

memorandum

DATE: August 27, 1984
 REPLY TO: *Carole Gagne Gervais*
 ATTN OF: Carole Gagne Gervais, PRM
 SUBJECT: IMPACT OF PRICING AND RELATED POLICIES ON AGRICULTURAL
 PRODUCTION IN CAMEROON.
 TO: See Distribution
 Through: *MD* Helen Vaitaitis, Acting Program Officer

Attached for your information is a copy of the subject report prepared by Dr. Boniface Essama Nssah under Contract 631-0135-C-00-3023-00.

DISTRIBUTION

A/DIR (1)
 PRM (5)
 PDE (1)
 ARD (3)
 SMD (2)
 HRD (UCD) (1)
 LIBRARY (2)
 ST/DIU (2) ✓
 Dr. ESSAMA NSSAH (2)
 USDA, R. KITE, (1)



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

Dze ndzo ene moni eyo] dzina?
What brings money nowadays?

Mekaba m'mo mene moni eyo] dzina
Cocoyams bring money nowadays

Ndze ndzo ene moni eyo] dzina?
What brings money nowadays?

Bikon mbiè bine moni eyo] dzina
Plantains bring money nowadays

A nnom wam, no] fa
Then my dear husband, take your machette

Beti folksong reflecting the
current awareness of the
economic importance of food
crops.

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENTS	(i)
I. INTRODUCTION	1
II. STUDY PURPOSE AND THEORETICAL FRAMEWORK	6
III. RESEARCH METHODOLOGY	9
IV. FORMULATION AND IMPLEMENTATION OF THE VARIOUS POLICIES...	10
A. Pricing of Agricultural Output.....	10
1. The Export Crops.....	11
2. The Food Crops.....	17
B. Input Subsidies.....	22
1. General Background.....	22
2. Subsidy Components and levels.....	24
3. The Existing Input Distribution Channels.....	26
V. ANALYSIS OF THE IMPACT OF VARIOUS MEASURES.....	29
A. Impact of Output Pricing.....	29
1. Agricultural Price Trends.....	29
2. Supply Response to Output Pricing.....	35
B. Impact of the Input Subsidy Program.....	46
1. Impact on the Output.....	46
2. Institutional Impact.....	48
3. Fiscal Implications.....	49
VI. SUMMARY OF FINDINGS AND RECOMMENDATIONS.....	50
ANNEX I : STATISTICAL ANALYSIS	
A. Framework.....	A3
1. Growth Rate Estimation	
2. Supply Response of Production	
3. Change in Crop Mix	

B.	Results.....	A6
	1. Trends	
	2. Supply Response	
ANNEX II	: 1982-1983 SCALE OF CHARGES FOR COCOA AND SOCIAL COSTS OF MARKETING COCOA IN CAMEROON.	A38
	: 1979 - 1980 COFFEE SCALE OF CHARGES.	
ANNEX III	: REFERENCES.....	A48

س

ACKNOWLEDGEMENTS

Any study on the impact of pricing policies on agricultural production, regardless of its scope, cannot be carried out effectively without the inputs of both the makers and implementors of these policies as well as the crop producers themselves.

This researcher regrets not having had the opportunity to tap the views of a sample of farmers on some of the issues raised in the report and recommends that for future studies undertaken by AID, adequate financial provisions be made to assure coverage of this vital group of participants in the production cycle.

As for the other categories of resource people, this researcher wishes to take this opportunity to express his sincere appreciation for their assistance during the performance of this study.

Heart felt thanks are particularly addressed to H. E. Dr Solomon For Gwei, Vice Minister of Agriculture, and to Messrs. Tcheuchoua Maurice Alex (Inspector, FONADER) and Njock Nje Paul (Director, Directorate of Prices, Weights and Measures) for facilitating contacts with relevant technical staff within their respective ministries or institutions.

A special note of gratitude is extended to Messrs. Moutome Théodore John (Deputy Director, FONADER), Tchiengue Emmanuel (Ministry of Higher Education and Scientific Research) and to Mrs. Balepa Julienne (Deputy Director Directorate of Studies and Projects, Ministry of Agriculture) for taking the time to meet with me and share their views on specific aspects of the study.

Sincere recognition must be addressed to Dr Wawa Ngenge Anthony (Directorate of Statistics, Ministry of Agriculture), and to Messrs. Houston James (Resident Economist, World Bank, Cameroon), Ndjiwona Komboe Joseph (Directorate of Statistics and National Accounting, Ministry of Plan and

Territorial Development), Nlate Owoundi kémy (FONADER), Nsah Gabriel (FONADER), Owona André Jules (FONADER) and Noubeyou Edmond (Directorate of Prices, Weights and Measures) for providing me with valuable documentation or data on the subject.

The researcher also wishes to thank Ms Sarah Lynch (then technical advisor in the Directorate of Studies and Projects, Ministry of Agriculture) for her suggestions on possible resource persons and information sources, and Mr Herbert Miller (Deputy Director, USAID, Cameroon), and Mrs Carole Gagné-Gervais (Assistant Program Economist, USAID-Cameroon) for their guidance and critical review of the first draft.

Appreciation must also be extended to Mrs. Tracy L. Ngom, Mrs Lydia Tabi and Ms Cecille Bessem Mengot for typing the entire manuscript.

To all those who were consulted but may not have been mentioned, this researcher expresses his gratitude.

Despite the various contributions mentioned above, this researcher stands solely responsible for the views and ideas contained in this report.

I. INTRODUCTION

The Republic of Cameroon (RC) covers, in Central-West Africa an area of 475,000 km² about one third of which is devoted to farming and stock-raising. The country stretches across 1,500 km from the southern equatorial forest to the northern savanna. The diversity of its climate, accounts for the large variety of crops produced in the country and which may be classified in many overlapping categories according as they are destined to exportation or to local consumption, or as they are grown traditionally on small farms or on large plantations by the agribusiness sector. Here we only consider these products as food or non-food crops.

Food crops generally include:

- Cereals (maize in the forest and highland region, sorghum in the North, rice on government sponsored projects like SEMRY or SODERIM, wheat on pilot projects like SODEBLE);

- Edible Fats and Oils (palm oil which is traditionally produced in the southern region from the exploitation of natural palm oil groves, groundnuts, cottonseed and sesame oils produced in the North.);

- Fruit and Vegetables (bananas, oranges, pineapples, tomatoes, etc...);

- Leguminous grains such as bambara nuts, beans, cowpeas and groundnuts in the North and West: (soybean is being introduced); and

- A variety of Tubers (cassava, cocoyams, plantains, sweet potatoes, taros and yams).

The non-food crops include coffee, cocoa, cotton and rubber. These are mainly classified as export crops even though some of the food crops are also exported (bananas, palm oil for instance).

In Cameroon, agriculture has always been and remains a very important sector of the economy. Indeed, this sector used to provide about 70 percent of the country's foreign exchange earnings without counting oil's revenues. Although this contribution has fallen below 28 percent, agriculture still provides annually 30 to 40 percent of budget revenues, employ a little over 70 percent of the working population and accounts for about 26 percent of GDP (the industrial sector's share is about 27.8 percent). The Government of the Republic of Cameroon's (GRC) agricultural policies seem guided by two major objectives, namely (1) the achievement of self-sufficiency in food production and (2) the strengthening of the country's capacity to earn foreign exchange. The first objective reflects the government's concern over the growing size of Cameroonian population (about 9 million in 1983), its patterns of migration, and the possible implications of these two factors on food production. In fact, it has been projected that by the year 1990, all foods considered, Cameroon would have moved from a position of relative self-sufficiency to that of a deficit, a situation which is not congruent with the government's strategy to make of Cameroon the "Granary of Central Africa". The government considers world food markets unreliable and costly sources of food supply, and reliance upon food imports a blow to national pride. As for the second objective, the GRC expects to achieve it through the sale of export crops. This is understandable in view of the fact that historically agriculture has played a very important role in financing the rest of the economy. However such a strategy has its own

limitations given the low elasticities of demand characterizing most export crops.

To achieve the above mentioned objectives, the GRC has formulated and implemented a set of policies through its specialized agencies and various ministerial departments. These policies may be classified into two groups: The first group comprising those measures aimed at effecting a substantial increase in productivity coupled with some structural changes (e.g. land reforms, promotion of large scale farming, mechanization, modification of state farming, to name a few) and the second group of policies consisting essentially of a series of producer incentives in the form of pricing and subsidies.

Currently, market forces determine the price for products accounting for about 80 percent of the value of agricultural production. However, the producer prices of the traded crops - which comprise export crops such as cocoa, coffee, cotton and rubber, and import substituting crops such as palm oil, rice and wheat-are regulated by the government. These crops make up about 20 percent of the value of agricultural production. In the case of cocoa and coffee, for instance, official prices are paid directly to farmers. As for the other crops produced by parastatal organizations, these institutions receive from the government agreed wholesale prices and in turn pay subcontracting farmers farm-gate prices which take into consideration both administration and production costs. These pricing schemes will be considered in detail in the body of the report.

The most important institution in charge of the implementation of pricing policies for export crops is the National Produce Marketing Board (NPMB) more commonly known as "Office National de Commercialisation des Produits de Base" (ONCPB). Its jurisdiction covers cocoa, coffee, cotton and groundnuts (palm kernels are not exported anymore). Other institutions are mostly product specific and are given almost complete monopoly to sell their product directly to the world market. These institutions are:

- The Cameroon Banana Organization more commonly known as "Organisation Camerounaise de la Banane" (OCB).
- The Cameroon Development Corporation (CDC) for the sale of tea, pepper, palm products and rubber.
- The Cameroonian Palm Groves Corporation also known as "Société Camerounaise de Palmeraies" or SOCAPALM concerned with processing and the sale of palm products.
- The Cameroon Rubber Development Corporation or "Société de Développement Heve. -Cameroon" (HEVECAM).
- The Cameroon Tobacco Corporation known as "la Société Camerounaise des Tabacs" (S.C.T.).
- And finally the cotton firm or "Société de Développement du Coton" more commonly known under its acronym SODECOTON

Even though food prices are not directly regulated by the Government, they do however fall under the jurisdiction of a few governmental agencies, namely the Directorate of Prices, Weights and Measures or "Direction des Prix, Poids et Mesures", The Food Development Authority or "Mission de Développement des Cultures Vivrières, et Fruitières (MIDEVIV) and the Cereal Office or "Office Céréalière". The regulation of import substituting crops is implemented by the Ministry of Commerce.

The National fund for Rural Development known as "Fonds National de Développement Rural" (FONADER) is the key institution in matters of input subsidies and loans to the agricultural sector.

In view of the newly proposed GRC's strategy (as outlined in the Fifth Five Year Development Plan) to extend pricing policies to the food crop sector, it is becoming increasingly important in the context of Cameroonian economy, to find out the extent to which farmers respond to pricing and other incentives set forth by the government.

II. STUDY PURPOSE AND THEORETICAL FRAMEWORK.

The underlying principle of the GRC's pricing is that prices should be set in such a way as to encourage farmers to produce enough to meet the demand without triggering urban food price increases and an unnecessary drain on the national budget.

At this point in time it is not clear what impact, if any, the government's incentive package has had on the level and pattern of agricultural production. This study purports to address this and related issues, with the view to using the findings in assessing the potential viability and relevance of these policies in food crop production. More precisely, special attention will be paid to the nature and types of both current and proposed price and subsidy incentives set forth by the government to influence the level and pattern of food crop and non food crop production and on their impact, both actual and potential, upon the agricultural sector. In order to fully appreciate this latter dimension, it is important to find out whether or not additional and/or better suited resources were moved to the agricultural sector as a result of the current incentive program, whether or not such a resource transfer was followed by an increase in production, and whether such an increase could reasonably be accounted for by such factors. In other words, the researcher will seek to determine:

- (a) the extent to which resource owners and crop producers are responsive to price and other signals;
- (b) The opportunity cost involved in such a resource transfer and the possible inefficiencies resulting from many distortions that government intervention may introduce in the system.

This concept of opportunity cost will guide the formulation of recommendations relative to the activities that the government should pursue and those it should transfer to the private sector.

In order to analyze these two components, a simplified model of the agricultural sector will be used, consisting of three typical intervening agents, each endowed with a limited set of resources to be allocated for the achievement of specific objectives. These agents are: the farmer or agricultural producer, the consumer of the agricultural output and the government.

1. The farmer has to allocate productive resources between the production of food crops and non-food crops so as to achieve the highest income possible, under technological (i.e., bearing in mind input-output relationships) and marketing constraints. Further, the income derived from the sale of his/her output places a constraint upon utility maximization. Here we assume that the farmer's utility is a function of two variables: leisure and the consumption level of all other goods and services.
2. The consumer of the agricultural output has to allocate his/her income between agricultural and non-agricultural goods and services so as to maximize utility.
3. The government is involved with limited fiscal resources which it must use judiciously to effect changes in the producer behavior (and to keep the

urban consumer happy) through a signal modification in both the input and the output markets. Under ideal conditions, market prices signal the relative scarcity of certain products or resources. The government incentive program is designed to increase the production of both food crops and non-food crops. In general, an increase in production may result from an increase in the quantity and/or improvement in the quality of the resources used in the process. An increase in production may also be the result of a more efficient use of the available inputs.

An attempt will also be made to analyze the pattern of production within the framework of a production possibility set defined in the food crop and non-food crop space. Technically speaking the question is whether the production possibility frontier has shifted in a parallel or non-parallel fashion whether incentive programs have favored food crops or non-food crops or vice versa.

The study will thus include one section reviewing the various policies for both food crops and non-food crops and their implementation, another wherein their impact is analyzed and the last one containing a summary of the findings and recommendations. The supporting data and statistical analysis will be found in Annex I.

III. RESEARCH METHODOLOGY.

The fundamental methodology used throughout the study has been the interpretation of facts contained in various government documents and publications as well as in relevant reports prepared by various development organizations on the subject, the organization and abstraction of ideas generated through meetings and informal discussions with government officials within the relevant ministries. It would have also been desirable to incorporate the views and opinions of a sample of farmers from various regions of the country and for selected crops to learn about some key variables which influence their decision-making process, and their knowledge of and perceived impact of the government policies. This researcher would have also wished to cross check data (for their accuracy and possible discrepancies) at their primary source and to update available information through direct contacts with relevant government institutions with headquarters located outside of Yaoundé. Discussions with relevant government technical staff working in the field would have also provided a more realistic appraisal of what is actually happening in the field, and of the constraints experienced by field staff in their day-to-day implementation of agricultural policies. Unfortunately, budgetary constraints precluded such activities.

