POLICY SYNTHESIS
for USAID - Bureau for Africa
Office of Sustainable Development
Number 23 October 1996

ASSESSING THE IMPACT OF COWPEA AND SORGHUM RESEARCH AND EXTENSION IN NORTHERN CAMEROON

By

James A. Sterns and Richard H. Bernsten

Food Security II Cooperative Agreement between U.S. Agency for International Development, Global Bureau, Economic Growth Center, Office of Agriculture and Food Security and Department of Agricultural Economics, Michigan State University

BACKGROUND: In much of Africa, per capita food production has been declining since the early 1960s. Cameroon has sought to counter this trend by increasing agricultural productivity through research and extension. In order to establish future investment priorities, policy makers need to know if past agricultural research investments have paid off. By comparing national experiences, explanations can also be sought as to why returns to research have varied across national programs.

OBJECTIVE: To address these issues, data were collected to estimate the benefits and costs of investments in sorghum and cowpea research and extension in northern Cameroon. Specific data needed to construct benefit and cost streams included: yields of traditional and introduced technologies, area harvested, adoption rates of technological innovations, prices of both inputs and outputs, climatic factors influencing both the research agenda and the returns to this research, and the costs of research and extension efforts. Focusing on 1979-87, the analysis addressed three questions: What were the returns to past investments? What factors explained the estimated returns and any variability in returns between the sorghum and cowpea programs? And how did institutions influence these returns and the distribution of their benefits?

FINDINGS: Estimated internal rates of return (RORs) were 15% for cowpea research and extension, and 1% for sorghum research and extension. The ROR is a measure of "profitability" of an investment. An ROR of zero indicates a return sufficient to cover the initial investment, but no more. The ROR must be equal to or greater than the target rate of return (the opportunity cost of capital) in order for the investment to be considered "profitable." In the case of northern Cameroon, an opportunity cost of capital of 10% was assumed, indicating that only cowpea research and extension was "profitable" in economic terms. Sorghum research and extension programs did have a positive ROR, indicating that they were at least able to cover their costs. Further, extensive sensitivity analyses tested the robustness of these estimated RORs, indicating that the results were relatively stable across a wide range of assumptions about the data used in the benefit and cost streams.

Certain characteristics differed between the sorghum and cowpea programs. These key factors give some indication as to why there were significant differences in their returns:

First, the improved cowpea technology represented a completely new farming system, while the introduced sorghum technology was simply a complement to traditional practices. The cowpea technology filled an existing need--an early maturing food crop to relieve hungry season food shortages. On the other hand, under normal rainfall conditions, the sorghum technology (the new variety S35) was just one more variety in a pool of over 1,800 accessions that have been identified in the region. S35 enjoyed some success because it also addressed a need of farmers in the region--a sorghum variety that is extremely drought tolerant. However, this need is not nearly as predictable or regular as the needs met by the cowpea technologies.

Second, the development of the cowpea technology focused primarily on varietal screening, as did the successes in the sorghum program. Screening programs are "cheaper" than breeding programs because many of the costs of generating the "improved" variety have already been incurred by other projects and institutions. The appropriateness of investing in screening versus breeding depends on its timing relative to the region's overall development.

Third, the incentives faced by cash crop farmers in northern Cameroon evolved during the period that these technologies were being developed and extended. Because of these changes, cowpea became a viable alternative to cotton, the traditional cash crop. This change undoubtedly contributed to the higher adoption rates for the cowpea technology relative to the sorghum technology.

Fourth, the relative difficulty of the problems addressed by the two programs may also explain some of the differences in the returns. Sorghum, relative to cowpea, has presented a formidable problem to researchers throughout West and Central Africa for over 30 years. Low returns to sorghum research, although undesirable, may simply reflect long-term historical trends and the possibility that returns to research and extension may, in part, be dependent upon the research agenda itself.

Analysis of key institutions, and their inter- and intra-relationships, partially explains how "successes" were achieved in northern Cameroon. Linkages within and between institutions proved critical to achieving positive rates of return. Three insights were particularly clear from the analysis. First, linkages within the research-extension system were critical (e.g., in targeting the research agenda to needs identified by extension workers). Second, linkages between the system and international research institutions were equally important (e.g., as a source of alternative cultivars). And third, government agricultural policies influenced the system's performance (e.g., by mandating the cotton parastatal to do food crop extension). Institutions also influenced the distribution of returns. In general, the technologies probably favored men relative to women, and cotton farmers relative to non-cotton farmers.

*Funding for this research was provided by the Technology Development and Transfer Unit of the Productive Sector Growth and Environment Division, Office of Sustainable Development, Bureau for Africa, USAID (AFR/SD/PSGE/TDT). The research was conducted under the Food Security II Cooperative Agreement between AID/Global Bureau, Office of Agriculture and Food Security, and the Department of Agricultural Economics at Michigan State University. The views expressed in this document are exclusively those of the authors.

Sterns is a doctoral candidate, Department of Agricultural Economics, MSU. Bernsten is a professor, Department of Agricultural Economics, MSU.

This paper is a summary of a report entitled: "Assessing the Impact of Cowpea and Sorghum Research and Extension in Northern Cameroon," International Development Working Paper No. 43. It can be obtained by writing to:

MSU Bulletin Office
10-B Agriculture Hall
Michigan State University
East Lansing, Michigan 48824-1039

This paper is also forthcoming as a SD Publication Series technical paper. It can be obtained through USAID's development information system (CDIE), CDIE Reference No. PN-ABS-731.