AGRICULTURAL POLICY ANALYSIS PROJECT, PHASE III

Sponsored by the

U.S. Agency for International Development

Assisting USAID Bureaus, Missions and Developing Country Governments
to Improve Food & Agricultural Policies and Make Markets Work Better

Prime Contractor	**Abt Associates Inc**
Subcontractors	**Development Alternatives Inc**
	Food Research Institute, Stanford University
	Harvard Institute for International Development, Harvard University
	International Science and Technology Institute
	Purdue University
	Training Resources Group
Affiliates	**Associates for International Resources and Development**
	International Food Policy Research Institute
	University of Arizona

Project Office 4800 Montgomery Lane, Suite 600, Bethesda, MD 20814 Telephone (301) 913 0500
Fax (301) 652 3839 Internet apap3@abtassoc com USAID Contract No LAG 4201 C 00-3052-00

A

AGRICULTURAL RESEARCH IN AFRICA AND THE SUSTAINABLE FINANCING INITIATIVE REVIEW, LESSONS, AND PROPOSED NEXT STEPS

January 1999

APAP III
Research Report
No 1072

Prepared for

Agricultural Policy Analysis Project, Phase III, (APAP III)

USAID Contract No LAG-C-00-93-00052-00

Authors R James Bingen
Derick W Brinkerhoff

ℓ

AGRICULTURAL RESEARCH IN AFRICA AND THE SUSTAINABLE FINANCING INITIATIVE REVIEW, LESSONS, AND PROPOSED NEXT STEPS

R James Bingen
and
Derick W Brinkerhoff

January 1999

Report prepared for

The Sustainable Financing Initiative (SFI)

U S Agency for International Development
Bureau for Africa
Office of Sustainable Development
and
World Bank
Special Program for African Agricultural Research

Abt Associates Inc
4800 Montgomery Lane, Suite 600
Bethesda, MD 20814

TABLE OF CONTENTS

I	**INTRODUCTION**	1
	A Background	1
	B Organization of the Paper	2
II	**REVIEW FRAMEWORK**	4
	A Thinking About the Challenges to Agricultural Research	4
	B An Analytic Review Framework for SFI	5
III	**OVERVIEW OF SFI ACTIVITIES**	8
	A Progress with SFI Field Support Activities and Results Achieved	8
	B SFI Analytic and Conceptual Work	15
IV	**OVERVIEW OF OTHER EXPERIENCES**	18
	A Policy and Organizational Considerations	18
	B Resource Mobilization and Policy Issues	23
	C Financial Mechanisms for the Mobilization of Resources	24
	D Financial Mechanisms for the Allocation of Resources	29
V	**LESSONS FOR FINANCIAL SUSTAINABILITY**	33
	A Financial Mechanisms Lessons	33
	B Organizational Lessons	36
	C SFI Policy Issue Lessons	38
	D SFI Operational Lessons	39
VI	**THE NEXT GENERATION OF SFI**	41
	A Underlying Issues	41
	B New Mechanisms for AR/NRM Funding	42
	C Efficiency and Effectiveness of AR/NRM Institutions	43
	D Policy Development	45
REFERENCES		46

I INTRODUCTION

A Background

Over the past twenty-five years, African agricultural research and natural resources management (AR/NRM) institutions 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 starting in the late 1980s began to cut funding for research institutions At the same time the public flow of resources to research became increasingly unreliable (Pardey, Roseboom, & 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 agricultural research 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 technology development and transfer remain critical to their economic development

The development of African agricultural science and technology, and especially the viability of African agricultural research/natural resource management (AR/NRM) institutions, continues to be heavily influenced as well by other global forces The globalization of financial markets, with an emphasis on export trade and competitive advantage, and the search for new products and new market opportunities, makes research and technology transfer all the more important for Africa's development Participation in the global economy for agriculture/natural resource-dependent Africa 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 manner 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 information-sharing of SFI experience among current and prospective SFI partners and international donors The U S Agency for International Development (USAID), Bureau for Africa, Office of Sustainable Development, Productive Sector Growth and Environment Division (AFR/SD/PSGE) has taken the lead on the first and third activities The Division works jointly with the Special Program for African Agricultural

