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Agricultural Research in Africa and the Sustainable Financing Initiative

Review, Lessons and Proposed Next Steps

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Agriculture, Natural Resources, and Rural Enterprise Division
Office of Sustainable Development
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Foreword

In the past decade, the U.S. Agency for International Development (USAID) has been challenged to scrutinize the effectiveness and impact of its work in Africa and make needed adjustments to improve its programs. Structural adjustment programs have been adopted by many sub-Saharan African countries—often with reluctance—and some significant economic development progress has been made.

As donor agencies face severe cutbacks and restructuring, and less assistance becomes available to developing countries (not just in sub-Saharan Africa), new ways must be found to channel declining resources into their most effective and productive uses. Agriculture is the dominant sector of sub-Saharan African economies and the potential catalyst for broad-based, sustainable economic growth. Hence donor agencies like USAID are increasingly looking to institutional arrangements in the agriculture and natural resource management sectors to sharpen competitiveness.

The USAID Africa Bureau's Office of Sustainable Development, Agriculture, Natural Resources and Rural Enterprise Division (AFR/SD/ANRE) has been analyzing the Agency's approach to the agricultural sector in light of a renewed focus on impacts and recent experiences of sub-Saharan African countries. This report reflects some of these efforts. Its authors are James Bingen, associate professor, Department of Resource Development, Michigan State University, and Derick Brinkerhoff, senior social scientist at Abt Associates Inc., who is coordinator of SFI technical assistance.

This publication is part of the Sustainable Financing Initiative (SFI) Series. This is a set of information resources that:

- describes the principles and tools of sustainable finance;
- provides up-to-date case studies in sustainable finance;
- reports on meetings that discuss sustainable finance; and
- presents SFI program activities and results.

The audience for this series is practitioners in Africa, including USAID field missions, African organizations attempting to develop new mechanisms, African funding agents, and other donors, as well as firms and individuals providing technical assistance to these groups. The SFI makes this series available in traditional print form as well as electronic versions.

The SFI is a joint effort of the World Bank, USAID, and two bodies that group donor, African, and international NGO partners: the Special Program for African Agricultural Research (SPAAR) and the Multi-Donor Secretariat (MDS). The SFI aims to help build capacity through focusing on African agriculture and natural resource management agencies. It works with these African agencies to help create new—and more sustainable—mechanisms and sources of funding for national needs and initiatives.

To make this publication series most effective, the documents are written to accommodate not only the point of view of African institutions undertaking sustainable finance programs, but also that of governments, potential funders, and other stakeholders. Thus these publications can reinforce the efforts of agriculture and natural resource management institutions to build coalitions and to inform stakeholders about the "art of the possible" in sustainable finance.

Dennis Weller, Chief
Agriculture, Natural Resources and Rural Enterprise
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Bureau for Africa
U.S. Agency for International Development

Acknowledgments

This paper was originally prepared as input to a Sustainable Financing Initiative roundtable held in Washington, D.C., in December 1998. The objectives of the roundtable were to review SFI experience to date and present lessons learned; review other selected experience with sustainable financing; identify the next generation of SFI issues, challenges, and opportunities; and reach a clearer understanding of current and new financial mechanisms and funding options for agricultural and NRM research. About 25 people attended the roundtable, including core members of the USAID and SPAAR SFI team, experts from other institutions, and the leaders of several of SFI's African partner organizations.

Subsequently, the paper served as a background piece for an SFI workshop held in December 1999 at the Kenya Agricultural Research Institute (KARI) in Nairobi. Forty-five participants discussed and debated how to generate increased and sustainable funding for agricultural research and technology transfer. African participants came from 12 different countries, and from the public, private, and NGO sectors. They were joined by international donor agency representatives, technical experts, and a staff member of Uruguay's national agricultural research agency. The workshop focused on sharing experience with sustainable financing in Africa and South America, reviewing lessons learned, identifying future challenges and priorities, and discussing next steps. The key topics covered at the workshop were organized according to the analytic framework developed in the paper. These included options for financial mechanisms and alternative funding strategies, institutional reforms, policy issues and frameworks, and new partnerships among key stakeholders.

The authors would like to thank both the roundtable and the workshop participants for their contributions to lively discussions of the issues, findings, and lessons reviewed in the paper. Several individuals provided guidance and/or detailed comments that have been incorporated in this revised version of the paper. First of all, Jeffery Hill, AID/AFR/SD, deserves special mention. He has been, and remains, a driving force behind SFI, in terms of ideas, commitment, and USAID resources. Moctar Touré and Jaakko Kangasniemi, both with SPAAR, have provided continuous and thoughtful input to the analytic (and operational) side of SFI, and their feedback was helpful in drafting and revising the paper. Others we would like to acknowledge include Gary Alex, World Bank; Derek Byerlee, World Bank; Moise Mensah, former Minister of Finance, Benin; Geoffrey Mrema, ASARECA; and Philip Pardey, IFPRI.

As for the views expressed in the paper and any errors or misinterpretations, the usual disclaimer applies: the authors are solely responsible.

Executive Summary

While the Sustainable Financing Initiative (SFI) concentrates on Africa, it is part of a global wave of interest and experimentation in the financing of development goods and services. Around the world, donors, governments, non-governmental organizations (NGOs) and foundations are looking for ways to assure that the resources for these goods and services will be available on a sustained basis.

This paper thus has a triple focus. First, it looks at a selected sample of these experiments in innovative financing for agricultural research (AR) in other parts of the world, along with related activities and trends, and draws lessons relevant for SFI. Second, it looks back, taking stock of SFI technical assistance and analytic support activities, and summarizes the lessons from SFI's experiences. Third, the paper looks forward, providing some thoughts on future SFI issues, actions, and potential paths.

PURPOSES

This analytic review serves several purposes. It seeks:

- to achieve a clearer understanding of current and new financial mechanisms and funding options for agricultural and natural resource management (NRM) research in sub-Saharan Africa, and of what is required to make these mechanisms work;
- to identify the next generation of SFI issues, challenges and opportunities.

Finally, the paper should help in soliciting new ideas and practical insights on how to strengthen the financial sustainability of AR/NRM institutions in sub-Saharan Africa.

ORGANIZATION AND FRAMEWORK

The paper is organized into six sections. The first is an introduction. Section 2 outlines an **analytic framework** for reviewing the experiences, accomplishments and issues raised to date in the implementation of SFI.

This framework situates sustainable financing mechanisms within the overlapping organizational and policy environments that influence the mechanisms' selection, use, viability, and effectiveness. The three categories of variables (financial mechanisms, organizational components, policy issue areas) can be thought of as nested systems, each sitting within a larger system. Looking at it this way helps the analyst think about what influences the viability of a particular financial mechanism, as well as how various mechanisms raise organizational and policy implications.

Using this framework, Sections 3 and 4 focus on USAID-funded SFI activities and on other experiences with financing mechanisms. USAID has supported assistance to the Southern Africa Centre for Cooperation in Agricultural Research and Training (SACCAR) in Botswana, the Network for Environment and Sustainable Development in Africa (NESDA) in Côte d'Ivoire, the Council for Scientific and Industrial Research (CSIR) in Ghana, the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) in Uganda, the Agricultural Research Council (ARC) and the Department of Research and Specialist Services (DRSS) in Zimbabwe, the Madagascar Environmental Endowment Fund (Tany Meva), and two Southern Africa regional commodity research networks: the Sorghum and Millet Improvement Program (SMIP), based in Zimbabwe, and the Southern Africa Root Crops Research Network (SARRNet), based in Malawi.

LESSONS

Section 5 summarizes lessons learned from both SFI and broader experience. The lessons include the following points.

Financial Mechanism Lessons

- Choices among financial mechanisms must take into account organizational and policy contexts.
- Sustainable financing requires a mix of mechanisms for different purposes at different times.
- The establishment of endowment funds represents just one approach to generating resources for AR; usually it is not the first step.
- Commercialization must be balanced with research and development objectives.
- Commodity checkoffs work as long as certain conditions apply.
- Government block funding is critical to a viable national agricultural and NRM research system.
- Competitive grant systems can be used strategically and selectively to help develop sustainable research systems.

Organizational Lessons

- Core organizational capacity is essential to financial sustainability; while scientific research capacity is central, management and planning capabilities are also key.
- SFI involves change in organizational culture.
- Organizational change for SFI must be adapted to each institution.
- Organizational change for SFI takes time.
- New financing mechanisms that require extensive organizational change will be difficult to implement.
- SFI for regional institutions is more complex than for national ones.
- Financial sustainability and performance are strengthened by institutional pluralism, in which AR/NRM institutions combine the efforts of public research agencies, the private sector, NGOs, universities, and international entities.

Policy Issue Lessons

- Policy can serve as an important impetus for initiating change, and as a pivotal motivator for pursuing reform.
- Simplistic policy frameworks for AR/NRM lead to poor policy decisions, such as blanket privatization and a narrow focus on commercial products.
- The policy issue areas affecting SFI are complex and interlocking.

SFI Operational Lessons

- The SFI toolkit, which involves applying a strategic approach through a series of analyses and a jointly developed workplan, has proven to be useful.
- Coordination among SFI donors is important.
- SFI is experiencing increased demand for services from AR/NRM institutions.

NEXT STEPS

Section 6 identifies possible next steps for the SFI. As SFI moves to a second generation of analytic and technical support, the initiative will focus more directly on financial mechanisms. Most countries have some commercial (export-oriented) agriculture that might support the introduction of some type of competitive grant or checkoff system. As SFI helps to introduce these systems, research leaders and scientists will need to consider how to use and design them so as to respond to the needs and interests of smallholder producers, as well as assure a measure of natural resource management.

For those sectors and countries that do not offer a viable commercial base (non–export oriented, with low levels of capitalization), SFI will be pursuing new and

unique objectives. Historically, agricultural research agencies around the world have not responded successfully to farmers and producers without much capital. Under these conditions, regional approaches to SFI might help to advance national-level agricultural research and development.

SFI's activities in support of experimenting with new mechanisms need to focus on the mix of mechanisms that will lead to sustainable financing. An overemphasis on any one mechanism could exaggerate already existing differences in funding between research programs. The next generation of SFI will look at multiple mechanisms, as well as the interplay among them and the various types of research and technology transfer goals that each AR/NRM system is trying to achieve. This calls for ongoing attention to the mix of mechanisms that will preserve the provision of public goods (e.g., smallholder-relevant research) with the supply of private goods (e.g., contract research for large commercial farmers or others with significant levels of capitalization).

While mechanisms will be at the core of SFI support efforts, the critical links to institutions and policy should not be neglected. Institutional effectiveness and supportive policy frameworks, broadly conceived around science and technology issues, continue to be vital to addressing funding and sustainability.

Glossary of Acronyms and Abbreviations

AFR	U.S. Agency for International Development, Bureau for Africa
ANRE	Agriculture, Natural Resources and Rural Enterprise Division of USAID/AFR/SD
APAP	Agricultural Policy Analysis Project
AR	agricultural research
ARC	Agricultural Research Council
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
BDU	business development unit (CSIR)
CSIR	Council for Scientific and Industrial Research (Ghana)
DRSS	Department of Research and Specialist Services (Zimbabwe)
IARCs	international agricultural research centers
ICRISAT	International Crop Research Center for the Semi-Arid Tropics
IFPRI	International Food Policy Research Institute
ISNAR	International Service for National Agricultural Research
ISRA	Institut Sénégalais de Recherche Agricole
KARI	Kenyan Agricultural Research Institute
NARSs	national agricultural research systems
NESDA	Network for Environment and Sustainable Development in Africa
NGOs	nongovernmental organizations
NRM	natural resource management
PSGE	Productive Sector Growth and Environment Division (now ANRE; see above) of USAID/AFR/SD
R&D	research and development
SACCAR	Southern African Centre for Cooperation in Agricultural Research and Training
SADC	Southern Africa Development Community
SPAAR	Special Program for African Agricultural Research
SFI	Sustainable Financing Initiative
TA	technical assistance
USAID/AFR/SD	U.S. Agency for International Development, Bureau for Africa, Office of Sustainable Development
USAID/W	U.S. Agency for International Development, Washington, D.C., headquarters

1. Introduction

1.1 BACKGROUND

Over the past 25 years, African institutions for agricultural research and natural resources management (AR/NRM) have relied on international donors and national governments for the largest part of their research program and operating support. Under pressure from structural adjustment policies to decrease public spending, many national governments began to cut funding for research institutions, starting in the late 1980s. At the same time, the public flow of resources to research became increasingly unreliable (Pardey, Roseboom, and Beintema, 1997). The international donor community filled some of the funding gap, but for several years has faced changing priorities and reduced levels of foreign assistance for AR. Most African countries, however, still rely heavily on their natural resources base and agricultural production for the livelihoods of the majority of the population. Agricultural research, and agricultural technology development and transfer, remain critical to their economic development.

The development of African agricultural science and technology, and especially the viability of African institutions for AR/NRM, continues to be heavily influenced by other global forces as well. One is the globalization of financial markets, with its emphasis on export trade and competitive advantage; the other is the search for new products and new market opportunities. For Africa, dependent as it is on agriculture and trade in natural resources, participation in the global economy depends upon effective linkages among research and technology producers, consumers, and funders.

The Sustainable Financing Initiative (SFI) addresses these linkages, taking the funding issue as the starting point. SFI is intended to promote experimentation with new financial mechanisms to support research and technology transfer. The objectives of SFI are:

1. to strengthen and diversify the financial base of African AR/NRM institutions, and
2. to promote AR/NRM institutions' capacity to manage their research and technology transfer programs in a sustainable way.

Accomplishing the first objective requires identifying alternative sources of funding, particularly from the private sector, and exploring new financial mechanisms. Addressing the second objective involves institutional reforms to reorient AR/NRM institutions to manage strategically, improve financial systems and accountability, identify and respond to key stakeholders and clients, and link research and technology transfer programs to priority needs.

SFI pursues its objectives through a variety of activities:

1. analytical and conceptual work;
2. coalition-building within the international community on the importance of AR/NRM and of financial restructuring of research and technology transfer;
3. planning and technical assistance for AR/NRM institutions engaged in reform; and
4. networking and sharing information about SFI experience among current and prospective SFI partners and international donors.

