

Assessing the World Bank Model of Structural Adjustment within the Context of the Senegalese Economy

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Abstract

Senegal's performance with structural adjustment programs depends essentially on the extent to which the underlying conditions correspond to the policy assumptions used in typical World Bank programs. Drawing on our own model of the Senegalese economy, we find that adjustment is possible, but under different conditions, and thus a different path from that projected under the World Bank's standard model of structural adjustment.

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Introduction

In its 1986 report on development in the world, the World Bank described the mechanisms accounting for the failure of agricultural policies in most of the countries of the Third World. The developments which follow intend to offer a schematic presentation of this description diagnosis (1st, part), then evaluate its relevance to the Senegalese experience in agriculture (2nd part), and finally offer an opinion about the adequateness of the new agricultural policy (NAP) to respond to the economic policy reforms developed by the World Bank from its explanatory model of agriculture within a developing country context.

I. Underlying Propositions of the World Bank Model

The World Bank model is macroeconomic in nature. As such, it clarifies interdependences on the level of the overall economy that derive from the reaction of production sectors to agricultural policy. In turn, one can reduce its content to the seven following propositions:

1. Third World peasants react to market prices. At the same time, their non-western traditions do not mean that neo-classic logic is foreign to them. Rather, they allocate their production factors optimally according to market signs, produce to sell, and sell on the most profitable markets.
2. Prices for the producer of agricultural goods are not index-linked to the international prices of agricultural raw materials, or to domestic inflation. The existence of marketing boards, due both to the heavy financial charges of the State and to its technical inability (e.g., weakness of the administrative machinery) to levy taxes on the countryside, denies the peasants both the right to sell on the international market, and to determine the selling price based on their production costs. As a result, there is on the one hand an underestimation of the value added by the agricultural sector, while on the other hand, parallel markets often arise to bypass control of the marketing boards.
3. The exchange rate is generally overvalued. Because of the commercial power of city dwellers, the nominal exchange rate is controlled by the monetary authorities not out of concern for maintaining national economic competitiveness, but to minimize the price in national currency of imported consumer goods. As a result, returns in national currency from

the marketing boards are minimized, prices for producers of agricultural goods vary in an uneven manner, and national exports are discouraged.

4. Agricultural production tends to remain stagnant. Deprived of all encouragement to supply official markets because of unfavorable relative prices, farmers rely more and more on subsistence farming and parallel markets. These parallel markets are illegal, and are often quite disorganized. As such, they reflect the limited opportunities for national economic growth posed by official pricing policies.
5. Food imports are substituted for food production. Because of the complementarity established between cash crops and food crops, a drop in agricultural production also means a drop in food production. Political considerations generally exclude rationing of food for city dwellers. As food demand increases, both because of a rural exodus and an overvalued exchange rate, food imports must inevitably increase.
6. Food imports increase financial debt pressures on the balance of payments. By contributing ex-ante to the increase in the deficit of the current account, food imports cause a drop in non-food imports, and add to the decline in overall activity if ex-ante the country under consideration is rationed on international financial markets because of its poor indebtedness record.
7. Each drop in agricultural production generates a drop in industrial activity. In the majority of developing countries, industry essentially transforms agricultural raw materials into finished and semi-finished goods.

II. Testing The Relevance of the World Bank Model

2.1 Evaluating the Terms of Trade in the Agricultural Sector. According to the "deflator" of value added of the primary sector (DVP), the index of Agricultural prices has changed neither in relation to the industrial price index (IPI) nor in relation to the consumer price index (CPI). If we look at the period between 1960 and 1985, the ratio between the DVP and IPI variables has remained unchanged with an annual variation estimated econometrically at 0.02%, a value not only infinitesimal but also statistically insignificant. As for the ratio between the DVP and CPI variables, its average growth rate between 1968-1985 was -0.95%.

The Senegalese experience does not verify the hypothesis of the World Bank model according to which the existence of marketing boards implies, ipso facto, exchange terms unfavorable to aviculture. What it does confirm is the hypothesis of a positive margin between the international prices of agricultural raw materials and the prices for Senegalese producers. Since 1986, peanut producer prices have been brought by the government above the price of peanuts on external markets so as to fight the growth of parallel markets. On the other hand, the unitary remuneration of producers of irrigated or pluvial rice has never been comparable to the export price of Thai or American rice. Nevertheless, the *non-repercussion* of international prices on the *internal prices* of Senegal could not be attributed to a refusal of Senegal's marketing boards to cover the production costs of peasant producers. ONCAD (Senegal's now defunct agricultural marketing board), and its successor, Senegal's CPSP (Caisse de Péréquation et de Stabilisation des Prix), like its predecessor ONCAD (the Office National pour la Commercialization Agricole au Développement), has always provided partial subsidies to farmers to offset the cost of fertilizers and seeds for the cultivation of peanuts. As for noncompetitive domestically produced irrigated rice in external markets, its production would have ceased long ago had it not been for a conscious decision by the State to support it at the cost of heavy financial charges imposed on the CPSP.

