA provided technical help, and France financed the operation whith a total of 1.6 billion MF in its first five years.

By the 1969/70 agricultural year the Operation had expanded to about two-thirds its present size. In 1974 it was transformed into OACV, adding an emphasis on cereals as well as activities in the fields of

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[1] The Cercles were: Bamako, Banamba, Kita, Kolokami and Koulikono. Republique du Mali, Mimistere de la Production, Institut d'Economic Rurale, Rapport de Factibilite' de l'Operation Arachide Culture Vivrieres, January 1973, Vol. I, p. 33.

functional literacy, human and animal health, road construction, research, and evolution. The World Bank became the primary external donor at that time.

The Operation is seen to have accounted for 59 percent of Mali's peanut production and 86 percent of the amount marketed.

II.1. Analysis of the Marketing Structure

Nicholas Hopkins described the way the old system[1] had worked:

> African merchants, who knew the country and had personal relations with the peasants whose peanuts they were buying, would roam the countryside looking for peanuts and would return to places where they customarily bought them. They would often offer consumer goods at the same time. They usually worked on commission for Lebanese merchants, who advanced them money and goods. The Lebanese would then sell the peanuts to one of the European trading companies. Slight fluctuations in peanut prices gave the middlemen the opportunity to outbid one another, and thus gave the peasant the chance to feel that he exercised some control over the situation.[2]

Since Mali's independence in 1960, a socialist oriented government abolished free trade in peanuts and stabilizes the producer price at a low level.

The failure of such a policy shown by the drastic decline in marketing levels in the mid-sixties led to the creation of the Operation.

II.1.1. The Marketing Forecasts

A first estimation of total output production, marketable output, etc. is made at the end of July when the campaign for production begins. This estimate is transmitted to the government.

A second estimation is done in October based on the crop's situation at the end of the cycle. Thus a correction of the first estimate is made.

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[1] Refers to the peanut marketing prior to the creation of the Operation in 1967.

[2] Nicholas S. Hopkins, Popular Government in an African Town: Kita, Mali, Chicago, The University of Chicago Press, 1972, pp. 40-41.

A survey of the farmer's needs for bags is then conducted to evaluate their degree of participation in the marketing process. Those data will be transmitted to the government, the exporting firm (SOMIEX), and the processing firms (SEPOM and SEPAMA). Those firms are the suppliers of bags used during the marketing campaign.

II.1.2. Committees at Both Cercle and Arrondissment Levels (Comite's Arachidiers)

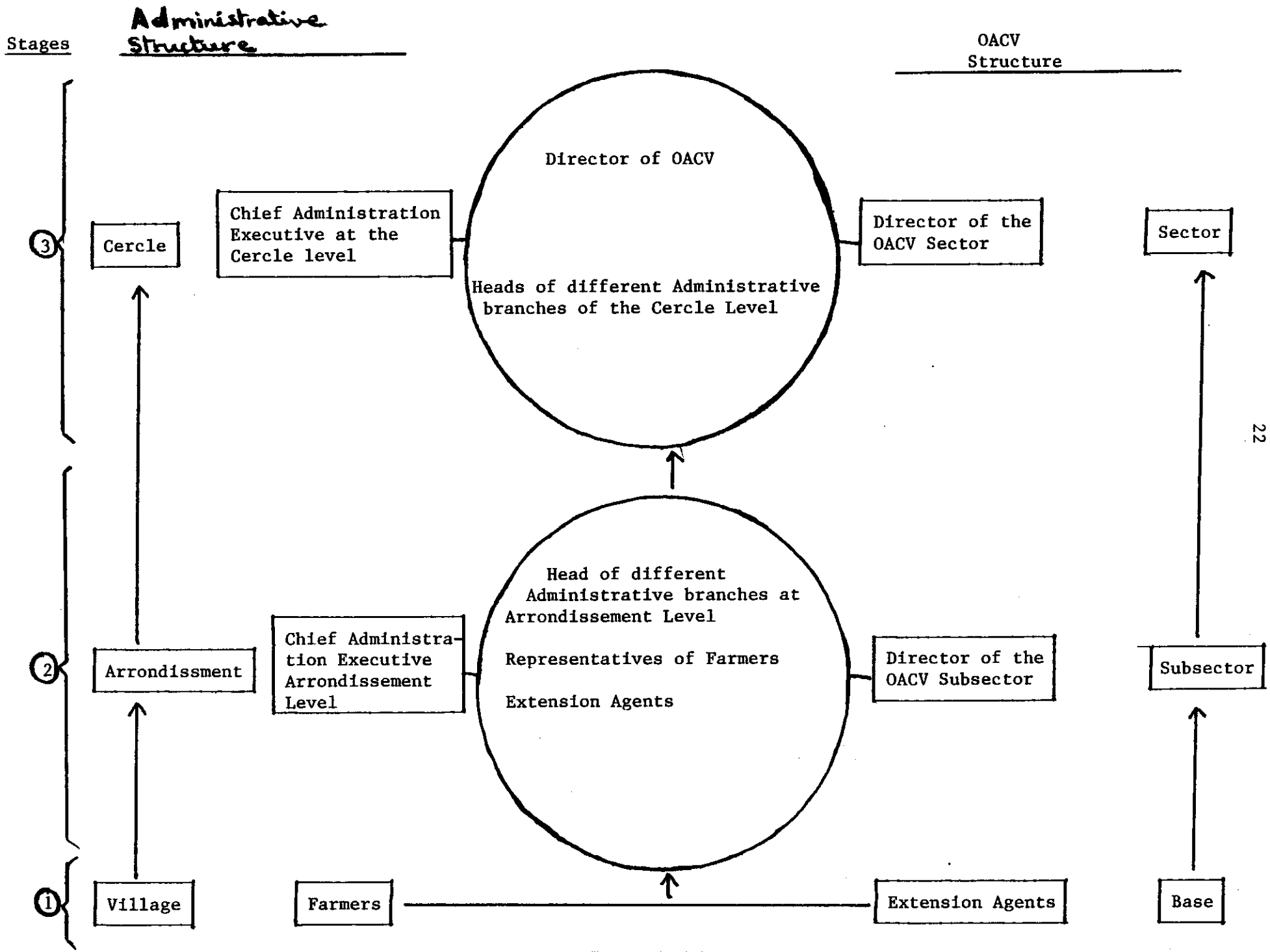
Figure 2 on page 22 shows how the OACV operation has adapted its structures to the existing administrative structures. Decisions concerning; the buying points, the dates of selling, how to avoid mishandled transaction etc., take place within those structures.