The U.S. Agency for International Development (USAID) has taken the lead on the first and third activities, via the Agriculture, Natural Resources and Rural Enterprise Division (ANRE) of USAID's Bureau for Africa, Office of Sustainable Development (AFR/SD). ANRE works jointly with the Special Program for African Agricultural Research (SPAAR), housed at the World Bank, on the second and fourth activities. (Note that until 1999 ANRE was known as

the Productive Sector Growth and Environment Division of AFR/SD, or AFR/SD/PSGE.) For contractor support for SFI, AFR/SD initiated a buy-in to the USAID Global Bureau's Agricultural Policy Analysis Project, Phase III (APAP III).

Early SFI activities focused on identification and analysis of financing mechanisms. Prior to the APAP III buy-in, AFR/SD had commissioned several studies that informed the discussions and preliminary planning of SFI's field component, which was launched at a workshop held in Maastricht in September 1995. The workshop was attended by the leadership of African AR/NRM institutions, donor officials, and technical experts (see Dunn, 1997; Gilles, 1997; Kalaitzandonakes, 1997; and USAID/AFR/SD/PSGE, 1996). After reviewing experiences with innovative financing mechanisms from other parts of the world, the workshop helped participants to clarify the financing problem confronting African AR/NRM institutions and to develop preliminary SFI workplans to search for solutions.

At the SPAAR plenary meeting in Uganda in February 1996, three institutions were selected for assistance in implementing their SFI workplans: the Southern Africa Centre for Cooperation in Agricultural Research and Training (SACCAR) in Gabarone, Botswana; the Network for Environment and Sustainable Development in Africa (NESDA) in Abidjan, Côte d'Ivoire; and Ghana's Council for Scientific and Industrial Research (CSIR) in Accra, Ghana. Subsequently, three other institutions were added: ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa) in Entebbe, Uganda, and the Agricultural Research Council (ARC) and Department of Research and Specialist Services (DRSS) in Harare, Zimbabwe.

Some assistance was also provided to the Madagascar Environmental Endowment Fund, Tany Meva. In addition, beginning in 1998, SFI worked with two commodity research networks in Southern Africa: the Sorghum and Millet Improvement Program (SMIP) and the Southern Africa Root Crops Research Network (SARRNet).

1.2 ORGANIZATION OF THE PAPER

In the few years the SFI has been active, there has been a growing wave of interest and experimentation relating to the financing of development goods and services. Around the world, as well as in Africa, donors, governments, NGOs, and foundations are searching for ways to assure that the resources for these goods and services will be available on a sustained basis.

This paper has a triple focus. First, it looks both in and beyond Africa, finding examples of innovative trends in financing agricultural research in many parts of the world and drawing lessons relevant for SFI. Second, it looks back, taking stock of SFI's technical assistance and analytic support activities and summarizing the lessons from the SFI experience base. Third, it looks forward, providing some thoughts on future SFI issues, actions, and potential paths.

This analytic review serves several purposes. It should help to 1) achieve a clearer understanding of current and new financial mechanisms and funding options for agricultural and NRM research in sub-Saharan Africa; 2) clarify what is required to make these work; and 3) identify the next generation of SFI issues, challenges and opportunities. Finally, the paper should help in soliciting new ideas and practical insights on how to strengthen the financial sustainability of AR/NRM institutions in sub-Saharan Africa.

Including this introduction, which constitutes Section 1, the paper is organized into six sections. Section 2 outlines an analytic framework for reviewing the experiences, achievements and issues raised to date in implementing SFI. Using this framework, Sections 3 and 4 focus on USAID-funded SFI activities and on other experiences with financing mechanisms. Section 5 summarizes lessons learned from both SFI and broader experience, and Section 6 seeks to identify possible next steps for the next generation of the SFI analytic and technical assistance program.

2. Review Framework

2.1 THINKING ABOUT THE CHALLENGES TO AGRICULTURAL RESEARCH

As the SPAAR Executive Secretary stated at the April 1998 Interministerial Meeting in Abidjan, agricultural research throughout sub-Saharan Africa is "in crisis." Program funding per researcher is declining, unreliable, and rarely linked to performance. Research priorities tend to be irrelevant to or poorly understood by national clientele, and available program funding relies largely on bilateral and multilateral foreign assistance programs. Governmental administrative and financial regulations are ill adapted to the operational requirements of AR, and public personnel policies are ill suited to developing a sustainable cadre of national research scientists (Touré, 1998).

This crisis traces its origins in part to a series of policy and program shifts among foreign assistance agencies that were driven by concepts of market liberalization and reduced public-sector employment in the 1980s. After a period of growing foreign public investment in AR throughout the 1970s and into the early 1980s, research program budgets began to stagnate or decline as donors reexamined their support for public institutions and state control in agriculture (Eicher, 1989). It is also clear that the initial enthusiasm for UNESCO's science policy assistance program, which aimed to establish and promote national science policy and institutions throughout sub-Saharan Africa during the 1960s and 1970s, had waned considerably by the mid-1980s (Davis, 1983). Moreover, with few exceptions, little or no attention was given to building and sustaining domestic sources of political support for AR (Byerlee, 1998).

Nevertheless, both foreign assistance agencies and African governments continue to be committed to finding more effective ways to foster and spread new agricultural technology that promotes economic growth and sustainable development. As the Abidjan Interministerial Conference concluded, it is important to shape and use "the necessary policy . . . instruments to support effective agricultural research and technology systems" (E. Terry, 1998). In the past, research policy might have focused largely on ways to help extension services keep technological innovations flowing from the researcher to the producer. However, the new generation of policy instruments must confront at least four more sophisticated challenges to agricultural research (Byerlee and Alex, 1998b).

First, the liberalization of trade in the new global era makes it more urgent for each country to use its comparative advantage—and to assure that improved agricultural technology is available to exploit this advantage. Second, the next generation of increased productivity in agriculture involves using inputs more efficiently without jeopardizing the resource base. Such activities, however, are more knowledge- and skill-intensive. Consequently, AR must learn to move away from a top-down relationship with producers in order to provide more specific technical information tailored to different producers' varied needs.

Third, AR must find ways to increase productivity in areas that have benefited little from past investments, with attention to promoting knowledge and practices that enhance the quality of natural resources. Fourth and finally, research must be in a position to take advantage of new biotechnologies as well as new information technologies. This involves much more than having the capacity to do biotechnology research. It also means recognizing and acting upon the new reality that foreign aid is no longer the only game in town. Globalization and advances in biotechnology create opportunities for the international private sector to collaborate with national entrepreneurs on a range of agricultural technology development schemes (Pray and Umali-Deininger, 1998). In other words, an

increasing number of African governments may now attract both public and private capital to promote agricultural research and technology transfer.

2.2 AN ANALYTIC REVIEW FRAMEWORK FOR SFI

It has become increasingly clear that responding to these challenges is much more than a question of getting more generous and stable funding for AR/NRM institutions. The challenges imply a diversification of funding sources that involves policy questions far beyond the agriculture sector, as well as institutional questions far beyond the public sector. Capacity issues loom large in thinking about various financial mechanisms to improve functioning within individual institutions, stimulate competition and demand-driven performance, and foster complementary efforts among the different institutional actors.

The interconnected nature of these considerations requires shifting from the macro to the micro level and back again. For example, policy decisions to generate new revenue by marketing research-related services must be backed up by the appropriate organizational structures and by personnel qualified to provide and oversee these services. Similarly, proposals for joint research ventures with international private investors require government policies that provide the incentives and investment protection needed to attract foreign capital.

This paper will describe a number of mechanisms for increasing the sustainability of financing for agricultural and NRM research. To help stimulate fresh insights on SFI issues, it uses an analytic framework that situates these mechanisms within their overlapping organizational and policy environments, for both of these environments influence which mechanisms are chosen, how they are used, how long they survive, and how well they work. These three categories of variables—the SFI mechanisms, the organizational components, the policy issues—can be thought of as nested systems, each sitting within a larger system (see Figure 1). This perspective, depicted as three concentric circles, helps us to think about what influences the viability of any SFI mechanism, as well as how various mechanisms raise related organizational and policy implications. This type of framework draws our attention to the iterative and interrelated nature of decision-making about sustainable financing.

The various mechanisms for financial sustainability that SFI is exploring and elaborating are located at the center of the framework. These options include two groups of activities: those designed to mobilize resources, and those designed to allocate resources.

For the mobilization of financial resources, the most commonly used mechanisms reviewed in this paper include:

- commercial activities;
- user services;
- research contracts;
- levies;
- checkoffs or cesses;
- corporate joint ventures, and
- endowments.

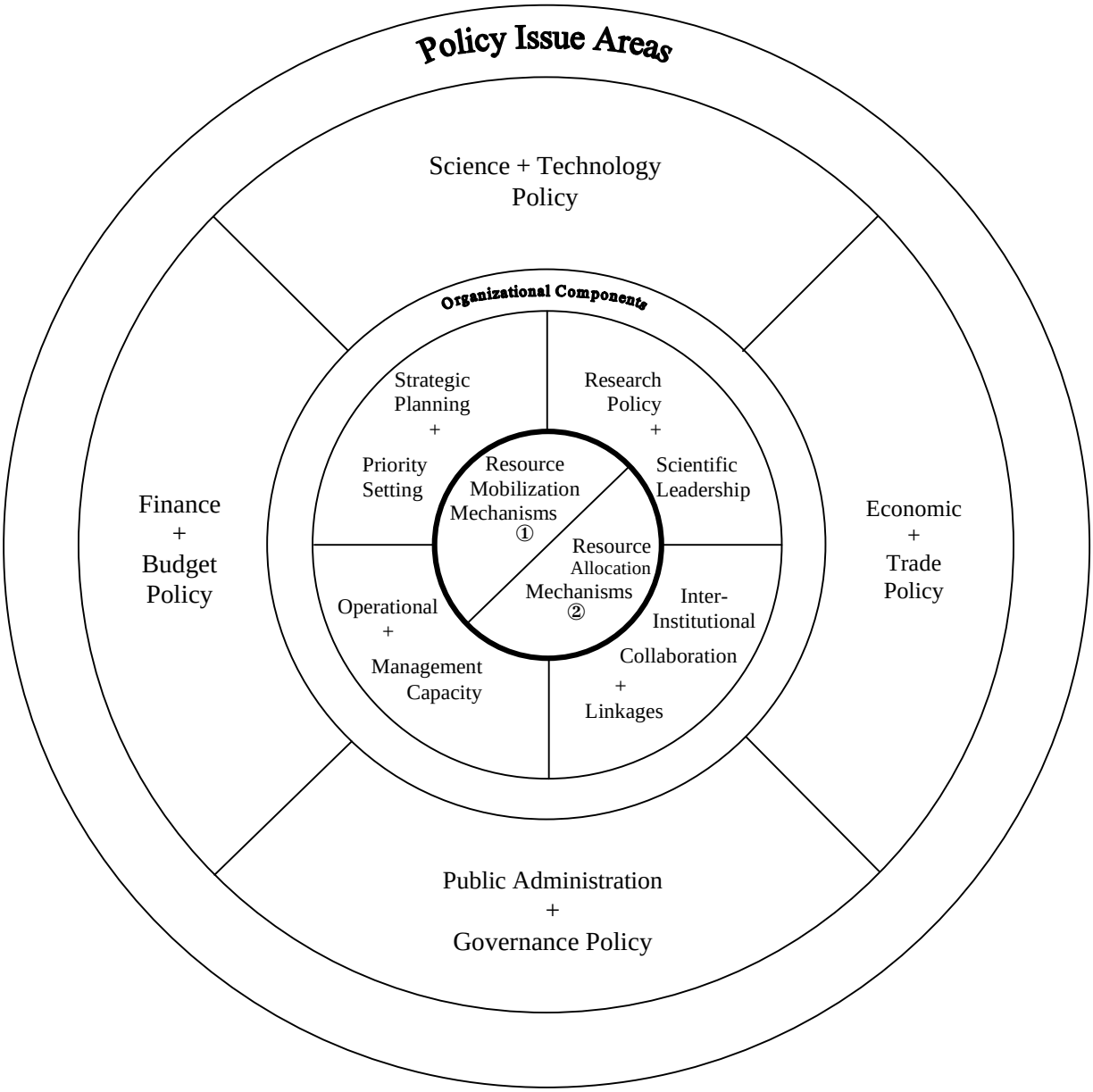
For the allocation of financial resources, the principal mechanisms reviewed in this paper are:

- block or formula funding, and
- competitive grants that can be administered through national or regional foundations, or through various regional or global programs.

The second circle comprises different components of the organizational setting within which financing options are designed and implemented. Experience suggests that it is useful to divide the components into four categories:

- strategic planning and priority setting;
- operational and management capacity;
- research policy and scientific leadership, and
- interinstitutional collaboration and linkages.

Figure 1: Sustainable Financing Analytic Framework



① **Resource Mobilization:**
Commercial Activities
User Services
Research Contracts
Levies
Checkoffs
Corporate and Joint Ventures
Endowments/Research Funds

② **Resource Allocation:**
Block Grants/Formula Funding
Competitive Grants Systems
Regional Networks and Funds

These components will influence how effectively an AR/NRM institution can implement the SFI financial mechanisms it selects. Different SFI mechanisms, in turn, can be designed with a view to strengthening various organizational components of an AR/NRM institution.

The third circle contains the policy issue areas that influence the effectiveness of selected financial mechanisms and the possibilities for implementing them, as well as feasibility for a given AR/NRM institution to operate within and to address components of its organizational setting. The empirically grounded policy categories used for this review include:

- science and technology;
- finance and budget;
- economics and trade, and
- public administration and governance.

The preliminary elaboration of this framework draws on our interpretation of SFI experiences to date, as well as on a broad range of discussions concerning financing for AR/NRM institutions and for diffusion of agricultural technology (e.g., Noor, 1996). The framework is based on the assumption that examining the interplay among the three types of variables—policy issue areas, the various options for mobilizing and allocating funds, and the organizational components—helps to sharpen thinking about the issues of concern for policymakers, donor agencies and research leaders. For example, decisions about using one or more financing options can be informed by exploring the "degree of fit" among policies, financing options and organizational components.

3. Overview of SFI Activities

This section looks at what USAID-supported SFI activities have accomplished since their inception. It reviews progress and results to date with institutional field support and analytic efforts.