Research (SPAAR), housed at the World Bank, on the second and fourth activities For contractor support for SFI, AFR/SD initiated a buy-in to the 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 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) The workshop reviewed experience from other parts of the world with innovative financing mechanisms, and 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, the Network for Environment and Sustainable Development in Africa (NESDA) in Abidjan, and Ghana's Council for Scientific and Industrial Research (CSIR) in Accra Subsequently two additional institutions were included for SFI assistance ASARECA (Association for Strengthening Agricultural Research in Eastern and Central Africa) in Entebbe, and the Agricultural Research Council (ARC) and the Department of Research and Specialist Services (DRSS) in Harare Some assistance was also provided to the Madagascar Environmental Endowment Fund, Tany Meva 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 (SAARNet)

B Organization of the Paper

In the few years since 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 looking 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 at a selected sample of this experimentation and related activities and trends in innovative financing mechanisms for agricultural research in other parts of the world, and draws lessons relevant for SFI Second, it focuses retrospectively, taking stock of SFI technical assistance and analytic support activities, and summarizes the lessons from the SFI experience base Third, the paper looks forward, and provides 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, and of what is required to make these mechanisms operational, and, 2) 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, Section I, the paper is organized into six sections Section II outlines an analytic framework for reviewing the experiences, accomplishments and issues raised to date in the implementation of the SFI Using this framework, Sections III and IV focus on USAID-funded SFI activities and on other experiences with financing mechanisms Section V summarizes lessons learned from both SFI and broader experience, and Section VI seeks to identify possible next steps for the next generation of the SFI analytic and technical assistance program

II REVIEW FRAMEWORK

A 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 is "in crisis " Program funding levels per researcher are 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 agricultural research, and public personnel policies are ill-suited to the development of a sustainable cadre of national research scientists (Toure, 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 agricultural research 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 generated by UNESCO's science policy assistance program for establishing and promoting 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 sources of domestic political support for agricultural research (Byerlee, 1998)

Nevertheless, both foreign assistance agencies and African governments continue to be committed to finding more effective ways to assure the development and availability of improved agricultural technology that helps to promote economic growth and sustainable development As the Abidjan Interministerial Conference concluded, it is important to elaborate and implement "the necessary policy instruments to support effective agricultural research and technology systems" (Interministerial Summit, 1998) In contrast to the past, however, when research policy might have focused largely on the means to encourage the continuous flow of technological innovations from agricultural research through extension, this generation of policy instruments must confront at least four more sophisticated challenges to agricultural research (Byerlee & Alex, 1998b)

First, the liberalization of trade that has accompanied a new era of globalization reinforces the need 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 more efficient input use without jeopardizing the resource base Activities to achieve these objectives are more knowledge and skill intensive Consequently, agricultural research will need to develop the capacity to move away from a top-down relationship with producers in order to provide more specific and tailored technical information that responds to the various needs of different producers

Third, agricultural research must find ways to increase productivity in areas that have benefited little from past investments, including attention to improving the availability and use of knowledge and practices that enhance the quality of natural resources Fourth and finally, research must be in a position to deal with, and take advantage of new biotechnologies as well as new information technologies This involves much more than having the capacity to undertake 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 research create opportunities for international private sector collaboration with national entrepreneurs to invest in a range of agricultural technology development schemes (Pray & Umali-Deininger, 1998) In other words, an increasing number of African governments now have potential opportunities to attract both public and private capital to promote agricultural research and technology transfer

B An Analytic Review Framework for SFI

It has become increasingly clear that responding to these challenges is much more than a question of increasing and stabilizing financial resource flows to AR/NRM institutions The diversification of funding sources for agricultural and NRM research implied by the challenges involves policy questions far beyond the agriculture sector, and a broad range of institutional considerations regarding the various actors participating in AR/NRM far beyond the public sector Capacity issues loom large in thinking about the use of various financial mechanisms to facilitate improved functioning within individual institutions, foster competition and demand-driven performance, and improve complementary efforts among the different institutional actors The interconnected nature of these considerations requires shifting from the macro- to the micro-level and back For example, policy decisions to generate new sources of revenue through the marketing of research-related services must be accompanied by the appropriate organizational structures and personnel qualified to assure and provide these services Similarly, proposals to pursue joint research ventures with international private investors require government policies that provide the necessary incentives and investment protection to attract foreign capital investment