At Stage 1 on Figure 2, page 22, a meeting between farmers and extension agents at the village (or Base) level takes place. Farmers express their concerns and propose solutions to solve problems which may occur during the marketing campaign.

At the Arrondissment (or Subsector) level at Stage 2 (on Figure 2, page 22), discussions arise around problems which occurred during the last marketing campaign. Concerns of farmers are also subject of discussions. Recommendations are made and transmitted to the Cercle (or Sector) level.

The final decisions about buying points, dates of selling, transactions, etc. are made at the Cercle (or Sector) level or Stage 3 on Figure 2, page 22. The Director of the OACV operation is involved at this stage. Farmers are still involved at this level but their participation is symbolic or advisory rather than effective.

Figure 2 : The Marketing Decision Making Process in the Malian Peanut Industry



II.1.3. Sales of Peanuts

Seasonal buying teams are formed and include:

1. Pay-clerk
1. Weigher
1. Checker
1. Conditioning Agent

Buying teams and farmers willing to sell meet at buying points which have already been agreed upon at the committee level.

II.1.4. Transportation Methods

OACV has a fleet of some 75 trucks of its own and hires about 120 more from private truckers.[1] Such policy allows the Operation to cut down on the transportation cost and at the same time avoid being only a transportation firm in a country with bad rural road conditions.

The Operation tries to get enough trucks to collect peanuts at the village level and then to transport them from the buying points to the sport ("seccos") where they are delivered to SOMIEX, SEPOM and SEPAMA.

SOMIEX arranges for export contracts through an international peanuts broker and moves the peanuts to the port (Abidjan, Ivory Coast) using private trucks or trucks of the Companie Malienne.

Payment to OACV by SOMIEX is made only after the peanuts are shipped. In principle payment is made 90 days after billing, which occurs one month after the transfer to SOMIEX.

II.2. Performance of the Marketing Structure

In at least two important respects the OACV organization of marketing has restored elements that were valued by the farmers. Most important

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[1] Plan Quinquennal de Developpement Economique et Social, 1974-1978, Director Generale der Plan et de la Statistique.

is the fact that OACV's buying teams, of which there were 76 in 1974-75, scour the country side as the merchants once did and make it relatively easy for the farmer to sell his peanuts. The second element is the existance of committees at both cercle and arrondissement levels (comites arachidiers) on which farmers are represented. These committees give farmers some say in deciding where buying points will be established and the dates on which they will function. In 1974-75 there were in fact 408 buying points in the OACV zone. OACV also states that it has a policy of "encouraging literate farmers to participate in the marketing operation whenever possible."[1] Village representatives observe the weighing of peanuts and the payment of farmers. They may appeal to the village chief and an OACV agent if they believe a transaction has been mishandled.

As long as a group of farmers, a village or cluster of villages can put together 80 sacks of 50 kg each, the Operation will send a truck to bring the peanuts to the buying points at no cost to the farmer. OACV is justifiably proud of this method of collection which clearly distinguishes its system from that used for cereals. In fact the official schedule of the charges allows OACV to recover 5,567 MF per ton for collection when it sells peanuts to the processing and exporting firms SEPOM and SOMIEX. Since similar charges are not allowable in the present system for purchasing cereals, OACV would take a loss on collections if it bought cereals as well as peanuts. This is the reason why the OACV Operation is reluctant to get into the cereals buying business, even though test runs have proved it could be very effective, unless and until the schedule of charges is changed.

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[1] OACV, Compte Rendu, p. 67.

Schedule for Peanuts 1974-75 (MF/ton)

Producer Price	40,000
Cost of Collection	5,567
Bagging and Handling	429
Market and Purchasing Costs	990
OACV Extension Costs	10,000
SCAER Levy	8,936
Cost of Seed Subsidy	2,260
1% of Loss of Weight	400
IBRD Grant for Road Maintenance	3,120
Price Paid by SOMIEX	71,902

The Operation nonetheless has real problems in carrying out its peanut marketing campaign. One is getting enough trucks to collect peanuts at the village level and then to transport them from the buying points to the spots ("seccos") where they are delivered to SOMIEX and SEPOM. Difficulties arise from the fact that the private truckers (a) are relatively well equipped in heavy trucks but have few smaller trucks suitable for rural roads; and (b) are dissatisfied with the allowable rate per kilometer ton. The latter remains at 65 MF on rural roads (80 in the first region) and 40 MF on "national" roads. OACV estimates unofficially that given the condition of most roads and the cost of fuel,[1] the rate per kilometric ton should be as high as 110 MF to make peanut marketing worthwhile for private truckers. What happened in 1974-1976 was that most truckers withdrew after making between two and ten trips.