3.1 PROGRESS WITH SFI FIELD SUPPORT ACTIVITIES AND RESULTS ACHIEVED

The following discussion summarizes assistance activities and results to date for the five institutions that SFI has been collaborating with since June 1996, as well as for the two collaborating commodity research networks. Start-up of field assistance began in the summer of 1996, following refinement of SFI workplans and the development of technical assistance (TA) plans. The workplans contained five components, which reflect the core elements of SFI: strategic planning, institutional reform, financial mechanisms development, coalition-building, and management of the change process. Further details on the specific activities undertaken for these institutions are elaborated in the reports prepared by the SFI consultants, listed in the bibliography.

The application of SFI tools and approaches, and the provision of TA, have had positive results on a variety of fronts, and represent an important part of the initiative's value added. For example, the marketing surveys conducted have demonstrated that alternative funding options, particularly commercial opportunities, do in fact exist; these are real and not hypothetical. The various types of analyses—stakeholder, organizational, financial, and human resources—have contributed to clearer problem definition and identification of constituencies, and thus have shaped the design of institutional strategies for sustainability. Subsequently, they have contributed to refinement of policy prescriptions and donor activities in support of SFI. Further, the coaching component of TA assignments has helped staff in institutions in transition to maintain confidence and motivation while confronting reform tasks.

A. Southern Africa Centre for Cooperation in Agricultural Research and Training

The SFI TA objectives developed with SACCAR include a) assist SACCAR to demonstrate and communicate the value of its activities and programs to key stakeholders; b) refine and elaborate the proposed endowment fund (SAFAR) and explore possible donor contributions to this mechanism; and c) reinforce SACCAR's capacity to manage the SFI implementation process strategically. TA in support of these objectives focused on a) analysis and modification of SACCAR's financial and budgeting system; b) development of new reporting systems, formats, and "public relations" materials; c) conduct of a stakeholder analysis and development of a coalition-building strategy; and d) operationalization of SAFAR.

The first task was undertaken in July–August 1996. An SFI consultant worked closely with SACCAR staff to analyze the Centre's financial operations; develop a methodology to enable SACCAR to distribute costs across programs/projects and across the different components of its institutional mandate; prepare financial projections for future revenues, recurrent and capital costs; and identify a set of management decision criteria to help set SACCAR priorities by program and functional area in the face of possible reduced funding, staff losses, etc. These analyses fed into documents submitted in August to the SADC (Southern Africa Development Community) Council of Ministers, which was considering SACCAR's future.

In November–December 1996 and continuing into January–February 1997, work began on the stakeholder analysis and coalition-building strategy, supported by an SFI consultant. This was initiated as a questionnaire-based exercise. A three-day workshop in March 1997, which brought together a large num-

ber of SACCAR stakeholders from the region, provided an opportunity for face-to-face consultation. During the period March–April 1997, another SFI consultant conducted a review of SACCAR's publicity materials, publications, and dissemination. The consultant made recommendations that involved revising SACCAR's materials, targeting products more closely to stakeholder audiences, and increasing the efficiency of mailings and materials distribution.

Following the March workshop, discussions among SACCAR, the SACCAR Board, the donors, SADC members, and the Government of Botswana (GOB) regarding the future of SACCAR intensified, spurred by the confluence of several factors: the impending termination of the USAID institution-strengthening project that had created SACCAR in 1984, the strategic planning exercise to chart SACCAR's post-USAID project path, the clarity regarding SACCAR operating costs introduced by the SFI financial and budget consultancy, and debate over SACCAR's most appropriate role, given its lack of viability as a commission. The future of SACCAR was sufficiently uncertain during this period that SFI workplan activities were put on hold. By the fall of 1997, however, stakeholder deliberations led to a decision to reconstitute SACCAR as a regional sector coordinating unit (SCU) operating as a semi-autonomous entity attached to the GOB's ministry of agriculture.

In December 1997 the SACCAR board chairman, the executive director, and USAID/RCSA and USAID/W staff conferred about transition planning for the new SACCAR. From those meetings a workplan emerged, organized around five tasks: 1) institutional analysis and reform to facilitate the effective transition to an SCU within a GOB administrative framework, 2) broadening and building a new SACCAR coalition, 3) strategic planning and program development, 4) developing new funding mechanisms and sources to harmonize and sustain regional programs, and 5) retooling of the operations of the regional research networks. SFI provided TA for the first task. In April 1998, an SFI consultant worked with the board chairman, conducting an institutional study that identified a) organizational placement options within the GOB for SACCAR, b) the administrative and financial authorities for the SCU, and c) key actions to be taken by the GOB to fully establish the new SCU.

The study recommended that SACCAR be constituted as a unit of the Botswana College of Agriculture, linked to but outside of the ministry of agriculture. The GOB, however, favored housing SACCAR within the ministry, and subsequently proceeded with this option. At the moment, SACCAR is in flux, essentially starting anew as a SCU. SADC is in the midst of addressing the larger issue of program coordination within the current SCU structure across the entire food, agriculture, and natural resources sector. It is likely that several components of the old SACCAR's mandate will be redistributed to other SCUs, and it remains to be seen what responsibilities SACCAR retains and how the new SCU fares. SADC and the donor community are at present reserving judgment on the effectiveness of the GOB's efforts to assume SACCAR's functions and to build support for the SCU.

Results: SFI TA has been a core factor in the transformation of SACCAR. The analysis of SACCAR's administrative and operating costs placed the question of its financial sustainability in clear relief for the first time. This contributed to the decision to reengineer SACCAR as an SCU. The strong focus of the debate and deliberations on financial viability was a direct result of SFI assistance. An important process dimension of this result is that problems and issues were defined jointly with SACCAR and its stakeholders. Other outcomes attributable to SFI include a) recognition by SACCAR staff and stakeholders of the importance of fulfilling the basic coordinating and information-sharing functions of SACCAR as a way to demonstrate value and effectiveness, and b) clearer focus on the importance of building and maintaining a regional coalition of national and local stakeholders (not just international) who support SACCAR's role and mission.

B. Network for Environment and Sustainable Development in Africa

An initial SFI workplan for NESDA was developed in June 1996, but start-up was placed on hold for a year, preempted by a review of the organization's structure, staffing, mandate, and operations that led to a

near total personnel turnover and restructuring. With a new coordinator in place in November 1997, discussions regarding SFI were revived in the context of strategic planning for the future. In January 1998, an SFI consultant spent a week in Abidjan working intensively with NESDA staff. The consultant prepared a revised SFI workplan plus some recommendations on the direction of NESDA's strategic vision for the organization itself, as well as on steps to take to better market its services to foundations. Next steps for NESDA with SFI were pursued under another USAID project, Implementing Policy Change, which provided TA to facilitate a four-day strategic planning workshop for NESDA staff, board members, and donors in October 1998. Sustainable financing retains an important place in NESDA's thinking about the future.

Results: The preparation of the initial SFI workplan helped to focus NESDA's attention on sustainability issues, something that the organization's donor partners were becoming increasingly concerned about. Thus SFI contributed to the rethinking of NESDA's leadership and direction. The hiring of the new NESDA coordinator gave the organization a renewed sense of mission and more focus in terms of fulfilling its mandate to provide services to its African membership.

SFI assistance has helped NESDA to begin to plan for the future with an ongoing emphasis on financial sustainability. As a result, NESDA's 2000–2004 strategic plan includes a component focused on sustainable financing. The organization has attracted funding from a number of international donors, and has continued to expand its membership base across the continent. Among its new outreach activities is the creation of a NESDA Web site. Two other important NESDA projects have attracted attention. In September 1999, it facilitated the launch of a network of African environmental lawyers. NESDA is also collaborating with the Scandinavian Seminar College to identify sites where progress has been made in implementing sustainable environmental policies.

C. Council for Scientific and Industrial Research—Ghana

The SFI TA objectives developed with CSIR included a) building effective partnerships with private-sector agricultural producers, NGOs, or other government entities to commercialize CSIR research products and services; b) developing mechanisms and tools that support and promote innovative collaboration with partners, and c) seeking out and entering into "deals" with selected partners. TA tasks were sketched out for each objective.

Four SFI TA assignments for CSIR were undertaken, all focused on helping CSIR to fulfill its mandate to commercialize its technologies and services and to generate a minimum of 30 percent of its budgetary needs through R&D commercialization. An SFI consultant spent November 1996 working with CSIR's newly hired marketing officer to conduct a client survey and set up a database for CSIR on partnership opportunities. The survey demonstrated that current and potential clients have a number of service needs that CSIR institutes could respond to; this was important in that it revealed to CSIR that commercialization options exist. For several of the CSIR institutes that were already market-oriented, this finding reinforced their awareness.

The second assignment targeted capacity assessment. CSIR institutes were surveyed by questionnaire on staff and organizational capacity. An SFI consultant developed the questionnaire and then, in January–February 1997, worked with the CSIR marketing officer to analyze the survey results; review institute business plans; and conduct seminars at eight institutes. At the seminars, the consultant discussed human resource issues, the skills required for effective commercialization, CSIR's plans for transitioning to commercialization, and the establishment of business development units (BDUs) in the various institutes. The consultant also provided some introductory training on marketing for senior institute staff, drafted a job description for a senior marketing officer position, proposed training to fill in identified skill gaps, and suggested ways that the CSIR secretariat could better facilitate the research institutes' transition to commercialization and the creation of BDUs.

The third SFI consultancy focused on supporting the establishment of the BDUs in each of the CSIR research institutes. A two-person SFI team went to

Ghana in April–May to 1) meet with senior managers to review BDU staffing and proposed position descriptions, 2) work with each institute individually to develop the best approach for establishing its BDU and a timeline for that process, 3) help them, where necessary, to target potential sources of candidates for positions, and 4) generally provide momentum to the process of establishing the BDU at each institute. The team visited nine institutes and helped them to develop a strategy for BDU development or, in cases where a BDU had recently been established, to develop action plans and begin to think about their marketing activities. The team also advised institute staff and management on policy and operational issues concerning relations between the institutes, the CSIR secretariat, and CSIR's BDU. The team, along with the CSIR executive director, visited the USAID mission to discuss progress with SFI and explore the possibility of providing mission support for CSIR staff training from an existing USAID project.

In the course of the three SFI consultancies, the need for better cost accounting and financial management emerged as a concern of CSIR managers. The fourth SFI assignment in October–November 1997 provided two consultants to work with the marketing officer and the newly appointed commercial director for the secretariat. Visits were made to nine institutes to build understanding of the concepts of cost estimating, pricing, and cost accounting. The consultants helped institute staff to explore procedures for applying these concepts, determining how and where to allocate costs, defining overhead expenses, and implementing cost containment measures. They made recommendations for modifications in CSIR's commercialization manual and advised the CSIR secretariat on relations and linkages between the secretariat and the BDUs. Further SFI-related TA was provided as part of the World Bank's National Agricultural Research Project (NARP) and the Private Sector Development Project (PSD). This assistance focused largely on making CSIR's BDUs operational.

Results: CSIR is a complex institution composed of a multitude of research institutes, whose products, services, stakeholders, and potential for viability vary significantly. What may make for financial sustainability in one institute may not be appropriate or possible for another. Thus, the meaning of financial sustainability for CSIR as a whole is open to interpretation. Gearing up to implement the commercialization policy set by the Ghanaian government involves a long-term and frequently painful process of institutional change for CSIR. The SFI assistance provided to date has been a catalyst in moving the change process along. However, the importance of some kind of short-term payoff was highlighted when the CSIR executive director, at a Washington meeting with SFI in July 1998, indicated that his staff were unwilling to invest more time and effort in SFI planning and organizational change in the absence of some new funding.

SFI assistance helped CSIR to grapple with the operational implications of commercialization. The following results can be attributed to the efforts of the SFI teams: a) increased recognition and understanding among CSIR staff of the opportunities for commercialization and of potential clients for CSIR services and technologies, b) timely creation of BDUs in the various CSIR institutes and their staffing, c) increased clarity in issues and procedures for implementing commercialization, d) institution-building for CSIR institutes actively pursuing commercial opportunities, e) improved morale among institute staff regarding commercialization, and f) increased skills and on-the-job training for the CSIR marketing officer.

D. Association for Strengthening Agricultural Research in Eastern and Central Africa

ASARECA, a regional coordinating entity created in 1994, has an important role to play in establishing and supporting regional approaches and mechanisms for agricultural research among national agricultural research systems (NARSs) and international agricultural research centers (IARCs). In addition, donor agencies are eager to work with indigenous regional entities to increase the relevance, coordination, and effectiveness of assistance to agricultural research and extension. SFI assistance to ASARECA focused on strategic planning, analytic support in the development of a competitive grants system, and research program impact assessment.

Beginning in October 1996, SFI provided assistance to ASARECA to review the association's mandate, operations, and current programmatic responsibilities; discuss ASARECA's future plans and sustainability with the executive secretary; reach consensus with the executive secretary on the scope, orientation, and operational logistics of a strategic planning exercise and an SFI workplan; and prepare terms of reference for TA to ASARECA for the strategic plan and the SFI. The October visit to Uganda laid the groundwork for a follow-up TA mission for further work with ASARECA on strategic planning in November–December 1996.

A two-person team assisted ASARECA to develop a strategic planning operational framework that reflected both a vision for the future and the steps required to attain that vision. The framework included a component to address financial sustainability. The team facilitated initial discussions of the action plan, drafted terms of reference for additional TA for follow-on analytic work, and made recommendations for its implementation. Based on this, ASARECA began to develop a strategic plan. SFI supported the process by providing five African senior-level experts as core members of the strategic planning task force and a separate but integrated two-person team, one African and one American, to address sustainable financing. The combined team worked intensively during April–June 1997, producing a draft plan by the end of June. Along with key ASARECA stakeholders, the team convened in Nairobi in July for a vetting and discussion of the strategic plan.

At the Nairobi meeting, the donors reaffirmed their commitment to supporting ASARECA and to helping the association develop a sustainable mode of operations. The financing mechanism that had the highest immediate priority was a system of competitive grants for AR; a longer-term, secondary priority was an endowment fund. Developing and operating a competitive funding mechanism thus became the first step on ASARECA's road to sustainability.