Rigorous statistical analysis was performed on the available data to estimate growth rates of key variables (e.g. production, area under cultivation, prices, yields.) and some elasticities of supply for selected crops. Through this process, specific hypotheses were tested, namely the significance of the observed trends and of the responsiveness of the level of production to the real producer price. An attempt was also made to test for possible changes in crop mix using proxies to measure opportunity cost.

IV. FORMULATION AND IMPLEMENTATION OF THE VARIOUS POLICIES.

A. Pricing of Agricultural Output.

Since independence, the formulation of public policy in Cameroon has been based on principles consistent with national cohesion, stability, planned liberalism and incremental change. These ideas have had an impact on agricultural policy in general and on pricing policy in particular. Up to 1972, the GRC's agricultural policy was not significantly different from that of the French administration. Emphasis was put on cash crops and on strong, centralized institutions for policy implementation. But on March 9, 1973, in Buea was launched the "Green Revolution" at the occasion of an agricultural show. This represented a major policy reorientation in the sense that the revolution concerned both cash and food crops and emphasized five major points namely:

- (1) The search for price stability through international trade agreements.
- (2) The modification and the strengthening of external marketing systems.
- (3) The building of an agricultural credit system.
- (4) Risk spreading through a diversification program that led to the cultivation of oil-palm, rubber, banana, tea, sugar-cane and rice.

- (5) Efforts at industrialization based on raw materials processing.

The second point of the program led to the creation, in 1976, of the NPMB (ONCPB), a key institution in the formulation and implementation of pricing policies of the government. The NPMB is a merger between the Produce Marketing Organization of the former West Cameroon and the various stabilization funds of the former East Cameroon (for cocoa, coffee, cotton and groundnuts). The most important functions of this institution are:

- (1) To regulate and peg the producer price.
- (2) To set up, control and strengthen marketing systems both within the country and abroad.
- (3) To take part in international conferences concerning the important cash crops.
- (4) To conceive and execute the plans capable of improving production both quantitatively and qualitatively.

1. The Export Crops

We limit our investigation to the three most important export crops, namely cocoa, coffee and cotton. All fall under the jurisdiction of the NPMB (ONCPB) and their prices are fixed every season by Presidential decree. Two items are of interest here: Cameroon's position in the world markets and the determination of the producer price.

a. Cameroon's position in the World Markets.

The World Price is the point of departure for the calculation of the producer price. For most of its export crops, Cameroon must act as a price taker since it cannot influence the prices of these crops due to the insignificance of its market shares. For instance, although Cameroon ranks fifth on the list of world cocoa producers, it has no market power since its production only represents about 8 percent of the world production.

Furthermore while these crops are harvested during a few months out of the year, their world-wide consumption is spread throughout the year. Thus their markets are essentially future markets with room for speculation. Indeed dealers' expectations are very important in price formation and introduce a random component in the world price which explains why world prices tend to fluctuate so wildly and unpredictably. Powerless before such uncertainty, the GRC has been relentlessly trying to contribute to the signing of an international cocoa agreement. The third one signed in 1980 is thought to be a failure because of the lack of full support by two key players. Ivory Coast on the producer side and the United States on the consumer side. This agreement pegs the price per pound of cocoa beans between U.S. \$1.00 and \$1.60 by means of a regulating stock which is financed by a levy on the exports of member countries. World prices have generally been higher for coffee than for cocoa. Since 1979, earnings on robusta coffee have been equal to or higher than earnings on exports of cocoa beans, but the quantity of robusta has always been smaller than that of cocoa. World prices for cotton have been very low.

b. The Producer Price.

The producer price for these export crops (cocoa, coffee, cotton) is fixed at the beginning of every campaign by Presidential decree on the advice of the NPMB. Its determination is guided essentially by the general objectives of pricing policies, which are:

- (1) To shelter the producer from erratic world prices.
- (2) To earn the necessary foreign exchange to import goods and services.
- (3) To provide the government with necessary revenues to finance development projects.
- (4) To promote rural development within the general framework of national cohesion, stability and planned liberalism.

More specifically seven factors determine the real level of the producer price. These are:

- (1) the world price which, as described above, is exogenous,
- (2) development taxes, which are politically fixed,
- (3) marketing costs,

- (4) the stabilization factor,
- (5) the level of subsidies,
- (6) the exchange rate and
- (7) finally the rate of inflation.

Thus, one may write: $P = f (w, d, m, s, k, x, r)$ where P stands for producer price, w , d , m , s , k , x , and r for world price, development taxes, marketing costs, stabilization factor, input subsidies, exchange rate and rate of inflation respectively. Indeed the price which is effectively received by the producer of an export crop depends on the combined effect of all these factors.

Dealers' expectations play a very important role in world price formation and introduce uncertainty that governments try to cope with by creating stabilization boards such as the NPMB in Cameroon. In order for this institution to continue to function as a stabilization fund, a reserve has been set up for each crop. A variable fraction of the tax revenue is earmarked for this reserve. The stabilization factor has a negative effect on the producer price since a levy must be imposed to make up a reserve. This effect is similar to that of marketing costs and other levies. The higher this factor the lower the producer price. More specifically the stabilization mechanism works as follows: if the world price is higher than usual, the increase is split between the producer and the fund, the fund usually getting the larger share; in other words, the reserve accumulated in pre-

vious years is used to continue to pay the producer a price which is at least equal to the one paid during the previous campaign. In point of fact the world price of cocoa has dropped steadily since October 1979 yet the producer price was increased from the 1979/1980 through the 1983/84 campaigns.

In general, there are three key agents involved in produce marketing; the NPMB, the cooperatives and the marketing agencies. The NPMB plays the most important role in the marketing process. Being the sole agent authorized to make foreign sales, this institution usually is the one to contact foreign clients and conclude transactions. It also instructs the marketing agencies to deliver the product according to the terms of the contract. These agencies are mostly responsible for inland marketing operations. One proposal contained in the Fifth Five-Year Plan is to promote the development of cooperatives in order to eliminate private marketing agencies. However, it is important to note that there exists a great difference in organization, function and efficiency between cooperatives of the English speaking area and those of the French speaking section. Indeed, the cooperatives in the French speaking provinces of the country rely almost completely on private agencies to fulfil their functions, while the other cooperatives control the entire marketing process from the farm-gate to delivery at the NPMB in Limbe or Douala. The NPMB pays the agent according to its scale of charges or "barème" and marketing costs can be calculated directly on the basis of these scales. Yet, it should be pointed out that marketing costs are likely to be high in the absence of competitive pressures in the marketing process.

As far as cotton is concerned, the NPMB acts through another institution, the SODECOTON, which purchases the unprocessed product from small farmers for sale directly on the world market. This institution is a vertically integrated company in charge of the development of cotton production. Using extension workers, it supplies the farmers with various inputs such as fertilizers, insecticides, herbicides and seeds for maize, groundnuts and cotton. Furthermore it gins, grades and processes seeds in its own ginneries, oil mills and refining plants. All the NPMB does is to peg the price of cotton in exchange for a levy on SODECOTON's profits.

The subsidies received by farmers have a booster effect on the producer price. Hence the common argument often made by the government that producer prices for export crops are not as low as they appear to be when one takes into consideration subsidies received by the farmers and which do represent a form of compensation.

Finally the exchange rate and the rate of inflation must be taken into consideration in any determination of the producer price since the bulk of these produce is exported and most inputs are imported. Because Cameroon belongs to the FCFA zone, it does not have full control over the exchange rate. However, the rate can become overvalued when domestic inflation is higher than abroad or as a result of various import restrictions. In those situations, the exchange rate may not reflect the true scarcity of foreign exchange. Such an overvalued exchange rate has the effect of rendering exports expensive and imported inputs less expensive. What the net effect on the producer price is may be the subject of another study.

2. The Food Crops.

As stated earlier, the price of most food crops is determined by the free play of demand and supply forces. However the GRC does have, standing by, the authority to control all prices including food crops and in fact does control the price of some import substituting foods. Let us now consider the system in detail.

a. General Price Regulation

The general principles defining the GRC's powers to regulate price may be found in Ordinance No. 72/18 of 17 October 1972, amended by Law No. 79/11 of 30 June 1979. This ordinance grants the government the power to regulate prices, the marketing of merchandise and any practice that could lead to speculative increases in consumer prices or that could prevent their decline if market forces warrant it. Decisions relative to prices may be taken by the Minister of Commerce after the "Commission Centrale des Prix" or other specialized commissions have been consulted, Governors of provinces upon power delegation from the Minister in charge of prices, and exceptionally by public organizations determined by the Minister. The Governors of provinces have thus received the power to fix the price of local food crops, livestock, game and other products that have not been industrially processed, and that of services provided by craftsmen such as shoe-makers.

Under the above ordinance the mechanism of price regulation involves the setting of the actual price, i.e. the determination of an increase or dec-

rease or the imposition of a profit margin or mark-up rate. Price determination may also involve any other measures deemed appropriate such as agreements with companies to guarantee global and relative price stability or the requirement that price lists be submitted for approval.

The key institution in charge of the application of the existing price regulation is the Directorate of Prices, Weights, and Measures. Elements of cost structure and typically allowed profit margins for imported and locally produced goods may be found in orders No. 004/MINEP/DPPM and No. 59/MINEP-/DPPM, respectively. It is interesting to note that this legislation has a free-market flavor. Indeed the third section of the seventh title of the ordinance is titled "Maintien de la libre concurrence" (maintaining free competition).

b. The Case of Import-Substituting Crops.

These crops are generally produced by agro-industries to which the government extends customs protection. In return the price at which they sell their output is controlled. To account for inflation, price revision requests are submitted yearly to the Directorate of Prices, Weights and Measures for analysis and approval. These requests, based upon production and marketing costs, and also on debt servicing charges, are subsequently sent to the Ministry of Commerce for decree signature and promulgation.

c. The Cereals Plan and the Jumelage system.

The main points of this plan may be found in Decree No. 74/456 of 10 May 1974 creating the Cereals Office or Office Céréaliier and in Decree No. 440 of June 21, 1975 reorganizing it. This institution is in charge of:

- Cereals price stabilization through a purchase and resale mechanism that attempts to guarantee remunerative producer prices and "reasonable" consumer prices.
- Production of local bread using an increasing percentage of millet sorghum flour or maize flour and less and less wheat flour.
- Development of efficient distribution systems for cereals and other food received from donor assistance.
- Search for export markets.
- Development of a security stock to augment the stabilization function in order to prevent food shortages and famines. These stocks are built through the purchase of large quantities of cereals at harvest time when prices are low. The purchases constitute one phase of the stabilization mechanism, the other being the resale of cereals when they are scarce later in the year to prevent speculation.

In order to meet its development goals in a cost-effective manner, the "Office Céréaliier" sought to minimize the number of middlemen by purchasing

as close to the producer as possible and to sell directly to the consumer. Accordingly, the Office entered into cooperative agreement with the SOCOOPEDS (Sociétés Coopératives d'Épargne et de Développement), which are equipped materially and logistically to purchase and resell the needed produce at the village level.

Under that cooperative agreement, the SOCOOPEDS must purchase cereals on behalf of the Cereals Office directly from the producers and resell the produce to consumers using their own distribution network. The Cereals Office provides them, at the beginning of each campaign, with an advance to cover expenses related to these activities. The resale price of cereals thus purchased is set by the Board of Directors and the price formula is based on the idea of ploughing back the profits in order to finance the operations of the "Office". Each SOCOOPED purchasing agent receives, in addition to a fixed salary, a bonus of 100 FCFA for each bag of 100 "agodas" bought, the agoda being a non-standardized traditional measure (used by farmers in the former North Province) based on the volume of grain rather than on weight.

This apparently sensible cooperative arrangement had serious implementation problems ranging from poor financial management by the SOCOOPEDS of the advances received from the Cereals Office to fraudulent purchasing practices by the SOCOOPEDS field agents, leading to sizeable profit margins by the latter. That unfruitful collaboration between the "Office" and the SOCOOPEDS led eventually to the dissolution of the protocol agreement, and to a search by the Cereals Office for new ways and means of achieving its development goals.

The new strategy of the Cereals Office consists on the one hand, of making individual cash advances to its own field agents for the purchase of cereals at the village level and on the other hand, establishing at the beginning of each campaign, individual contracts with development agencies such as SODEBLE, SOECOTON, and SEMRY. Under this new arrangement, the contractor is responsible for the purchase of cereals and the Cereals Office ensures their transport to and from the various market centers, their storage and their resale throughout the year. Notwithstanding its efficiency, this new strategy has also proven not to be effective in meeting the objectives of the Cereals Office.

Firstly the resale price of cereals purchased by the "Office" is usually, as high as (if not higher than) their market price. Rice is a good example. During the 1982-1983 campaign, the market price of a 100 kg bag of SEMRY rice was 13,678 FCFA whereas the same 100 kg bag of rice was sold by the Cereals Office for 14,500 FCFA.

The case of rice is peculiar due to the fact that imported rice is less expensive than locally produced rice. In fact the market price in Garoua of 1 ton of imported rice is 150,000 FCFA while the same rice produced locally would cost 175,000 FCFA, or 25,000 FCFA more. In order to ensure that most of the locally produced rice is sold, the GRC has established a pairing system known as "Jumelage". Under this system the wholesale rice importer is obliged to buy 1/3 of his/her total volume of importations from SEMRY. This system worked well up to 1980, but began to have serious implementation problems as its strict application would have implied reducing the total volume of rice importations, and at the same time raising the market price

f 1 kg of imported rice. Thus, at the beginning of 1983, SEMRY was unable to sell its stock, and has been as a result experiencing financial difficulties.

Secondly the efforts of the "Office" have till recently been concentrated mainly on millet and sorghum which constituted about 75 percent of the purchases, although the "Office" has the mandate to stabilize the price of all cereals. In fact it is only during the 1980 - 1982 campaign that the Cereals Office began to purchase the other cereal varieties (maize, rice). Finally given its small share in the cereals market (i.e. less than 1 percent of the total production of cereals and less than 10 percent of the total volume of cereals marketed), the Cereals Office has not been able to influence (let alone regulate) the market price of cereals which continue to fluctuate from year to year.

If the Cereals Office is to achieve its stabilization objective, it must try to refocus its strategy back to the traditional village markets with the aim to reorganizing the latter and progressively bringing the farmers to accepting the kilogram as the standard measuring unit, in lieu of the traditional agoda, which is unreliable.

B. Input Subsidies

1. General Background.

Input subsidies to small farmers were initiated and financed in Cameroon in the 1960's by international agencies such as FAC, FAO, FED and USAID.

The FED program initiated in 1965 concerned coffee and cotton production. It paid a subsidy of 50 to 60 percent of fertilizer price up to 1969 at which time the rate dropped to 20 percent and stayed at that level till the end of the program in 1971. Ox-drawn equipment for cotton cultivation was also part of the FED subsidy program.