In 1974-76 there was also a severe shortage of sacks and in certain sectors supplies of fuel were exhausted; so that even when truckers were available and willing to haul peanuts, they were on occasion stymied by other shortages. Nor does the Operation the usual financial problems.

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[1] 165 MF 1 liter for regular gasoline, the equivalent of $1.30/gallon.

SOMIEX and SEPOM are supposed to make funds available in advance for the marketing campaign, which usually begins officially on December 1st. (The Operation does a small amount of buying with its own funds in October and November to accommodate farmers who need cash.) In 1974-75, however, the campaign was delayed a month by lack of funds and sacks, and in 1975-76 it dragged on into May. It is not surprising that OACV has sought the right to borrow directly from the Development Bank and to supply its own sacks.

Even when payment is received in the allotted time, the method of payment causes financial problems for OACV. The problem is particularly acute because SOMIEX is very slow in moving the peanut, as a result of transportation difficulties (a shortage of trucks) and a desire to wait for the best possible export price.

CHAPTER III

ANALYSIS OF THE SHORT-RUN SUPPLY RESPONSE OF PEANUTS IN MALI

III.1. Economic Procedures

Econometrics which literally means "economic measurement", consists of the application of mathematical statistics to economic data to lend empirical support to the models constructed by mathematical economics and to obtain numerical results.[1] In this study, econometric methods will be used to analyze factors affecting the area cropped of peanuts in Mali. The following steps will be followed in our econometric inquiry:

a) Specify the model in explicit equation form and describe the hypothesized relationships between the economic variables;

b) Collect data on the variables of the model and estimate the coefficients of the model;

c) Evaluate the estimated coefficients of the model on the basis of economic, statistical and econometric criteria; and

d) Use the results of the model, i.e., elasticities, forecast, etc.

III.2. Model Specification

III.2.1. Economic Model

The peanut model consists of an economically meaningful relationship which relates domestic area cropped of peanuts (GRACR) to lagged price of

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[1] Gerhard Tintner, Methodology of Mathematical Economics and Econometrics, the Univeristy of Chicago Press, Chicago, 1968, p. 74.

peanuts, lagged price of millet-sorghum, lagged price of maize, lagged peanut acreage and to the binary variable for drought.

Total domestic production has been used as dependent variable related to: lagged price of peanuts, lagged price of millet-sorghum, lagged price of maize, lagged domestic production of peanuts, and to the binary variable for drought. The results proved to be inconclusive.

Rationale for the use of all variables used in the equation analyzing the factors affecting the area cropped of peanuts is given below:

- Lagged Price of Peanuts (LGRPR)

This variable measures the effects of the expected future price on farmer's decision to produce. Economic theory predicts that, under pure competition, price constitutes the major determinant of the farmer's decisions as to what to produce and how much to produce. But farmers seldom know what prices will prevail at harvest when they are making planting decisions. Producer prices lagged a year were taken to be expected prices, which actually affected the producer decision making process. We recall that in Mali, official government prices for the current year are published after harvest.

The expected price is hypothesized to be positively associated with area cropped of peanuts.

- Lagged Millet Price (LMIPR) and Lagged Maize Price (LMAPR)

In the short-run, the most important cost involved in the production of peanuts (or any crop) is the lost opportunity to produce other commodities. Two important alternative crops in the case of peanuts are millet/sorghum and maize.

When two crops compete for the same type of resources (land) the relative price of these crops is expected to determine the amount of resources allocated to each crop.

Here the prices of both millet/sorghum and maize are expected to be a determinant of the amount of land allocated to the production of peanuts.

The two prices are hypothesized to be negatively related to the area cropped, and, or to domestic production of peanuts.

- Drought (DV1)

Weather influences the production of most agricultural commodities and remains a relevant determinant of production patterns.

Expected rainfall also influences the farmer's decision on the amount of land cropped. In Mali for instance, in order to limit the loss, a farmer may decide not to crop as much land as he can based on his expectation of a bad rainfall condition in the near future, meaning the same production period.

Ideally one would use average rainfall data to measure the impact of drought, but such data was not available. Thus, a binary variable carrying values 1 during the years of drought (1969 - 1970 - 1973 - 1974 - 1979) and values of 0 otherwise is included to capture the effects of the recent Sahelian drought.

A negative relationship is expected.

- Lagged Groundnut Acreage (LGRACR)

This lagged variable represents the rigidity inherent in production, stemming from land suitability constraints for particular crops, farmer familiarity with certain types of peanuts production, eating habits (peanuts is both a food and a cash crop) and others.

This variable is hypothesized to be positively associated with the dependent variable.

III.2.2. Statistical Model

The above mentioned relationships are then expressed in stochastic equation form. Stochastic indicating that the model is not expected to represent the real phenomena exactly. The alternative regression equations which will be fitted to data and the theoretical expectations about the signs of the parameters of each equation are consistent with the biological and economic relationship already discussed. In general we have:

GRACR = (LGRPR, LMIPR, LMAPR, DV1, LGRACR) + e_t where:

GRACR = area cropped (in ha.)
LGRACR = area cropped lagged 1 year (in ha.)
LGRPR = lagged 1 year groundnut price (in Malian Francs)
LMAPR = lagged 1 year in maize price (in Malian Francs)
LMIPR = lagged 1 year millet price (in Malian Francs)
DV1 = rainfall, binary variable takes values of 1 for good rainfall and 0 otherwise.
e_t = error term, assumed normally distributed with zero mean and finite and constant variances.