Following discussions in Washington with the ASARECA executive secretary, SPAAR, and AID/AFR/SD in September and October 1997, SFI assistance was provided to develop a concept paper laying out best practices with competitive grant mechanisms and elaborating the application of these practices to ASARECA. An SFI consultant began work on the paper in November, traveled to Uganda in December to interview ASARECA staff and various NARS personnel, and prepared a draft paper in January 1998. The paper was reviewed and endorsed at the ASARECA meeting of network coordinators and National Steering Committee leaders in February 1998. Follow-up assistance was provided in June 1998, when a consultant worked with ASARECA to develop an operational plan for the competitive grants system.

SFI also provided ASARECA with assistance in commodity research program impact assessment and monitoring. In June 1998 an SFI consultant participated in the meeting of ASARECA research networks, where staff worked on their next round of funding proposals. The consultant gave a presentation on impact assessment and worked with individual networks to integrate the concepts presented into their proposals. In July he completed a draft concept paper for ASARECA on this topic, following it in October 1998 with a short ASARECA "vision statement" on the economic impact of agricultural and NRM research. In November–December 1998, he developed an operational plan for ASARECA's coordination and management of impact monitoring.

Results: SFI assistance has been integral to ASARECA's progress over the past two years. The results of the strategic planning exercise, and its SFI component, set the course both for agricultural development in the region and for ASARECA as an organization. SFI's support was a direct contributor to these outcomes. The preparation of the concept paper and the operational plan for a competitive grants system has laid the groundwork for a transition to performance-based program funding in East and Central Africa that can coordinate donor resources for increased impact and synergy. It appears likely that a regional research fund will be created in the near future. SFI's assistance with impact assessment and monitoring, along with the competitive grants TA, has helped to increase ASARECA's capacity and reputation as an entity that

can manage for results, both programmatically and financially.

E. Zimbabwe's Agricultural Research Council and the Department of Research and Specialist Services

The Agricultural Research Council (ARC) and the Department of Research and Specialist Services (DRSS) are key players in the public-sector agricultural research system of Zimbabwe. Both organizations are currently undergoing major reforms and restructuring. Reforms at DRSS are centered on addressing the department's significant decline in services and financial resources, its drop in staff morale, and its greatly reduced impact. Turning these problems around constitutes the core of DRSS's institution-strengthening plans. The ARC, on the other hand, has for most of its existence been an ineffective advisory body, and current reforms are aimed at strengthening the organization, first as a national-level forum for agricultural sector stakeholders, and second as a policy guidance organization capable of formulating a strategic vision and influencing the national research agenda for agriculture and natural resources. Sustainability issues are central to the reengineering of both ARC and DRSS.

In January 1997 ARC/DRSS asked SFI to assist in analysis and planning for the sustainable financing of the restructured organizations. An SFI visit in February reviewed the status of the ARC/DRSS reengineering exercise and discussed what kinds of assistance SFI might provide toward the planned reforms. This visit led to further discussions between the SFI management team and the head of the ARC regarding the fit between the reform objectives of the ARC and the DRSS, particularly the latter, and those of SFI. In the meantime, the Zimbabwe government and the World Bank began preparation for the Agricultural Services and Management Project (ASMP), intended to help ARC and DRSS to implement their reengineering reforms. In June 1997, in another SFI visit to Harare, an SFI consultant worked with ARC and DRSS to develop a fuller SFI workplan that would integrate SFI assistance with ASMP resources to address sustainability concerns for both organizations. This assignment resulted in a draft SFI workplan, which ARC and DRSS subsequently modified and then submitted to SPAAR for consideration.

TA to support implementation of the workplan was included, with activities split between SFI resources and those anticipated to be available through ASMP. In the fall of 1997 ARC proposed a set of TA activities to be supported by SFI, but the proposal overestimated the resource levels available. The preparation process for ASMP was significantly delayed; thus the intended complementarity with SFI was impeded. An SFI visit to Harare in April 1998 reviewed the situation and led to an agreement that SFI would fund the completion of a cost recovery study for DRSS that had been started but halted due to a lack of Zimbabwe government funding. Work began on the study over the summer and a final report was submitted in November 1998.

Results: It is premature to talk about results from SFI assistance at this point, given the delays experienced. Most immediately, the completion of the DRSS cost recovery study helps the Zimbabwe government meet one of the conditions of effectiveness for ASMP.

F. Southern Africa Regional Agricultural Commodity Research Networks

Research partnerships among international donors, the IARCs, and NARSs have been formalized in network structures to address research and technology transfer. These networks are important mechanisms for both mobilizing and allocating resources. Among the issues facing the commodity networks is the need to clearly demonstrate the contribution of network activities to achieving objectives and generating impacts. SFI provided TA to two regional networks in preparing five-year plans with targeted objectives, indicators, monitoring plans, and demonstrated impact linkages. A related issue is to increase the extent to which research and technology transfer is demand-led. During the period May-July 1998, an SFI consultant worked with the Sorghum and Millet Improvement Program (SMIP), based in Zimbabwe at the Matopos Research Station of the International Crops Research Institute for the Semi-Arid Tropics, to develop a strategic plan for its Phase IV activities over the next five

years. SFI provided similar assistance in September–October 1998 to the Southern Africa Root Crops Research Network (SARRNet), headquartered in Malawi, which deals with cassava and sweet potato. The International Institute of Tropical Agriculture and the Centro Internacional de la Papa (International Potato Center) manage the network. This assistance contributed to the preparation of a strategic plan for SARRNet's Phase II (1999–2004).

Results: SFI assistance to SMIP and SARRNet helped these networks respond to the requirements of their funders, and contributed to their capacity to manage for results and impacts.

3.2 SFI ANALYTIC AND CONCEPTUAL WORK

SFI undertook four activities in this arena: analysis of a NR endowment fund in Madagascar; conceptual rethinking of the overarching strategy for moving AR/NRM institutions in the direction of financial sustainability; analysis of the implications of SFI for NGO sustainability; and analysis of competitive grants systems for regional AR/NRM programming.

A. Madagascar Environmental Endowment Fund, Tany Meva

A USAID/Madagascar request for SFI assistance led to a joint mission-SFI funded visit to Madagascar in November 1996. The SFI consultant undertook a rapid analytic appraisal of the policy development activities supported by USAID's KEPEM (Knowledge and Effective Policies for Environmental Management) Project and by USAID Non-Project Assistance. One activity had involved creation of an environmental endowment fund known as Tany Meva. Managed by a Malagasy foundation, Tany Meva provides a mechanism for sustainable financing for environmental and natural resources management activities. The fund seeks to facilitate innovative partnerships among government, local non-governmental organizations (NGOs), international NGOs, bilateral and multilateral assistance agencies, and the private sector.

Results: This assistance helped USAID/Madagascar prepare the next iteration of assistance in the environment sector. The analysis of Tany Meva and KEPEM fed into the mission's priority- and target-setting for its Strategic Objective No. 3: Reduce natural resources depletion.

B. SFI Conceptual Framework

In the spring of 1997 the SFI management team decided it was worthwhile to clarify and refine the conceptual boundaries of the initiative for several reasons. Among these were a) to reassess the elements of SFI activities for NARSs in terms of the critical areas requiring attention, and b) to provide a basis for monitoring and evaluating progress with SFI. A consultant undertook this analysis and completed a draft report by the end of July 1997. The report, *The Road to Financial Sustainability,* was reviewed and finalized for publication in September 1997, first appearing as an APAP III Research Report, and then in January 1998 as one of the AFR/SD SFI report series.

Results: This paper was widely distributed among SFI partners, and is frequently requested by individuals and institutions interested in issues of financial sustainability. A major result of this SFI conceptual work has been a reframing of the pursuit of financial sustainability that accords a central role to institutional change as a precursor to the design and installation of new financial mechanisms. The paper has had an important impact on the thinking of donor agencies, AR/NRM institutions, NGOs, and country governments. It shapes the thrust and orientation of SFI's technical assistance and provides milestones for tracking and monitoring the progress of SFI-assisted efforts with individual institutions.

C. SFI and NGO Financial Sustainability

SFI was invited to participate in a seminar sponsored by the European Centre for Development Policy Management (ECDPM) in Maastricht that focused on the role of sustainable finance in development, with a particular focus on NGOs. The seminar, held in May 1997, built upon the SFI Maastricht meeting of September 1995 (hosted by ECDPM), incorporated key elements of SFI thinking, and sought to apply it to a broader

development arena. An SFI consultant prepared a background paper for the seminar on the implications of SFI experience for NGO sustainability, and gave a presentation to the participants on SFI.

Results: The paper and the presentation were well received by ECDPM and the seminar participants. The editors of a Dutch journal, *Derde Wereld*, requested that it be included, in Dutch translation, in a special issue devoted to alternative financing and NGOs, which was published in the fall of 1997. As a result, SFI ideas and experience have been more widely disseminated in the European development community.

D. Competitive Grant Systems

This work was carried out as part of the assistance to ASARECA. The concept paper reviews the features of successful grantmaking and discusses how ASARECA could organize to manage a competitive grant system.

Results: The concept paper produced for ASARECA reinforced the acceptance by the board and the donor community of the idea of regional funding for AR, allocated via competitive grants. Considerable interest has been shown in the paper by others who arelooking at possibilities for competitive grant systems slsewhere in Africa, as well as beyond the continent.

4. Overview of Other Experiences

Using the analytic framework presented in Section 2, this section reviews a wide range of experiences with sustainable financing from sub-Saharan Africa as well as selected cases from Asia and Latin America. As indicated earlier, looking at sustainable financing mechanisms in terms of the interplay of several policy and organizational features, a concept illustrated in Figure 1, helps to sharpen our thinking about sustainable financing, generating fresh insights and new ideas for future SFI activities.

This section is divided into four parts. Following a review of the selected policy and organizational issues that arise in the design and implementation of any particular financing mechanism, Part 4.2 reviews specific issues related to resource mobilization. Parts 4.3 and 4.4 survey experiences with selected resource mobilization/allocation mechanisms designed to promote sustainable agricultural and NRM research and discuss issues that they raise.

4.1 POLICY AND ORGANIZATIONAL CONSIDERATIONS

There is broad agreement that for agricultural research, the interested parties need to understand policy constraints before making decisions on research planning and institutional reforms (Byerlee and Alex, 1998). Research leaders and managers are quite aware of the importance of finding the fit between their research programs and different ministry-level policies. In addition to executing research, "building and maintaining links with policymakers" is also a critical management task (Elliott, 1998: 115). Moreover, at the ministerial level, especially in West Africa, there is a growing awareness of and appreciation for the contribution of AR to development (Terry, 1998a). Despite such widespread agreement, practical application lags behind. The establishment in the early 1980s of the Bureau of Macro-Economic Analysis within the Senegal Agricultural Research Institute (ISRA) may stand as a unique effort to incorporate a capacity for dealing directly with a broad range of agricultural marketing and trade policy issues into a research institution (Bingen and Crawford, 1989).

For research leaders and scientists, being able to articulate how AR contributes to national development goals is clearly an important step toward assuring some level of funding for it. In fact, as Tabor suggests, "the ability to formulate, articulate, and gain consensus on such a vision, and to translate it into a demonstrable reality, increasingly determines whether agricultural research funding has been set at a level commensurate with the development challenges posed for it" (Tabor, 1998b: 22). Equally if not more significant, the ability of research leaders to address national policy issues and deal successfully with policymakers may be the critical first step toward "shifting accountability from donors" and moving toward "consistent domestic funding of research" (Badiane and Dione, 1998). Clearly, research leaders across sub-Saharan Africa must take the initiative to build domestic political support for AR (Rukuni, Blackie, and Eicher, 1998).

The ability to work across multiple policy arenas is a commonly overlooked skill for research leaders, but it is essential. To develop and pursue multiple options for more sustainable financing, research leaders must be prepared to move beyond their "home" ministries and into the domains of finance and commerce. Such policy skills are an important, yet commonly neglected, element in forging better relations with extension services, which can make it easier to link improved results in the field with investments in agricultural research (ISNAR, 1998; Kaimowitz, 1990). Similarly, as research leaders explore new types of public-private sector alliances, they also need to be aware of the ways in which banking and credit policies provide incentives for business to invest in agriculture market and rural activities, as well as for farmers to invest in

improved agricultural technology (Echeverria, 1998a). Recent international trade and intellectual property rights agreements suggest that successful research leaders must be able to operate in the international policy arena as well (Brenner and Serpa, 1997).

Agricultural research leaders cannot be expected to "carry all the water," but enhanced policy awareness will be important for those concerned with identifying options for sustainable financing. Every policy area has its own political structure and networks, interaction processes, influential actors and biases toward agricultural research (Lowi, 1964). Consequently, agricultural research leaders (and donor agencies) need to appreciate and craft strategies for SFI options that respond to the different interests and actors in each policy area.

A. Strategic Planning and Priority Setting

It is clear that the success of SFI will depend upon the ability of research leaders to pay attention to policy, but national science and technology policy statements rarely provide research managers with the level of specificity needed to develop clearly consistent research programs. The absence of a clear statement of government objectives often leads to mixed and sometimes contradictory statements to the scientific community (Beattie, 1998).

Faced with this type of situation, it is useful for research leaders to distinguish between questions that involve what the government or the private sector might finance and those that involve how financial resources should be allocated or managed. In the first instance, economic theory and concepts of public goods might offer some useful priority-setting tools. Such concepts can help decision-makers review the amenability of research to various exclusion mechanisms and thereby distinguish between the types of research that might attract private and public investment.

In reality, however, the boundary between public and private research goods is blurred and is influenced significantly by institutional factors that vary widely between countries (Beynon, 1996; Echeverria, 1998a). Regardless of where decision-makers draw the line between public and private goods, they must engage in a separate, but related, priority-setting exercise concerning how to improve the management and allocation of available financial resources. Decisions on improved cost-effectiveness or the distribution of benefits from research cut across both public and private research investments and activities.

The absence of clear government objectives for research has also led many donor agencies to promote national research priority-setting exercises that sometimes even exceed those followed in any industrialized countries. The rationale for engaging in national research priority setting seems compelling. As the financial resources for agricultural research decline, setting priorities can be a first step toward achieving increased research efficiency and relevance. Such exercises are a way to structure information on environmental, production, and market conditions and to focus attention on client constraints and the potential of research to address those constraints. Moreover, priority setting allows research leaders to take a proactive role in soliciting government and donor support for areas identified as vital to agricultural development efforts.