To gain fresh insights and perspectives on sustainable financing for agricultural and NRM research, this paper uses an analytic framework that situates the mechanisms for increasing the sustainability of financing within the overlapping organizational and policy environments that influence the selection, use, viability, and effectiveness of these mechanisms These three categories of variables (SFI mechanisms, organizational components, policy issue areas) can be thought of as nested systems, each of which sits within a larger system (see Figure 1) This perspective, depicted as three concentric circles, facilitates thinking 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 inter-related nature of decision-making related to 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

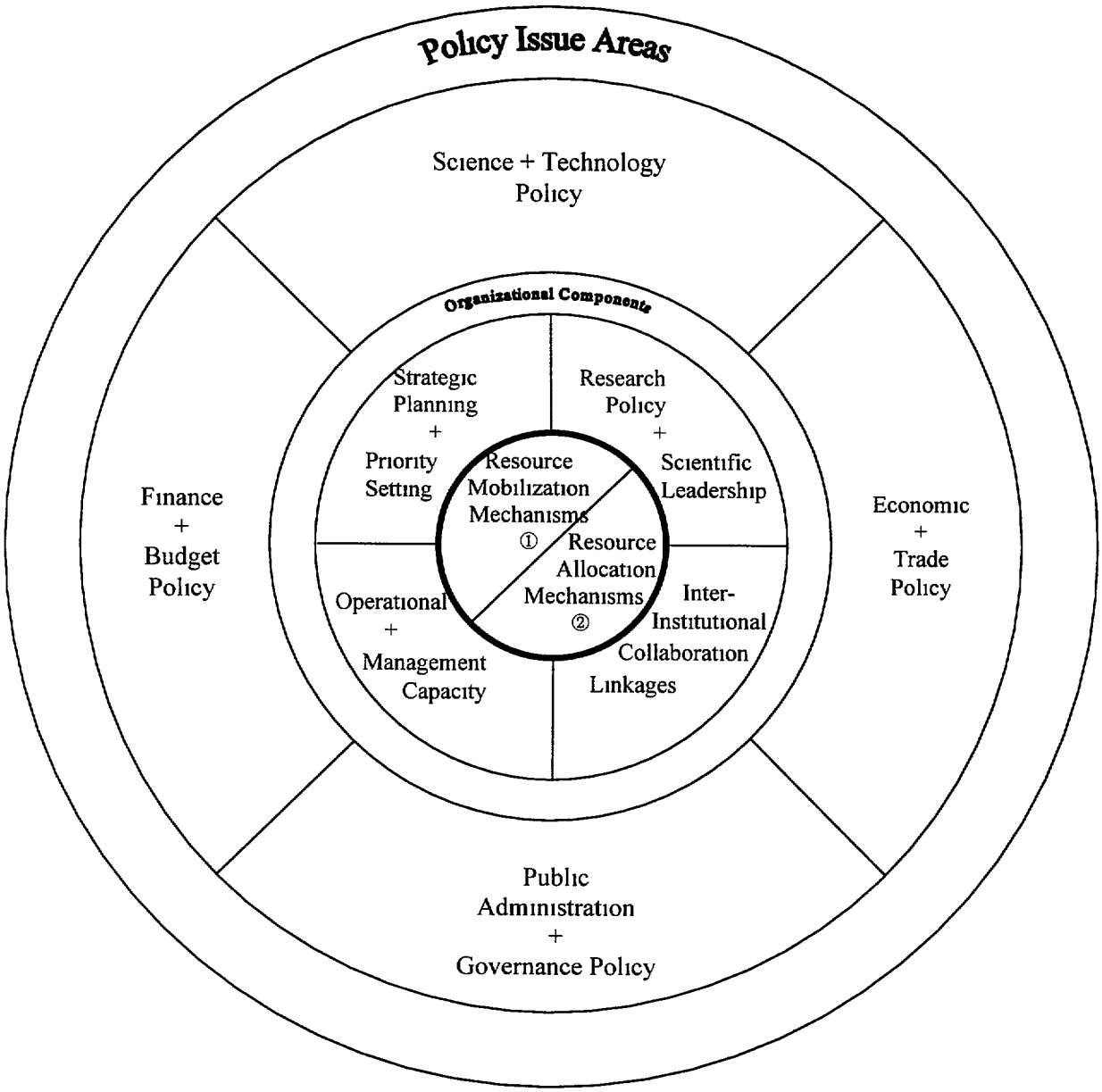
financial resources, the most commonly used mechanisms reviewed in this paper are commercial activities, user services, research contracts, levies, checkoffs or cesses, corporate joint ventures, and endowments For the allocation of financial resources, the principal mechanisms reviewed in this paper include 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 the organizational setting within which financing options are designed and implemented Experience suggests that it is useful to divide this setting into four component categories strategic planning and priority setting, operational and management capacity, research policy and scientific leadership, and inter-institutional collaboration and linkages These types of organizational components will influence the effective implementation of SFI financial mechanisms selected by an AR/NRM institution Various SFI mechanisms, in turn, can be designed in order to strengthen various organizational components of an AR/NRM institution