The USAID program provided subsidies on pesticides in its fight against black pod disease of cocoa. This program started in 1964 and was continued by FAC in 1967 and finally by the cocoa stabilization fund in 1968, which expanded the scope of the program to include the fight against capsid infestation. It was hoped that all these programs would be habit forming for the farmers i.e., eventually lead to an awareness among Cameroonian farmers of the agronomic and economic benefits of fertilizer use. Most of these international programs had built in a credit subsidy component which reportedly declined due to poor repayment rates.

The first fertilizer program financed by the Cameroonian government was initiated in 1973 through the Robusta stabilization fund. It consisted of twenty percent subsidy on 12,000 tons of NPK fertilizer. During the same year, the government consolidated this action by subsidizing pesticides and sprayers to treat the major crop diseases. The crops involved were: cocoa, coffee, cotton and cereals in the former North Province. Thus 1973 is considered as the year of birth of the general subsidy program for the three major non-labor inputs (fertilizer, agricultural chemicals, and sprayers). Not all types of fertilizers and chemicals are covered by the current subsidy program and there are different rates of subsidization for the inputs concerned. Among fertilizers, only NPK 20.10.10 and ammonium sulphate are subsidized.

In a recent study on agricultural input supply in Cameroon by Elliot Berg Associates, it is reported that the export crop sector gets over 80 percent of total fertilizer consumption with coffee accounting for about half of this share. Mostly fertilizers best suited to coffee production are imported. Virtually no fertilizer is used on cocoa and staple food crops. Almost all the fertilizer going to food crops can be accounted for by intensified rice cultivation in the former North Province and by vegetable production in the Foubot area in the West. With respect to chemicals, only pesticides used in the fight against major crop diseases are subsidized.

Nearly all subsidized chemicals go to cocoa and coffee production. In recent years, cocoa has received the greatest share of pesticide expenditure. The GRC views the subsidies program as a way to encourage the adoption by farmers of subsidized inputs and to return to farmers some of the money taken away from them through taxation and other levies imposed on their agricultural products. Accordingly, heavy levies which up to 1980 were imposed by the NPMB on export growers' revenues to finance (among other things) the subsidy program have since been replaced by extra budgetary oil revenues. The management of the current input subsidy program was assigned to FONADER in 1974 and the Ministry of Agriculture has the ultimate jurisdiction of the program.

2. Subsidy components and levels

The difference between the price actually paid by the farmers and the one they would have paid in the absence of the subsidy constitutes the subsidy component of an input. Direct subsidies are fixed for fertilizer and pesticides as a percentage of the C.I.F. import price in Douala.

With respect to pesticides which are treated as a public good, the effective rate of subsidy is 100 percent on both the import price and the transportation costs. But, farmers still pay a non zero price for pesticides to the extent that most often they supply the labor and sprayers necessary to carry out the treatment.

In the case of fertilizer, since 1973, the subsidy rate on the import cost of ammonium sulphate and NPK 20.10.10. has stayed within the range of 40 to 66 percent (it was 13 to 22 percent before 1973). The effective rates are believed to be higher since official calculations express the subsidy rate as a percentage of the importer's depot price instead of a percentage of the farm gate price as the case should be. Only UCCAO has been transporting its own fertilizer and passing the cost on to its farmers; the other cooperatives have been unable to do so. In 1981 FONADER decided to assist those cooperatives by subsidizing transportation cost. This makes the subsidized price of fertilizer uniform throughout the country and increase the actual rate of subsidy.

There exist indirect subsidies within SEMRY and SODECOTON. The effective subsidy on ammonium sulphate and urea purchased by SEMRY is estimated at 60 percent and 24 percent respectively. This institution supplies to its farmers a package of inputs consisting of 75 kg of urea and 50 kg of ammonium sulphate per half hectare. The farmers reimburse at harvest time by selling their paddy to the project at lower than market price. Before 1979-80, the inputs were bought directly by SEMRY from importers, but since then FONADER has been subsidizing SEMRY'S fertilizer purchases at an increasing rate. SEMRY in turn has been passing the costs on to farmers through its price policy for paddy.

SODECOTON supplies its farmers with seed (rice seed, groundnut seed, cotton seed) and non-seed inputs (NPK 15-15-15, urea, pesticide, fungicide and insecticide). The required reimbursement is 20 percent of harvest and does not cover the full cost of this input package. This reimbursement implies fertilizer subsidy levels of about 57 percent for cotton and 64 percent for groundnuts. These levels of subsidies are financed by SODECOTON from overall subsidies granted by the government and by making withdrawals from producer prices. This attempt by SEMRY and SODECOTON to obtain partial reimbursement for subsidized inputs constitutes an incentive for farmers to sell their output outside official channels. Also the experiences of these two institutions raise questions about subsidy programs linked to specific projects. Such programs cannot be adequately maintained where local recurrent financing is not available.

3. The existing input distribution channels.

SOCAME which was a source of locally produced fertilizer and other agricultural chemicals, became plagued by problems stemming from inefficiency and cost overruns and was permanently disbanded in 1981. Since then, all supplies of these inputs come from foreign firms; some of the largest being SEPCAE, SHELL-CHIMIE, DIANA-SICAC and Hamerson International. TROPIC in Douala supplies a variety of small implements such as machettes, animal traction rigs and sprayers for agricultural chemicals.

The Cameroonian input acquisition and distribution system is mixed in the sense that the government intervenes only at certain phases and/or for some inputs. There are three main circuits of fertilizer distribution in Cameroon.

(a) The government circuit

This circuit supplies subsidized fertilizer to smallholders. It accounts for about 38 percent of all the trade in fertilizer. It is highly centralized and involves complex procedures. The principal actors are:

- Provincial extension services and cooperatives helping estimate the needs of the farmers at the provincial level.
 - The Directorate of Agriculture (Direction de l'Agriculture) which prepares a technical file centralizing the needs estimates drawn from each of the provinces.
 - NPMB and the Presidency of the Republic (especially the Department of Central Contracts and the Tenders Board) involved respectively in financing and in the procurement of subsidized inputs.
- Subsidized fertilizer is channeled to smallholders through formal cooperatives, or through integrated development agencies, or the extension services of the Ministry of Agriculture (MINAGRI). This system is reportedly plagued with inefficiencies stemming from shortages, late delivery with inadequate information and supply of wrong kinds of inputs. The shortages are essentially due to high subsidy rates. It is estimated that, at these rates, the government could hardly satisfy half of the expressed demand. Late delivery is due to complex procedures of financing, tendering and delivery of the institutional system. Inadequate information and delivery of wrong kinds of inputs reflect the general lack of competent and

well-motivated technical field staff, insufficient research and the failure to extend the available research findings to the farmers.

There exists a governmental sub-circuit in charge of the distribution of non-subsidized fertilizer to state agencies.

b) The private circuit.

There exists a small but vibrant private sector which also supplies government projects and cooperatives with some inputs. The market share of this sector amounts to 10 percent. This private circuit is credited with stemming the effects on smallholders of shortages created by the inefficient government circuit.

V. ANALYSIS OF THE IMPACT OF VARIOUS MEASURES.

Here we consider the effects of price policy and the input subsidy program on the level and pattern of production in Cameroon. Two conditions are necessary for any price policy and/or subsidy program to have an effect. The economic environment must be such that price information circulates without impediment; in addition economic agents must be responsive to these measures. Thus a fundamental question that must be answered is: How responsive are Cameroonian farmers to various incentives? In order to fully appreciate this dimension, the researcher examines the behavior, over time, of agricultural prices, production and related variables such as area under cultivation and yield. Information on yield is used in assessing the output effect of the fertilizer component of the input subsidy program. In connection with the same program, consideration is given to its institutional impact and its fiscal implications.

A. Impact of Output Pricing.

1. Agricultural Price Trends.

In this section, the behavior of agricultural prices for both export and food crops will be examined to determine their relative variability and as a corollary, the effectiveness of the government stabilization program.

(a) Price trends for export crops.

Relative price stability for export crops is determined by comparing the variability of the nominal export price (FOB) to that of the producer price (PP). A good statistical measure of relative variability is the coefficient of variation (CV) often used in financial analysis to measure risk.

Coefficients of variation of three major export crops are presented in table I.

TABLE I : Coefficients of Variation (in percent) of FOB and Producer Prices of Cocoa and Coffee (Arabica and Robusta); 1961 - 1979.

	Cocoa	Arabica	Robusta
FOB	88	69	80
PP	65	33	40

This table shows greater variability for export prices than for producer prices. When the producer prices for all three crops are considered, the table reveals greater variability for the producer price of cocoa than for coffee, arabica coffee being the least variable of the three. One may reasonably infer from these results that the stabilization program has succeeded in reducing price uncertainty for these crops for the period considered.

Besides price stability, it is important to examine the evolution of the real producer price since this is a key determinant of profitability. It is very unlikely that the traditional Cameroonian farmer will go through elaborate calculations to determine crop profitability. This however, does not mean that he/she is not aware of the concept of purchasing power. In fact the vast majority of farmers can compare the various baskets of non-farm goods and services that they have been able to afford over time. Table II contains growth rates of FOB and producer prices for the major export crops.

TABLE II : Trends¹ in Nominal, Real² Producer and FOB Prices of Four Major Export Crops (percent per annum)

CROP	Nominal Producer Price	Real Producer Price	Nominal FOB Price	Period
COCOA	4.00	-2.40	5.30	1951 - 82
	15.00	4.00	14.70	1970 - 82
ARABICA	4.10	-3.70	8.30	1961 - 80
	10.00	-2.10*	16.50	1970 - 80
ROBUSTA 3	6.20	1.20	10.30	1961 - 81
	11.40	1.10	19.50	1971 - 81
COTTON	5.20	-2.10	-----	1960 - 81
	1.00	-3.50	-----	1960 - 73
	-----	-0.03*	-----	1971 - 81
	11.20	0.40*	-----	1974 - 81

1. Least squares trend growth rates see ANNEX I
 2. Producer price deflated by the 1982 consumer price index
 3. The end period for robusta is 1979
- * Not statistically significant at the five percent level.

Table II indicates that for all the periods considered, the nominal producer prices have been on the increase for each of the four crops. Thus from 1951 to 1982, the producer price of cocoa grew at an average yearly rate of 4 percent, and at a much higher rate of 15 percent for the 1970 - 1982 period. For arabica coffee the nominal producer price grew on average 4.1 percent a year between 1961 and 1980, and at a yearly rate of 10 percent between 1970 and 1980. The rates for robusta coffee for the same periods are 6.2 and 11.4 percent respectively. The nominal producer price of cotton also showed a positive trend; indeed, it grew at a yearly rate of 5.2, 1.0 and 11.2 percent for the periods 1960 - 1981, 1960 - 1973 and 1974 - 81 respectively.

These positive trends in nominal producer prices for these export crops become meaningless when one takes inflation into consideration. Indeed, all producer prices presented in Table II and representing prices in constant 1982 FCFA showed a negative trend, at the exception of those of robusta coffee and cocoa for the period 1970 - 1982. A determination of the magnitude of these trends reveals that trends in the real producer prices of arabica coffee (1970 - 1980) and of cotton (1974 - 1981) are not statistically significant which means the evidence contained in the data is not strong enough to conclude that these trends are different from zero. However trends for all crops for the other periods presented in the table are statistically significant.

These price trends are the result of the combined effect of the seven producer price determinants discussed in Section IV, although the relative weight of each factor cannot be easily assessed.

One measure often used in various studies is the percentage of the FOB price going to the producer. Such percentages are presented in the following table for three major export crops:

TABLE III : Producer Price/FOB (in percent) for Arabica Coffee, Robusta Coffee and Cocoa in Cameroon: 1960 - 1979

PERIOD	ARABICA	ROBUSTA	COCOA
The entire period (1960 - 79)	66	57	46
Federation (1961 - 1972)	76	67	53
Unification 1973 - 1979	49	40	33

Source: McLindon et al.

Table III reveals for each export crop, the lowest producer prices during the period 1973-1979, an interesting finding when one considers that the same period was marked by the launching of the "Green Revolution" in 1973 and the creation in 1976 of the NPMB. Yet one should be cautioned against using the percentage of FOB price going to the farmers as an index of the effectiveness of the Board. In fact some of the funds generated through various levies are re-injected in various ways to the regions and farmers growing those crops by the GRC through institutions such as SODECAO, SOCCODER, FONADER etc... Thus the Ministry of Agriculture estimated that, for the 1978/1979 campaign, 12.3 percent of the nominal producer price of

cocoa, 14.2 percent of arabica price and 9 percent of robusta producer price where returned to the farmers in the form of pesticide and fertilizer subsidies (Ref. Bilan Diagnostic). The lack of time series on these estimates made it impossible to adjust the various nominal producer prices accordingly. Finally the results on price trends suggest the importance of the overall macro-economic policies with respect to the government's ability to control inflation. An increase in the producer price can only be meaningful in an environment of moderate inflation.

(b) Food Crop Price Trends.

For a study mostly concerned with production response to price, the relevant price variable is the producer price. There were, unfortunately, no producer price data available for the food crops involved. Thus, market prices were used whenever they were available. This researcher's decision was based on his conviction that, despite important margins resulting from middlemen and transport costs, market prices are adequate proxies of producer prices. In the same line of thought, any responsiveness of food production to market price could be interpreted as a hypothetical supply response.

In the absence of data on national food crop prices, regional prices as observed in two provincial headquarters were used. Trends for these prices are presented in Table IV.

TABLE IV : Trends¹ in Nominal and Real² Market Prices for Selected Food Crops

CROP	Nominal Market Price	Real Market Price	Period
PLANTAIN CS ³	13.63	3.60	1968-81
CASSAVA CS	13.03	3.20	1968-80
MAIZE CS	10.60	-0.30*	1971-80
RICE PADDY NORTH**	14.00	2.00	1976-81
PLANTAIN W ⁴	22.00	10.00	1978-83
YAM W	15.00	3.00	1978-83

-
1. Least Squares Trend Growth Rates, See Annex 1.
 2. Market Prices deflated by the 1982 Consumer Price Index.
 3. CS for Center - South (Yaoundé Prices)
 4. W for West (Bafoussam Prices)
 * Not statistically significant at the five percent level.
 ** Producer Price
 N.B. Millet Sorghum Prices were not available.

The results contained in Table IV above show that, in Yaoundé and Bafoussam, the real market price of plantain, cassava and yam grew at rates greater or equal to 3 percent per annum. The price of plantain in Bafoussam grew faster than that of yam in real terms, the rate being 10 percent per year on the average between 1978 and 1983. For these crops, demand must have increased faster than supply. The rate of growth of the real market price of maize in Yaoundé is insignificant for the 1971-1980 period.

