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CASH CROP AND FOODGRAIN PRODUCTIVITY IN SENEGAL: Historical View, New Survey Evidence, and Policy Implications

By

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BACKGROUND: Up to the end of the 1970s, Senegal was in the forefront of African agricultural innovation and development. The early introduction of peanut cash cropping fostered the rapid adoption of animal traction and one of the highest fertilizer use rates in West Africa. By the end of the 1970s, however, the agricultural sector was in decline and producing huge government deficits. Despite more than a decade of structural adjustment, agricultural productivity growth trends from 1960 to the present were stagnant.

OBJECTIVES: The objectives of this research are to: review the evolution of Senegalese agricultural policy and its impact on cropping productivity; describe current production practices in the Senegalese Peanut Basin, identifying factors that now contribute to or constrain productivity growth; and offer recommendations for policy initiatives likely to improve productivity.

FINDINGS: Three major types of findings, with policy implications and recommendations, were drawn from this research.

I. Lessons from History

1. Agricultural intensification and productivity growth are driven by **cash crops** with reliable markets and predictable prices;

2. **Crop research** has helped maintain productivity despite declining rainfall;

3. **Liberalization** has improved cereal marketing efficiency; but the production impact has been small as peanuts still provide more predictable markets and profits;

4. **Vertical integration** of extension, input distribution, credit, and output marketing **systems** serves geographically dispersed smallholders well, encouraging agricultural intensification more than today's less integrated systems;

5. Vertically integrated systems can become costly and inefficient, particularly if management responds more to **political pressure** than to business logic;

6. A lack of attention to rural **literacy, extension**, and farm-level **financial analysis** has fostered the adoption of technologies such as animal traction and fertilizer that farmers are now having difficulty sustaining;

7. Senegal's **failure to monitor relevant economic indicators** during the 1960s and 1970s increased the severity of the economic crisis that brought structural adjustment to the forefront in the 1980s.

II. Current Input Use Patterns and Constraints.

Farmers are unanimous that the most important constraint is their inability to obtain desired quantities of peanut seed. Inadequate seed has led to lower peanut income and diminished capacity to purchase productivity-enhancing inputs: ageing animal traction equipment is not being replaced, fertilizer use has become virtually nonexistent, organic matter returned to the soil is far from adequate, use of certified seed is extremely rare, as is use of chemical inputs to protect seed quality or fight pests. Family labor is under-utilized during slack periods while wage laborers are rarely hired during peak periods. **The key strategies now used by farmers to increase yields and/or incomes are strategies that cannot be sustained in the long-run:** 1) extensification on marginal lands; 2) increasing peanut seeding rates to compensate for declining soil quality; 3) increasing the quantity (but not necessarily the quality) of labor.

Farmers' perceptions of constraints on use of productivity-enhancing inputs vary by input:

1) Fertilizer is considered too expensive; 2) Fungicide yield potential is poorly understood; 3) Insecticides on stored seeds make the seeds inedible; 4) Poorly functioning markets limit access to hired labor; 5) Peanut seed constraints make it difficult to provide traditional in-kind payments to seasonal laborers (navétanes); 6) Yield potential of certified seed is poorly understood; 7) Reduced pasture near villages limits manure availability; 8) Multiple uses of crop residues reduce availability of soil organic matter; 9) Credit programs do not allow for flexible repayment schedules required by farmers producing in risky environments.

Two important **objectives for the peanut sector** are:

1. to maintain peanut production at a level which keeps the processing industry running at capacity;
2. to increase farm incomes.

Farmers' inability to obtain desired quantities of peanut seed prevents attainment of both these objectives. Although the seed marketing and distribution system could be improved, farmers' **inadequate cash reserves and poor access to credit are the principal bottlenecks** — at present, there is more of a demand-side than a supply-side problem.

III. Economic Efficiency and Factors Associated with Higher Levels of Productivity.

Although economic efficiency of current production practices varies by farm type and agroclimatic zone, two findings apply for almost all situations:

1. If farmers continue to cultivate without fertilizer, the primary means of increasing yields and profits is to increase seeding rates beyond the current level (which already exceeds recommended rates);
2. The marginal value product of household labor is less than the prevailing wage rate suggesting that more labor than necessary is being used during most of the cropping season.

Input use patterns, adequacy of caloric intake, location, and access to cash are the principal factors that differentiate high productivity farms from others.

Farms located in zones with better soils and rains tend to have better yields; there are, however, notable exceptions:

1. Cereal yields in the southeastern Peanut Basin were significantly lower than those in less favorable zones; and
2. Peanut yields in the drier northern and central zones were not statistically different from those in the higher rainfall zones.

Failure to control crop disease appears to have caused low cereal yields in the southeast. We attribute the latter result to the successful development and extension of shorter-cycle peanuts that are well-adapted to conditions in the drier zones.



Had these varieties not been developed, more than half the Peanut Basin would no longer be producing peanuts.