The third circle contains the policy issue areas that influence the effectiveness of, and possibilities for implementing selected financial mechanisms, 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, economic and trade, and public administration and governance

The preliminary elaboration of this framework, as presented above, draws from our interpretation of SFI experiences to date as well as a broad range of discussions concerning financing for AR/NRM institutions and for the successful diffusion of agricultural technology (e g , Noor, 1996) The framework is based on the assumption that examining the interplay among the policy issue areas, the various options for financial resource mobilization and allocation, and the organizational components helps to sharpen thinking about the issues of concern for policy makers, donor agencies and research leaders related to sustainable financing For example, decisions concerning the use of one or more financing options can be informed by exploring the "degree of fit" among policies, financing options and organizational components

Figure 1 Sustainable Financing Analytic Framework



① **Resource Mobilization**
- Commercial Activities
- User Services
- Research Contracts
- Levies
- Checkoffs
- Corporate & Joint Ventures
- Endowments -- Research Funds

② **Resource Allocation**
- Block Grants/Formula Funding
- Competitive Grants Systems
- Regional Networks & Funds

III 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

A 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, and for the two 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 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 informed 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 assisted staff in institutions in transition to maintain confidence and motivation while confronting reform tasks

1 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 tasks 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 to the SADC Council of Ministers in August, 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 of a large number 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, and made recommendations regarding revising SACCAR's materials, targeting products more closely to stakeholder audiences, and increasing the efficiency of mailings and materials distribution

Subsequent to the March workshop, discussions among SACCAR, the SACCAR Board, the donors, SADC members, and the Government of Botswana (GOB) intensified regarding the future of SACCAR, spurred by the confluence of several factors the impending termination of the USAID institutional 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 and 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, stakeholder deliberations led to a decision to reconstitute SACCAR as a regional sector coordinating unit 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 regarding 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 a sector coordinating unit within a GOB administrative framework, 2) broadening and building a new SACCAR coalition, 3) strategic planning and program development, 4) 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, and conducted 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 organization's 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 the definition of problems and issues was conducted collaboratively and 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

2 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, and prepared a revised SFI workplan plus some recommendations on the direction of NESDA's strategic vision for the organization, and 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 support to facilitate a four-day strategic planning workshop for NESDA staff, board members, and donors in October 1998 Sustainable financing retains an important spot 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 for strategic planning helped NESDA to begin to plan for the future with an ongoing emphasis on financial sustainability It is too early to look for concrete results

3 Council for Scientific and Industrial Research-Ghana

The SFI TA objectives developed with CSIR included a) to build effective partnerships with private sector agricultural producers, NGOs, or other government entities to commercialize CSIR research products and services, b) to develop mechanisms and tools that support and promote

innovative collaboration with partners, and c) to seek out and enter 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 to discuss human resource issues, the skills required for effective commercialization, CSIR 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) assist 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 and the CSIR Secretariat and its BDU The team, along with the CSIR Executive Director, visited the USAID mission to discuss progress with SFI and explore the possibility of mission support for CSIR staff training from an existing AID 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 modification in CSIR's commercialization manual and advised the CSIR Secretariat on BDU-Secretariat relations and linkages 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 Transitioning 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