2.2 Assessing Exchange Rate Distortions of the CFA Franc. In relation to France and the Ivory Coast, the two principal markets with which Senegal has strong economic ties, the CFA exchange rate does not appear to be overvalued. A major reason is that the general level of prices in Senegal has been generally in line over a long period of time in relation to inflation in France and in the Ivory Coast. This does not mean that since 1960 the commercial power of city dwellers has been minimal, that the exporting sector is doing brilliantly, that the financial situation of the CPSP or of ONCAD has experienced permanent equilibrium, or that producer prices have tended to increase in real terms. However, it does indicate the need to take into consideration variables other than the real exchange rate of the CFA franc if one is to account for the predominance of the city dwellers' interests in the choice of economic policy, the inability of the exporting sector to reflect the growth of international commerce, and the ongoing financial crises which has been the permanent lot of ONCAD and the CPSP since the second half of the 1970's and the evolution of rising prices in agricultural production.

2.3 How Rational are Peasant Producers? The environment in which Senegalese peasant producers have been operating since political independence from France in 1960 has undergone a great many modifications. Several of them are worth noting. First, there

was a progressive suppression of the barter economy between 1960 and 1966. This was followed by a redirection of development in rural zones after the crises of 1962, after which came the arrival of ONCAD as sole medium of peanut trading since 1968. In turn, Senegal then entered the beginning of a new drought cycle in 1969. Then came the overgenerosity of the State (gifts of seeds and fertilizers, the wiping out of the peasants' debts) following the recurrence of the drought since 1971, giving rise to increased public sector indebtedness. Lastly came a series of reforms in rural area management. They began in 1972 and were accompanied by an increase in the number of organizations operating in rural areas since 1974. In turn, this coincided with the liquidation of ONCAD in 1980 and its replacement by SONAR between 1981 and 1984. Starting in 1981, SONACOS was given responsibility for managing the peanut market, after which came the launching of the NAP(new agricultural policy) in 1984. When we look at these events, the neo-classic economic reasoning that presupposes the stability of the environment of the decision maker (the "ceteris paribus" clause) would at best account only imperfectly for the reactions of the agricultural producers. In fact, contrary to these predictions, the following has been observed in Senegal:

- a. in fifty percent of the cases where the price given to the peanut producer experienced a variation (1967, 1974, 1980, 1982, 1986), peasant producers reacted "irrationally", namely, by modifying their peanut crop production in opposition to the evolution of their unitary remuneration.
- b. in fifty percent of the cases where the producer price of millet varied (1971, 1975, 1982, 1984, 1986), it coincided with peasant producer decisions to alter their millet production in the opposition direction of the variation.
- c. in 1961, 1963, 1965, 1967, 1971 and in 1980, peasant producers reacted to every change in relative prices between peanuts and millet by simultaneously increasing their millet and peanut crops, a decision contradictory to conventional economic logic.
- d. in twenty six percent of the cases (1962, 1965, 1977, 1980) where the areas planted with millet increased, the production function of the peasants "behaved poorly", i.e., the marginal productivity of cultivated land was negative.

- e. in twenty seven percent of the cases (1963, 1968, 1970, 1980) where there was an increase in the areas planted with peanuts, the marginal productivity of cultivated land was negative. In this case, agricultural production appears to have been wasted altogether.

What can be said of these patterns of peasant producer behavior? What is clear is that influences other than exchange terms and technology are involved in determining agricultural production decisions within the Senegalese economy. In our review of the Senegalese experience since the 1970's, the following causality relations appear to have been the most relevant:

- a. Production of millet or of peanuts by the acre fluctuates significantly with the amount of rainfall.
- b. Millet and peanut crops, even if varied in opposed directions, are not substituted for each other in consumption.
- c. Millet crops increase following every year of drought.
- d. The extension of peanut crops depends upon the peasants' supply of seeds which results either from their past production or from their ability to buy seeds (the scenario of the 1980's).

The Senegalese experience leads us to consider a world which cannot only be reduced to exchange and technology, but which embraces the way in which resources given to the agricultural sector are used. Such a world must include the behavior of peasants in the face of famine, the disappearance of fallow fields under the pressure of a worsening ecological environment and the capacity of the peasants to self-finance their agricultural production inputs.

Senegalese peasant rationality is based on several considerations. First, they cannot react readily to the rise of peanut prices, either because such a rise modifies their net unitary remuneration little or not at all, or because their granaries lack cereals. Second, they can be indifferent to the rise in price of millet because their granaries are overflowing and peanut seeds are readily available. Third, they can decide not to substitute millet for peanut crops and not leave fields fallow. Fourth, their production function "behaves poorly" if the technical means put at their disposal by the State are not

at the level of the ecological challenge which the series of droughts since 1971 has imposed.