Farms with the best peanut yields have better access to cash at planting time. This access comes from a combination of higher overall incomes, larger prior-year peanut harvests, more livestock which can be easily converted to cash, and better access to credit.

Although there is evidence that noncropping income improves food security and is re-invested in cropping activities, we were unable to establish a clear link between high shares of noncropping income and better cropping productivity.

POLICY IMPLICATIONS AND RECOMMENDATIONS: Senegal needs to **encourage farmers to move from the present pattern of increasing yields by mining the soil to an agriculture based on more intensive production technologies that conserve the natural resource base while increasing returns to land and labor.** The recent devaluation of the CFA franc has improved the profitability of export crops such as peanuts and increased demand for local cereals, yet **there is little evidence that farmers are moving toward the type of agricultural intensification needed to meet Senegal's long-run income and food security goals.**

As this type of intensification is not only in the long-run interests of farmers but also in the long-run interests of the entire nation, farmers cannot be expected to carry the full financial burden of the transformation. The government has an important role to play in fostering policies and public investments that will induce private farmers and other business persons to invest in the production, marketing, and use of more intensive yet sustainable agricultural production technologies. In the absence of this enabling environment, there is little hope for improving productivity.

We believe **the most urgent issues** to address are: **1)** the quality and quantity of peanut seed available to farmers; **2)** restoring soil fertility; **3)** renewing animal traction stocks; **4)** land tenure legislation; **5)** increasing rural cash income to improve food security and input access.

The following paragraphs offer some ideas about remedial actions in five major areas which are suggested by our research. The next logical step is to evaluate the relative costs and benefits of these suggested options in view of developing policies and programs that are economically feasible and sustainable.

I. Peanut Seed. **There is a need to improve capacity to purchase seed** as this increases quantities planted and contributes to improved quality through replacement of household stocks. Some options to consider are: **1)** increasing credit availability, **2)** making credit repayment schedules more flexible, **3)** promoting noncropping sources of cash income.

Seed storage, supply, and marketing systems can also be improved by: **1)** promoting the sale of certified seed through marketing campaigns; **2)** increasing distribution points for certified seed; **3)** encouraging sales in smaller units than the 50-kilogram sacks now used; **4)** making certified seed available for purchase year round; **5)** increasing competition in the production and sale of certified seed; and **6)** fostering extension programs to promote insecticides and fungicides.

II. Soil Fertility. Profitability of and access to fertilizer can be improved by: **1)** cutting costs of production and distribution through infrastructure investments, reduction in import duties and taxes, and stimulating demand to levels that foster economies of scale; **2)** conducting analyses on the level of subsidy required to increase fertilizer use; **3)** judiciously using subsidies if cost/benefit analyses show that subsidies provide net benefit to society; **4)** studying fertilizer response with attention to local phosphates and combining fertilizer with improved management (water harvesting, windbreaks, etc.); **5)** increasing private

sector involvement in fertilizer promotion (extension, demonstration trials).

Promotion of organic matter is essential. Measures to encourage this are: **1)** programs that promote livestock fattening to increase manure availability; **2)** feasibility studies for converting urban waste to soil supplements; **3)** research and extension on technologies that increase green manure or animal fodder; **4)** programs to link input use and improved natural resource management practices (tying fertilizer credit to composting, for example); and **5)** programs to increase availability of crop residues for soil enhancement (replacement of millet-stalk fencing with live fences, for example).

III. Animal Traction Equipment. Most existing animal traction equipment is fully depreciated.

In the next 5-10 years there will be a major need for manufacture, sales, and credit programs to encourage recapitalization of the equipment stock. Measures to consider are: **1)** providing credit and technical support to local blacksmiths; **2)** creating a financial analysis unit in the extension services to help farmers evaluate their debt carrying capacity, particularly for traction equipment; and **3)** reducing the costs of production for industrially manufactured equipment.

IV. Land Tenure Legislation. There is a need for **land tenure reform** that permits (and protects legally) transactions in land so as to ensure better land allocation (those who need it get it). This **will increase cropping specialization, funneling land to more productive farmers.** At the same time, research suggests that titling land so that it can be used as loan collateral does not have strong farmer support.

V. Income Diversification. Most farmers do not want to abandon farming but want to diversify income sources to reduce risk, improve access to inputs, and increase income and food security. Policy options that would help farmers diversify income sources are: **1)** the promotion of micro-enterprise programs (credit, training, etc.) in rural areas, particularly in fragile zones; **2)** industrial

planning that locates employment generating activities in rural areas that have high levels of underemployed labor; **3)** programs to encourage development of rural enterprises that support agriculture through upstream (input The first set of findings deals with provision, for example) and downstream (output processing, for example) linkages; and **4)** food-for-work programs targeted at households with the most severe income and food security problems.

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MSU Bulletin Office
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This paper is also forthcoming as an SD Publication Series technical paper. It can be obtained through USAID's development information system (CDIE) (catalogue number forthcoming).