As recent experience from Benin illustrates, an identifiable national policy for agricultural research strengthens and supports research. It helps to outline research approaches and identifies resource requirements and mechanisms for financial and institutional support. The preparation of such a policy, however, requires that policymakers concerned with science and technology, as well as those in finance and commerce, acquire some knowledge of the agricultural sector, and develop an awareness of the comparative advantages of research as a policy instrument (Janssen, Perrault, and Houssou, 1997).

More often than not, the implementation of plans arising from priority-setting exercises has faltered from lack of attention to critical policy and organizational issues, including problems with research scientists' salary scales, conditions of service, and research operating funds. In addition, it has proven difficult to formalize research priority-setting processes in several industrialized countries. Instead, in several coun-

tries, grower associations have played increasingly important roles in identifying and setting research priorities. While this involvement has tended to lead to a focus on shorter-term and more adaptive research in the United States, in Germany the influence of farmers has led to new initiatives in NRM research (Basler, 1998; Clarke, 1998).

At the same time, "a common thread in the evolution of agricultural policy processes in developed economies has been the increase in the influence of non-farm interest groups [such as food processors, consumer groups, and environmental and conservation groups] on agricultural policy" (Alston, Pardey and Smith, 1998: 75). These cases highlight the importance of broadening the base of stakeholder support for research financing. They also remind us of the multiple relationships among a country's policies—in science and technology, international marketing and exports, and national administration and governance—that influence the design and implementation of sustainable financing mechanisms.

B. Public Administration and Governance

Experiences with sustainable financing initiatives around the world suggest that the design and implementation of financing mechanisms must be adapted to government policies concerning the administrative structure, functions and roles of public agencies as well as to national policies concerning governance. There is no blueprint for restructuring AR/NRM institutions so that they can implement sustainable financing activities. Each is at a different level of human capacity and scientific development (Eicher, 1989; Rukuni et al., 1998).

Governments everywhere are questioning the public-sector status of research. Since public organizations cannot rely on profits as a measure of performance, it has become increasing popular to try to identify various management practices and arrangements that could provide information on the performance and impact of public institutions. The "new public management" in public administration assumes that the performance of public agencies can be defined through private-sector measures of client orientation and preferences (Terry, L., 1998). The distinctiveness or "separateness" of national research agencies from most other government agencies makes research especially susceptible to the application of new public management principles (Busch and Bingen, 1994). Based on these principles, many governmental research institutions in Great Britain have been reorganized as "agencies" that are now responsible for full cost recovery (Beattie, 1998; see also Roseboom and Rutten, 1998, for a discussion of changes in the organization of agricultural research in the Netherlands).

Nevertheless, this approach is based on two assumptions that weaken its applicability for most research leaders. First, it assumes that the policy process is separate from program implementation. Second, and as a result, it sidesteps the need for research managers to deal with issues of political accountability and responsiveness to both domestic and international political interests.

Rather than moving into a wholesale incorporation of private-sector principles, and given the long-term nature of most agricultural research, it may be more useful to examine how incentive systems and professional opportunities might help to improve AR (Buringuriza, 1996). As found in the Federal Research Centers in Germany, employment relationships for scientists vary from unlimited assignments to long-term employment contracts and to fixed-term collaboration contracts for special research projects. Instead of seeking to apply neoclassical economic principles to AR, the use of variable employment relationships permits the centers to reduce costs, attract special funding, and respond to the government's mandate to undertake research that meets specific information needs of the ministry (Basler, 1998).

A variety of experiences with organizational change in agricultural research indicate that there is a range of organizational models to consider. Some efforts to rationalize public agricultural research and financing involve establishing various types of apex bodies to govern or coordinate agricultural research administration and financing. The role of agricultural research councils varies widely, as some have moved beyond a policy and coordinating role to undertake research themselves. Experience, however, especially from Asia,

suggests that research generally may not be well served by this type of institution. The councils that have proliferated for most part have failed to live up to expectations. Instead of serving to streamline research, they have become another bureaucratic layer (ISNAR, 1998; Mentz, 1998). Similarly, the National Committee for Agronomic Research in Benin (CNRA) was set up as a consultative body to coordinate agricultural research and formulate annual budget proposals, but it has been unable to influence the national research budget or to coordinate AR among institutions (Janssen et al., 1997). In southern Africa, Zimbabwe's Agricultural Research Council is an example of such an apex organization; it has suffered from weak and narrow support due to its inability to reach out to stakeholders within the small-farmer majority (Rukuni et al., 1998).

Governing boards raise another set of issues. They commonly represent an effective way to link a research agency to its external environment and can provide strategic guidance to management. But most have been generally problematic, especially because frequent changes in board membership undermine the performance of the research institute (ISNAR, 1998). Various efforts to introduce major changes in financial management and auditing, including consolidated funding mechanisms, have proven equally difficult. Just as donor agencies have been reluctant to give up control of their own projects through consolidated funding, various formal and informal interest groups with ties to research agencies hinder change (Alston et al., 1998).

Little information is available on how these various models may affect the responsiveness of agricultural research to new technological demands and priorities. Nevertheless, the pressure to make AR more client-oriented, cost-conscious, and performance-driven has been reinforced by renewed concerns with improved governance through democratization and decentralization. As farmers and private industry become more vocal in expressing their technological needs, this renews attention to the decentralization of AR and to technology user participation in research planning. If research is to become more client-oriented, then groups, and especially farmer organizations, must have the constitutional right to associate and to make demands upon government policymakers. Moreover, political leaders and administrative officials must recognize and accept citizens' demands for accountability as legitimate. The effectiveness of Zimbabwean commercial maize farmers in successfully influencing and supporting the research agenda for maize illustrates the kind of contribution that can occur from direct alliances with farmers. On the other hand, as Rukuni observes, it has proven much more difficult to get Zimbabwe's smallholders involved in a meaningful way (Rukuni et al., 1998).

Specific governmental regulations that encourage the creation of smallholder groups may, in fact, undercut their autonomy. As the establishment of the regional research committees in Mali suggests, the operation of such groups is often removed from local conditions, and as a result farmers are often reluctant to accept them (Collion, 1994). Consequently, many government-sponsored farmers' organizations fail to mobilize effective demand and appear as empty shells at the local level.

In sum, "decentralization can contribute to build more responsive and accountable institutions from the bottom up. But to do this, effective governance arrangements that foster accountability at the local level are needed, as well as an appropriate level of scientific and financial oversight from the center" (ISNAR, 1998: 10). Participatory models from elsewhere cannot be applied wholesale. At a minimum, the process requires investments in social capital to create a vocal, educated public.

Once a decentralized and more participatory model is designed, as Zimbabwe appears to have done (Rukuni et al., 1998), then research leaders and policymakers need to look for two different kinds of payoffs: those that improve the research agenda, and those that help leaders design more successful financing mechanisms. Farmers' group involvement in programming and monitoring can help broaden and refine the research agenda with respect to social, economic and environmental objectives. In addition, enhanced community

involvement could help research agencies take local conditions into account so as to design more cost-effective ways to use, manage and conserve resources (Beynon et al., 1998). On the other hand, decentralization does not necessarily optimize research investments. The cases of both the United States and India indicate that a range of intergovernmental relations influence regional or local investments—and, in some situations, continued underinvestment—in agricultural research (Mruthyunjaya and Ranjitha, 1998; Schweikhardt, 1989).

4.2 RESOURCE MOBILIZATION AND POLICY ISSUES

Funding mechanisms to mobilize resources for agricultural research vary widely, depending on what countries/regions are involved and what commodities are the main focus of research (Alston and Pardey, 1998; Echeverria, 1998a). Resource mobilization is also strongly influenced by national policy decisions in several sectors as well as by the organizational setting involved. Consequently, research mobilization requires the significant involvement of research leaders. Exercising such leadership is challenging, however, even under the best of conditions.

As the experience in Kenya illustrates, getting financial management and administrative practices in order is an important first step toward successful resource mobilization (Beynon et al., 1998). The SFI experiences discussed earlier indicate the continuing and problematic nature of these kinds of organizational changes. Moreover, research leaders must consider funding strategies to cover research needs as well as recurrent costs. Viable alternative funding mechanisms must satisfy the need for regular and continuous resource flows (Idachaba, 1998), as well as the needs of policymakers for higher-quality research and accountability (Janssen, 1998).

Similarly, as Tabor states, "the resolution of the recurrent-cost financing problem requires the full support and cooperation of the main agricultural research system financiers. . . . The true challenge is to involve the financiers in a frank and transparent review of the issue, and to arrive at a shared vision of the corrective steps to be taken" (Tabor, 1998a: 55). For example, the development of national agricultural research policy in Benin depended heavily on agreements reached with both the treasury and agriculture ministries concerning cost recovery, as well as a broader government commitment to promote national priorities instead of specific project or donor agency interests (Janssen et al., 1997). Finally, successful resource mobilization depends upon continued investments in professional training for scientists and in assuring the development of scientific research capacity (Echeverria, 1998a; Mruthyunjaya and Ranjitha, 1998; Rukuni et al., 1998).

Given this variety of policy and institutional considerations, experiences with sustainable financing offer several criteria that research leaders might use in assessing alternative funding mechanisms:

- *Additionality,* or how many new resources can be added without driving out old resources (Janssen et al., 1997).
- *Accountability,* or the extent to which different financing will improve the organization's goal orientation, quality of research, cost effectiveness and responsiveness to key stakeholders (Byerlee and Alex, 1998).
- *Administrative costs,* and what extra administrative resources would be required to manage other new resources.
- *Research flexibility,* that is, whether alternative mechanisms will increase the organization's options for responding to needs beyond what treasury-based block funding permits (Janssen et al., 1997: 146; also see Terry, E., 1998).

Experience suggests that a separate series of considerations are useful for mobilizing funding from the private sector. Different types of firms (multinationals or domestic) will invest differently in the development of agricultural technology. Consequently, research leaders must be prepared to identify a) the activities, technologies and resources which might interest the private sector; b) the market for these

activities; c) institutional mechanisms for linking public and private resources; and d) costs and potential problems of obtaining private funding. Both policy and organizational issues must be considered. As one recent study notes:

> There are many ways of using the assets and outputs of public agricultural research to generate revenue from the private sector. To cash in on these possibilities, research institutes must have either productive research programs or valuable assets under their control. At the same time, there should be a sizable market of organized farmer groups or profitable agribusinesses willing to pay for research and technology. Laws to protect intellectual property, combined with effective enforcement of those laws, are also key ingredients for successfully earning money from research. (Pray and Umali-Deininger, 1998: 225)

4.3 FINANCIAL MECHANISMS FOR MOBILIZING RESOURCES

This section reviews experiences and issues related to the use of five different financial mechanisms for mobilizing funding for AR/NRM.These mechanisms include commercial activities/user services; research contracts; checkoffs/cesses; corporate and joint ventures; and endowments/research funds.

Commercial Activities/User Services: Commercialization and fee-for-service mechanisms can reinforce the link between research priorities and user needs. In the United States, for example, the current system of state agricultural experiment stations traces its origins to commercial or user services that were offered to farmers through state-level "chemists' shops." Prior to the establishment of either the land-grant colleges or the agricultural experiment stations, researchers ("chemists") focused on services for soil and fertilizer testing. In other words, state-level agricultural research emerged from, and subsequently incorporated, several types of commercial activities or user services (Rosenberg, 1976).

The contemporary situation throughout sub-Saharan Africa and elsewhere differs significantly from this bottom-up, demand-driven model. Instead of emerging from a series of decentralized fee-for-service activities closely linked to farmer demands, most national AR/NRM systems embody a range of organizational traditions and priorities that can be traced to the colonial era. Consequently, many of these systems now struggle with forging better connections to farmers and other constituencies while reshaping their mandates.

This struggle creates multiple tradeoffs between the goals and priorities of scientific and technology policy and the concern with developing sustainable financing mechanisms. Given the limited scientific research infrastructure in many countries, most national research agencies confront tremendous pressures from many sources to commercialize and make their facilities and services more broadly available. Research leaders thus must try to balance the use of fee-for-service mechanisms and various commercial activities to generate revenue without sacrificing the capacity to realize broader science and technology objectives (Byerlee and Alex, 1998). In the drive to recover costs and maintain infrastructure in the short term, AR/NRM institutions may be motivated to sacrifice long-term basic research functions.

Once this type of organizational planning and priority-setting occurs, the ability to benefit from the resources mobilized through commercial activities and user services depends upon government finance and budget policy concerning cost recovery. In Kenya, government approval of cost recovery has allowed KARI to raise revenues by selling seeds and other products, as well as by levying user charges for certain advisory and regulatory services (Beynon et al., 1998). In neighboring Uganda, on the other hand, a series of government policies, ranging from ownership of National Agricultural Research Organisation (NARO) facilities to intellectual property rights, has hampered efforts to pursue various commercialization opportunities (Buringuriza, 1996). Stable governmental funding for recurrent costs is also critical, because to offer viable commercial services, AR/NRM institutions need a functioning infrastructure and scientific capacity (Idachaba, 1998).

Research leaders also confront another set of related organizational and policy issues. There are various ways to organize an institution to implement commercial activities. The establishment of separate entities or organizational units within research departments that are responsible for service and commercial activities, such as the Central Veterinary Laboratory in Mali or the livestock services in Senegal, represents one approach. As discussed earlier, Ghana's CSIR has set up business development units for each of its institutes, as well as a secretariat-level BDU. To operate such units successfully requires different management capacities and skills from those required for successful scientific research (Pardey, Alston, Roseboom and Wyatt, 1998a).

These organizational options raise at least two different types of policy concerns. First, separating commercial services into a separate unit tends to insulate the rest of the organization from the client-focused and performance orientation that is one of the intended benefits of this mechanism. Second, the incentives to pursue commercialization as a way to mobilize resources are closely linked to the allocation of resources. At issue is the creation of "have" and "have-not" units within the same agency. Units with readily commercialized services resist subsidizing non-commercial units. Hence efforts to achieve more sustainable financing may jeopardize institutional sustainability, not to mention provoking inter-unit conflict.

Research Contracts: Contracts are a variant of fee-for-service mechanisms. Where commercial opportunities with cash and/or export crops exist, various types of research contracts or agreements offer opportunities to pursue a variety of both policy and management objectives. For example, throughout most of West and Central Africa, where cotton is a major export commodity and source of foreign exchange earnings, most cotton research is financed through agreements with national cotton companies. A major policy issue concerns the extent to which the cotton company and research agency are prepared to allow growers a more direct role in setting research priorities (Bingen, Carney and Dembelé, 1995).