2.4 Evaluating Trends in Agricultural Production. Since the beginning of the Sahel drought cycle in 1969, one of the major concerns of the Senegalese State has been competition between parallel markets and official commercial trading. If, as in 1971 and in 1973, peasants were given seeds and fertilizers free of charge, if they then paid only a fraction of the debts that they were incurring, the decision by the State to bring peanut producer prices above the world market prices, as in 1986, was necessary to prevent the possibility of a return of rural producers to a self-sufficient subsistence economy, by itself counterproductive to economic growth and development on an overall scale. That the share of peanut production sold in official commercial trading continued to drop on an average of -83% between 1962 and 1970, 68% between 1971 and 1980, 50% between 1980 and 1985 - attests to the need for continuing efforts to integrate parallel markets into official ones.

Senegal is not a country where the rural world has turned in on itself. Despite significant rural consumption of cereals (millet, irrigated and seasonal rice), apart from imported rice, urban households are essentially supplied by local production of primary products. Agricultural production and yields fluctuations are due primarily to erratic rainfall. In a normal year, there has never been a tendency for a drop either in peanut or cereal production. In addition, the econometrically estimated tendency of cereal production is upward between the period 1960-1985, even taking into account the years of drought.

2.5 The Links Between Industrial Activity and Agricultural Production. The Senegalese experience validates the positive correlation between the primary and secondary sectors, underlined by the World Bank in its 1986 report (page 80). Nevertheless, the agricultural sector differs slightly according to the economic history of the country. Between 1960 and 1987 the secondary sector did not see the growth rate of its value of industrial production, of VIND (4.15%), line up with the growth rate (2.5%) of the primary sector despite interdependence between the oil mills and peanut production and the importance of the transformation of peanut seeds in industrial activity. This performance signifies on the one hand that industrial sub-sectors exist - energy, phosphates, chemistry, textiles - and which, together or individually, have since 1960 sheltered the secondary sector from the ups and downs of the primary sector (in years of drought, the secondary sector decrease has always been lower than that of the primary sector). On the other hand, the secondary sector, outside of oil mills, can neutralize the

impact of a macroeconomic depression. In 1967, 1969, 1971, 1977, and 1981, a contraction of the GDP coincided with growth in the secondary sector.

2.6 Substitution Possibilities Between Domestic Food Production and Cereal Imports.

There has not been any significant substitution of cereal production and cereal imports in Senegal. The behavior of these two sectors has been, on the contrary, relatively complementarity. Specifically, rice and wheat imports have increased at the same time as rice and millet production. This anomaly arises from the central position that peanut production has always been central to agricultural policy, and from the shaky financial situation of the CPSP since the second half of the 1970's. In fact, by maintaining peanut production not only as the most profitable type of commodity production, but also as a commodity in which speculative trading could be undertaken, Senegalese public authorities have encouraged peasant producers to consider their cereals as food rather than cash crops. In other words, millet and rice production has covered essential, or subsistence, food needs, while providing a residual level of marketable production for urban consumers. It is for this reason that millet flour traded in Dakar, even if not subsidized by the CPSP, has never succeeded, either in terms of quantity nor price, in competing with imported SIAM (i.e., Thai and Burmese) rice to the point of curbing demand for it.

Despite increasing levels of domestic cereals production, imports have also been encouraged by a variety of underlying factors. The most important of these factors are:

- a. Importers, recognized or not recognized by the law, have been able to enjoy healthy profit margins as the State during the 1980's raised the consumer price of rice to improve the financial situation of the CPSP.
- b. Faced with the alternative of extraordinary subsidies, the CPSP was in no position to encourage both the continual extension of production of non-competitive irrigated rice and the systematic substitution of River rice for imported SIAM rice.

2.7. The Significance of Food Imports in the Balance of Payments.

It was only from 1968 to 1977 that economizing on food imports would have strongly affected the external deficit of Senegal. In 1970, in 1971, in 1974, and in 1977, a surplus of the current account would have materialized and would have allowed the country to confront more favorably the periodic turbulence which began with the drought of 1978.

In other words, from the point of view of the balance of payments, reforms in the agricultural sector were necessary during the preceding ten years but not later. In fact between 1978 and 1984, the deficit of the current account tended to rise independently of the level of imports of rice and wheat. Economizing on cereal imports would have left the unfavorable tendency of the external position unchanged, and which in turn, justified the establishment of adjustment programs.

In all cases cereal imports have limited Senegal's economic growth by placing claims on scarce foreign exchange reserves. At the same time, the deficit of the current account of Senegal has always been financed through external bilateral and multilateral capital inflows. There has never been thus far a rationing ex-ante in the balance of capital such that imports have had to be contracted in order to meet debt servicing obligations, even though it has resulted in an increase in overall external debt. Indeed, no trade-off between food imports and non-food imports has been imposed on Senegalese policymakers. In addition, debt service, whose growth was explosive between 1978 and 1985, has thus far not given rise to depressive effects. Permanent declines in national income have been avoided thus far by unilateral net transfers.