III.2.3. The Data

This study relies primarily upon secondary time series data from 1963 to 1980. Most data were found in the Marches Tropicaux et Mideteraneens (1979), in the C.I.L.S.S. documents (1977), in the West African Rice Development Association (WARDA) document (1979), in the Production Year Book (FAO), in the Final Report (December 15, 1976) of the CRED (Center for Research on Economic Development, University of Michigan), in the Country Development Strategy Statement (FY82 of 1981 of the U.S.A.I.D.), and the OACV operation documents (1974-75 and 1977).

The variety of sources does reflect the difficulty of finding reliable data. Each of these sources often gives a different estimate for a given variable. This study uses what seems to be the most consistent figures when conflicting estimates exist.

The 1963 starting point of the data series corresponds to third year after the country obtained its independence in 1960. This three-year-period may be considered as a transition period, under which the socialist structure of the first government was being effectively established in the countryside. This transitional period corresponds also to the time where fewer, but some african merchants working on commission for Lebanese merchants were still roaming the countryside looking for peanuts to buy.

Data on area cropped are generally collected by the extension agents. Each extension agent is in charge of a certain number of villages (the number varies from two to five villages per agent). It is the duty of the extension agent to make measurement of all area cropped and total output for the zone under his supervision. Yields are calculated from aggregate area and production figures. The data collected are transmitted to the chief of the subsector at the arrondissement level, who has the responsibility of checking their accuracy and sending them to the Director of the OACV sector. The same data will then be sent to the Directeur General of OACV, the Directeur of the Agriculture Department, and to the Ministry of Rural Development.

Data on prices correspond to official producer prices published each year after harvest in government document. The Monthly Statistical Bulletin of Mali over various years has also been helpful.

The black market prices were not available to be used in this study. Although the black market exists, and some quantity of peanut is smuggled into neighboring countries (such as Senegal and Ivory Coast), its magnitude was not estimated by any of our various sources.

III.2.4. Estimation

The equations are estimated by ordinary least squares (OLS) with the usual assumptions for OLS: normally distributed error term with zero mean, constant and finite variances. The estimated coefficients will be then consistent, asymptotically efficient and have approximately a normal distribution.

This will make it possible to use t-test for statistical inferences. The confidence intervals will then be unbiased, the predictions and forecasts unbiased, consistent and efficient.

The results of the estimation procedures of the regression equations predicting the area cropped of peanuts in Mali are summarized in Table 6 on page 33.

III.2.5. Evaluation

Evaluation of the empiricial results for peanuts will be done on the basis of economic, statistical and econometric criteria.

The economic criteria are concerned with the logic of the model, i.e., with the signs of the coefficients.

The statistical criteria refers to: (a) the proportion of the variation in the dependent variable that can be "explained" from changes in the explanatory variable; in short the value of R^2; (b) the statistical significance of each explanatory variable as defined by the t-tests; and (c) the overall significance embodied in the F-tests.

The econometric criteria refers to the tests of the assumptions of the basic regression model about the error term (assumed normally distributed with zero mean, and finite and constant variances).

Table 6. Regression Equations Predicting the Area Cropped of Peanuts in Mali (1963-1980)

	Dependent Variable, Groundnut Acreage (ha) (GRACR)	Intercept (c)	Lagged Price of Peanuts (MF) (LGRPR)	Lagged Millet Price (MF) (LMIPR)	Lagged Maize Price (MF) (LMAPR)	Lagged Peanuts Acreage (ha) (LGRACR)	Drought (DV1)	R^2	$\bar{R}^2$	D.W.	F. Ratios
1	OLS	95.42 (12.27)	2.44* (9.83)					.85	.84	2.09	96.70*
2	OLS	114.77 (10.57)	4.65** (4.56)	-2.73** (-1.35)	-1.27** (-.85)			.93	.92	2.18	68.43*
3	OLS	105.03 (10.57)	4.44** (3.94)	-2.78** (-1.34)	-1.24** (-.81)	.10∞ (.52)		.93	.91	2.20	48.73*
4	OLS	107.77 (10.31)	3.38** (3.01)	-1.96∞ (-1.04)	.11∞ (.74)		-12.69 (-1.99)	.95	.93	1.92	63.28*

1 - t-values in parantheses.

2 - * significant at $\alpha = .005$.

3 - ** significant at $\alpha = .20$.

4 - ∞ not significant at $\alpha = .20$.

The following general conclusions can be made based on the results in Table 6, and on the above criteria:

- Except equation 4 where LMAPR is positive, all the other specified equations meet the economic criteria, i.e., the signs of the coefficients are consistent with a priori economic theory.

- The overall statistical significance as measured by the F-test is satisfactory for all equations at $\alpha = .005$.

- Auto correlation[1] is not a problem as indicated by the Durbin Watson statistics (D.W. varies from 1.92 to 2.20). Any of the value in this range is close to 2.0 which is considered an indication of no serial correlation.[2]

- The explanatory power of the independent variables in the models is acceptable ($R^2 > .85$). Nevertheless, each equation from 1 through 4 in Table 6, will be subject to detailed analysis.