In an example from East Africa, a research contract between KARI and a floriculture producer, the Oserian Development Company, has helped an important Kenyan export industry. It has also served a means for opening up the export market to more small-scale producers. Moreover, the contract has helped lead to training opportunities for both KARI and ODC researchers and to investment in new and specialized research facilities (Kalaitzandonakes, 1997).

While contracts can address broader scientific and social policy concerns, they can also be used, where appropriate, to address organizational issues such as research incentives. For example, not only does CORPOICA, the Colombian parastatal research agency, have the freedom to do contract research, but research staff on tenured employment arrangements must obtain part of their funding from contracts (Nestel and McMahon, 1998).

Checkoffs/Cesses: Checkoff or cess systems are widely used to fund commodity-specific research when 1) a commodity is commercially important and 2) market structure makes it easy to collect the stipulated checkoff or cess. Under these conditions, checkoffs can be relatively efficient and fair mechanisms (Alston and Pardey, 1998).They may not, however, be the best way to fund research on multiple, related commodities or on agro-environmental issues.

While finance and budget policy decisions are usually sufficient to establish a checkoff system, such a system may also be a means to design major institutional changes. In Australia, the establishment of Research Development Centers (RDCs) in 1985 and 1989 to manage research funds generated by industry levies substantially increased the share of funds for publicly conducted agricultural R&D. In New Zealand, statutory bodies (marketing boards) have used levies to support market development and research programs since the 1920s. The 1990 Commodity Levies Act, however, not only permitted industry groups to impose mandatory levies to fund sector-specific research and other (market-development) activities, but led to the establishment of new commodity group funds for several agricultural products (Alston et al., 1998).

Checkoff systems have been used successfully as well to achieve broader governance goals, including the creation of an awareness among producers of the importance of agricultural research and a concern with how their money is being spent. In Colombia, new commodity production levies are recycled to the commodity associations to be managed and in some cases to fund their own research or to negotiate contracts (Nestel and McMahon, 1998). Similarly, in Australia, the checkoff system has increased industry representation on RDC boards and project selection committees. Most checkoff systems, however, cannot be assumed to represent all growers. In most cases, larger, more highly capitalized growers dominate decision-making in the management of these systems.

Nevertheless, checkoff systems can be used to strengthen research across a range of institutions. Joint funding has been a key principle in the Netherlands for years, and in the mid-1980s, legislation enabled the creation of commodity-specific statutory bodies in Great Britain. In Australia, the establishment of Cooperative Research Centers in the early 1990s has linked "research by government, universities, and the private sector, [and thereby] fostered a revitalized growth in total funding for agricultural R&D" (Alston et al., 1998: 71). In Uruguay as well, INIA has been able to use resources available in part through a checkoff to take advantage of available facilities at other institutions, tap into research at other organizations and help create a "true national agricultural research system" (Hobbs, Indarte, and Lanfranco, 1998).

Despite the use of checkoffs as one means to build and strengthen a truly national research system composed of multiple (public and private) institutions, the full incorporation of universities into NARSs remains problematic. Neither Australia nor New Zealand have fully integrated their universities into the national research and extension systems, just as relations between extension and research remain limited in Germany (Basler, 1998; Byerlee and Alex, 1998; Henzell, Crawley, Johnson, and Wallis, 1998). This is a well-recognized problem in Africa as well, and is compounded by the continued weaknesses in the scientific capacity of many African universities.

Corporate Joint Ventures: The emergence of an increasingly global agri-food industry raises increased possibilities for many governments to consider joint ventures to invest in AR with international firms. Experience to date indicates that a variety of policy conditions influence investments by private capital in AR: a potential for large and growing markets; location-specific technology; guaranteed appropriability of R&D benefits; and supportive government policies, including tax incentives. More specifically, several types of legislative measures appear to be important in attracting private-sector investment. These include abolishing national monopolies in plant breeding, providing tax concessions for investments in research, changing seed and patent laws to encourage local investment, and allowing institutes to participate in joint ventures. In addition, considerable public investments that assure the availability of skilled and experienced professional cadres of researchers are required to attract private investments in AR (Pray and Umali-Deininger, 1998). Finally, governments need to appreciate that some kinds of research investments are more attractive than other kinds to private capital (Carney, 1998).

Public-private joint research activities have become relatively widespread throughout Latin America and the Caribbean. Nestel and McMahon, for example, cite cases of "synergy through joint ventures" with maize in Guatemala, rice in Colombia, and cattle in Jamaica (Nestel and McMahon, 1998). They also identify several instances where private-sector research is expanding. Examples include horticulture research in Mexico, especially as many scientists leave public service and establish their own research facilities, and maize and soybean research carried out by private Brazilian seed production companies.

The case of barley research with the Kenya Breweries offers an example of a successful joint venture in East Africa. In 1975, the KB established its own barley research center, and since 1978 it has funded all barley research. Yields have more than doubled. At same time, its practical monopsony on the purchase of malting barley, high tariffs on imported lager, and the marketing reform and Plant Varieties Act of 1994 have significantly reinforced incentives for the KB to undertake research.

Clearly, consideration of this funding mechanism depends heavily upon a series of economic policy decisions that directly affect opportunities for greater or different relationships with private sector. As the African Development Bank recommends, "African governments need to urgently implement policies that create the right investment environment which will encourage increased participation by the private sector in agricultural R&D" (Badiane and Dione, 1998: 11). The challenge for African governments, however, lies in a clear articulation of their science and technology priorities and the exploitation of what Byerlee and Alex call research "complementarities" (Byerlee and Alex, 1998). In other words, where economic and finance policy provides the necessary incentives for private-sector investment, the outstanding issue arises in identifying how public-sector resources can then be used for the more difficult and long-term tasks aimed at poverty alleviation, NRM and environmental protection.

In addition, research managers confront a serious organizational dilemma: to the extent that a government succeeds in attracting private capital investment in AR, these investments will likely drain scientists from national institutes. As a result, the success of private investment in research will depend upon significant public investments in professional training and in strengthening the scientific capacity of multiple organizations, including universities.

Endowments/Research Funds: Experience suggests that endowment funds have been established most successfully in support of a range of environmental activities rather than to fund agricultural research (see GEF, 1999). In over two dozen countries, environmental funds help to cover the recurrent costs of parks and protected areas, strengthen environmental institutions, and promote sustainable development. Such funds are usually independent of government. They tend to be created as NGOs or foundations; they receive funding from a variety of sources, including debt-for-nature swaps, grants and levies.

The appeal of endowment funds lies in the assurance of long-term funding, which allows stable and predictable resource flows, long-term planning, and retention of qualified professionals. At the same time, when these funds are linked with stakeholders in governance and management, they can help to promote democracy and accountability (Interagency Planning Group on Environmental Funds, 1995). The West African Rural Foundation (WARF) represents an interesting case to watch in terms of its ability to foster collaborative, farmer-based research (West Africa Rural Foundation, 1998).

As Pardey has noted, however, endowment funds require significant administrative and financial skills to operate (Pardey et al., 1998a). Other desirable organizational traits include minimizing the proportion of government representation on the boards of funds, maintaining a measure of scientific and technical independence, and keeping only a small secretariat. Thus far, many donors have been reluctant to commit to setting up endowment funds, partly due to concerns regarding several organizational issues, including the management capacity to handle the funds, assure accountability, and preserve the capital (Ellsworth, 1998). Consequently, endowment funds remain more of a long-term goal to be aspired to than an immediate real option as a financial mechanism for AR. However, it may be that positive experience with competitive grants systems could lead to more openness in considering endowments for AR, as the institutions managing the grants gain a track record for successful management and donors become more comfortable with a lesser degree of direct operational control.

4.4 FINANCIAL MECHANISMS FOR ALLOCATING RESOURCES

This section briefly reviews three types of mechanisms for allocating financial resources. These are discussed separately from the mechanisms for resource mobilization, primarily to highlight some of the differences between mechanisms for allocation versus mobilization. In reality, research leaders and policymakers commonly consider mechanisms for the mobilization and allocation of resources together. Moreover, many resource mobilization mechanisms,

such as research contracts and checkoff systems, can also be used to allocate resources.

Each of the mechanisms reviewed here could be designed in the context of national or federal systems as well as on a regional and international basis. Given the renewed attention to regional approaches to research in sub-Saharan Africa, regional funds are discussed below as a separate category.

Block/Matching Grants and Formula Funding: The decline in aggregate funding for block grants, and uncertainties about their timely allocation, are among the key reasons for the current attention to alternative and more sustainable funding mechanisms for agricultural research. Moreover, as discussed earlier, block grants and formula funding do not provide a straightforward way to link funding and performance. Nevertheless, some type of public funding will continue to be critical in supporting AR, and it is useful to consider at least three key features of block and/or matching grants that deserve further consideration in discussions of sustainable financing.

First, a key concern with block grants stems from governmental finance and budget issues. Simply put, national budgetary policy and allocation procedures may clash with research programs' need for reliable, timely access to resources. As Idachaba convincingly demonstrates, the effects of instability, fluctuations, and delays in funding wreak havoc on the capacity of AR/NRM systems in Africa to operate effectively, with increasingly severe consequences over time (Idachaba, 1998). Finance ministries usually turn a deaf ear to demands to accord research agencies greater financial autonomy or to establish a system of advance fund releases (Byerlee and Alex, 1998). However, such discussions need to take place, and uncertainty minimized to the extent possible.

Second, block grants need to be viewed not just as central-government allocations to AR/NRM institutions. Regional and local jurisdictions can also be components of this funding mechanism. For example, in the United States and Australia, a system of matching grants has been developed to complement block grant funding between the federal government and state agricultural research stations. This system has helped both to assure a fit with local needs and to address broader issues related to agricultural science and technology. As Pardey suggests, without federal government support tied to matched state support, agricultural R&D at the state level would probably be much more narrowly focused (Pardey, Roseboom and Fan, 1998b). These types of arrangements mean that block grants are not necessarily the "blunt" funding and policy instrument that many consider them to be.

Third, this type of funding system, especially in its application in the United States, appears to help achieve certain organizational or administrative objectives that might not otherwise be possible. The formula funds from the U.S. Department of Agriculture are key in establishing and maintaining effective networking. This involves a relatively small amount of money appropriated to each state institution on a formula related to the size of the state's agriculture, but it represents the "glue" that holds the system together and helps federal and state systems plan ahead together (Clarke, 1998). This system is also the means for optimizing research investments (Schweikhardt, 1989).

The implication for developing countries is that formula funding can be used effectively to promote sustainable financing and science and technology policy objectives. It should not be regarded simply as the least desirable alternative among the list of allocation mechanisms. It is an integral element of any research and technology transfer financing system.

Competitive Grants: Competitive funding mechanisms for AR are becoming widely used in developing countries, especially in Latin America. When backed by significant external support or by an endowment, national policymakers and donors see these mechanisms as effective tools to achieve a range of policy-level objectives that range from priority setting to fostering inter-institutional collaboration to lowering research costs (see, for example, Henzell et al., 1998; Nestel and McMahon, 1998). However, as Echeverria points out, the circumstances under which competitive funding is most appropriate are still unclear, as is its complementarity with more traditional institutional funding mechanisms. Also, benchmarks to measure its performance are still lacking (Echeverria, 1998b).

Competitive funding can be used to achieve several management objectives: to help coordinate research across different institutions, to encourage productive researchers, and to reallocate research resources by tying grants to high-priority research areas. While this type of funding can help to promote a measure of accountability as well as strengthen the links among national, regional and international organizations, it is not "a substitute for institutional development and longer-term investments in developing research infrastructure" (Byerlee and Alex, 1998: 24; see also AGRTN, 1995; Anderson, 1998). At the managerial level, moreover, competitive grants systems require good management skills. If a grants system is intended to promote greater allocative efficiency, then grants must be allocated according to efficiency criteria, and not according to political or personal preferences (Alston and Pardey, 1998).

The Agricultural Technology Development Fund (FPTA) in Uruguay illustrates a model competitive funding mechanism for client orientation and effective resource use. The fund finances agricultural research projects that the national institute, INIA, carries out in collaboration with non-INIA researchers in other research organizations and institutes. As such, it enables INIA to establish an integrated national AR system and to establish strategic alliances with national and international players (Hobbs et al., 1998).

In addition to the above policy and management concerns, competitive grant systems raise at least one policy issue that requires special attention. These systems must be specifically designed to be poverty focused. Without a deliberate effort to orient a competitive grant system toward issues of research equity, small-scale producers who constitute the poorest and least empowered sectors of society do not have the institutional clout or economic power to ensure that their technology needs are met (ISNAR, 1998).

Regional Funds: The use of regional funds has recently captured the attention of policymakers throughout sub-Saharan Africa. At the Abidjan Interministerial Conference in early 1998, the African Development Bank suggested that a regional fund could help promote AR as "a regional or sub-regional task, serving the priority interest of groups of countries and not single states" (Badiane and Dione, 1998: 11). Similar arguments have been made with respect to AR in the European Union. One of the implications of European integration is that separate national agencies or programs that cover everything can no longer be justified, especially since the Union should encourage borrowing and sharing of technology and research capacity (Basler, 1998).

The interest in creating (or re-creating) a more regionalized research system in sub-Saharan Africa is not new (Eicher, 1989). Regional research, whether conducted on a competitive grants basis or via some sort of formula funding, has long been promoted as one means to take advantage of technology spillovers, to facilitate borrowing, and to deal with the small-size problems of nationally based grants programs. At the same time, regional research teams can address important human capital development concerns and tap into the scientific resource capacity of multiple institutions. Regional programs can also help to develop scientific skills of national researchers by facilitating exchanges and interaction among scientists with both national and international programs.

Latin America's FONTAGRO may offer some useful lessons for the establishment of regional funds in sub-Saharan Africa (Inter-American Development Bank, 1996). This relatively new fund is designed to encourage and finance strategic research on a medium- to long-term basis, and to produce technologies with the characteristics of regional public goods. The fund seeks to promote the competitiveness of the rural sector in ways that contribute to poverty reduction and the sustainable management of the resource base. These include adding a permanent flow of new resources to regional AR; accelerating applied research at the national level by supplying public goods-type technologies of cross-country relevance; and promoting research cooperation and collaboration among organizations at national and regional levels and between Latin American/Caribbean and international AR organizations (Hertford, 1998).