2. Supply Response to Output Pricing

In general, price and/or yield uncertainty may influence both the pattern and level of agricultural production. If two crops have dif-

ferent degrees of price uncertainty, farmers may be expected to emphasize the production of the lower risk crop, the one with greatest risk being heavily discounted. This substitution may not be applicable to most export crops in Cameroon because they are region specific, but could be valid between food crops and between export crops within a given region.

As for the opportunity cost of production it is inversely related to the level of production. Accordingly, the farmer would tend to move to the crop with the lowest opportunity cost.

The observed trend in production and related variables for both export and food crops are presented in Tables V and VI.

TABLE V

TRENDS¹ IN PRODUCTION, HECTARAGE AND YIELD FOR SOME EXPORT CROPS. (percent per annum)

CROP	PRODUCTION	HECTARAGE	YIELD	PERIOD
COCOA (NATION)	2.30	-----	-----	1951-82
	0.14*	3.34	-3.20	1971-81
COCOA CS ²	-5.60	-2.30	-3.30	1971-81
ARABICA (NATION)	0.20*	-----	-----	1968-80
	-2.04	1.39	-3.43	1971-81
ARABICA W ³	-3.40	-.80	-4.20	1971-81
ROBUSTA (NATION)	2.12	5.42	-3.30	1971-81
COTTON	6.40	2.70	3.70	1953-81
	7.41	-6.21	13.62	1971-81

1 Least squares trend growth rates, see ANNEX I

2 CS for Center-South

3 W for west

* Not statistically significant at a five percent level

TABLE VI

TRENDS¹ IN PRODUCTION, HECTARAGE YIELD FOR SELECTED FOOD CROPS (percent per annum).

CROP	PRODUCTION	HECTARAGE	YIELD	PERIOD
PLANTAIN CS	7.61	10.9	3.29	1968-81
CASSAVA CS	-4.60	2.10	-6.70	1968-81
MAIZE (NATION)	5.08	10.11	-5.03	1971-81
MAIZE W	-5.30*	0.74*	-6.04	1971-81
PLANTAIN W	14.00	-4.00	18.00	1977-81
YAM W	-9.00	-7.00	-2.00	1977-81
MILLET-SORGHUM	7.64	0.87*	6.77	1971-81
RICE PADDY	5.35	-0.13*	5.48	1971-81
RICE PADDY NORTH	-54.70	-21.50	-33.20	1977-81

1. Least squares trend growth rates, see ANNEX I

* Not statistically significant at a five percent level.

Referring to table V relative to export crops, the following observations may be made:

- From 1951 to 1982: cocoa production grew at the national level at an annual rate of 2.3 percent and cotton at a rate of 6.4 percent. The yield for cotton increased at a rate of 3.7 percent per year.
- From 1971 to 1981: National cocoa production stagnated and in the former Center-South province production declined at a rate of 5.6 percent per year. Arabica coffee production declined both at the national level and in the West province, the rates being 2.04 and 3.4 percent per year res-

pectively. Robusta coffee production increased at a rate of 2.12 percent per year and cotton production increased 7.41 percent per year.

The most striking result revealed by this table is the declining yield of all export crops, at the exception of cotton. This raises questions about the effectiveness of institutions charged with assisting the cocoa and coffee farmers.

With respect to the food crops, the following observations (presented in Table IV) can be made:

- From 1968 to 1981 in the former Center-South province, plantain production and yield increased at rates of 7.61 and 3.3 percent per year respectively; both cassava production and yield declined 4.5 percent and 6.7 percent per year respectively.
- From 1971 to 1981: national maize production increased at 5 percent per year but the yield declined at 5 percent per year. The production stagnated in the West province with a declining yield. Both millet and sorghum production and yield increased 7.64 and 6.77 percent per year respectively. The national production and yield of rice paddy increased at about 5 percent per year. However, in the former North province, the production of paddy rice by small holders declined at a rate of 54.7 percent per year; so did the area under cultivation and the yield at rates of 21.5 and 33.2 percent respectively.

From 1977 to 1981: plantain production and yield in the West province increased at a rate of 14 percent and 18 percent per year, while the area under cultivation declined at a yearly rate of 4 percent. These results suggest a possible diversion of fertilizer from coffee to plantain in the West province. Yet for the same period, yam production and yield declined at yearly rates of 9 percent.

It is understandable that food crops in the traditional sector show negative trends in yield since there are no programs to carry out research on most food crops nor to extend the available research findings to the food crop farmers.

In order to better analyze the responsiveness of production trends to price trends, this researcher adapted the concept of supply elasticity to the specific context to measure the responsiveness of production trends to price trends, and called the new measure "trend elasticity of supply". "Trend elasticity of supply" is defined in this study as the ratio of the growth rate of production to the growth rate of price for the same period. The ratios thus computed are presented in Tables VII and VIII, based on the data from Tables II, IV, V and VI.

TABLE VI

"TREND ELASTICITIES OF SUPPLY" FOR EXPORT CROPS.

CROP	NOMINAL ELASTICITY	REAL ELASTICITY	PERIOD
COCOA (NATION)	0.58	-0.96	1951-82
	0.01	0.07	1971-81
COCOA CS	-0.30	-1.40	1971-81
ARABICA (NATION)	-0.20	0.97	1971-81
ARABICA W	-0.34	1.62	1971-81
ROBUSTA (NATION)	0.19	1.93	1971-81
COTTON	0.68	-215.56	1971-81

1 Using the growth rate of the nominal price.

2 Using the growth rate of the real price.

Table VIII

"TREND ELASTICITIES OF SUPPLY" FOR SELECTED FOOD CROPS

CROP	NOMINAL ELASTICITY	REAL ELASTICITY	PERIOD
PLANTAIN CS	0.56	2.11	1968-81
CASSAVA CS	-0.35	-1.44	1968-80
PLANTAIN W	0.64	1.40	1977-81
YAM W	-0.60	-3.00	1977-81
RICE PADDY NORTH	-3.91	-27.35	1977-81

Looking at the magnitudes of both types of trend elasticities, it is apparent that the real trend elasticities of supply are greater in absolute value than the nominal trend elasticities of supply. This means that production is more responsive to changes in real producer price than to changes in nominal producer price.

One would expect the supply elasticity to be positive under normal circumstances (except in the case of a backward bending supply curve). In this respect the cocoa and cotton results are odd in the sense that their production increased while the real producer price decreased. Hence the negative sign of their real trend elasticities of supply. A possible explanation for these results is that, for the periods concerned, there must have been an exogeneous factor, whose effect on production was stronger than the real producer price effect.

It is important to point out that the cocoa results are congruent with those found by the World Bank in their study of the world cocoa market. Indeed the World Bank study reveals that in the 1970's cocoa production in Cameroon increased inspite of negative trends in the real producer price. According to the World Bank, this was "due to government-sponsored

hybrid plantings which increased yields significantly". Yet the finding of the present study do not support that argument, for the following reasons:

- From 1971 to 1981 Cocoa yield declined both at the national level and in the former Center-South province at rates of 4.6 and 3.30 percent per annum respectively.

- and in the former Center-South province, cocoa production declined during the same period, in spite of a positive real producer price trend.

A more plausible explanation for these "unusual" trends is that cocoa production responds to changes in real producer price with considerable lag. In fact at the world level, cocoa production figures suggest that cocoa production responded to the high real producer prices that prevailed in the 1960's with a seven year lag. This lagged response was further confirmed by this researcher through regression analysis (see Annex I). Thus for the sample period 1950-1982, cocoa production was inversely related to the real producer price lagged one year but it responded positively to the same variable lagged nine years.

Notwithstanding the discussion above, the explanation offered by the World Bank for cocoa production behavior could account for the observed results about cotton. Indeed the cotton trend elasticity of supply is negative for the 1971-1981 period possibly because production increased at a rate of 7.41 percent per year inspite of declining or stagnant real producer prices. For the same period, the area under cotton cultivation decreased at a rate of 6.21 percent per annum resulting in an average rate of yield increase of 13.62 percent per annum.

One could therefore argue that the technical assistance effect (mechanization, fertilizers and insecticides) overwhelmed the real producer price effect on production.

The observed trend elasticities of supply are positive for coffee. This could mean that the lag period of supply response is shorter for coffee than for cocoa. This is very likely in view of the fact that coffee output is more sensitive to variable inputs such as labor, fertilizer and pesticides than cocoa production. In addition given the scarcity of land in the West province, coffee producers are more likely to react quickly to changes in opportunity cost through intercropping which, not only takes some labor away from coffee but also affects yield.

As far as food crops are concerned, positive trend elasticities were observed for plantain in the former Center-South province and in the West. Since market prices were used in the calculations, these results could mean that plantain producers received a significant portion of the market price and were responsive to it. But for those food crops showing a negative response to increases in real market price, it could mean that, notwithstanding the assumption that the producer received a significant share of the market price, the opportunity cost of production could not be covered by the received fraction of the market price.

Another important and interesting aspect of the supply response to prices concerns the production pattern. In a perfect economic environment output and input prices in the appropriate markets reflect the true scarcity of the goods and services involved. In such an environment prices and

especially relative prices serve as signals to resource owners who are constantly looking for better opportunities for their resources. Thus production pattern could shift over time as changes in relative prices affect the opportunity cost of production. An investigation of this aspect within the Cameroonian agricultural sector, should take into account the following peculiarities:

- ecological constraints prevent significant competitive relations to exist among export crops. Thus each region has one export crop as its major cash crop.
- within each region the major export crop compete for the same land and other inputs with local food crops that are increasingly marketed. For instance, competitive relations exist between cotton, rice and millet and sorghum in the former North province; between arabica coffee, maize, and plantain in the West; and between cocoa and plantain, cassava, and the various yams in the former Center-South province. These competitive relations must also hold among food crops within each region. Also it should be pointed out that as far as labor is concerned, both export crops and food crops compete with non-agricultural jobs requiring only unskilled labor. This dense network of competitive relations (between export crops and food crops, between the various food crops and between all crops and non-agricultural jobs) coupled with the lack of reliable data on food crop producer prices and costs of agricultural production makes any detailed investigation of production pattern changes almost impossible. However some tendencies could be inferred from the results.

Indeed, for the former Center-South province, from 1971 to 1981, cocoa hectareage declined on the average at a rate of 2.3 percent per annum in spite of a positive trend in the real producer price. This finding suggests that, in the former Center-South province, resources were moved out of cocoa production. It may also lead to the assertion that the increase in real producer price could not cover the opportunity cost of creating new plantations. Such a view is consistent with the findings of a recent cocoa study conducted by the Ministry of Agriculture. That study reveals that cocoa planting, although socially profitable, is not profitable for the farmer. It goes on to demonstrate that for the private producer of cocoa, the average total cost can be estimated at FCFA 358 per kilogram while the average revenue is about FCFA 300 per kilo. Thus the cocoa producer is losing money the economic profit being negative. If this loss is maintained or increased resources are bound to keep moving out of cocoa. It was further estimated that if the farmer were to create a new plantation, the cost per kilogram of cocoa would rise to FCFA 429. This increase is mainly due to labor costs which are now higher (FCFA 750 per day) than they were (FCFA 480 per day) when the existing plantations were created thirty years ago.

Given this situation, cocoa farmers will in the short run continue to maintain existing plantations as long as variable costs can be covered, but in the long run production should be expected to decline as it is unlikely that farmers will invest in new cocoa plantations.

Now the question is whether in the former Center-South province the resources which were moved out of cocoa production were shifted to food crop production. One would answer in the affirmative in view of the facts that

the area under plantain and cassava cultivation increased significantly and that clearing new land in the southern rain forest is not an easy task. Yet it is hard to give a firm answer to this question as that would require an exhaustive examination of all possible alternatives.

Similar results were found in the former North province where land has been withdrawn from cotton production following an important increase in yield. However there is no clear indication as to where this land was affected, the area under millet and sorghum cultivation having remained constant.

Finally, in the densely populated west province, characterized by land scarcity the area under arabica cultivation declined at a yearly rate of 3.43 percent; maize hectarage stagnated and that of plantain declined at a rate of 4 percent per year. Yam hectarage also declined at a rate of 7 percent per annum. In this case, land shifts were observed in both the export and food crop sectors. Again our analysis cannot be carried any further, for reasons mentioned earlier. One interesting result in connection with the West province is the fact that for the period considered, the production of plantain increased at a rate of 14 percent per year while hectarage was declining at a rate of 4 percent per annum leading to an average increase in yield of 18 percent per year. This could be an indication that fertilizer intended for arabica coffee was instead used on plantain or that plantain benefited from intercropping practices.

B. Impact of the Input Subsidy Program.

1. Impact on the output

The impact of the input subsidy program on the level and pattern of the agricultural output may be analyzed through two groups of factors. The first is related to input pricing and the second to organizational inefficiencies.

With respect to input prices, it is important to note that the Cameroonian subsidy program applies only to non-labor inputs. Thus, it would to the extent of its effectiveness distort relative prices between subsidized and unsubsidized inputs. This may lead the farmers to use more of the subsidized inputs and less of labor. Output may decrease by virtue of the law of variable proportions. This law states that there exists an optimal combination of inputs beyond which production is bound to decrease. Furthermore such a situation would lead to a slow growth in employment opportunities in the agricultural sector thus exacerbating the rural exodus phenomenon with its negative effect on the production of both export and food crops.

Growth trends of fertilizer import prices and subsidized users prices are given for both NPK 20.10.10 and ammonium sulphate in table IX below

Table IX

TRENDS⁽¹⁾ IN IMPORT PRICES AND USER PRICE (Thousand FCFA per MT) OF BOTH NPK 20.10.10 AND AMMONIUM SULPHATE (percent per annum).

PRODUCT	NOMINAL	NOMINAL	REAL	PERIOD
	IMPORT PRICE	USER PRICE	USER PRICE	
NPK 20.10.10	12.7	6.6	-2.8	1968-82
	6.2	1.7*	-7.7	1973-82
AMMONIUM SULPHATE	10.4	8.8	-2.3	1966-82
	5.9	2.0*	-6.0	1974-82

(1) Least squares growth trends

* Not statistically significant at a five percent level.

The results contained in Table IX reveal that from 1973 to 1982 the nominal user price of NPK and ammonium sulphate stagnated (the observed growth rates being statistically insignificant) while the real user price of both fertilizers was declining over time. This is evidence that the government may have sought so keep user prices constant over time, at least for these two fertilizers and for pesticides. This input pricing policy is not only conducive to the relative price distortions mentioned earlier but also to increasingly higher subsidy rates which in turn may lead to the shortages of needed inputs. The effect of such shortages is to reduce the production of both export and food crops. However, the negative effect of these shortages is somewhat reduced by the activities of the private distribution network.