Equation 1 is the result of the regression of peanuts acreage on the lagged price of peanuts (LGRPR). The coefficient is positive as expected and is significant at $\alpha = .005$ level, which means that area cropped and thus production is positively related to the lagged government price of peanuts.

Equation 2 introduces the lagged price of peanuts (LGRPR) and the lagged prices of millet (LMIPR) and maize (LMAPR). The lagged peanuts price retains its positive sign but decreases in significance from $\alpha = .005$ to $\alpha = .01$ levels. Lagged millet price (LMIPR), lagged maize price (LMAPR) are significant at $\alpha = .20$. The signs of the two substitutes (production substitute) of peanuts are negatively related to peanuts acreage as expected. This suggests that when prices of millet and maize increase,

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[1]Auto correlation, i.e., the problem of the error term in one time period being correlated with the error in any other time period. It will make the parameters unbiased, consistent but not efficient. The variances of the parameters and the error term will be biased. As a result, significant tests and confidence intervals are biased. Thus, predictions and forecasts will be unbiased and consistent but not efficient.

[2]Salvatore, op.cit., p. 192, Wannacott, "Econometrics, p. 61.

farm resources used for producing peanuts are diverted into millet and maize production, causing the area cropped of peanuts to decrease.

Equation 3 introduces the lagged peanuts acreage (LGRACR) into the model. All the signs of the coefficients come out as expected. The lagged prices of millet and maize are still significant at $\alpha = .20$, but the lagged peanuts acreage is not significant at $\alpha = .20$. The explanatory power of the independent variables does not change and the adjusted R^2 decreases.

Equation 4 deletes the lagged peanuts acreage and introduces the binary variable for drought (DV1) to the model. The coefficient for DV1 has a negative sign as hypothesized and is statistically significant at the $\alpha = .20$ level. The drought in the Sahel did in fact cause area cropped, and thus production of peanuts to fall. The lagged price of millet retains its negative sign but decreases in significance. The lagged maize price takes a positive sign contrary to what was expected, and decreases in significance. The explanatory power of the independent variables increases slightly from $R^2 = .93$ to $R^2 = .95$. The adjusted R^2 ($\bar{R}^2$) also increases slightly from .91 to .93.

A test for multicollinearity[1] reveals positive since the simple correlation between the explanatory variables varies between .7 and .9. Therefore it might be concluded that multicollinearity is the reason for the reduction in the magnitude of the significance levels. Further evidence of this multicollinearity is indicated by the large $\bar{R}^2$ (.93).

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[1]Multicollinearity, i.e., high correlation between explanatory variables, makes it impossible to isolate the effect of each explanatory variable on the dependent variable.

However, multicollinearity is not a violation of our basic assumption of OLS. It is more a question of art than a basic scientific question, and one of the solutions to the problem of multicollinearity could be to live with it.[1]

The two best models are therefore, equations 2 and 3. Both models are theoretically logical since the signs of the coefficients are consistent with a priori economic theory. Serial correlation is not relevant as indicated by the Durbin-Watson statistics (2.18 and 2.20 respectively). The t-statistics show that each of the included variables are significant at $\alpha = .20$ level, except in equation 3 where the lagged peanut acreage is not significant at $\alpha = .20$ level. The explanatory power, R^2, is quite acceptable, i.e., 93 percent of the variation in the dependent variable could be "explained" by the variables in each equation. The overall statistical significance as measured by the F-test is satisfactory for both equations as already stated.

Nevertheless, equation 3 uses the lagged dependent variable as independent variable. In such a case, standard applications of the Durbin-Watson statistic are inappropriate.[2]

Therefore, based on the general and detailed conclusions presented it is decided to consider equation 2 as the representative model.

III.2.6. Elasticities

Elasticities are very useful in applied economics and policy analysis. They enable economists to understand the behavior of economic participants facing economic changes (e.g., price incentives).

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[1] Refers to notes on AEC 835 on multicollinearity.

[2] Refers to notes on AEC 843 on the Durbin-Watson test. We note that the Durbin's two-stage method can be used here.

In our study, two types of short-run elasticities will be considered: the own-price elasticity and the cross-price elasticity.

The own price elasticity is the percentage change in the quantity supplied to the percentage change in the price of the product, other factors being held constant. Since an increase in supply is normally associated with a rise in price, the sign of this elasticity usually is positive.[1]

The cross-price elasticity of supply measures the responsiveness of the quantity supplied of a certain commodity to a change in the price of the competing crop.[2] In our case, it explains what will be the percentage change in the area cropped of peanuts due to a certain percentage change in the prices of millet and maize each at a time and ceteris paribus. Other things remaining the same, a rise in the price of millet or maize can be expected to lead to a decrease in the amount of land allocated to peanuts, thus a decrease in the supply of peanuts. The cross-price elasticity is hypothesized to be negative.

For a linear relationship, $Y_t = b_0 + b_1 X_{t-1}$, the supply elasticity is derived as the following:

$$\frac{dYt}{dX_{t-1}} \cdot \frac{\bar{X}}{\bar{Y}} = b_1 \cdot \frac{\bar{X}}{\bar{Y}}$$

where Y_t is area cropped in year t and X_{t-1} is price in previous time period. $\bar{X}$ and $\bar{Y}$ are mean values of the respective variables.

From equation 2 the own-price elasticity of area cropped in the short-run was derived and equals: .7964. This elasticity is positive

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[1] Tomek and Robinson, op.cit., p. 77.