III. Testing the Recommendations of the World Bank Model

3.1 Macroeconomic Reform Issues. The new agricultural policy (NAP) such as it appeared in 1984 was not a component of a new overall economic policy, but rather a new sectoral policy. Its key elements have been:

- a. it proposes to bring about a transfer of value added to benefit agriculture "by the establishment of a price system taking equally into account consumer prices and prices on the international market", but does not express its opinion on either the way of setting industrial policy or on the need to readjust the exchange rate of the CFA franc.
- b. it indicates the need to protect local cereals to the detriment of imported rice without any consideration of the contribution to public finances (CPSP) of the positive standardizing of the price of rice not of the exchange rate as a determining instrument of exchange terms between national and foreign products.
- c. it forms the basis for planning to create transformation activities of local cereals but does not question the ability of the environment ex-ante

-industrial structure, industrial incitements, effective rate of protection - to make them profitable and viable.

- d. it envisions. an improvement in the financial situation of the peanut industry without mentioning the need to correct the exchange rate of the CFA franc to reconcile the tendency to increase prices given to the Veanut producer - required by a transfer of value added in favor of agriculture - and the tendency, which is not necessarily upward, of international prices of oil products (cf the situation after 1986). it calls access of farmers to credit "an essential condition of the intensification of agriculture" while ignoring mention of the correlation between access to credit and the asset structure of farmers.
- e. the National Bank of Agriculture is the principal policy instrument in financial matters; but within the present framework, one does not see how this new institution could succeed in providing financial services to farmers where other intermediary financiers have failed (BNDS, USB), or of those who suspended their entrance into the market (i.e., Non-Senegalese banks).
- f. although privatization characterizes the basic approach of current reforms, what does privatization really mean? How can it succeed without specifying how private economic agents are to replace State intervention how they are to succeed in boosting agricultural sector production?

The new industrial policy (NIP) launched two years later also confirms the sectorial nature of the NAP. Its entire provisions in fact, are not likely to realize the objectives of restructuring and making the agricultural sector more dynamic. There are several reasons why this is likely to be so, namely:

- a. the opening of borders by the lowering of the customs tax and the suppression of quantitative restrictions on one hand favors an increase in cereal imports. Favorable profit margins from imports, which benefit the CPSP and smugglers (because of the non-indexing of the consumer price of rice to its import price), compromises the extension of irrigated rice production targets set by Senegalese policymakers, mostly because elevated production costs in the area surrounding the Senegal River region simply can not compete with imports.

- b. operating privileges of national companies in the name of investment codes (CSS, Senelec, Sonees, SAR, Sococim) remain largely unchanged. This perpetuates some sources of overpricing, thereby inducing entrance of private operators into the production of agricultural products. Private operators may not necessarily foster the adoption of modern farming techniques by peasant producers.
- c. the valuation of local resources - recognized by the last investment code as enjoying a privileged status - will inevitably enter into conflict with the opening of borders, given the comparative advantage ex-ante of countries with cereal surpluses.
- d. increased flexibility in the work market (e.g., reduction or elimination of work guarantees, plus the possibility of renewing at will the contract for limited duration work) and the current rise in unemployment following the opening of borders will create significant dislocations in financial transfers. This will take place mostly as a cut off in revenues distributed to households, that is to say, the outlets for private operators specialized in agricultural production.
- e. What is thus missing is the articulation of an institutional framework between the NAP and the Senegalese environment. Missing too is an elaboration of the Policies which are to be used in its implementation, a statement of its independence in relation to the overall approach of agricultural policy. In effect, the World Bank model does not spell out to what extent Senegalese authorities can pursue both financial independence and economic growth based on agricultural re-invigoration and privatization.

3.2 Privatization of Senegalese Agriculture.

Liberalization of the selling of rice, peanuts, seeds and fertilizers is the way in which the disengagement of the State is conceived by the NAP. However, today State, or Para Statal, divisions - Sonacos, the CPSP, the peanut foundation bank, Sonagraines, the CSA, Sodefitex, etc... - remain the major players in the rural world. This paradox is not only the consequence of the necessary transition between giving up a former policy and starting a new one. Above all, it explains the difficulty of translating the NAP into fact.

To the point, how could one reconcile competition from the private sector in CPSP operations when CPSP profit margins on imported rice permit it to compensate for the deficit of most of the industry? Or, how could Sonacos and its subsidiary company (Sonagraines) totally hand over operations to private operators (POS) when private operators possess none of their technical or financial capacity? In turn, how could private operators enter en masse into agricultural production when climatic problems and the inadequacy of the banking system to finance farmers create uncertainty in all agricultural investments? And finally, how could peasant producers finance themselves, i.e., provide for themselves for their seed and fertilizer needs, when their assets have been seriously affected by a cumulative series of droughts since 1970? In short, the ultra-liberal recommendation of the World Bank to "liberalize, and in addition, all the rest will be given to you" faces considerable obstacles when we view this policy within the Senegalese context.