Organizational inefficiencies cause late delivery of the subsidized inputs with inadequate information and sometimes use of wrong kinds of in-

puts. These factors are bound to keep the level of agricultural production below its potential as revealed by the negative yield trends observed for most crops.

Finally if a crop benefits from the subsidy program but is not taxed like other crops to finance the program, the production of such a crop is overemphasized. This seems to be the case in Cameroon for cotton the production of which is promoted through subsidies which, till recently, were financed by cocoa and coffee.

2. Institutional Impact

A dynamic or progressive agriculture is characterized by the constant appearance of new alternatives in resources or practices. It is important that the farmer be sufficiently equipped to process all this technical, economic and other information in order to make rational choices. Thus, the farmer needs to develop management skills in order to properly react to various economic incentives. The current system does not provide the farmer with such opportunities since user prices are kept below free-market levels and not many input varieties are available. The farmer cannot therefore over time, acquire experience in determining optimal input combinations for one production or efficient resource allocation in the case of several competing crops.

In addition input shortages and other deficiencies associated with the current program may inhibit the development of cooperatives since farmers may gradually lose confidence in various agencies created to assist them.

Finally , by relying so much on foreign-assisted parastatal organizations for fertilizer distribution to smallholders outside the coffee-growing areas, the current system prevents the main government agencies from acquiring and/or strengthening their experience in that domain.

3. Fiscal Implication.

The policy of keeping the user price constant for most subsidized inputs has led to a constantly growing subsidy budget. This budget was less than a billion FCFA in FY 1973/74; it reached 7.4 billion by FY 1981/82, resulting in an average growth rate of about 26 per cent per annum (see table B 12 in ANNEX 1). It is therefore important to consider the opportunity cost of these resources in light of the aforementioned inefficiencies. These resources are withdrawn either from other aspects of agricultural development where they could be more effective or from the non-agricultural sector leading to a decrease in the growth of national product.

VI SUMMARY OF FINDINGS AND RECOMMENDATIONS.

As stated earlier, the fundamental principle of the GRC's agricultural pricing policy is to set both input and output prices in such a way as to encourage farmers to produce enough to meet either some predetermined targets for export crops or the growing demand for food crops without triggering urban food price increases. How this policy has been applied in both the food and export crop sectors and its impact on production has been the subject of this study. The primary variable of interest throughout the study has been the producer price, bearing in mind the real producer price as a key determinant of profitability.

An examination of price trends for both food and export crops coupled with an analysis of the supply response to output pricing and to various input subsidy measures suggest that the GRC's pricing policy is not being consistently applied in both the food and export crop sectors. Indeed only export crop prices are regulated and only inputs used on export crops are subsidized. Food crop farmers receive almost no subsidized inputs and most food crop markets are free of government intervention. Measures taken by the government to stabilize the price of cereals have not so far been effective. During the past decade, the government's price policy has led to constant nominal user prices for the subsidized inputs, which in turn have required an ever-increasing subsidy budget, with the resulting input shortages that negatively affect agricultural output.

As for the cash crops, export prices showed greater variability than producer prices for cocoa, arabica and robusta coffee. One could thus

infer from this finding that the government's stabilization program has succeeded in reducing price uncertainty for these crops for the period considered (1961-1979). Yet, when the producer prices for four major export crops (cocoa, arabica coffee, robusta coffee and cotton) were examined, these prices showed a positive trend in nominal terms, but not in real terms, except for robusta coffee and cocoa the prices of which showed a moderate increase in real terms for the period 1970-1982.

Market food prices (which were used as proxies of producer prices in the absence of the latter) grew much faster both in nominal and real terms than the producer prices of export crops except for maize prices in Yaoundé which grew almost at the same rate as the consumer price index. These market food price increases point to the ineffectiveness of MIDEVIV.

Looking at "the trend elasticities of supply" as a measure of the responsiveness of production trends to price trends, the study reveals that the real trend elasticities of supply are greater in absolute value than the nominal trend elasticities, a finding which suggests that production is more responsive to changes in real producer price than to changes in nominal producer price. Furthermore the real trend elasticities of supply suggest that export crop production does respond with a variable lag to changes in the real producer price, and that changes in productivity can substantially alter that response.

The most striking finding was the declining yield for all export crops (except for cotton), which raises questions about the effectiveness of institutions with the mandate to improve the productivity of cocoa and coffee farmers.

The lack of information on producer prices for the food crops precluded a definite assessment of foodcrop output behavior.

Another important aspect of the supply response is the production pattern. In a perfect economic environment, resource owners use price and especially relative prices in selecting opportunities for allocating their resources. An investigation of this important aspect of the supply response within the Cameroonian agricultural sector revealed that, with respect to export crops, land was moved out of cocoa production in the former Center-South province for the period 1971-1981 as demonstrated by a decline in cocoa hectareage, in spite of a positive trend in the real producer price. Similarly in the former North province, land was withdrawn from cotton production following an important increase in yield. Yet, the information at hand does not give any clear indication as to whether the land moved from these export crops was shifted to food crops. There is however an indication that in the West province fertilizer intended for arabica coffee was divested to plantain, a phenomenon which could be easily explained by intercropping practices often associated with plantain cultivation in the region.

Going back to the fundamental question raised about the responsiveness of agricultural output to prices, results of this study show that, other things being equal, for export crops, production does respond with a variable lag to changes in the real producer price and to technical progress as revealed by changes in yield. Thus the effect of the real producer price can be fully captured only if one controls for the productivity effect. It would therefore be misleading to assert, as has

been done in many reports, that the real producer price is the principal factor in the increase or decrease of production. There are many examples in the study where production declined despite an increase in the real producer price, and vice versa. There are also situations where the yield effect may dominate the real price effect particularly in cases where the factors critically affecting yield are out of the control of the individual farmer.

In light of those findings, the following recommendations can be made:

(1) Traditional role of the export crops in the Cameroonian economy must be carefully re-examined in view of the increasingly important role played by oil, and the growing demand for food in urban areas. Certainly one has to keep in mind that oil is a non-renewable resource and long-term planning must take this point into consideration. However, it seems that the constraints imposed by the perceived need for generation of foreign exchange and revenue could be some how relaxed to allow for increases in producer prices. In fact substantial increases are needed to reverse the negative trends shown by the producer prices in real terms and to improve the real income received by export crop farmers.

(2) Although the level of world prices will continue to be a binding constraint, additional increases in producer prices could be achieved if the government gradually phased out the subsidy program and let the private sector (which has a comparative advantage) handle input supply; and if measures were taken to reduce marketing costs (e.g. by improving the

communication systems and ensuring greater fiscal responsibility). The fundamental advantage in deregulating the producer prices and dropping the subsidy program is that, in the long run, the farmer is bound to make calculations for her/himself and thus develop sound management skills.

(3) Relatively greater emphasis must be laid on the production of food crops. The government should limit its intervention to activities which have the character of a public good and could significantly improve food production and productivity. This could involve encouraging the transfer of simple technologies which have been proven effective, emphasizing research on improved seed varieties as well as experiments with traditional agricultural practices to see which ones could be preserved and replicated on a large scale.

(4) Mechanisms must also be found to effectively extend research results to farmers. These measures must be an integral part of a comprehensive rural development program aimed at revitalizing rural communities and bringing idling labor from urban centers back to the rural areas.

All these measures would allow the government to rely on relatively dynamic and responsive small farmers than on generally inefficient large state corporation for the production of agricultural crops. Furthermore, such measures could lead to a more dynamic system which would be more responsive to various incentives and could lead to increased production of food at low consumer prices corresponding to an outward shift in the food supply schedule.

(5) The government should seek to pursue macro policies aimed at curbing inflation as a means to increasing real producer prices and hence real farm income.

(6) The GRC should carefully examine its existing data base as well as its present methods of information gathering and dissemination, and reassess its needs and policies with respect to the types of data which must be collected and the sectors of activity which must be given priority in the process. It is hoped that such an exercise would lead to the development of a two-pronged policy aimed at expanding the country's data base with respect to agricultural production and at establishing a reliable system for monitoring growth and the behavior of key variables in relevant sectors of the nation's economy.

This Statistical Annex is divided in three parts. The first one is essentially a technical note explaining the procedures used for the estimation of various parameters of interest; the second part presents the results of estimation while the last one includes tables of the raw data used in estimation.

PART A - FRAMEWORK

PART A- FRAMEWORK

1. Growth rate estimation.

For key variables such as production, prices and area under cultivation, the average annual growth rate was estimated by applying least squares to the following equation:

$$\ln y_t = a + gt + u_t$$

Where: \ln stands for the natural logarithm, y_t for the variable of interest, t is the trend variable, a and g are constants (g measuring the annual rate of growth), and u_t is a random disturbance.

The growth rate of yield can be inferred from those of production and of area under cultivation. In fact, yield is defined as the ratio of production to area, therefore its growth rate must equal the rate of growth of production minus the rate of growth of the area under cultivation.

2. Supply Response of Production.

In trying to assess the effect of producer price on the production of export crops such as cocoa, coffee and cotton it is important to consider the two components of the production decision, namely the decision about investment in tree stocks and that about the rate of production from a given level of tree stock. Because of this structure of the decision making process and the life cycle of the trees involved, it is thought that the

effect of producer price production occurs with some lag, and this price effect is distributed over time. Therefore, in order to capture the full impact of price variation on production, a distributed lag model is needed. Such a model would include as explanatory variables besides the producer price appropriately deflated and lagged, the stock and age of the trees, and the weather.

Unfortunately, all the calculations had to be performed with a hand calculator. This limitations coupled with lack of data on some variables (tree stock for instance) forced this researcher to use a simpler model than a distributed lag model to approximately estimate the impact of producer price on production. Thus only short run supply elasticities were estimated. The real producer price lagged one period was used for the export crops while the current real market price was used for the food crops. To account for possible shifts in the supply schedule due to the effect of omitted variables a trend variable was included in all equations as the second explanatory variable, with the hope that in so doing the bias of the estimates would be reduced.

The following equations were therefore used as model

$$\ln Q_t = a + b \ln P^*_{t-1} + gt + u_t \quad \text{for export crops.}$$

and

$$\ln Q_t = a + b \ln P^*_t + gt + u_t \quad \text{for food crops}$$

In the above equations, Q_t stands for production at time t , P^*_t for the real producer price at time t ; a , b and g are constants (b measuring the

price elasticity of supply). Note that all available prices were deflated by the consumer price index reflecting prices in constant 1982 FCFA.

3. Change in crop mix.

In order to estimate the change in crop mix i.e. export versus food crops, a measure of the opportunity cost of one type of crop in terms of the other was needed. Such a measure is theoretically given by relative profitability as measured by the ratio of marginal profits. Yet such an approach would lead to cumbersome analysis at the national level as one would need to construct aggregate marginal revenues and costs. Furthermore such an analysis may yield results that are not necessarily meaningful.

Thus the present study was limited in this regard to an analysis of competing relations among selected crops at the regional level. In addition, proxies for relative profitability were used in the absence of data on producer prices and/or production cost for most crops. Accordingly, for the former Center-South province, the purchasing power of cocoa in terms of plantain or cassava was used (i.e. the producer price of cocoa divided by the market price of plantain or of cassava). A trend variable was also used to account for possible shifts in the regional production possibility frontier (even though the assumption of full and efficient employment of resources is questionable).

The following equation was used in estimation

$$\ln Q_t = a + b \ln OC_{t-1} + qt + u_t$$

Where OC stands for an appropriate proxy for the opportunity cost. The remaining variables and parameters are as in previous equations.

PART B - RESULTS

PART B - RESULTS

The results obtained from the available data are as follows:

1. TRENDS:

TABLE B 1
COCOA IN CAMEROON: Growth Rate Estimates of Production, Prices, Area and yield.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	60.42	0.0228	0.786	10.50	1951-82
	107.76	0.0005	0.0004	0.06	1970-82
CURRENT	53.03	0.04	0.44	4.85	1951-82
PRODUCER PRICE	55.72	0.15	0.93	12.06	1970-82
CONSTANT	532.98	-0.024	0.354	-4.03	1951-82
PRODUCER PRICE	226.11	0.04	0.52	3.44	1970-82
	205.58	0.06	0.73	4.96	1971-81
CURRENT	73.76	0.053	0.67	7.79	1950-81
FOB PRICE	123.80	0.147	0.833	7.067	1970-81
CONSTANT	753.46	-0.007	0.054	-1.31	1950-81
FOB PRICE	505.47	0.04	0.256	1.86	1970-81
AREA:	323,824	0.0334	0.64	3.76	1972-81
YIELD:		-0.032			1971-81

Note: The word "hat" is used to denote the estimated value of a parameter or of a variable. Thus g-hat stands for estimated growth rate. t-stat stands for the t-statistic used to test the significance of the growth rate.

TABLE B 2

COCOA IN THE FORMER CENTER - SOUTH PROVINCE: Growth Rate Estimates of Production, Purchasing power in terms of Plantain and of Cassava, Area and Yield.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	119,965	-0.0559	0.513	-3.08	1971-81
PURCHASING POWER IN PLAINAINS:	3.23	0.034	0.45	2.54	1971-81
PURCHASING POWER IN CASSAVA:	4.10	0.0713	0.62	3.62	1971-81
AREA:	312,455	-0.023	0.312	-2.02	1971-81
YIELD:		-0.0328			

TABLE B 3

PLANTAIN IN THE FORMER CENTER - SOUTH PROVINCE: Growth Rate Estimates of Production, Price, Area and Yield.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	319,450	0.0761	0.600	4.25	1968-81
CURRENT MARKET PRICE:	11.73	0.1363	0.927	11.80	1968-81
CONSTANT MARKET PRICE:	56.776	0.0355	0.522	3.46	1968-81
AREA:	66,351	0.109	0.77	6.31	1968-81
YIELD:		-0.033			

TABLE B 4

CASSAVA IN THE FORMER CENTER - SOUTH PROVINCE: Growth Rate Estimates of Production, Price, Area and Yield.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	398,536	-0.046	0.284	-2.18	1968-81
CURRENT MARKET PRICE:	7.72	0.1303	0.907	10.34	1968-80
CONSTANT MARKET PRICE:	36.15	0.032	0.312	2.23	1968-80
AREA:	97,424	0.021	0.26	2.03	1968-81
YIELD:		-0.0665			1968-81

TABLE B 5

ARABICA COFFEE IN CAMEROON: Growth Rate Estimates of Production, Price, Area and Yield.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	24,856	0.002	0.0023	0.0231	1968-80
	29,270	-0.0204	0.134	1.1862	1971-81
CURRENT	138	0.0413	0.623	5.46	1961-80
PRODUCER PRICE	136	0.0998	0.94	11.9	1970-80
CONSTANT	877	-0.037	0.793	-8.3	1961-80
PRODUCER PRICE	571	-0.0212	0.2513	-1.74	1970-80
FOB PRICE	142	0.0833	0.73	6.8	1961-79
	185	0.165	0.79	5.5	1970-79
AREA:		0.014	0.58	3.53	1971-81
YIELD:		-0.0343			1971-81

TABLE B 6

ARABICA COFFEE IN THE WEST PROVINCE: Growth Rate Estimates of Production, Area and Yield.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	22,310	-0.034	0.2113	-1.55	1971-81
AREA:	93,054	-0.008	0.057	- 0.48	1972-81
YIELD:		-0.042			

TABLE B 7

MAIZE IN THE WEST PROVINCE: Growth Rate Estimates of Production, Area and Yield. (Results for the nation are included for comparison).