[2] Tomek and Robinson, op.cit., p. 84.

as expected. Such elasticity is reasonably acceptable given that obtained by Niane[1] for groundnuts in Senegal, i.e., a price elasticity for supply of 0.69. For policy purposes, it indicates that producers are quite responsive to changes in prices. Here, this elasticity implies that a 10 percent increase in price of peanuts would result in an increase in area cropped by 7.9 percent, ceteris paribus.

The cross-price elasticiy for change in the price of millet is negative as expected and equals -.32. Millet is substitute for groundnuts. As the price of millet increases, productive factors are diverted from groundnuts into millet production, causing the supply curve of groundnuts to shift to the left.

The cross-price elasticity for change in the price of maize is negative as expected and equals -.18. This also suggests that maize is a substitute for groundnuts. As maize increases, productive factors are diverted from groundnuts production into maize production causing the supply curve of groundnuts to shift to the left.

These findings strongly suggest that farmers in Mali and particularly in the OACV zones do respond to price in a fashion predicted by neoclassical economic theory.[2]

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[1] Niane, "Supply and Demand of Millet and Sorghum in Senegal," Appendix II, p. 66.

[2] Schultz, Transforming Traditional Agriculture, p. 33 argues that ". . . the doctrine that farmers in poor countries either are indifferent or respond perversely to changes in prices. . . is patently false and harmful. Price policies based on it always impair the efficiency of agriculture."

CHAPTER IV

SUMMARY OF FINDINGS, POLICY IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

IV.1. Summary of Findings

The findings from this study, as well as the previous studies in the neighboring country of Senegal,[1] confirm that peanuts farmers in Mali respond to price incentives. Consequently, any government policy toward this commodity should take into account Malian farmers' ability to grow peanuts in response to price offered to them.

It is worth noting that 1974-1975 subsequent production and marketing increases have been spectacular. OACV officials ascribe at least part of the gains to expectations by farmers that the government would raise the producer price before the crop was marketed. But OACV requests for an increase to 50 MF/kg were not granted. In June 1976 a team from the Bureau for Africa, United States Agency for International Development, Washington, D.C., under work order number AID/afr-C-1143 conducted a field work in Mali from May 26 to July 7, 1976.[2] They found real concern among OACV agents and government administrators that the existing momentum toward greater production would be lost if there were no price increases for 1976-1977. In fact there has been none. The team concluded

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[1] Niane, "Supply and Demand of Millet and Sorghum in Senegal," Appendix II, P. 66. It should be noted that Senegal is the 2nd biggest producer of groundnuts in Africa after Nigeria, and the fourth in the world after India, Nigeria and the U.S. Mali used to be the fifth biggest producer in Africa after Nigeria, Senegal, Niger and Sudan.

[2] Mali, Agricultural Sector Assessment, Final report, December 15, 1976.

that there is a distinct possibility that continued maintenance of the producer price at 40 MF/kg will cut short the increases in marketings and exports that have occurred since the end of the drought. The case is strongest for cash crops, notably cotton and peanuts, since it is with profits from these crops that farmers will be able to invest in the modernization of their own techniques.

Some observers have maintained that in the mid-sixties under the socialist regime, the Malian farmer was given considerable exhortation but little material inducement to produce more and market more. The result was a turn back toward subsistence farming and increased auto-consumption, particularly of peanuts. They concluded that the lack of consumer goods in rural areas played an important part, but the stagnation of producer prices was also crucial.[1]

Since there is little hope offered by world price trends, concern for continued increases in peanut exports warrants a critical look at the numerous charges and taxes that are taken out of peanut revenues before the farmer finally gets his share.

a. An export tax of 4,050 MF per ton has been unchanged for four years, despite the rise and fall in world prices.

b. SCAER,[2] took 8,936 MF per (unshelled) ton in 1974075. This is a variable levy that helps to cover SCAER's annual operating deficit.

c. OACV imposes a tax of 15,380 MF per ton to pay for part of the cost of providing extension and other services, including road repair. Since 1970 the "government" contribution to OACV has come entirely from this tax rather than from the national budget.

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[1] See W. I. Jones, op.cit., pp.299-305.

[2] Societe de Credit Agricole et d'Equipment Rural (SCAER) is a state agency which has a monopoly on the distribution of farm implements, fertilizer and pesticides. SCAER also provides short and medium term credit for farmers. It is important to note that credit is provided only through the development operations.

d. Finally, SOMIEX takes a percentage not only to cover its export cost but also to help subsidize consumer imports.

All of these charges and taxes plus the cost of shipping by rail to Dakar[1] (25,224 MF per ton of shelled peanuts)[2] provide some explanation of the large difference between producer's prices in Mali and in Senegal: 40 MF and 83 MF equivalent, respectively. Economic analysis might well be able to estimate the benefits that would accrue to the Malian government and its agencies as well as to the Malian farmer if some of these levies were reduced and the producer price raised.

IV.2. Policy Implications

IV.2.1. Basic Theory

The creation of OACV is intended to satisfy domestic demands in peanuts, to generate foreign exchange earnings, and to provide government substantial revenues.

It is worth noting that the domestic demand in Mali and the world demand (particularly the EEC[3]) for Malian peanuts and peanut products is higher than the quantity supplied. The STABEX system, even though its overall impact on the development of the ACP states[4] and the world welfare is

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[1]Mali, a landlocked country uses the railroad between Bamako (Malian Capital) and Dakar (port and Capital of Senegal) for its foreign trade.

[2]Mali, Ministere des Transports, Etude des Transports Bamako-Kaves, 1976, Annexes, p. III.22.