4 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 NARSs and 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 with the Executive Secretary issues relating to ASARECA's future plans and sustainability, 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 technical assistance 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 taskforce 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, and produced a draft plan by the end of June The team along with key ASARECA stakeholders convened in Nairobi in July for a vetting and discussion of the strategic plan

At the July 1997 stakeholders meeting to review the strategic plan, 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 agricultural research, 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 NARSs 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 a plan for operationalizing 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, and in October 1998 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 ECA 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 contributed to increasing ASARECA's capacity and reputation as an entity with the ability to manage for results both programmatically and financially

5 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 significant decline in financial resources and in services, a drop in staff morale, and greatly reduced impact of the department Turning these problems around constitutes the core of DRSS's institutional 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 requested support from SFI to assist in the 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 in support of the planned reforms The outcome of this visit led to further discussions between the SFI management team and the head of the ARC regarding the fit between the ARC's and DRSS's, particularly the latter's, reform objectives and SFI's In the meantime the Zimbabwe government and the World Bank began preparation for the Agricultural Services and Management Project (ASMP), intended to assist ARC and DRSS to implement their reengineering reforms In June 1997, another SFI visit to Harare was scheduled to work with ARC and DRSS to more fully develop an 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

6 Southern Africa Regional Agricultural Commodity Research Networks

Research partnerships among international donors, the international agricultural research centers, and national agricultural research systems 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 ICRISAT's Matopos Research Station, 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 IITA and CIP 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

B 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

1 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 status of the policy development activities undertaken with support from USAID's KEPEM (Knowledge and Effective Policies for Environmental Management) Project and Non-Project Assistance, one of which involved the creation of an environmental endowment fund, known as Tany Meva Tany Meva is managed by a Malagasy foundation and provides a mechanism for sustainable financing for environmental and natural resources management (E/NR) activities The endowment fund seeks to facilitate innovative partnerships among government, local 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 Strategic Objective No 3

2 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 national agricultural research systems 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 TA and provides milestones for tracking and monitoring progress with SFI assistance efforts with individual institutions

3 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

4 Competitive Grants 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 grants 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 agricultural research allocated via competitive grants There has been considerable interest in the paper by others looking at possibilities for competitive grants systems in other parts of Africa, as well as beyond the continent

IV OVERVIEW OF OTHER EXPERIENCES

Using the analytic framework presented in Section II, 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, illustrated in Figure 1, helps to sharpen our thinking about sustainable financing, and to generate 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, this section reviews specific issues related to resource mobilization Parts C and D survey experiences with, and issues raised by selected resource mobilization and resource allocation mechanisms designed to promote sustainable agricultural and NRM research

A Policy and Organizational Considerations

There is broad agreement that for agricultural research, an understanding of policy constraints should inform decisions on research planning and institutional reforms (Byerlee & Alex, 1998) Research leaders and managers are quite aware of the importance of finding the fit between their agricultural research programs and different ministerial level policies In addition to executing research, "building and maintaining links with policy makers" 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 agricultural research to development (Terry, 1998a) Despite such widespread agreement, 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 (Bingen & Crawford, 1989)

Attention to national policy and policy-makers and the ability of research leaders and scientists to articulate how agricultural research contributes to national development goals is clearly an important step toward assuring some level of funding for agricultural research 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 policy-makers may be the critical first step toward "shifting accountability from donors" and moving toward "consistent domestic funding of research" (Badiane & Dione, 1998) Clearly, research leaders across sub-Saharan Africa must take the initiative to build domestic political support for agricultural research (Rukuni, Blackie, & Eicher, 1998)

The ability to work across multiple policy arenas is a commonly overlooked, but essential policy skill for research leaders 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, but commonly neglected,

element in forging improved research-extension relationships to assure that the results of research activities can be more readily attributed to investments in agricultural research (ISNAR, 1998, Kaimowitz, 1990) Similarly, as research leaders explore new types of public-private sector research 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 also suggest that successful research leaders must be able to operate in the international policy arena (Brenner & 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 Each 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