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	228,313	-0.053	0.213	-1.56	1971-81
AREA:	142,293	0.0074	0.0103	0.30	1971-81
YIELD:		-0.060			1971-81
NATIONAL					
PRODUCTION:	282,607	0.0508	0.392	2.41	1971-81
NATIONAL AREA:	208,684	0.1011	0.7913	5.84	1971-81
NATIONAL:					
YIELD:		-0.0503			1971-81

TABLE B 8

PLANTAIN IN THE WEST PROVINCE: Growth Rate Estimates of Production, Area and Bafoussam prices.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	207,756	0.14	0.87	4.51	1977-81
AREA:	147,280	-0.04	0.44	-1.54	1977-81
YIELD:		0.18			1977-81
CURRENT MARKET PRICE:	16	0.16	0.33	0.99	1978-81
	15	0.22	0.74	3.40	1978-83
CONSTANT MARKET PRICE:	27	0.10	0.38	1.57	1978-83

TABLE B 9

YAM IN THE WEST PROVINCE: Growth Rate Estimates of Production, Area and Bafoussam market prices.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	214,239	-0.09	0.59	-2.07	1977-81
AREA:	130,356	-0.07	0.44	-1.53	1977-81
YIELD:		-0.02			1977-81
CURRENT MARKET PRICE:	43	0.15	0.78	3.78	1978-83
CONSTANT MARKET PRICE:	77	0.03	0.14	0.81	1978-83

TABLE B 10

ROBUSTA COFFEE IN CAMEROON: Growth Rate Estimates of Production, Price, Area and Yield.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	60,493	0.0117	0.15	1.44	1968-80
	61,908	0.0212	0.4024	2.46	1971-81
AREA:	134,263	0.0542	0.67	4.06	1972-81
YIELD:		-0.033			1972-81
CURRENT PRODUCER					
PRICE:	75	0.623	0.82	9.26	1961-81
	104	0.114	0.96	14.60	1971-81
CONSTANT PRODUCER					
PRICE:	477	0.012	0.315	2.95	1961-81
	359	0.011	0.10	0.99	1971-81
FOB PRICE:	89	0.103	0.80	8.15	1961-79
	156	0.1954	0.81	5.41	1971-79

TABLE B 11

COTTON IN CAMEROON: Growth Rate Estimates of Production, Price, Area and Yield.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
PRODUCTION:	13,202	0.064	0.61	6.44	1953-81
	6,367	0.17	0.70	4.36	1953-62
	46,414	0.02	0.05	0.61	1963-72
	29,653	0.1045	0.67	3.8	1973-81
CURRENT	20	0.052	0.78	8.4	1960-81
PRODUCER PRICE	26	0.0103	0.45	3.1	1960-73
	34	0.112	0.96	12.16	1974-81
CONSTANT	132	-0.021	0.73	-7.28	1960-81
PRODUCER PRICE	145	-0.035	0.901	-10.74	1960-73
	91	0.004	0.021	0.36	1974-81
	92.5	-0.00034	0.0003	0.05	1971-81
YIELD:	325	0.037	0.614	6.55	1953-81
	318	0.05	0.54	2.42	1953-60
	499	0.0083	0.0215	0.5	1960-73
	419	0.16	0.934	9.2	1974-81
AREA:		0.027			1953-81
		-0.0547			1973-81

TABLE B 12

FERTILIZER, AND PESTICIDE COST IN CAMEROON: GROWTH RATE ESTIMATES OF COST PER METRIC TON, USER PRICE AND TOTAL VALUE OF FERTILIZER AND PESTICIDE IMPORTS.

<u>VARIABLE</u>	<u>a-hat</u>	<u>g-hat</u>	<u>R²</u>	<u>t-stat</u>	<u>Period</u>
NPK Nominal Cost*	20	0.1267	0.7353	5.78	1968-82
	51	0.0615	0.3146	1.92	1973-82
NPK Nominal User Price*	17	0.0661	0.5768	4.04	1968-82
	30	0.0173	0.0566	0.70	1973-82
NPK Real User Price*	32	-0.0277	0.1830	-1.64	1968-82
	40	-0.0772	0.537	-3.05	1973-82
Ammonium Nominal cost**	13	0.1041	0.711	6.07	1966-82
	38	0.0591	0.2607	1.68	1973-82
Ammonium Nominal User Price**	13	0.0881	0.6065	3.93	1966-82
	26	0.0201	0.0986	0.875	1974-82
Ammonium Real User Price**	24	-0.023	0.1208	1.17	1966-82
	28	-0.0596	0.383	2.08	1974-82
Total Value of Fertilizer and Pesticide Imports	426	0.1552	0.912	12.04	1964-79
	1651	0.1718	0.701	3.43	1973-79
Value of the subsidy on Fertilizer, Pesticide and sprayers	915	0.2583	0.83	5.9	1973-82

* 1972 Data not available

** 1969 - 1973 Data not available

2. SUPPLY RESPONSE

COCOA (NATIONAL LEVEL): 1950 - 1982

$$(\ln Q_t)\text{hat} = 5.03 - 0.104 \ln P^*_{t-1} + 0.0214 t$$

(0.031) (0.00121)

$R^2 = 0.9531$

$$(\ln Q_t)\text{hat} = 3.8 + 0.072 \ln P^*_{t-9} + 0.0172 t$$

(0.098) (0.0057)

$R^2 = 0.4725$

PLANTAIN (FORMER CENTER - SOUTH): 1968 - 1980

$$(\ln Q_t)\text{hat} = 9.22 + 0.85 \ln P^*_t + 0.047 t$$

(0.6) (0.029)

$R^2 = 0.6313$

ARABICA COFFEE (NATIONAL LEVEL): 1968 - 1980

$$(\ln Q_t)\text{hat} = 10.013 - 0.0203 \ln P^*_{t-1} - 0.0004 t$$

$R^2 = 0.032; F = 0.1653$

ROBUSTA COFFEE (NATIONAL LEVEL): 1968 - 1980

$$(\ln Q_t)\text{hat} = 11.14 - 0.022 \ln P^*_{t-1} + 0.0123 t$$

$R^2 = 0.163; F = 0.97$

COTTON: 1961 - 1981

$$(\ln Q_t)\text{hat} = 8.43 + 0.43 \ln P^*_{t-1} + 0.033 t$$

$R^2 = 0.20; F = 2.20$

CROP MIX The case of cocoa and Plantain in the former Center - South Province. 1971 - 1980

$$(\ln Q_t)\text{hat} = 12.74 - 0.92 \ln OC_{t-1} - 0.024 t$$

(0.52) (0.0265)

$R^2 = 0.61;$

OC = Purchasing power of a kg of Cocoa in terms of kgs of plantains used as a proxy for opportunity cost. -14-

PART C - RAW DATA

TABLE 1

COCOA IN CAMEROON: Production (000 MT), current producer price (FCFA/kg), current FOB price FCFA/Kg), constant producer price (1982 FCFA), constant FOB price (1982 FCFA), producer prices as % of FOB price.

YEAR	CONSUMER PRICE INDEX	PRODUCTION	CURRENT PRODUCER PRICE	CURRENT FOB PRICE	CONSTANT PRODUCER PRICE	CONSTANT FOB PRICE	PRODUCER AS % OF FOB
1950	12.3	50.4	47.5	91	386	740	52
1	12.6	57.8	78.5	120	623	952	65
2	13.0	57.1	84.0	117	646	900	72
3	13.9	58.7	80.0	118	576	849	68
4	14.0	60.1	125.0	165	893	1179	76
5	14.1	60.7	101.5	142	720	1007	71
6	14.6	64.4	70.0	99	480	678	71
7	15.5	70.2	72.0	108	465	697	67
8	17.6	70.4	76.0	139	432	789	55
9	18.1	75.3	80.0	124	442	685	65
1960	18.6	86.1	80.0	121	430	651	66
1	19.2	77.5	75.0	104	391	541	72
2	21.3	94.4	70.0	113	329	531	62
3	22.5	92.0	72.0	117	320	520	62
4	22.9	96.5	80.0	90	349	393	89
5	23.5	80.4	45.0	97	192	413	46
6	24.8	88.0	55.0	127	222	512	43
7	25.1	92.2	55.0	153	219	610	36
8	25.9	98.4	70.0	201	270	776	35
9	26.8	98.0	85.0	196	317	731	43
1970	28.5	113.2	85.0	144	298	505	59
1	30.4	124.9	75.0	128	247	421	59
2	32.2	105.3	75.0	224	223	696	34
3	37.2	106.0	80.0	227	215	610	35
4	41.4	117.8	100.0	277	242	669	36
5	46.1	96.0	120.0	236	260	512	51
6	53.0	82.0	150.0	303	283	572	50
7	57.9	105.0	220.0	527	380	910	42
8	63.7	110.0	260.0	680	408	1068	38
9	70.6	121.9	290.0	661	411	936	44
1980	79.3	111.1	300.0	585	378	738	51
1	89.7	118.3	310.0	472	346	526	66
2	100.0	106.05	330.0		330		
3			370.0				

SOURCE: MCLINDON et al., BILAN DIAGNOSTIC

TABLE 2

FORMER CENTER - SOUTH PROVINCE COCOA PRODUCTION (MT), Cultivated area (HA), opportunity cost in terms of plantain and cassava.

YEAR	ARFA CAMEROON	AREA PROVINCE	PRODUCTION PROVINCE	OPPORTUNITY COST PLANTAIN	OPPORTUNITY COST CASSAVA
1971	-	346,599	114,746	3.75	6.25
2	380,000	349,625	123,716	3.13	4.41
3	320,000	272,082	108,214	3.20	4.71
4	325,000	298,380	106,859	3.57	5.00
5	337,672	234,991	88,094	3.64	5.00
6	419,000	* 240,794	* 70,278	5.17	5.77
7	408,371	246,598	52,467	4.07	5.95
8	431,058	263,335	79,373	4.06	6.67
9	425,302	261,473	70,204	4.53	8.79
1980	429,161	263,509	83,297	4.23	10.34
1	444,052	264,467	74,395	-	-
2	-	-	-	-	-
3	-	-	-	-	-

* Arithmetic mean of the two neighboring observations

SOURCE: MINAGRI Agricultural Statistics yearbooks, Ministry of Commerce (MOP), Directorate of statistics and national accounting.

TABLE 3

FORMER CENTER - SOUTH PROVINCE PLANTAIN PRODUCTION (MT), AREA UNDER CULTIVATION (HA), CURRENT MARKET PRICE (FCFA/Kg IN YAOUNDE) AND REAL MARKET PRICE (1982 CONSTANT FCFA)

YEAR	PRODUCTION	AREA	CURRENT MARKET PRICE	CONSTANT MARKET PRICE
1968	552,251	86,078	17	66
9	546,836	98,814	16	60
1970	277,270	78,400	17	60
1	381,301	102,164	20	66
2	422,015	110,927	20	75
3	391,538	104,294	25	67
4	406,390	108,345	28	68
5	449,624	99,752	33	72
6	588,051	280,000	29	55
7	768,631	263,550	54	93
8	863,667	266,976	64	100
9	1,004,141	270,537	64	91
1980	1,000,652	273,788	71	90
1	900,522	238,900	-	-
2	-	-	-	-
3	-	-	-	-

SOURCE: MINAGRI Agricultural statistics yearbooks, MOP, Directorate of Statistics and National Accounting.

TABLE 4

FORM R CENTER-SOUTH PROVINCE CASSAVA PRODUCTION (MT), cultivated area (HA), current and constant market prices (1982 = base).

YEAR	PRODUCTION	AREA	CURRENT MARKET PRICE	CONSTANT MARKET PRICE
1968	381,381	123,908	7.5	29
9	400,794	125,297	10	37.3
1970	233,493	84,585	11	38.6
1	281,922	89,630	12	39.4
2	309,518	93,300	17	52.8
3	298,605	96,756	17	45.7
4	300,117	103,666	20	48.3
5	330,315	110,525	24	52
6	379,142	145,900	26	49
7	393,602	128,868	37	64
8	400,867	130,542	39	61.2
9	148,297	132,995	33	46.7
1980	150,411	134,591	29	36.57
1	171,500	115,288	-	-
2	-	-	-	-
3	-	-	-	-

SOURCE: MINAGRI AGRICULTURAL STATISTICS YEARBOOKS, MOP, Directorate of Statistics and National Accounting.

TABLE 5

ARABICA COFFEE IN CAMEROON: Current Producer Price (FCFA/Kg), Constant
 Producer Price (1982 = base), FOB Price (FCFA/Kg), Producer Price as % FOB
 Price and Production.

YEAR	CURRENT PRODUCER PRICE	CONSTRAINT PRODUCER PRICE	FOB PRICE	PRODUCER PRICE % FOB	PRODUCTION
1961	175.3	913	202.2	87	-
2	174.8	822	204.5	85	-
3	192.1	853	221.5	86	-
4	195.4	853	234.8	83	-
5	185.3	789	229.6	81	-
6	157.3	634	214.0	74	-
7	155.7	618	210.0	74	-
8	157.8	607	218.0	72	21,349
9	201	590	276.0	73	22,519
1970	174	705	263.0	66	23,678
1	165	572	248.0	67	27,812
2	175	512	284.0	62	30,452
3	200	470	296.0	68	33,226
4	190	483	324.0	59	24,923
5	235	412	457.0	51	30,992
6	275	443	936.0	29	22,760
7	325	475	1,022.0	32	19,736
8	360	510	651.0	55	22,203
9	390	510	824	47	27,505
1980	390	492			25,523

SOURCE: BILAN DIAGNOSTIC, BERG ASSOCIATES.