[3]The EEC is the largest importer of peanuts with over 50 percent of the total imports. All European countries together, including the Eastern European countries, account for roughly 90 percent of all imports of groundnuts, groundnut oil and groundnut meal.

[4]See European Community and the Third World, p. 48.

questionnable[1], can be used by poor and landlocked countries such as Mali to make the most of the opportunities offered in the task of developing and promoting their exports.

While a number of criticisms against the revenue maximizing policy could be addressed to the Malian government, it is also relevant to consider arguments in favor of such a policy. For example, Helleimer, G.K. in studying "The Fiscal Role of Marketing Board in Nigerian Economic Development," contended that a primary justification of the existence of marketing boards is the collection of revenue for economic development.

Some economists in the recent years have considered that income distribution could be achieved through export taxation devices. Another argument to support the export taxation policy has to do with the national need for maximizing agricultural capital formation. Because of the low marginal propensity to save among individual producers, more weight has been given to the saving force of the government to achieve and speed up the maximization of agricultural capital formation.

Free trade theory rejects all these arguments in support of the export taxation policy because of the disincentive effects underlying this policy of income withdrawals. Unfortunately, many less developed countries (LDCs) have adopted restrictive trade policies, to reduce the effects of the world price uncertainty on their domestic economies.

It can also be assumed that if maximizing economic efficiency is the first concern of the government, export taxes should not occur, and then, farmer price in this condition should equate world market prices. On the other hand, if the government intends to maximize its revenue through

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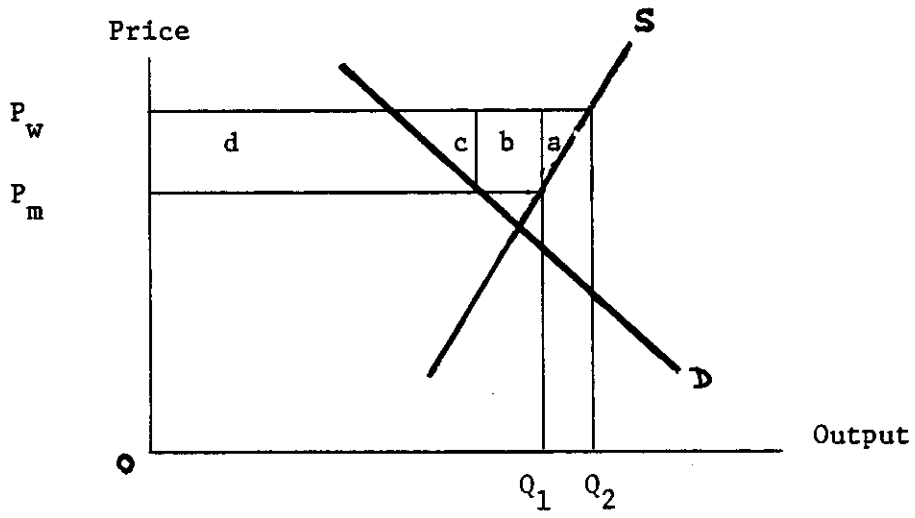
[1]Among a number of criticisms against the ACP-EEC trade relations is the "trade diversion" effect which occurs whenever efficient producers are kept outside a given trading zone.

export taxation, then a relatively lower producer price as compared to the world peanut market price will be achieved. This intervention will result to a smaller production.

Export taxes may also be designed to curtail exports in order to prop up world prices of a primary commodity, as when Ghana discourages the export of cocoa or Brazil the export of coffee. This argument does not hold for the Malian peanuts whose world market share of 2 percent is too small to influence world price.

IV.2.2. Impact of Alternative Pricing Policies for Peanuts in Mali



Q_1 and Q_2 are production under alternative policies.

P_w - represents the world price.

P_m - is the producer price in Mali which is Lowered in order to derive the maximum amounts of tax revenue and to provide cheap domestic commodities (the effects of producer prices on farm incentives are not considered).

This analysis assumes that the supply and demand curves of peanuts in Mali are known. The domestic equilibrium price is lowered to establish the country as competitive and potential exporter.

Under economic efficiency policy, quantity Q_2 is produced. Under government policy of revenue maximization, the government withdraws income from farmers by imposing a tax and lowering producer price. This engenders disincentive effects on production response and then leads to a smaller output Q_1.

The following changes take place within the exporting country:

- Producers' surplus declines by area a + b + c + d.
- Consumers' surplus increases by area d.
- Government revenue increases by area b. Area b is a transfer from the government to the marketing board.
- The net dead weight loss equals the areas of triangles a + c.

IV.2.3. Marketing

The primary attention of the government and of donors has been focused on increasing agricultural production of cereals and export crops. This orientation has been justified by a need for foreign exchange revenues. Now, however, the production capability or potential has developed to a point where markets and marketing facilities are limiting output and income expansion in the sector. Unless substantially more attention is given to the need for attractive markets and facilities adequate for commodity movements, there may be strong desincentive to production.

Peanut storage is a matter of urgent concern, part of the problem is due to the slow movement of finished products into domestic or export marketing channels. One bottleneck appears to be SOMIEX's management of exports.

Transportation bottlenecks are caused both by poor rural roads and poor major highways. Another source of transportation problems is the low ton/kilometer haulage rate allowed by law. A widespread need to commandeer

private trucks for transporting agricultural products clearly indicates that trucking rates are too low. A large part of the transport problem might be solved by increasing freight rates to allow private truckers to cover real costs, including labor and entrepreneurship costs.