Global research programs, such as the Global Programme for Musa Improvement and the Global Initiative on Late Blight, offer additional models to consider. Instead of beginning with a funding mechanism per se, these programs begin with a "global problem" and then develop a coordinated set of activities, carried out by wide range of participants and directed towards solving a specific problem or set of problems (see Anderson, 1998).

Several caveats concerning regional funds and networks, however, are in order. A national strategy to capture the benefits of regional or global programs requires flexibility and the scientific capacity in the national system to act in response to developments elsewhere (Byerlee and Alex, 1998). Moreover, regional funding may simply transfer the funding problem to another level (Eponou, 1998). Access to regional funding does not mean that national funding is not necessary.

5. Lessons for Financial Stability

This section presents several preliminary lessons that emerge from experience in working on SFI concerns with African AR/NRM institutions over the past several years and from the review of other experience discussed in Section 4. Following the categories identified in the analytic framework in Figure 1, this section discusses these lessons in terms of the financial mechanisms for mobilizing and allocating resources, the AR/NRM institutions and their organizational components, and the policy environment. In addition, it reviews some operational lessons that arise from the experiences of assisting AR/NRM institutions with SFI issues. The lessons summarized here should help to inform a next generation of SFI activities.

In brief, the road to sustainable financing takes time, will, commitment, and bold, institution-wide innovation that involves financial, organizational and policy reforms. The way is not clearly marked, nor can individual AR/NRM institutions travel this road alone.

5.1 FINANCIAL MECHANISM LESSONS

Choices among financial mechanisms must take into account organizational and policy contexts. Simply, organization and policy matter. Experience with various financial mechanisms clearly shows that, as Figure 1 illustrates, they function within different policy and institutional settings that directly influence success. The transition to sustainable financing depends upon a core management capacity for several activities, including program management, budgeting/accounting, and human resources development. Specifically, AR/NRM institutions face weak prospects for either mobilizing or allocating financial resources without a minimum capacity for financial accountability and transparency. Without this capacity, new financial mechanisms will not be sustainable. Institutional performance and sustainable funding cannot and should not be decoupled.

This lesson means that research leaders must be prepared to operate within several different policy arenas beyond the domain of ministries of agriculture or scientific research. The successful introduction of mechanisms for both mobilizing and allocating resources will depend upon research leaders' ability to participate in the policy arenas of finance, commerce, and perhaps local administration to the extent that government is decentralized. Research leaders must see themselves and their research agencies as policy actors able to speak the language of policymakers and to discuss the rationale for research, and its benefits, in terms various policymakers understand.

Sustainable financing requires a mix of mechanisms for different purposes at different times. Public funding through governmental agencies will continue to play an important role in all agricultural research activities. It is overly simplistic to think of SFI as a wholesale shift from one source (public) of resources and one type (formula funding) of mechanism to another source and type. On the contrary, as AR/NRM institutions seek to serve a wider variety of clients and stakeholders, and provide a mix of public and private goods and services involving research and technology transfer, they need to draw upon several types of mechanisms for resource mobilization and allocation. The mix may evolve over time, but research managers must be able to fashion these mechanisms according to a range of criteria, including their institution's geographic focus, its commodity orientation(s), and its scientific capacity for undertaking a range of research, from food processing and safety to cattle and agricultural chemicals.

Moreover, various SFI options will "play" differently in different policy arenas. For example, government finance and budgetary procedures affect the level and nature of public resources for research, including pay

for scientific staff. In addition, economic and trade policy will influence the possibilities for joint ventures with foreign investors, for the establishment of funds, or for various types of regional collaboration.

A. Mobilization of Resources

Setting up endowment funds represents just one approach to generating resources for research. Many donor agencies and AR/NRM institutions have considered endowments the highest and most immediate priority for putting AR/NRM organizations on a sustainable financial footing. To assume that an endowment is the first step, however, reflects an unrealistic and oversimplified view of the contribution that endowments can make to sustainable financing. In part, attracting funds for an endowment depends on an organization's existing capacity, credibility, accountability, and performance track record. These prerequisites are not created overnight, but result from a long and sometimes painful reform process.

Within limits, regionally based endowment funds might be an effective means to strengthen national-level research. They offer a more viable basis for entering international capital investment markets and might provide an opportunity to address issues that would be extremely difficult to support only at the national level. In addition, regional funds offer opportunities for scientific exchange and for donors and research scientists to work together. Considered in this way, regional funds can complement and enhance, rather than compete with, national programs.

Commercialization must be balanced with research and development objectives. The development of fee-for-service activities, contract research and other commercial opportunities is not a panacea for public budgetary reductions. Many agricultural research agencies have important services that can be provided on a fee basis to selected groups of producers. Many may also have the scientific capacity to engage in contract research for selected clientele. The development of such services and contracts, however, must be balanced by at least two considerations. What are the implications of services and contracts for the diversion of scarce scientific research personnel? And what are the implications of serving specific producers or clientele at the expense of a broader public? In short, research leaders need to distinguish between the appeal of commercial products and services (for which there is a market demand and the possibility for partial or total cost recovery) and an agency's research and development mission.

Under pressure to diversify funding sources and faced with public budget cuts, some institutions have sought to pursue the quickest and easiest targets. Often this means leasing out equipment, selling agricultural produce from experimental farms, and/or contracting out staff. However, these strategies pose a risk of weakening, rather than strengthening, an institution's capacity to fulfill its objectives in research, technology transfer, and dissemination. There is a distinction between commercializing research facilities—that is, using an institution's physical plant, equipment, and staff for commercial purposes—and commercializing research: i.e., developing research products and services for which there is a market demand and the possibility for partial or total cost recovery. Too much emphasis on the former could divert scarce operating resources away from research, and thus impede fulfillment of the institution's fundamental mission. Commercialization strategies need to carefully balance short-term cost recovery and long-term sustainability.

The issues raised by attracting corporate capital for joint research ventures or for private research activities are similar to those raised by the marketing of research services and facilities. Private capital offers opportunities for moving agricultural science and technology in new and innovative directions and for building a constituency for research. However, attracting private investment depends upon having the scientific capacity already in place. It also depends upon the economic, commercial and scientific policies that make private investments in research attractive. Orienting scientific staff in this direction and getting such policies in place must be balanced against taking care of the common good—for example, by responding to non-commercial producers or to non-commercial environmental and natural resource issues.

Commodity checkoffs work. Under certain conditions, commodity checkoff systems have proven

successful as a means to fund commodity-specific research. Checkoffs work where there are commodities that are commercially important, where the research outputs are applied, and where the market structure for these commodities facilitates collection of the checkoff. These systems are relatively efficient and fair, and they can improve grower awareness and support for agricultural research. As noted above, however, they not useful for pursuing research on multiple commodities or agro-environmental issues, or for doing basic research.

B. Resource Allocation

Government block funding is critical to a viable national agricultural and NRM research system. Despite the widely recognized decline in national budget allocations for AR/NRM, not to mention the criticism that block funding as an allocation mechanism has encouraged non-responsive and non-performing research systems, there remains an important place for public funding of core research capacity. Such funding is needed to maintain key scientific and support personnel, research and technology-transfer infrastructure, and recurrent operating costs, as well as strategic research decision-making. Yet it needs to be structured in order to enhance the prospects for supplemental private funding and to make competitive mechanisms functional.

Competitive grant systems can be used strategically and selectively to help develop sustainable research systems. Competitive grant systems (CGSs), with their built-in orientation to performance, accountability, and some measure of quality control through a proposal review process, can be a constructive mechanism for allocating research resources, especially if used as complementary to other institutional funding mechanisms. Many national systems in sub-Saharan Africa, though, cannot currently meet all the management conditions required for a successful CGS. Such systems can be biased by personal and/or political influences. They tend to favor shorter-term research activities, and they require special efforts to assure that research is directed towards the needs of smaller-scale producers. The limitations of national CGSs can be potentially mitigated if the systems are administered on a regional or international basis. Regional CGSs can build credibility with donor agencies and the private sector, leading to support for research that might not otherwise be funded. The associated costs of the proposal preparation and review process, however, need to be closely monitored.

5.2 ORGANIZATIONAL LESSONS

Core organizational capacity is central to financial sustainability. As noted earlier, AR/NRM institutions need a well-rounded set of basic organizational strengths in order to mobilize and allocate financial resources. Without attention to the organizational components presented in Figure 1, no AR/NRM institution can aspire to sustainability. Strengths that are commonly identified as necessary include 1) basic operational and management capacity, 2) the ability to plan strategically and to take a proactive stance for linkages and inter-institutional collaboration, and 3) research and scientific leadership. Key among these strengths is scientific research capacity. Agricultural science requires researchers, and researchers require continued training and upgrading. Training researchers is a “flow,” not a “stock” problem. Without these strengths, AR/NRM institutions will find it difficult or impossible to mobilize financial resources and to allocate them properly, nor can they build the stakeholder support that will lead to a continuation of resource flows in the future.

SFI involves change in organizational culture. While this was recognized in the pairing of institutional reforms with the search for alternative mechanisms, in the early thinking of SFI it was underestimated. Entrenched systemic structures (e.g., civil service rules, public-sector procedures, etc.), the weight of history and tradition, and lack of experience with the private/NGO sectors reinforce a significant cultural mindset hindering change. SFI must confront this mindset as it pushes researchers and institution managers to shift from supply- to demand-driven research, to respond to new stakeholders, to think in terms of concrete targets and impacts, and to take a hard look at current practice. This kind of

change requires strong and committed leadership, as well as ongoing effort by all participants.

Organizational change for SFI must be adapted to each institution. Related to the previous lesson, no single solution or administrative approach will fit all research institutions. Donors and national governments tend to underestimate the need to mold organizational reforms to specific circumstances. Organizational change often appears easy and straightforward. Such a view, however, overlooks the web of multiple and overlapping influences and constraints on AR/NRM institutions that Figure 1 illustrates. It is, in fact, the challenge posed by this web that gives rise to one of the major crosscutting features of organizational change: the need for greater organizational autonomy and flexibility to deal more effectively with an institution's unique set of structural and attitudinal hurdles.

Organizational change for SFI takes time. If past experience is any guide, it will take more than a change in donor priorities to bring long-term and sustainable changes in the funding of agricultural research. A phased approach and a clearly articulated strategy—one that recognizes the relationship between short- and long-term financial sustainability—will be an important part of the transition. Various financing mechanisms need to be tested on a pilot basis. Overall, a long-term approach to transition will permit a period of policy and program socialization, as scientists, research managers and policymakers get adjusted to new financing models.

New financing mechanisms that require extensive organizational change will be difficult to implement. Mechanisms that call for incremental changes from existing practice are much easier for institutions to implement than those requiring more radical restructuring or procedural reform. For example, scientists accustomed to competitive research grants can transition more easily to a broader system of competitive funding than they can to a system of contract funding with the private sector. SFI experience with helping institutions to deal with commercialization policies, which call for significant organizational change—structurally, procedurally, and attitudinally—reinforces this lesson.

SFI for regional institutions is more complex than for national ones. Several of the SFI partners provide services regionally rather than to a single country (SACCAR, NESDA, ASARECA). These entities have diffuse objectives, often face difficult political issues, have less potential for mobilizing non-donor support, and are less able to demonstrate direct private-sector payback for their services. As noted above, however, the sustainability of national and regional AR/NRM institutions is linked. At issue is how donor agencies can balance support for regional efforts that can foster truly regional activities and thereby strengthen research in individual countries without diverting financial resources into a new layer of institutions. A successful regional program requires national-level capacity to understand and promote a regional effort. In each country, leaders at both policy and management levels must be able to see and articulate what a regional approach has to offer.

Institutional pluralism strengthens financial sustainability and performance. The strongest AR/NRM systems are those that combine the efforts of public research agencies, the private sector, NGOs, universities, and international entities such as the IARCs. Both the nature of the research problems that need to be tackled—e.g., environmentally sustainable agriculture, biotechnology, etc.—and the range of capacities required call for the collaborative actions of several institutional partners. Pluralistic institutional arrangements are more effective and produce better results. Further, their increased performance leads to more stakeholder support and thus to more willingness to mobilize resources for research and technology transfer. For the future, this lesson implies more focus on public-sector AR/NRM organizations' abilities to link with other research and technology transfer partners, along with more focus on the management capacities of those partners.

5.3 SFI POLICY ISSUE LESSONS

Policy can serve as an important impetus for initiating change, and as a pivotal motivator for pursuing reform. This lesson emerges clearly from

the broader literature on financial sustainability as well as the SFI experiences of CSIR and SACCAR. In the case of CSIR, the commitment and efforts made in setting up the business development units, in pursuing commercial options, and in developing new organizational procedures can be linked directly to the inducement of the government's policy decision regarding commercialization. Similarly, policy decisions by the Botswana government and SADC have had a clear impact on prompting SACCAR to confront sustainability and financing issues head-on. This lesson suggests that a policy component should be considered integral to SFI reform efforts.

Simplistic policy frameworks for AR/NRM lead to poor policy decisions. Discussions of sustainable financing mechanisms need to distinguish clearly between theoretical notions of agricultural research as a public good and a more empirically based understanding. While it is true that agricultural and NR research has many of the features of a pure public good, simplistic and ideology-based policy approaches to the public-goods nature of this research are not particularly fruitful. Borrowing from widely used concepts in institutional economics, some SFI policy "solutions" involve transforming agricultural research from a public to a private good. Such policy frameworks will not create appropriate incentives for AR/NRM institutions to maintain research and technology transfer services for small farmers. Thus, over time, the public-goods component of research will diminish.

A more empirical view of agricultural research as a public good recognizes that we must identify how research responds to public needs—especially the needs of those who may not be otherwise represented in policy discussions. In other words, AR/NRM sustainable financing depends upon elaborating a policy framework that is informed by both a theoretical and empirical view of public goods. Such a combined approach would be sufficiently flexible to identify opportunities for privatization while guarding a concern for the distribution of benefits/costs and the ability of users to pay.