TABLE 7

WEST PROVINCE ARABICA PRODUCTION (MT), AREA UNDER CULTIVATION (HA) AND OPPORTUNITY COST IN TERMS OF MAIZE (USING THE MARKET PRICE IN YAOUNDE),

<u>YEAR</u>	<u>PRODUCTION</u>	<u>AREA</u>	<u>OPPORTUNITY COST</u>
1971	24,420	-	4.71
2	24,920	113,453	3.80
3	22,405	76,621	4.26
4	15,452	98,079	5.14
5	20,720	95,376	4.27
6	*15,890	*95,640	3.62
7	11,061	95,905	3.07
8	14,603	94,560	4.74
9	16,796	100,627	5.91
1980	20,404	101,588	4.06
1	18,638	103,988	-
2	-	-	-
3	-	-	-

* Average of the two neighboring observations

SOURCE: MINAGRI AGRICULTURAL STATISTICS YEARBOOKS, DIRECTORATE OF STATISTICS AND NATIONAL ACCOUNTING.

TABLE 8

WEST PROVINCE PLANTAIN PRODUCTION (MT), AREA UNDER CULTIVATION (HA),
CURRENT MARKET PRICE (FCFA/Kg IN BAFOUSSAM) AND CONSTANT MARKET PRICE
(1982 FCFA KG)

YEAR	PRODUCTION	AREA	CURRENT MARKET PRICE	CONSTANT MARKET PRICE
1977	250,885	136,040	-	-
8	272,873	137,537	22	35
9	320,594	139,070	25	35
1980	323,801	140,461	18	23
1	473,613	112,761	41	46
2	-	-	44	44
3	-	-	60	52

SOURCE: HINAGRI Agricultural yearbooks;

DIRECTORATE OF STATISTICS AND NATIONAL ACCOUNTING

TABLE 9

WEST PROVINCE YAM PRODUCTION (MT), AREA UNDER CULTIVATION (HA), CURRENT MARKET PRICE (FCFA/Kg IN BAFOUSSAM) AND CONSTANT MARKET PRICE (1982 FCFA/KG)

YEAR	PRODUCTION	AREA	CURRENT MARKET PRICE	CONSTANT MARKET PRICE
1977	181,599	113,038	-	-
8	183,992	114,281	58	91
9	173,999	115,535	47	67
1980	176,085	116,941	61	77
1	120,454	80,603	93	104
2	-	-	90	90
3	-	-	102	89

SOURCE: MINAGRI Agricultural yearbooks;

DIRECTORATE OF STATISTICS AND NATIONAL ACCOUNTING

TABLE 10

WEST PROVINCE MAIZE PRODUCTION (MT), AREA UNDER CULTIVATION (HA), YAOUNDE
MARKET PRICE (CURRENT AND CONSTANT FCFA/Kg).

YEAR	PRODUCTION	AREA	CURRENT MARKET PRICE	CONSTANT (1982) MARKET PRICE
1971	149,375	112,765	35	115
2	173,630	119,515	46	143
3	155,557	135,177	47	126
4	395,658	283,989	37	89
5	230,800	166,500	55	119
6	*194,910	*152,300	76	143
7	159,020	138,100	106	183
8	160,701	139,619	76	119
9	98,825	141,126	66	93
1980	100,010	142,820	96	121
1	146,863	154,593	-	-
2	-	-	-	-
3	-	-	-	-

* Average of the two neighboring observations.

SOURCE: MINAGRI AGRICULTURAL STATISTICS YEARBOOKS; DIRECTORATE OF
STATISTICS AND NATIONAL ACCOUNTING.

TABLE 11

MAIZE PRODUCTION (MT) AND AREA UNDER CULTIVATION (HA) (NATIONAL LEVEL)

<u>YEAR</u>	<u>PRODUCTION</u>	<u>AREA</u>
1970-71	263,151	233,590
1971-72	283,862	248,124
1972-73	300,000	250,000
1973-74	316,538	263,571
1974-75	376,847	312,154
1975-76	661,620	537,800
1976-77	465,463	523,137
1977-78	477,338	531,654
1978-79	400,988	536,802
1979-80	407,638	544,860
1980-81	410,684	495,911

SOURCE: MINAGRI Agricultural Statistics Yearbooks.

SUMMARY: AREA g-est. = 0.1011, $R^2 = 0.7913$; t-stat = 5.84
PRODUCTION g-est. = 0.0508, $R^2 = 0.3918$; t-stat = 2.41
INFERRED g FOR YIELD; - 0.0503

TABLE 12

ROBUSTA COFFEE IN CAMEROON CURRENT PRODUCER PRICE (FCFA/Kg), CONSTANT PRODUCER PRICE (1982 FCFA/Kg), FOB PRICE (FCFA/Kg), PRODUCER PRICE AS % FOB AND PRODUCTION.

YEAR	CURRENT PRODUCER PRICE	CONSTANT PRODUCER PRICE	FOB PRICE	PRODUCERS PRICE % FOB	PRODUCTION
1961	95.7	498	142.4	64	-
2	90.3	424	142.4	63	-
3	102.0	453	155.0	66	-
4	127.0	555	149.1	85	-
5	100.0	426	114.7	69	-
6	115.0	464	160.5	72	-
7	115.0	458	165.5	69	-
8	115.0	444	155.9	74	56,000
9	117.0	437	197.0	59	51,533
1970	125.0	439	204	61	68,686
1	125.0	411	208.2	60	65,181
2	125.0	388	209.0	60	65,024
3	130.0	349	256	51	62,930
4	135.0	326	261	52	68,990
5	145.0	315	404	36	77,970
6	195.0	368	819	23	57,154
7	250.0	432	863	29	61,903
8	280	440	605	46	63,500
9	310	439	720	43	80,660
1980	320	404	-	-	69,332
1	330	368	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-

SOURCE: BILAN DIAGNOSTIC, ELLIOT BERG ASSOCIATES.

TABLE 13

ROBUSTA COFFEE PRODUCTION (MT) AND AREA UNDER CULTIVATION (HA) (NATIONAL LEVEL).

<u>YEAR</u>	<u>PRODUCTION</u>	<u>AREA</u>
1970-71	65,181	-
1971-72	64,790	139,912
1972-73	62,939	130,000
1973-74	68,990	146,780
1974-75	77,970	171,338
1975-76	69,728	212,566
1976-77	61,903	201,808
1977-78	65,600	231,976
1978-79	80,900	197,917
1979-80	72,863	199,880
1980-81	86,957	207,937

SOURCE: MINAGRI, Agricultural Statistics Yearbooks.

SUMMARY: AREA g-est = - 0.0542; R^2 = 0.6731; t-stat. = -4.06

PRODUCTION g-est. = 0.0212; R^2 = 0.4023; t-stat. = 2.46

INFERRED g FOR YIELD: 0.0754

TABLE 14

COTTON PRODUCTION (MT), AREA UNDER CULTIVATION (HA), YIELD (Kg/HA), CURRENT PRODUCER PRICE (FCFA/Kg), CONSTANT PRODUCER PRICE (1982 FCFA).

YEAR	PRODUCTION	AREA	YIELD	CURRENT PRODUCER PRICE	CONSTANT PRODUCER PRICE
1953	3,665	11,900	308	-	-
4	9,524	22,950	415	-	-
5	14,578	38,875	375	-	-
6	15,584	46,659	334	-	-
7	20,787	50,088	415	-	-
8	22,600	50,223	450	-	-
9	22,273	49,496	450	-	-
1960	20,462	55,302	370	27	145
1	29,233	54,846	533	27	141
2	25,111	63,412	396	28	131
3	41,424	67,686	612	28	124
4	45,607	72,277	631	27	118
5	43,960	78,922	557	27	115
6	57,530	91,755	627	26	105
7	55,792	97,820	570	25	100
8	49,041	98,081	500	28	108
9	67,982	101,314	671	28	104
1970	91,316	108,194	844	30	105
1	38,373	102,055	376	30	99
2	43,183	99,044	436	31	96
3	45,242	87,679	516	31	83
4	27,835	61,176	455	38	92
5	40,002	64,520	620	43	93
6	49,465	73,178	676	43	81
7	47,764	59,930	797	55	95
8	40,686	48,436	840	65	102
9	59,478	47,130	1,262	65	92
1980	80,307	56,594	1,419	75	95
1	84,344	65,227	1,293	80	89
2	-	-	-	-	-
3	-	-	-	-	-

SOURCE: SODECOTON 1979/80 1980/81 ANNUAL REPORTS; BILAN DIAGNOSTIC.

TABLE 15

RICE (PADDY) PRODUCTION (MT) AND AREA UNDER CULTIVATION (HA), AND PRODUCE PRICE (FCFA/Kg),

<u>YEAR</u>	<u>CURRENT PRODUCER PRICE</u>	<u>CONSTANT PRODUCER PRICE</u>	<u>PRODUCTION</u>	<u>AREA</u>
1970-71	-	-	13,737	16,573
1971-72	-	-	13,840	15,652
1972-73	-	-	7,945	16,909
1973-74	-	-	11,867	18,927
1974-75	-	-	24,079	21,229
1975-76	30	57	29,906	23,716
1976-77	30	52	48,060	25,688
1977-78	42,5	67	42,805	24,555
1978-79	42,5	60	45,561	24,242
1979-80	55,0	69	15,006	17,330
1980-81	55,0	61	7,625	10,385

SOURCE: MINAGRI Agricultural Statistics Yearbooks.

SUMMARY: AREA g-est, = 0,0013; R^2 = 0,0002; t-stat, = 0,04 .

PRODUCTION g-est, = 0,0535; R^2 = 0,0680; t-stat, = 0,81

INFERRED g FOR YIELD: 0,0548

TABLE 16

MILLET AND SORGHUM PRODUCTION (MT) AND AREA UNDER CULTIVATION (HA)

<u>YEAR</u>	<u>PRODUCTION</u>	<u>AREA</u>
1970-71	312,191	447,345
1971-72	339,594	487,145
1972-73	312,350	438,960
1973-74	309,455	459,510
1974-75	366,372	404,069
1975-76	410,935	480,570
1976-77	390,321	414,073
1977-78	326,223	423,184
1978-79	408,880	490,400
1979-80	1,414,125	496,764
1980-81	440,665	512,980

SOURCE: MINAGRI Agricultural Statistics Yearbooks,

SUMMARY: AREA g -est = 0.0087; R^2 = 0.1281; t -stat. = 1.15

PRODUCTION g -est = 0.0764 R^2 = 0.3440; t -stat. = 2.17

INFERRED g FOR YIELD: 0.0677.

TABLE 17
VALUE OF FERTILIZER AND PESTICIDE IMPORTS
1964 - 1979 - FAO ESTIMATES
(Million FCFA)

<u>YEAR</u>	<u>FERTILIZER</u>	<u>PESTICIDES</u>	<u>TOTAL</u>
1964	491	205	696
1965	516	62	578
1966	239	227	466
1967	442	326	768
1968	637	607	1,244
1969	627	415	1,042
1970	593	559	1,152
1971	903	604	1,507
1972	672	639	1,311
1973	885	764	1,649
1974	1,266	1,094	2,360
1975	2,979	920	3,899
1976	1,166	1,779	2,945
1977	1,099	2,076	3,175
1978	3,180	3,260	6,440
1979	1,941	2,552	4,493

SOURCE: FAO TRADE YEARBOOK (Cited by BERG ASSOCIATES)

g-est. = 0.1552 $R^2 = 0.9120$

TABLE 18

FERTILIZER USE AND COTTON PRODUCTION BY SODECOTON

<u>YEAR</u>	<u>USE PER HECTARE</u> (Kilos)	<u>PRODUCTION PER HECTARE</u> (Kilos)
1977	150	797
1978	291	840
1979	178	1,262
1980	186	1,419
1981	272	1,300
1982	262	1,300

SOURCE: ELLIOT BERG ASSOCIATES.

TABLE 19

WORLD MARKET PRICES (FCFA/KG) FOR COCOA, COFFEE AND COTTON.

<u>YEAR</u>	<u>COCOA</u>	<u>ARABICA</u>	<u>ROBUSTA</u>	<u>COTTON</u>
1968	178	204	187	154
9	231	230	190	144
1970	188	335	257	168
1	149	274	261	199
2	162	283	249	191
3	252	340	245	277
4	376	390	312	314
5	267	396	288	247
6	489	788	673	387
7	929	1,664	1,209	355
8	851	800	739	347
9	701	828	775	318
1980	547	962	697	393
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-

SOURCE: ELLIOT BERG ASSOCIATES.

TABLE 20
 NOMINAL AND REAL COST AND SUBSIDIZED
 PRICE OF NPK 20.10.10. 1968-1982
 (Thousand CFA per metric ton)

YEAR	NOMINAL		NOMINAL		NOMINAL SUBSIDY		REAL		REAL SUBSIDY	
	COST	INDEXa	USER PRICE	INDEXa	RATE (percent)	COST	INDEXa	USER PRICE	INDEXa	RATE (percent)
1968	22	26	15	33	32	36	43	24	53	32
1969	20	24	16	36	20	31	37	25	56	20
1970	21	25	17	38	19	32	38	26	58	19
1971	26	31	21	47	19	38	45	31	69	19
1972	-	-	-	-	-	-	-	-	-	-
1973	30	36	24	53	20	36	43	29	64	20
1974	63	75	23	51	63	69	82	25	56	63
1975	84	100	45	100	46	84	100	45	100	46
1976	84	100	45	100	46	77	92	41	91	46
1977	96	114	36	80	63	80	95	30	67	63
1978	66	79	32	71	52	50	60	24	53	52
1979	74	88	32	71	57	51	61	22	49	57
1980	82	98	32	71	61	51	61	20	44	61
1981	89	106	32	71	64	51	61	18	40	64
1982	78	93	35	78	55	41	49	18	40	55

a/ Base year = 1975

SOURCE: Elliot Berg Associates.

TABLE 21

NOMINAL AND REAL COST AND SUBSIDIZED
PRICE OF AMMONIUM SULPHATE 1966-1982
(Thousand CFA per metric ton)

YEAR	NOMINAL		NOMINAL USER		NOMINAL SUBSIDY		REAL		REAL SUBSIDY	
	COST	INDEX ^a	PRICE	INDEX ^a	RATE (percent)	COST	INDEX ^a	PRICE	INDEX ^a	RATE (percent)
1966	23	35	10	28	57	40	61	17	57	47
1967	19	29	14	39	26	32	48	24	67	26
1968	16	24	14	39	13	26	39	23	64	13
1969	14	21	-	-	-	22	33	-	-	-
1970	15	23	-	-	-	23	35	-	-	-
1971	17	26	-	-	-	25	38	-	-	-
1972	20	30	-	-	-	26	39	-	-	-
1973	22	33	-	-	-	27	41	-	-	-
1974	41	62	20	56	51	45	68	18	50	51
1975	66	100	36	100	45	66	100	36	100	45
1976	66	100	30	100	55	60	91	27	75	55
1977	75	144	30	83	60	62	94	25	69	60
1978	48	73	26	72	46	36	55	20	56	46
1979	51	77	26	72	49	35	53	18	50	49
1980	58	88	28	78	52	36	55	18	50	52
1981	62	94	28	78	55	35	53	16	44	55
1982	58	88	35	97	40	30	45	18	50	40

a/ Base Year 1975

SOURCE: Elliot Berg Associates.