1 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 many 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 policy-makers 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, & Houssou, 1997)

More often than not, however, the implementation of the plans arising from priority-setting exercises has faltered from lack of attention to various policy and critical organizational issues, including research scientist salary scales, conditions of service, and the lack of research operating funds In addition, it has proven difficult to formalize research priority-setting processes in several industrialized countries Instead, in several countries, 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, & 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 science and technology policy, international marketing and export policy, as well as national administrative and governance policy that influence the design and implementation of sustainable financing mechanisms

2 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 national policies concerning governance There is no blueprint for restructuring AR/NRM institutions in order to implement sustainable financing activities Each is at 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 & 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 & 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 As a result, and second, 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 improve agricultural research (Buringuriza, 1996) As found in the Federal Research Centers in Germany, employment relationships for scientists vary from unlimited assignment to long-term employment contracts and fixed-term collaboration contracts for special research projects Instead of seeking to apply neoclassical economic principles to agricultural research, 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 the establishment of 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, especially from Asia, however, 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) acts as a consultative body to coordinate agricultural research and formulate annual budget proposals, but it has been unable to influence national research budget or to coordinate agricultural research 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 a 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 means for linking 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 research institute performance (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 create constraints on change (Alston et al , 1998)

Little information is available concerning the relationship between these various models and responsiveness of agricultural research to new technological demands and priorities Nevertheless, the pressure to make agricultural research 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 agricultural research and participation in research planning

To achieve a greater measure of client orientation, 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 alliances directly 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 they are frequently only reluctantly accepted by farmers (Collion, 1994) Consequently, many government-sponsored farmers' organizations fail to mobilize effective demand and commonly 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, investments in social capital to create a vocal, educated public are required

Once a locally adapted or internally-driven, decentralized and more participatory model is designed, as Zimbabwe appears to have done (Rukuni et al , 1998), then research leaders and policymakers need to distinguish between the payoffs to the research agenda and those to the design of 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 design more cost-effective responses to the site-specific nature of resource use, management and conservation (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 & Ranjitha, 1998, Schweikhardt, 1989)

B Resource Mobilization and Policy Issues

Funding mechanisms to mobilize resources for agricultural research vary widely depending upon the geographic focus and commodity orientation of research (Alston & Pardey, 1998, Echeverria, 1998a) Resource mobilization is also strongly influenced by national policy decisions in several sectors In addition, the organizational setting will significantly influence the success of resource mobilization strategies and mechanisms 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 policy-makers 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 & 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 & Alex, 1998)
- Administrative costs, and what extra resources would be required to manage new resources
- Research flexibility, that is, whether alternative mechanisms increase options for responding to needs beyond treasury-based block funding (Janssen et al , 1997 146, also see Terry, E , 1998)

Experience suggests that a separate series of considerations are useful for the mobilization of 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 the a) activities, technologies and resources might be of interest to the private sector, b) market for these activities, c) institutional mechanisms for linking public and private resources, and d) costs and potential problems of obtaining private funding Thinking about the mobilization of private sector resources involves consideration of policy and organizational issues 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 & Umali-Deininger, 1998 225)

C Financial Mechanisms for the Mobilization of 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 and with 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 & Alex, 1998) In the drive to recover costs and maintain infrastructure, AR/NRM institutions may be motivated to sacrifice long-term basic research functions in the search for short-term financing

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 with respect to cost recovery In Kenya, government approval of cost recovery has allowed KARI to raise revenues through sale of seeds and other products as well as levy 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 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 the ability of AR/NRM institutions to offer viable commercial services depends upon a functioning infrastructure and scientific capacity (Idachaba, 1998)

