BRIEF REPORT
ON THE OUTCOME AND POLICY IMPLICATIONS
OF THE SAFGRAD NETWORK
IMPACT ASSESSMENT STUDY

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INTRODUCTION

The purpose of the assessment has been to determine the impact of agricultural research in improving farmer and consumer incomes resulting from the use of technology; to evaluate the on-station and on-farm performances of selected NARS in SAFGRAD Networks; and to document the institutional evolution and cosntraints to future development of NARS research capabilities.

The study involved the cooperative efforts of national scientists from institutions in eight countries (Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Mali, Niger and Nigeria), the network entities, particularly the Steering Committees of the respective networks, the Oversight Committee, and IARCs collaborating in the implementation of the SAFGRAD project.

1.0. HIGHLIGHT OF THE IMPACT ASSESSMENT FINDINGS

i) Contribution to NARS research capacity building

In the past decade, there has been a substantial change in the quality of research staff in the eight case-study countries. Although a large number of researchers have limited experience, the percentage of scientists holding post graduate degrees has increased. In the eight study countries more than 25 and 45% of researchers (except Niger) have Ph.D. and M.Sc. level training, respectively.

Network activities - training (short-and long-term), workshops, seminars, scientific monitoring tours and special and general conferences - have directly or indirectly contributed to the improvement of research skills. During SAFGRAD I (1979-86), long-term training was provided to eight and 22 people from member countries at Ph.D. and M.Sc. levels, respectively. Short-term training that lasted from a few weeks to nine months was offered to 250 and 140 participants during SAFGRAD Phases I and II (1987-91), respectively. This training was based on improving research skills needed by various SAFGRAD member countries (Table 1 and 2).

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ii) SAFGRAD Networks have enhanced the release of technologies

The amount of time required to develop new agricultural technologies for release is generally about 10 years. The first phase of the SAFGRAD project was primarily concerned with germplasm development and distribution, while the second phase concentrated more on networking and increased involvement of the NARS in supplying and testing technologies.

The maize network has the highest number of total releases for the five countries surveyed, that is, 78 new technologies (varietal and non-varietal). In fact, maize cultivar releases were more than twice those for the cowpea network and more than four times those for sorghum. Cowpea and sorghum follow with 32 and 17, respectively. Sorghum technologies released in two east African countries, Ethiopia and Kenya, number 26. All of the east and central African countries reported releases of new cowpea and maize technologies, while only Ghana and Mali reported releases of new sorghum technologies.

Cameroon, Ghana and Nigeria released the largest numbers of new maize varieties, more than twice as many as Burkina Faso or Mali. The largest numbers of new cowpea varieties were released by Nigeria, twice as many as any other country. Again, Nigeria has a much larger cowpea-production area than any of the other countries.

Ghana released the largest number of new sorghum varieties, three times that of the only other country releasing new varieties. Given the large areas of sorghum production in Burkina Faso and Nigeria and the paucity of new technologies, more effort needs to be undertaken in these countries to move technologies on the shelf to the release stage and onto farmers' fields. In fact, streamlining the process of review and release of new technologies remains a major challenge for future investments in technology development.

Almost half of the new sorghum technologies released in Ghana, Mali, Kenya and Ethiopia were non-genetic in nature; for example, methods for planting, fertilizing, and processing techniques. Conversely, about 90% of the maize and cowpea technologies released were genetic in nautre, while only 10% were non-genetic.

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Some attention has been given by the NARS to the development of water and soil-conservation measures, integrated pest-management strategies, and processing, marketing and policy studies, and other off-farm constraints. Kenya has recommended more sorghum production techniques for farmer use than new varieties. Ethiopia recommends not only techniques for sorghum production but also storage and processing technologies. Both Kenya and Ethiopia have released about the same number of new varieties.

iii) Economic impacts

There have been substantial impacts from the research on maize and cowpeas in West Africa. For example, in Ghana the area in improved maize cultivars increased from 20% in 1982 to 55% in 1991. From 1985-92, the annual social benefits from maize research ranged from $4.8 million to $84 million. The estimated internal rate of return to this investment in public research was 73%.