TABLE 22

TERMS OF TRADE BETWEEN ROBUSTA AND ARABICA COFFEE
PRODUCER PRICES AND FERTILIZER PRICES, 1968-1980
(CFA per kilogram and Index)

YEAR	WEIGHTED USER PRICE OF FERTILIZER a/	COFFEE/FERTILIZER TERMS OF TRADE b/	
		ROBUSTA	ARABICA
1968	29	123	141
1969	15	238	232
1970	16	227	277
1971	20	195	192
1972	-	-	-
1973	23	169	168
1974	22	184	200
1975	42	100	100
1976	40	112	130
1977	34	179	179
1978	30	259	239
1979	30	290	265
1980	31	311	277

a/ .65 NPK .35 ammonium sulphate as per the recommended dose.

b/ Index of producer price of coffee to user price of fertilizer; base year = 1975

SOURCE: Elliot Berg Associates.

TABLE 23

VALUE OF THE SUBSIDY ON FERTILIZER PESTICIDE,
AND SPRAYERS, 1973/74 - 1981/82
(Million CFA)

YEAR	PESTICIDES		MIST		TOTAL	
	FERTILIZER	FUNGICIDE	INSECTICIDE	SPRAYERS ^{a/}		SPRAYERS ^b
1973/74	295	162.12	372.06	0	81.06	910
1974/75	450	163.94	677.67	0	120.00	2,961
1975/76	450	345.94	665.89	22.40	59.99	1,544
1976/77	600	687.71	536.03	68.89	164.56	1,890
1977/78	1,650	589.30	775.81	21.11	352.28	3,389
1978/79	1,682	1,502.36	740.11	51.41	156.23	4,132
1979/80	1,900	1,934.15	2,628.41	65.72	267.04	6,795
1980/81	3,670	1,939.16	3,063.95	23.81	433.69	9,131
1981/82	2,500	4,882.29 ^{d/}		0	0	7,382

a/ Pulverisateur.

b/ Nébulisateur.

c/ Rounded to the nearest million CFA.

d/ Fungicides and insecticides.

SOURCE: Elliot Berg Associates.

ANNEX II

- (1) 1982 - 1983 SCALE OF CHARGES FOR COCOA AND SOCIAL COSTS OF MARKETING COCOA IN CAMERCON.
- (2) 1979 - 1980 - COFFEE SCALE OF CHARGES

SOURCE: McLindon et al., NPMB

TABLE 4.9

As of October 19821982-1983 Scale of Charges for cocoa

1. Balanced freight	
2. Maritime insurance (0.67% of CIF)	
3. Losses in transit	
4. Expense for supervision during shipment (1.750% of CIF)	
5. Maritime transport charges (1.25% of CIF)	
6. Brokerage fees (P.M.)	
7. Transit expense	2,855
7A Charge bill of lading stamp	167
8. Port tax for	1,267
9. Sealing tax	75
10. Toll	60
11. Customs Solicitor's fees	350
12. Shipment tax	1,030
13. Exportation duties	56,000
14. Specific tax	1,000
15. Drying tax	875
16. Phytosanitary tax	50
17. General expenses	9,240
18. Exporter's margin	3,500
19. Packing	P.M.
20. Warehouse rent	565

21. Warehousing insurance	688
22. Other financial expenses	14,801
23. Losses during warehousing and drying	3,822
24. Manipulating and transport	1,728
25. Expense for gathering	2,645
26. Transport differential	27,096
27. National council	900
Total	128,714

SOURCE: NPMB, Bareme du Cacao for 1982-1983. Note that items 1-6 are for cost, insurance and freight once the cocoa is "free on board" ship in Douala. Items 7-27 constitutes inland marketing expenses and taxes.

TABLE 4.9.b

BAREME EUROPE

(Pour compter du 1er Octobre 1982)

Decision No. 147/ONCPB/DG/DA du 30-9-1982 C A F: _____ 1,003,400

PRIX D'EQUILIBRE

1.	Frêt pondéré.....	476,79
2.	Assurance maritime (0,67% sur CAF).....	
3.	Freinte de route (1,75% sur CAF).....	
4.	Frais de surveillance au débarquement...	14,56
5.	Frais financiers transport maritime (1,25% sur CAF)	
6.	Frais de courtage (P.M.).....	
	3,67%.....	<u>36,824</u>
	TOTAL EN FM.....	85,959
	FOB EN FM.....	917,441
	FOB EN F CFA.....	458,720
7.	Frais de transit.....	2,855
7A.	Timbre sur connaissement.....	167
8.	Taxe portuaire aconage.....	1,267
9.	Taxe de plombage.....	75
10.	Peage.....	60
11.	Honoraire d'agree en Douane.....	350
12.	Taxe d'embarquement.....	1,030
13.	Droits de sortie (32% sur VM).....	56,000
14.	Taxe spécifique.....	1,000
15.	Taxe de conditionnement (0,50% sur VM).	875
16.	Taxe phytosanitaire.....	50

17.	Frais generaux.....	9,240	
18.	Benefice Exportateur.....	3,500	
	TOTAL		<u>76,469</u>
	VALEUR LOCO-MAGASIN		382,251
19.	Emballage (P.M.).....		
20.	Loyer magasin.....		565
21.	Assurance pendant le magasinage (1.8% sur VLM)		688
22.	Frais financiers.....		14,801
23.	Dechets pendant magasinage et reconditionnement (1% sur VLM)		3,822
24.	Manutention et transport.....	1,728	
25.	Frais de ramassage.....	2,649	
26.	Differnetiel de transport.....	27,096	
27.	Taxe CXonseil National des Chargeurs...	900	
	NU-BASCULE DOUALA		<u>52,245</u>
	330,000		330,006

TABLE 4.10

Social costs of Marketing Cocoa in Cameroon

(Central-South and East Provinces)

FCFA per Metric Ton

7	Transit Costs	2,855
17	General Charges	9,240
18	Exporter's Margin	3,500
19	Packaging	P.M.
20	Storehouse Rent	565
21	Insurance During Storage	688
22	Financing Charge	14,801
23	Loss in Storage (Magasinage)	3,822
24	Loading and Transport	1,728
25	Gathering Charges	2,645
26	Transport Differential	<u>27,096</u>
	<u>Total</u>	<u>66,949</u>

SOURCE: Derived from NPMB's Scale of Charges for Cocoa, 1982.

TABLE 4.11

Social costs of Marketing Cocoa by Marketing
Sequence in Centre-South and East Provinces
in FCFA per Kilogram

1.	Organisation of collection in Central Storage	9.0
2.	Transport of gathered cocoa	2.0 - 15.0
3.	Bagging and stocking	6.0
4.	Transportation for delivery	5.0 - 30.0
5.	Financing charges:	
	- Financing purchase from farmers	5.0
	- Financing of stocking (from storage to embarcation)	8.3
6.	Management costs (cooperatives and exporters	<u>13.3</u>
	Total	<u>46.6 - 86.6</u>
	Mean	<u>67.6</u>

SOURCE: SEDES (102), 1982.

DIRECTION DES ACHATS
SERVICE CAFES
DIFFERENTIEL CAFE ROBUSTA

CAMPAGNE 1979/1980

F R A N C E - MEDITERRANEE

N.B: APPLICATION DECISIONS

N°s 45 - 47 - 49/ONCPB/DG/DA du 22 et 30/10/79

1. Frêt maritime.....	30 196.8
2. Assurance maritime (0,65 sur CAF).....	
3. Freinte de route (0,75%).....	
4. Frais de surveillance au débarquement...	1 079
5. Frais financiers transport maritime (1,12% sur CAF)	
6. Frais de courtage (1%).....	
	3,52%.....
TOTAL EN FM.....	
FOB EN FF.....	
FOB EN F CFA.....	
7. Timbre sur connaissance.....	167
8. Frais de transit.....	2 598
9. Taxe portuaire aconage.....	904
10. Taxe de plombage.....	85
11. Peage.....	43
12. Honoraire d'agree en Douane.....	350
13. Taxe d'embarquement.....	765
14. Taxe d sortie.....	134 400
14A Vacation ouaniere.....	135
15. Taxe specifique.....	3,000
16. Taxe de conditionnement (0,50% sur VM).	1 600
17. Taxe phytosanitaire.....	50

18.	Frais generaux Afrique.....	5 575
19.	Benefice Exportateur.....	3,200
	de 7 a 19	152 872
19a	Taxe C.N.C. 30% FOB.....	
	De FOB a LOCO MAGASIN.....	
20.	Emballage (P.M.).....	
21.	Loyer magasin.....	599
22.	Assurance pendant le magasinage (1.50% sur LM) 688	LOCO MAGASIN
23.	Frais financiers (1.85% sur L.M moins dechets).....	
24.	Dechets magasin (0,50% sur L.M.).....	
25.	Manutention et transport.....	1 384
25.	Calibrage.....	5 500
26.	Frais de triage.....	7 000
27.	Frais d'usinage.....	21 000

NU-BASCULE DOUALA

PRELEVEMENT: _____ F CFA KILO PRIX CAMPAGNE
SOUTIEN : _____ F CFA KILO

ANNEX III. REFERENCES

.

ANNEX III. REFERENCES

1. A.L., 1983, Cameroon - Balanced Development in a Miniature Version of Africa, THE COURIER, No. 79 MAY - JUNE 1983.
2. AHMADOU, BOUBA, 1983, Marchés des Céréales dans La Province Du Nord, Délégation Provinciale du Plan et de L'Industrie du Nord.
3. CATRISSE, Benoit, 1983 Le CAMEROUN - Une Agriculture qui choisit la productivité Contre la Sécheresse, Afrique Agriculture No, 99 Novembre 1983.
4. DELANCEY, Virginia, 1981, The Impact of Cameroon Agricultural Policies on the production of Food Crops, USAID/CAMEROON.
5. ELLIOT BERG ASSOCIATES, 1983, Agricultural Input Supply in Cameroon, Vol. I MAIN REPORT, E.B.A. ALEXANDRIA VIRGINIA.
6. GORDON, Donald, 1983, Agricultural Pricing Policies, Development Digest Vol XXI, No. 1. July 1983.
7. INTRILIGATOR, Michael D., 1978, ECONOMETRIC MODELS, TECHNIQUES, AND APPLICATIONS, Prentice Hall, Englewood Cliffs, N.J.

8. KMENTA, Jan, 1971, ELEMENTS OF ECONOMETRICS, THE MACMILLAN COMPANY, N.Y.
9. MAMADOU, Alpha Barry, 1983, Matières premières - Grandes manoeuvres Sur Le CACAO, Jeune Afrique Economie No. 24 Octobre 1983.
10. MCLINDON, Michael P., WAWA NGENGE Anthony, and AYISSI Timothee, 1983, Cocoa in Cameroon : Policy and the Economics of Production, Ministry of Agriculture, Directorate of Studies and projects, Service of Agro-Economic Surveys.
11. MEIER, Gerald (ed), March 1983, Pricing Policy for Development Management, The Johns Hopkins University, Baltimore.
12. MELLOR, John W., 1966, The economics of Agricultural Development, Cornell University Press, ITHACA, N.Y.
13. MINISTERE DE L'AGRICULTURE 1980, Bilan Diagnostic du Secteur Agricole de 1960 à 1980, YAOUNDE.
14. MINISTRY OF AGRICULTURE, Agricultural Statistics Yearbooks, 1970 - 1981, Yaoundé.
15. MINISTERE DU COMMERCE, REVUE DE LA DIRECTION DES PRIX, POIDS ET MESURES, Yaoundé.

16. MINISTRY OF ECONOMIC AFFAIRS AND PLANNING, THE FIFTH FIVE
YEAR ECONOMIC, SOCIAL AND CULTURAL DEVELOPMENT PLAN, Yaoundé.

17. PLATON, Pierre, 1980, Le MARCHÉ CAMEROUNAIS, Marchés
TROPICAUX ET Méditerranéens No, 1826 du 7 Novembre 1980, PARIS.

18. SANDERS, Charles and Quan CAO, 1975, ASSESSMENT OF
Agriculture Institutions, (United Republic of Cameroon,
USAID/W.

19. SCANDIZZO, P.L and TSAKOK, I., 1983 FOOD PRICING POLICIES IN
DEVELOPING COUNTRIES, Development Digest, Vol XXI No. 1 July
1983.

20. SCHISSEL, Howard, 1983, CAMEROON ECONOMY - The Products and
the Buyers, WEST AFRICA 19 September 1983.

21. SCHULTZ, W., 1983, On the Economics and Politics of
Agricultural Incentives, DEVELOPMENT DIGEST, vol. XXI No. I
July 1983.

22. TIMMER. C. Peter, 1980, FOOD PRICES AND FOOD ANALYSIS in
LDCs, IPC Business Press.

23. TIMMER. C. Peter, FALCON, P. WALTER, and Pearson R. SCOTT,
1983, FOOD POLICY ANALYSIS, The JOHNS Hopkins University
Press. Baltimore.

24. TOLLEY, George S. VINOD, THOMAS, and WONG, CHUNG MING, 1982,
Agricultural Price Policies and the developing Countries, The
JOHNS Hopkins University Press. Baltimore.

25. USAID, 1982, PRICING, SUBSIDIES, AND RELATED POLICIES IN FOOD
AND AGRICULTURE, Bureau for Program and Policy Coordination,
WASHINGTON, D.C.

26. USAID, 1983, CAMEROONIAN AGRO-INDUSTRIES. YAOUNDE.

27. WORLD BANK, 1983, THE OUTLOOK FOR PRIMARY COMMODITIES Staff
Commodity Working Paper No. 9, The World Bank, Washington, D.C.

28. WORLD BANK, 1983 - 1984, Commodity Trade and Price Trends,
The JOHNS Hopkins University Press. Baltimore.

29. WORLD BANK, 1982, World Development Report, Oxford University
Press.

30. WORLD BANK, 1981, Accelerated Development in Sub-Saharan
Africa (An Agenda for Action), Washington D.C.

31. WORLD BANK, Staff Working Papers No. 608, 1983, Sub-Saharan
Agriculture Synthesis and Trade Prospects. The World Bank,
Washington, D.C.

32. WORLD BANK, Staff commodity Working Paper No. 8 (June 1982),
Analysis of the World Cocoa Market. The World Bank,
Washington, D.C.

33. WORLD BANK, June 1982, ANALYSIS of the World Coffee Market,
World Bank Staff Commodity Working Paper No. 7 The World
Bank, Washington. D.C.