IV.3. Suggestions for Further Research

This study has attempted to explain the reasons for the "peanut problem" in Mali. The use of qualitative and partial data calls for caution in the interpretation and use of the results.

Due to the lack of sufficient and reliable data for the analysis of a complete model, the econometric model constructed to explain the acreage response of peanuts in Mali, is somewhat limited.

It is therefore suggested that continuing research to estimate the effects of prices on supply and demand of peanuts should be initiated, with possibly including more detailed information such as cost of inputs, producer prices, rainfall, soil moisture content, yield, domestic prices to consumers, etc. Supply and demand elasticities and cross-elasticities should be estimated, if better quality time-series data can be obtained from field research. Currently price policy is established and modified without good information about price effects.

Separate studies would also be needed dealing with the problem of decision making under different pricing policies. The problem formulated will be a relatively simple dynamic programming problem which will require survey data for estimation.

IV.4. Conclusion

Peanuts dropped from first place in 1961 to last in 1965 among major commodities in contribution to the total export earnings of Mali. There have been fluctuations in production since 1962. In the process the total production decreased and Mali's share of the world market declined from 3.5 percent to 2 percent.

It has been argued that the decline in the proportion of peanuts exported was due to the following reasons among many others:

- A substantial increase in domestic consumption of peanuts, particularly with the supply of two processing firms (SEPOM and SEPAMA).
- The low level of the producer price and the late start of the marketing campaign.
- A downward trend in the world price of peanuts after a peak in 1974.

This study has investigated this problem of declining production and export with the following set of objectives:

a. To analyze factors affecting the area cropped of peanuts in Mali.

b. To analyze the current structure and conduct of the Malian peanut industry.

c. To outline the principal ideas which may permit an evaluation of the efficiency of peanut price policy with respect to its impact on production, marketing and export of this commodity.

The method used for carrying out these objectives was an econometric method in the modeling of the acreage response of peanuts in Mali. The results of the econometric analysis of the short-run acreage response indicated, in general, that:

- The area cropped of peanuts in Mali is responsive to price changes. For instance, a 10 percent increase in price could lead to a 7.9 percent (ceteris paribus) increase in the area cropped of peanuts in the following year; and

- The changes in the price of millet affects the area cropped of peanuts in Mali. For instance, the negative cross-elasticity of -.32 obtained indicates that millet production is a strong competitor for land suitable for peanuts production.

- The changes in the price of maize do affect the area cropped of peanuts in Mali. For instance, the negative cross-elasticity of -.18 obtained indicates that maize production is a strong competitor for the land suitable for peanut production.

Thus, the estimated functions support the hypothesis that peanut farmers in Mali react to price; there we conclude that:

1. Market intervention to raise producer price is desirable This does not mean that price increase alone will solve the prevailing "peanut problem" in Mali. Market intervention should be carried out along with other measures in order to achieve the objectives of the OACV operations, such as a more efficient marketing system, etc.

2. As long as the peanut production is concerned, a high cost investment is involved and the project remains unattractive for poor farmers as long as cash generated is not large enough to more than offset the cost involved in the production process.

3. Taxes should be removed or at least reduced.

As a general conclusion, we will point out the following: In the 1970's, less than 10 percent of the planned development expenditure was allocated to the agriculture sector in Mali. The problem of Mali's rural development is not one of not knowing in broad terms what needs to be done to support peasant agriculture.

The most fundamental problems are attitudes and vested interests. The subsistence rural sector must be seen as critical for economic development and must be given the priority that it urgently requires.

APPENDIX

Year	Area[a]	Price of[b] Groundnuts	Price of[c] Millet/Sorghum	Price of[d] Maize
1962	109	14	15	12.5
1963	116	15	13	13
1964	131	13.5	11	11
1965	131	13.5	11	11.5
1966	137	14.5	11	12
1967	138	15.5	11	12.5
1968	140	19	16	22
1969	129	15	16	16
1970	118	24	16	20
1971	162	24	18	20
1972	174	30	20	25
1973	158	30	20	25
1974	153	31	20	25
1975	182	40	25	32
1976	188	47	30	36
1977	200	47	30	36
1978	232	50	32	36
1979	215	50	34	40
1980	240	60	40	50

[a]Source is Mali, Rapport Annuel, Campagne 1980-81. Ministere de L'agriculture, D.N.A. Center for Research on Economic Development, University of Michigan, Mali Agriculture: Sector Assessment (1976) John McIntire, Rice Policy in Mali, Standord University. 1978 and 1979: Marches Tropicaux et Mediteraneens.

[b]Groundnuts in the shell. Source: 1959-1977: Ibid, p. 11a. 1961-1976: C.I.L.S.S., op. cit., vol. I. 1978: Assises du Commerce, Tome II, p. 3. 1979: Marchés Tropicaux et Mediteraneens, p. 3568.

[c]Mali has never established separate prices for millet and sorghum. Before 1967 there were separate prices by surplus or deficit region. Source: 1959-1977: WARDA, op. cit., p. 3c. 1978 and 1979: Marches Tropicaux et Mediteraneens, p. 3563. 1961-1976. C.I.L.S.S., op. cit., vol. I.

[d]Source is Mali, Rapport Annuel, Campagne 1980-1981, Ministere de L'agriculture, D.N.A. 1961-1976: C.I.L.S.S., op. cit., vol. I. Monthly Statistical Bulletin of Mali (various years, Bamako).

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