Maintaining yield gains or avoiding yield declines is a critical factor to consider in funding decisions on agricultural research. High social benefits were also estimated for maintenance research on cowpeas in Mali and Burkina Faso. These social benefits ranged from $800,000 to $12.3 million annually over the period 1984-91.

Farm-level diffusion of new varieties of sorghum was substantially less than for maize and cowpeas. Nevertheless, S-35 has been successfully introduced into northern Cameroon and more recently into Chad. During seven years of diffusion in Cameroon, the estimated social benefits were as high as $288,000 for the conservative estimate and $831,000/year for the optimistic scenario.

Social benefits to research were only estimated for the three illustrative cases cited above. However, in this study there has been substantial documentation of diffusion of new cultivars and to a lesser extent, of improved agronomic techniques associated with the new cultivars. Again, the most succesful and best-documented examples of successful diffusion were for maize and cowpeas. In the future it will be crucial to obtain these same success levels with sorghum and millet in the semi-arid regions.

2.0. POLICY IMPLICATIONS

i) Financing of Research

The allocation of funds for research by governments in various countries did not accompany the substantial increase in research manpower and programme expansion. The implementation of research projects and capital development was expanded primarly through increases in donor funds or loans. Large proportions of the national research budgets contributed by governments were used to cover salary costs. In general, there has been a significant decline in operating funds for research in the past ten years. The possible options to NARS for responding to these financial pressures include:

- Streamine their research programmes, within the limits of their own resources. This calls for NARS institutions to undertake fundamental policy reforms, including merging or phasing out of programmes and scaling down the size of research operations.

- Allocation of more national resources in support of agricultural research. National governments need to take research more seriously as the main driving force to agricultural development. NARS should face up to actual realities and avoid depending on donors to strengthen research and agricultural development. Donors, however, could continue to help in certain fields of research and human resource development where NARS may have a weaker comparative advantage.

In general, NARS are starved for resources not only for recurrent costs but also for improving research infrastructure. Budget allocations of research of NARS governments should triple in the 1990s to effectively support agricultural development. The national governments will increasingly have to support their NARS at higher levels. In recent years, many NARS have become even more dependent on donor funding, often more than two-thirds of their funding (Fig 1, 2, 3 and 4). This is not a sustainable system.

ii) Improving the research environment

For the NARS to be effective, it has to be insulated sufficently from domestic political pressures so that it can work on the same research problems over a sufficiently long period. Frequently, this precondition for effective research has been easier to achieve in the IARCs than in NARS. With increased capital in the NARS and assuming that policy makers will increasingly recognize the high return of research, the NARS should be able to become even more effective.

In general, improvement of the research environment includes:

- Establishment of conducive research policies, including research statutes with adequate allocation of funds and competitive salary-scale benefits to attract scientists so that they can make research their long-term careers.

- Recognition of innovative and highly productive researchers at national level through periodic evaluation of research output and technology diffusion. Special prizes, merit awards, promotion and salary increases could be provided to more deserving scientists.

- Encouragement of technical publications in professional and national journals, technical bulletins and leaflets for extension and farmers' use. Such scientific tradition., i.e., building the knowledge base through publications, is virtually lacking in most of Sub-Saharan Africa.

- Promotion of multidisciplinary research and pooling of scientific talents and resources to alleviate specific constraints to agricultural production.

- Introduction of the system of competitive research grants which could motivate NARS researchers not only to increase output but also to be creative, with major concern to transfer results to end users (i.e., farmers, private agencies, industry).

iii) Change of donor priorities

Africa is no longer on the preferential list of the donor community. Furthermore, donor fatigue has shifted the focus and priorities of funding agencies to few and selected research and development areas. National governments, therefore, will have to fund an increasing proportion of national research and technology adoption programmes.

iv) Changes in the research agenda of CGIAR institutions

In the 1990s, donors are in the process of making critical choices on which end of the research system to concentrate their resources. Since NARS particularly, the "Lead Centres" have attained the capacity to increasingly generate their own technologies through conventional systems of crop improvement and production, IARCs have reoriented their efforts towards strategic research. To attain this goal, CGIAR (1992) increased the number of its supporting institutions without commensurate increase of its budget. Hence, there is presently not only financial pressure on the IARCs, but also to define the strategic research agenda from which NARS can benefit.