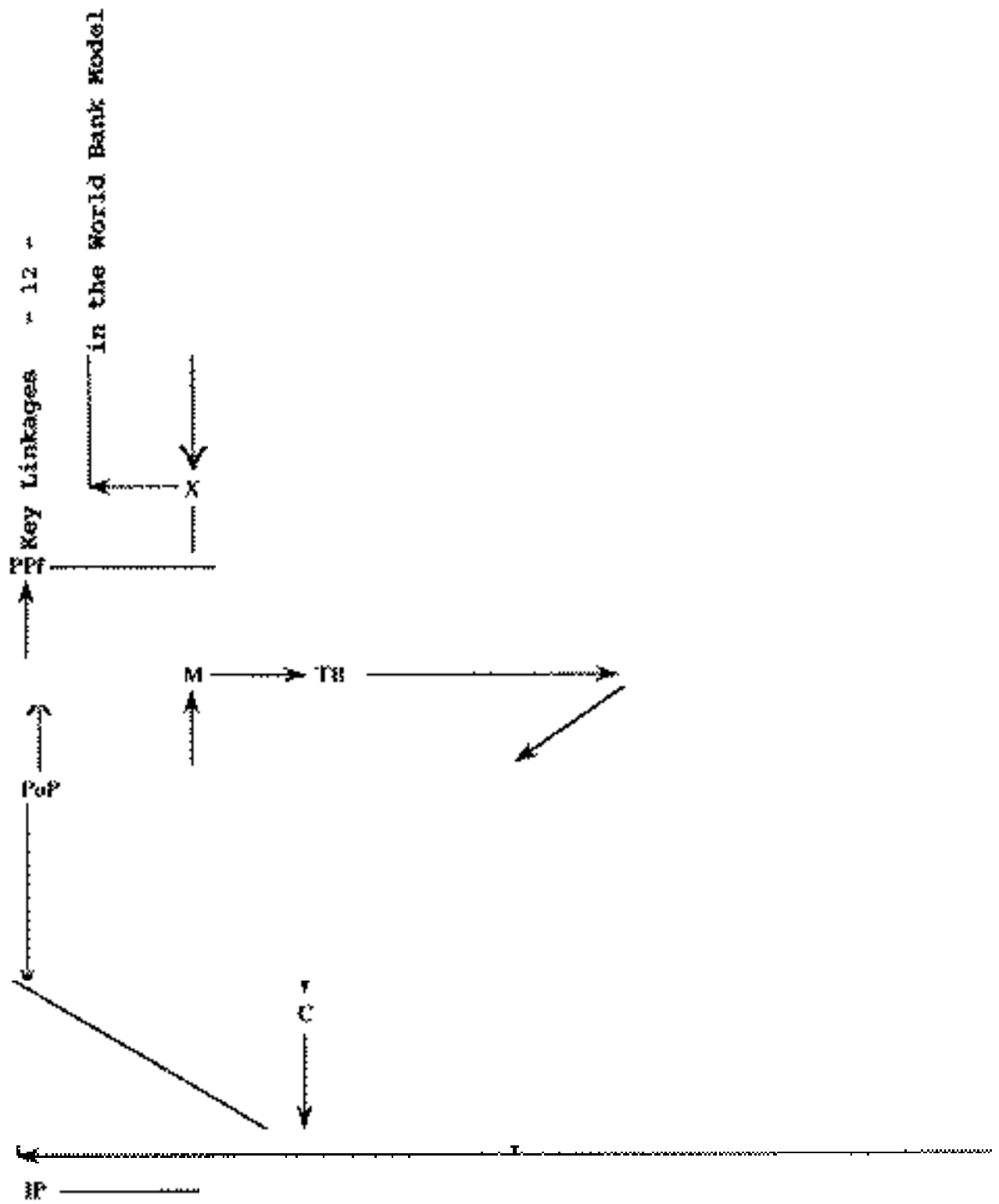
3.3 Promoting the Use of Market Prices. The NAP was supposed to implement free market prices and put an end to the distortions caused by State intervention. However, the Senegalese experience thus far points to a number of anomalies, namely:

- a. rice imported by the CPSP is sold at a price with no relation to its import price,
- b. locally consumed oil is billed by Sonacos at a price with no relation to its export price,
- c. the peanut production price, higher than the international peanut market price, costs the peanut guarantee organization a fortune in subsidies.