The debate over the need for legislation to protect intellectual property rights (IPR) as the basis for attracting private investment in biotechnology plant research illustrates another dimension of this oversimplified thinking about private and public goods. While IPR legislation is important to encourage certain types of private investment in agricultural research, assuming that such investments can substitute for, or help to diversify, public-funded research adopts a narrow, product-oriented approach to AR. Such a view overlooks the training provided through public research (and education) and the need for public funds to train and educate scientists. It is commonly overlooked that the current role of private industry in biotechnology grew from those trained through public and joint public-private relationships.

The policy issue areas affecting SFI are complex and interlocking. As Figure 1 illustrates, broad categories of policies influence SFI, both in terms of what is possible and of the incentives for change. Important connections are found between finance and budget policy—the most obvious category affecting SFI—and the research institution experimenting with alternative financing arrangements. Connections exist as well among the various policy areas that influence the implementation of SFI. A clear example emerging from SFI experience involves the way finance and budget policies are affected by public management policies concerning public procedures and personnel. National civil service regulations do not accommodate the professional careers of research scientists; for example, promotions are usually based on seniority, with little recognition of performance. Similarly, it is well known that decentralization creates challenging and often novel opportunities for research administrators and programs such as the SFI to bring research closer to clients.

National science and technology policy influences many important research decisions that are directly related to SFI. Some illustrative instances include a) national research priorities that encourage national scientists to be involved in regional and commodity-based networks instead of national programs; b) partnership between regional or international research programs and national activities, including the promotion of professional scientific exchanges and the development of

long-term scientific relationships among scientists; and c) professional training and education.

Economic and trade policy decisions also directly influence many SFI options, including the range and type of rural services (input supply, marketing, food processing, etc.) that are needed by farm families and rural entrepreneurs. Economic and trade policies determine the opportunities for international investments in agricultural research and technology development, as well as the incentives to create new business partnerships among national actors (farmers, processors, transporters, researchers, etc.). They affect the chances of promoting new and innovative commercial processing activities that can increase the demand for specific research products. Finally, they influence the private and public sectors' capacity for a range of farm and market activities, as well as farmers' ability to invest in improved agricultural activity.

5.4 SFI OPERATIONAL LESSONS

The SFI toolkit has proven to be useful. SFI TA shares a number of common elements across the various interventions to date, starting with the development of an SFI workplan in close collaboration with the SFI partner. These workplans have had a strategic management focus, targeting stakeholder analysis, an examination of institutional strengths and weaknesses, and an identification of opportunities and constraints in the institutional environment (including a focus on policy). Most SFI partners have expressed at one time or another the view that this strategic approach, along with its toolkit, are useful, while sometimes also expressing frustration at the slow pace of progress, policy obstacles, and the lack of funds forthcoming for their institutions.

Coordination among SFI donors is important. One key operational lesson has to do with cooperation and coordination among donors providing assistance to particular AR/NRM institutions, both national and regional. SFI has experienced a few glitches in this area. For example, the focus of the fourth CSIR TA team was to have been on system development for cost accounting, but upon arrival in Ghana the team learned that a computerized accounting system, supported by the World Bank, was due to be installed in early 1998. Another example comes from SFI experience with ARC/DRSS in Zimbabwe, where there have been some gaps in communication between the SFI management team and the World Bank staff in charge of developing the Agricultural Services and Management Project (ASMP). Since most SFI efforts involve more than a single donor, the effectiveness of the intervention is enhanced to the extent that donor activities are in synch with each other.

An underlying question involves the extent to which donor agencies are prepared to provide the long-term support that the transition to sustainable financing requires. This question has been asked about donor commitment for over 20 years, but takes on added significance when it is realized that SFI is not simply an end but involves a capacity for continued change and adaptation. As many observers have noted, donor agencies need to assure that their policies designed in the name of SFI do not perpetuate the problems created by an outpouring of foreign assistance.

SFI is experiencing increased demand for services from AR/NRM institutions. SFI has increasingly been asked for help with various aspects of sustainable financing. The lesson here is that the success achieved to date has generated further demand. However, the USAID resources allocated to TA and analytic support are limited. Thus an important operational issue is how to decide which institutions should receive SFI assistance, and what kind of targeted and strategic assistance can have the highest leverage and impact on moving institutions down the SFI road.

6. The Next Generation of SFIs

This section offers some preliminary programmatic ideas for consideration in developing the next generation of SFI initiatives. Following a brief presentation of two broad issues or underlying assumptions for a next generation, the programmatic ideas are organized in four categories that are derived from our analytic framework: mechanisms, institutional considerations, partnerships and policy considerations.

These next steps are proposed in order to generate a discussion that will contribute to a reconsideration or elaboration of these and additional proposals. Our thoughts for the next generation of SFI also build on Byerlee's exploration of new models for agricultural research systems and on Bathrick's discussion of a new paradigm for agricultural and rural development (Bathrick, 1998; Byerlee, 1998). There is no perfect approach to sustainable financing. We will learn by doing and by accepting a new level of risk-taking in implementation.

6.1 UNDERLYING ISSUES

Up to now, SFI and other, related initiatives around the world have evolved within a changing global context. At least two interrelated issues have been central to this evolution. These issues are not unique to SFI, but they raise special challenges in thinking about its future.

One issue concerns international donor assistance. A major impetus behind SFI has been the decline in donor assistance for African AR/NRM institutions, and the need to achieve demonstrable impacts from assistance provided. For over 20 years, there has been a debate over the effectiveness of long-term institution- and capacity-building assistance. An equally long period of time has been spent in trying to assess the impact of agricultural research through a variety of economic analyses (e.g., see Pee, 1977). The benefit of hindsight, however, has exposed the positive effects of, and necessity for, continued investments in the human capital and institution-building efforts that were started during the Green Revolution era. In today's world, open-ended donor commitments to this type of assistance have all but disappeared. Yet SFI activities around the world have repeatedly shown that various continued investments in human resource and organizational capacity are indispensible. The next generation of SFI needs to consider ways to meet this challenge.

A second issue confronting SFI is of more recent origin, arising from the twin forces of democratization and globalization that have emerged anew over the last decade. While the boundaries of this issue are still being defined, it involves ways of using SFI initiatives to assure the broadest access to global advances in knowledge about agricultural R&D strategies that serve local needs. We only dimly perceive the implications of new international trade agreements for national agricultural research. In contrast to many current initiatives, addressing this issue requires donor agencies and government policymakers to review R&D needs in a more global (non-national) context and to ask which local interests are served by addressing these needs. As discussed earlier, SFI has invested in several regional activities. Many of these could be expanded.

Together, these two issues offer people concerned with SFI a basis for responding to the relatively recent calls to think more creatively and pluralistically about ways to support and promote agricultural research and development in sub-Saharan Africa. The challenge lies in this question: how can we fashion support for specific research agencies and institutions from a systems perspective—one that places these organizations within the interrelated spheres of national, regional and global scientific and technology development?

6.2 NEW MECHANISMS FOR AR/NRM FUNDING

SFI field activities have focused more on the institutional preconditions for installing new financial mechanisms than on the mechanisms themselves. The next generation of SFI is poised to focus more on the mechanisms. Most countries have some commercial (export-oriented) agriculture that might support some type of competitive grant or checkoff system. As SFI helps to introduce these systems, research leaders and scientists can be asked to consider how the use and design of such systems can help respond to the needs and interests of smallholder producers as well as assure a measure of natural resource management.

For those sectors and countries that do not offer a viable commercial base (non–export oriented, with low levels of capitalization), SFI initiatives will be pursuing new and unique objectives. Historically, agricultural research agencies around the world have not responded successfully to farmers and producers who are not highly capitalized. Under these conditions, regional approaches to SFI might help to advance national-level agricultural R&D.

SFI's activities in support of experimenting with new mechanisms need to focus on the mix of mechanisms that will lead to sustainable financing. An overemphasis on any one mechanism could exaggerate already existing differences between research programs with different levels of funding. Instead, the next generation of SFI will look at multiple mechanisms as well as the interplay among them and the various types of research and technology-transfer goals that each AR/NRM system is trying to achieve. This calls for ongoing attention to the mix of mechanisms that will go on providing public goods (e.g., smallholder-relevant research) as well as private goods (e.g., contract research for large commercial farmers or others with significant levels of capitalization).

Program Elements:

1. Two types of surveys should be undertaken. The first survey should seek to compile a relatively comprehensive inventory of experiences to date with sustainable financing. Anecdotal evidence suggests that several ongoing experiences that do not go under the name of sustainable financing might have much to offer those who are designing SFI activities. A second survey should focus on selected countries with commodity sub-sectors that might support the development of a checkoff system to fund agricultural research. The outline of such a survey should include an economic and marketing analysis; a policy-organizational analysis of commodity or farmer organizations; and an economic-fiscal policy analysis. Specific follow-up actions might include the preparation of policy and operational guidelines to implement a checkoff system, as well as organizational development support to commodity/farm groups in order to enable them to play a role in and/or manage a checkoff system.

2. Countries with relatively strong commercial agriculture against which a cess could be assessed should develop competitive grant programs to encourage the incorporation of natural resource management and environmental concerns into more standard commodity research programs. Depending upon the country, such a program could be administered by a range of institutions, from a special office within a ministry of science and technology (or agriculture) to some type of joint university–research agency technical committee.

3. Modeled after the global research programs, SFI might help to develop a regional competitive application program for a regional research network to begin addressing specific problems or issues that could not be supported by national producers or pursued by individual national institutes.

4. SFI could begin to work with national institutes in order to design strategies for soliciting corporate foundations to invest in support of research activities and/or infrastructure needed to deal directly with issues confronting smallholders with little capital.

5. Within donor agencies, SFI should stimulate both greater information sharing across departments and cross-sector program initiatives—e.g., between economic growth and democratization and governance—that might be designed to bring research closer and make it more accountable to stakeholders who might not otherwise be able to influence research program policy-making.

6. SFI could act as a catalyst for the establishment of regionally based endowment funds.

6.3 EFFICIENCY AND EFFECTIVENESS OF AR/NRM INSTITUTIONS

Addressing management issues has proven to be one of the most difficult tasks confronting most SFIs. Whether SFI takes a more national or a more regional approach in promoting agricultural science and technology, experience reinforces how crucial efficient and effective management is to sustainable research and technology transfer systems. Without it, AR/NRM institutions cannot a) produce valued research outputs; b) attract national support and resources; c) attract international donor confidence and funding; d) tap into global scientific resources; and e) assure accountability to stakeholders and the broadest distribution of benefits in research.

SFI assistance to AR/NRM institutions will need to continue and even expand in the future. Creative ways to leverage SFI assistance must be explored; this puts a premium on continued donor collaboration and coordination (e.g., between USAID and the World Bank's Agricultural Sector Investment Programs).

Program Elements:

1. Financial management systems will require continuing attention, as they are essential to making all types of financial mechanisms work. Periodic, short-term consultancy missions may be the most effective means to develop a local, sustainable capacity for dealing with financial management issues.

2. It is not just public-sector AR/NRM institutions that need to be efficient and effective. The various partner organizations need such capacity as well. This will be a new area for SFI attention that will emphasize inter-institutional linkages.

3. Through regional competitive funding programs or renewed attention to global scientific research programs, SFI might be able to stimulate the setting up of more long-term mechanisms to promote scientific exchange and professional development among research scientists.

Participation of New Partners

One of the biggest challenges confronting the next generation of SFI arises from the need to begin thinking about agricultural R&D as part of a much wider process of the development of science and technology. In a global era, researchers find partners beyond national boundaries and profit from closer links with research groups across continents. Now more than ever, SFI can advance agricultural science and technology by encouraging efforts to draw upon the scientific capacity of multiple governmental and nongovernmental organizations. NARSs need to reach out to and tap the expertise that resides in the private sector, in NGOs, in universities, and in producers' associations. National agricultural R&D systems of the future should be defined by a variety of interrelated national, regional and global resources.

Program Elements:

1. SFI should explore ways to encourage and join the research capacity within universities and agricultural training institutions with that currently found in many national research institutes. As in the United States, private foundations are often especially interested in supporting the establishment of new and innovative university-based initiatives.

2. Some type of university-research agency collaboration may also be the way to explore new research areas, such as food safety and human nutrition, that would, in turn, open possibilities for new types of funding.

3. Similarly, it might be useful to revisit how NGOs (including environmental groups) and commodity or producer groups can play a more effective advisory and implementation role in AR.

4. As with the first generation, the next generation of SFI activities needs to pay attention to innovative and cost-effective ways of involving partners and stakeholders in critical operational aspects of the R&D system (for example, priority-setting) so as to build ownership, understanding and commitment.

6.4 POLICY DEVELOPMENT

The policy dimension is equally essential to the next generation of SFI. As the first generation of SFI experience has shown, new mechanisms and restructured institutions need integrated policy frameworks. Such frameworks supply appropriate incentives and reduce the impediments to experimenting with new forms of financing and delivering AR/NRM services.

More broadly, sustainable financing for research and technology will depend upon policy frameworks that ease access to regional and global trade, increase the competitiveness of agricultural exports, and promote agribusiness development/investment and value-added processing. In other words, the policy orientation for agricultural research needs to incorporate "non-traditional" areas such as investment banking policies, intellectual property rights and international trade agreements. This means more integration with economic and fiscal policy as well, including exchange rates, tax rates, and interest rates. It also means more recognition of the links between AR/NRM and policies relating to food security and nutrition.

Program Elements:

1. It may be time for SFI to catalyze another look at senior government officials' commitment to science and technology R&D throughout sub-Saharan Africa. High-level policy decisions will be needed to address research concerns that range from intellectual property rights to the requirements for participating in global scientific linkages and being able to access global advances in knowledge.

2. Based on several discussions of the multiple policy dimensions that affect SFI and agricultural research, as well as a widespread appreciation that policymakers tend to overlook or undervalue agricultural research, it is time to take the next step beyond Abidjan with a participatory, multi-policy analysis of agricultural research in selected countries. With the involvement of selected policymakers, such a cross-ministerial survey might accomplish two important objectives. First, it might identify and clarify specific policy areas in which SFI could develop new initiatives. Second, it might help educate some policymakers about the contribution of AR to agricultural and rural development. Development of new indicators and methodologies to assess impact could be part of such efforts.

3. SFI could consider sponsoring some type of policy training for agricultural research leaders and managers to assist them in dealing with policymakers and other stakeholders. Related to this type of training, SFI might want to examine cases in which policy analysis has been successfully introduced into a national agricultural research system.

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