v) Justification for research

Without exception, all NARS need to improve their accountability to investments made on research. More evidence from impact studies needs to be presented to government policy makers, to the general public and donors. Setting-up monitoring systems and impact analysis should be structured as integral activities of any agricultural research and development programmes, to convince national governments that investments on research is paying off. Increased political commitment and financial support by governments could also send signals to donors that countries concerned are serious about improving the efficiency and output of their research systems.

Classic problems that must be resolved by reorganizing NARS (i.e. phasing out and merging of research and administrative units) are: (a) defining feasible research priorities and programmes that could be supported largely within the respective NARS resources; (b) enhancing multidisciplinary research programmes and teams and creating a conducive research environment to work together long enough to make an economic impact; and (c) enhancing the participation of clients (i.e., farmers extension agents, NGOS, agro-industries, etc.) at various phases of research and development activities.

vi) Networks

There is conflict between reducing crop commodity networks to manageable size, excluding the weak and small NARS. For example, the revised maize network in West and Central Africa includes only eight countries (Benin, Burkina Faso, Cameroon, Côte d'Ivoire, Ghana, Mali, Nigeria and Togo). The main criteria used in excluding small or weak NARS are the economic importance of the crop and NARS research base. Donor support is also shifting from the support of crop commodity networks to resource management networks. These implications on networks are evident.

CONCLUSION

The SAFGRAD Networks have performed an important role in accelerating the diffusion of technologies developed by diverse sources.

New generations of technologies of maize, cowpea, sorghum and farming systems developed through the SAFGRAD Project are in the pipe line. Future effort should also be concentrated on enhancing the adoption of these technologies. Perhaps the most important contribution of SAFGRAD has been its facilitation of professional development, scientific collaboration, training and confidence building of NARS.

Many NARS have become highly dependent upon external financing. Increasingly, national governments will have to pay for a much larger share of their research and extension costs. This requires susbtantial reform and changes by each NARS and agricultural development system.

Realizing the high pay off from research investments, donors and national governments need to give resource priority to the development of intitutions (the NARS) and the product (applied agricultural research) that will be essential to drive the agricultural development process.

The impact assessment findings showed that the SAFGRAD Project was well conceived, involving the tripartite institutional partnership (NARS, OAU and IARCs). NARS (as beneficiaries of the project) fully participated in network management; the IARCs provided technical support for the development of networks, while the OAU, through its Coordination Office, not only mobilized available research resources in the sub-region but also carried out network activities that transcended political boundaries as well as linguistic and cultural barriers. Indigenous regional institutions were established by the countries themselves as a mechanism to mobilize and bring together their national efforts. The OAU/STRC-SAFGRAD regional-management mechanism not only accelerated the transfer of network scientific leadership and management to NARS but also facilitated the pursuit of a concerted policy for food self-sufficiency and research self-reliance.

Table 1. Improvement of Research Skills Through Training, Workshops, and Monitoring Tours.

Network Activities	Number of Participants		Total
	SAFGRAD I (1979-86)	SAFGRAD II (1987-91)	
Workshops/Seminars	764	900	1664
Short-Term Training	250	140	390
Long-Term Training (M.Sc. & Ph.D.)	30	–	31
Monitoring Tours	65	100	165
General Conferences	130	165	295
TOTAL	1239	1305	2545

Table 2. SAFGRAD Long-Term Training Support, December 1986.

Country	Level of Training		Total
	M.Sc.	Ph.D.	
Botswana	1	–	1
Burkina Faso	3	6	9
Cameroon	2	–	2
Chad	1	–	1
Guinea, Conakry	4	2	6
Mali	6	–	6
Senegal	2	–	2
Somalia	1	–	1
Togo (French Support)	2	–	2
TOTAL	22	8	30

Source: SAFGRAD I Synthesis Report, 1977-1986.

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