Contrary to its objectives, the NAP discourages agricultural production in practice, encourages food dependence and deepens the deficit of the peanut business. Sonacos could close its oil mills, import refined oil and achieve better profit margins on its domestic sales than it does with its present operations. Food dependence will increase as long as imports are more profitable than domestic production. This stems, of course, from the fact that export market prices bear little relation to Senegalese producer prices, and when higher than average world peanut prices discourage domestic food production in favor of expanded peanut oil production. Instead of contributing to absorbing the State's losses in the agricultural sector, the NAP increases them, thus rendering the disengagement of the State more and more necessary but more and more difficult, given

the continuing need for a healthy agricultural sector for sustainable economic development..

Annex I



Glossary of Terms

C	-	consumption (in total volume: total volume of...) (private and public)
CAD	-	current account deficit
CPI	-	consumer price index
DBT	-	outstanding debt
e	-	nominal exchange rate
er	-	(net,actual) exchange rate
GDP	-	gross domestic product
GNP	-	gross national product
ICP	-	international raw materials prices
IMC	-	cereal imports (in volume: volume of...) IP - service of the debt
M	-	total imports (in value; value of...)
MPC	-	cereals sales output
PC	-	volume cereals output
PCAsh	-	volume cash crop production
Pop	-	population
PP	-	price in national currency given to the producer
PPf	-	international prices of raw materials in national currency
TB	-	trade balance
VAG	-	volume added value of agriculture
VIND	-	volume added value of industry
X	-	exports (in volume: volume of...)

Annex II

Estimating Equations

1 $\underline{DVP}_t = 0,871 + 25,10 \text{ Temps}$
 $\text{DVSt} \quad (t=28,8) - (t=0,11)$

$$R^2 = 55,10 \quad DW = 1,94 \quad F = 0,0134 \quad 1960 - 1985$$

2 $\text{RMiLt} = 0,0235 + 0,873 \text{ PLV } t$
 $(t=0,64) \quad (t=2,12) t$

$$R^2 = 0,62 \quad DW = 2,3 \quad F = 38,6 \quad 1961 - 1985$$

3 $\text{RARcht} = 0,0334 + 1,184 \text{ PLV } t$
 $(t=0,66) \quad (t=6,12) t$

$$R^2 = 0,61 \quad DW = 2,56 \quad F = 37,5 \quad 1961 - 1985$$

4 $\text{LMiLt} = 0,0344 - 0,332 \text{ Qlv(ILt-1} + 0,89 \text{ LMiLt-1}$
 $(t=1,61) \quad (t=.3,85) \quad (t=3,09)$

$$R^2 = 0,41 \quad DW = 1,62 \quad F = 7,5 \quad 1962 - 1985$$

5 $\text{QCRt} = 537,47 + 11,26 \text{ Temps}$
 $(t=7,59) \quad (t=2,45)$

$$R^2 = 0,2 \quad DW = 2,08 \quad F = 6,04 \quad 1960 - 1985$$

6 $\text{YARcht} = 959,17 - 9,64 \text{ Temps}$
 $(t=9,68) \quad (t=-1,39)$

$$R^2 = 0,08 \quad DW = 1,87 \quad F = 1,93 \quad 1962 - 1985$$

7 $\text{MCRt} = 141,56 + 12,51 \text{ Temps } t$
 $(t=7,99) (t=10,9)$

$$R^2 = 0,83 \quad DW = 1,51 \quad F = 119,02 \quad 1960 - 1985$$

$$8 \text{ MCR}_t = 181,94 + 0,1864 \text{ QCR}_t \\ (t=2,42) \quad (t=1,77)$$

$$R^2 = 0,11 \quad DW = 0,55 \quad F = 3,16 \quad 1960 - 1985$$

$$9 \text{ QVS}_t = -31,71 + 1,145 \text{ QVPT}_t \\ (t=-1,19) \quad (t=4,68)$$

$$R^2 = 0,47 \quad DW = 0,62 \quad F = 21,92 \quad 1960 - 1985$$

Glossary

DVP	-	"deflator" of the value added in the primary sector
DVS	-	"deflator" of the value added in the secondary sector
RMIL	-	millet production by acre
PLV	-	rainfall, in millimeters
RARch	-	peanut production by acre
LNOL	-	fields planted in millet
QMIL	-	millet output
QCR	-	cereal output
QVP	-	value added (in volume, volume of...) of the primary sector
QVS	-	value added (in volume, volume of...) of the secondary sector
YARch	-	peanut output
MCR	-	cereals output

Notes

*QCR is the sum of millet, rice, and corn output

*MCR is the sum of rice and wheat imports

*the point above certain variables is the growth rate operator

Comments

Equation 4 is the empirical proof of the inverse relationship between rainfall in t-1 and the fields planted in millet in t if and only if:

a/ the Equation 4 is an estimation of a Koyck transformation of the following specification:

$$LMIL_t = \sum_{i=0}^n c_i QMIL_{t-i-1} + v_t$$

where:

$$-\hat{c}_i = 0,332$$

$$-\hat{c}_j > 1, \hat{c}_j - \hat{c}_{j-1}$$

$$-\hat{c}_0 = 0.89$$

b/ the QMIL variable is still a function of rainfall which is confirmed by the following regression:

$$QMIL_t = 0,0278 + 1,794 LMIL_t + 0,697 pLV_t$$

(t=0,69) (t=4,82) (t=3,92)

$$R^2 = 0,78 \quad DW = 2,29 \quad F = 40,6 \text{ période d'estimation 1961 - 1985}$$

Annex III

Explanation of Symbols

CAB	-	current account balance (in billions of francs)
CGRND	-	price of kilogram of peanuts exported by Nigeria to London (in francs)
CPI	-	African consumer price index (base 100 in 1967)
CRZTH	-	price of kilogram of rice exported by Thailand (to,in) Bangkok (in francs)
DVP	-	"deflator" of the value added value of the primary sector (base 100 in 1977)
DVS	-	"deflator" of the value added value of the secondary sector (base 100 in 1977)
FMDR	-	resources of the Rural Development Bank intended to finance inputs and agricultural equipment (in millions of francs)
LMIL	-	millet crops (in thousands of acres)
LYARCH	-	peanut crops (in thousands of acres)
MBL	-	wheat imports (in thousands of tons)
MCR	-	cereal imports ($MCR = MBL + MRZ$)
MRZ	-	rice imports (in thousands of tons)
PLV	-	average rainfall over all of Senegal (in millimeters)
PNQARCH	-	net price for the peanut producer (in francs)
PQARCH	-	gross price for the peanut producer (in francs)
PQMIL	-	price for the millet producer (in francs)
PQRZ	-	price for the rice producer (in francs)
QCR	-	cereal output ($QCR = QRZ + QMIL$)
QMIL	-	millet output (in thousands of tons)
RMIL	-	millet output by acre (in kilograms)
RYARCH	-	peanut output by acre (in kilograms)
TDPIBE	-	growth rate of the GDP "deflator" in Senegal (as a percentage)
TDPIBE F	-	growth rate of the GDP "deflator" in France (in %)
TDPIBE CI	-	growth rate of the GDP "deflator on the Ivory Coast (in percentage)
TQVP	-	growth rate of the value added volume of the primary sector,(in %)
TQVS	-	growth rate of the value added volume of the secondary sector (in %)
VMCR	-	value imports of wheat and rice (in billions of francs)
YACHC	-	peanut output sold by official trading channels (in thousands of tons)
YARCH	-	peanut output (in thousands of tons)

Annex IV **Database Used in the Econometric Model**

	DVP	DVS	CPI	DVP/DVS	DVP/CPI	PQARCH	CGRND	PQRZ	CRZTH	FMDR	TDPIBE	TDPIBEf	TDPIBEci
1960	42,80	52,90		0,80		22,00	48,00	18,00	30,00		-00,44	03,60	
1961	55,00	55,00		1,00		22,00	47,00	18,00	33,00		04,28	03,40	
1962	46,90	55,10		0,85		22,00	41,00	18,00	37,00	580,90	01,71	04,70	
1963	45,40	54,90		0,82		21,50	42,00	18,00	35,00	537,40	-00,24	06,40	
1964	47,80	56,20		0,85		21,50	45,00	21,00	33,00	438,60	03,79	04,10	
1965	47,80	56,90		0,84		21,50	50,00	21,00	33,00	516,80	00,47	02,20	
1966	56,90	58,10		0,97		21,50	45,00	21,00	40,00	803,00	00,32	02,90	
1967	47,60	59,20	100,00	0,80	0,47	21,50	44,00	21,00	54,00	400,00	01,60	03,20	
1968	54,40	57,50	101,00	0,94	0,53	18,00	40,00	21,00	50,00	356,20	-01,85	04,30	
1969	48,00	62,10	103,00	0,77	0,46	18,00	53,00	21,00	47,00	139,20	06,02	06,50	
1970	51,70	62,40	107,00	0,82	0,48	18,50	63,00	21,00	39,00	545,70	04,35	05,60	
1971	55,40	64,10	111,10	0,86	0,49	19,50	69,00	21,00	36,00	880,30	03,05	05,80	
1972	58,40	66,90	117,50	0,87	0,49	23,00	63,00	21,00	37,00	717,10	03,97	06,20	
1973	64,80	68,50	131,30	0,94	0,49	23,00	86,00	21,00	65,00	851,70	07,64	07,80	
1974	67,50	89,00	153,10	0,75	0,44	29,00	177,00	21,00	129,00	1192,10	16,84	11,10	
1975	98,90	100,30	201,50	0,98	0,49	41,50	92,00	21,00	77,00	5080,10	11,17	13,40	
1976	97,50	94,30	207,20	1,03	0,47	41,50	100,00	41,00	60,00	3525,80	04,11	09,90	19,20
1977	100,00	100,00	228,30	1,00	0,43	41,50	133,00	41,50	66,00	1968,10	08,60	09,00	32,00
1978	103,30	117,00	235,00	0,88	0,43	41,50	141,00	41,50	82,00	2786,50	09,14	09,50	04,70
1979	108,40	123,40	257,30	0,87	0,42	41,50	119,00	41,50	70,00		06,08	10,40	06,90
1980	114,10	141,50	279,80	0,80	0,40	45,50	102,00	41,50	91,00		08,06	12,20	09,40
1981	121,90	146,40	296,30	0,83	0,41	50,00	168,00	41,50	130,00		09,54	11,80	01,50
1982	149,80	152,10	347,60	0,98	0,43	70,00	125,00	41,50	96,00		10,27	12,60	04,20
1983	157,50	170,00	388,20	0,92	0,40	70,00	132,00	51,50	105,00		09,65	09,50	15,40
1984	162,50	207,10	427,00	0,78	0,38	70,00	152,00	51,50	109,00		14,10	07,20	
1985	189,20	239,20	490,50	0,79	0,38	70,00	156,00	60,00	97,00		11,70	05,80	

	LMIL	RMIL	QMIL	PQMIL	PLV	LYARCH	YARCH	RYARCH	YACIC	PNQARCH	TQVP	TQVS	QCR	MBL	MRZ	VMCR	CAB
1960	762	514	392	17	709	977	892	913	786	21,0	7,87	3,54	486	74,10	109,80		
1961	831	490	406	17	744	1026	995	969	859	21,0	-13,41	6,26	502	57,30	118,10	4,17	
1962	865	490	424	17	748	1015	880	866	765	21,0	25,95	5,54	528	66,60	100,80	4,34	
1963	959	498	478	17	767	1084	930	858	806	21,0	2,16	3,21	611	63,20	184,50	4,05	
1964	1011	526	532	17	886	1055	960	910	867	21,0	0,32	6,89	679	61,10	179,20	4,13	
1965	1069	518	554	20	813	1114	1101	918	993	21,0	11,26	3,37	717	61,40	179,20	5,77	
1966	997	424	423	20	729	1114	857	769	701	21,0	-10,60	2,08	590	77,00	159,30	6,00	
1967	1155	566	661	20	991	1164	1005	887	834	17,0	x,99	4,51	855	65,60	153,40	6,89	
1968	1024	439	454	20	528	1191	830	697	623	17,0	0,49	3,76	537	63,80	185,20	8,42	-9,102
1969	1037	600	639	20	708	953	759	796	593	17,0	1,93	2,28	828	96,80	145,90	6,35	-11,396
1970	976	410	405	20	596	1049	575	556	447	18,5	5,78	8,52	542	113,2	119,20	5,72	-2,770
1971	975	516	503	17	774	1060	976	932	747	22,0	-16,49	2,66	661	113,5	187,50	7,19	-5,040
1972	936	344	322	17	471	1071	553	532	434	22,0	23,82	2,00	379	96,90	169,00	6,37	3,774
1973	1094	467	510	17	577	1026	658	658	464	24,0	-16,12	-1,96	608	105,00	192,00	12,12	-23,280
1974	1154	689	800	17	702	1052	960	932	724	40,0	23,14	11,41	963	86,00	207,00	20,88	-13,680
1975	963	645	616	25	704	1311	1388	1077	1020	40,0	4,19	2,53	790	104,60	102,20	10,07	-16,478
1976	895	566	507	30	704	1294	1196	924	952	40,0	14,57	10,81	676	109,00	244,00	15,57	-18,564
1977	943	442	420	30	542	1161	508	447	396	40,0	-6,80	5,11	515	96,00	248,00	15,86	-12,740
1978	1053	753	802	35	735	1154	1051	919	787	40,0	-23,60	-9,00	1007	142,00	239,00	15,46	-49,500
1979	968	512	521	35	591	1047	668	646	326	43,0	27,20	11,10	663	124,00	352,00	20,20	-47,912
1980	1117	488	531	40	496	1065	488	460	153	46,0	-18,30	-3,00	649	97,00	302,00	23,00	-87,354
1981	1177	625	736	40	676	1015	880	870	625	60,0	-5,60	5,70	915	122,00	339,00	32,79	-125,440
1982	991	590	585	50	621	1149	1096	965	765	60,0	24,80	15,00	766	105,00	329,00	33,03	-87,647
1983	828	425	352	50	394	965	564	590	234	50,0	4,80	2,30	530	113,00	380,00	40,50	-110,313
1984	1000	480	471	55	614	859	669	779	130	50,0	-17,50	-1,80	689	129,00	370,00	41,30	-119,673
1985	1350	700	950	55	633	594	576	969	300	90,0	5,90	2,20	1244	97,60	336,50	34,40	
1986	1000	650	630		591	806	820	1029	590	90,0	10,20	3,30	879	100,00	318,00	21,80	