Research leaders also confront another set of related organizational and policy issues Multiple organizational options to implement commercial activities exist 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 Ghana's CSIR has set up business development units for each of its institutes as well as a Secretariat-level BDU The successful operation of such units requires management capacities and skills different from those required for successful scientific research (Pardey, Alston, Roseboom, & 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 Consequently, efforts to achieve more sustainable financing may jeopardize institutional sustainability, not to mention provoke 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 Throughout most of West and Central Africa where cotton is a major export commodity and source of foreign exchange earnings, for example, 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, & Dembele, 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, and also served a means for opening up the export market to more small-scale producers Moreover the contract has facilitated training opportunities for both KARI and ODC researchers and led to the 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, as a means to address organizational issues such as research incentives CORPOICA, the Colombian parastatal research agency, for example, not only has the freedom to do contract research, but research staff on tenured employment arrangements must obtain part of their funding from contracts (Nestel & McMahon, 1998)

Checkoffs/Cesses Checkoff or cess systems are widely used to fund commodity-specific research when a commodity is commercially important and when market structure facilitates the collection of the stipulated checkoff or cess Under these conditions, checkoffs can be relatively efficient and fair mechanisms for achieving specific science and technology goals with respect to specified commodities (Alston & Pardey, 1998) Checkoffs, however, may not be the most appropriate mechanism for mobilizing resources to pursue 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 research and development 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 Columbia, 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 & 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 case, 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, & 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 national agricultural research systems remains problematic Neither Australia nor New Zealand have achieved full integration of their universities into the national research and extension systems, just as relations between extension and research remain limited in Germany (Basler, 1998, Byerlee & Alex, 1998, Henzell, Crawley, Johnson, & 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 agricultural research with international firms Experience to date indicates that a variety of policy conditions influence investments by private capital in agricultural research 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 agricultural research (Pray & 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 & McMahon, 1998) They also identify several examples where private sector research is expanding, e g , 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 Breweries established their own barley research center, and since 1978 the KB has funded all barley research Yields have more than doubled At same time, the KB's 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 & 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 & 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, natural resource management and environmental protection In addition, research managers confront a serious organizational dilemma to the extent that a government is successful in attracting private capital investment in agricultural research, these investments will likely drain scientists from national institutes Consequently, 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 more than 24 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 for 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 operate (Pardey et al , 1998a) Other organizational considerations 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 of organizational concerns, including the management capacity to handle the funds, to assure accountability, and to 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 agricultural research However, it may be that positive experience with competitive grants systems could lead to more openness in considering endowments for agricultural research 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

D Financial Mechanisms for the Allocation of Resources

This section briefly reviews three types of mechanisms for allocating financial resources These mechanisms are discussed separately from the mechanisms for resource mobilization primarily to highlight some of the differences between these types of mechanisms In reality, research leaders and policy-makers commonly consider mechanisms for the mobilization and allocation of resources together Moreover, many resource mobilization mechanisms, such as research contracts and check-off 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 the aggregate funding levels, and the uncertainties of timely allocation, of block grants 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 agricultural research, 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, one of key concerns with block grants stems from governmental finance and budget policy and procedures Simply, national budgetary policy and allocation procedures are not necessarily consistent with research program needs for access to reliable resources on a timely basis 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 & 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 allocations to AR/NRM institutions Regional and local jurisdictions can also be components of this funding mechanism For example in the U S 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, in the absence of federal government support tied to matched state support, the nature of agricultural research and development at the state level would probably be much more narrowly focused (Pardey, Roseboom, & 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 U S , 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 facilitates forward planning between federal and state systems (Clarke, 1998) This system is also the means for optimizing research investments (Schweikhardt, 1989)

The implication for developing countries is that formula funding as a mechanism 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 agricultural research are becoming widely used in developing countries, especially in Latin America When backed by significant external support or by an endowment, national policy-makers and donors see these mechanisms as effective tools to achieve a range of policy-level objectives that range from priority setting and fostering inter-institutional collaboration to lowering research costs (see for example, Henzell et al , 1998, Nestel & McMahon, 1998) However, as Echeverria points out, the circumstances under which the use of competitive funding is most appropriate, its complementarity with more traditional institutional funding mechanisms, and the development of 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 & Alex, 1998 24, see also AGRTN, 1995, Anderson, 1998) At the managerial level, however, 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 & 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 agricultural research system and to establish strategic alliances in 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 to respond to 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 policy makers throughout sub-Saharan Africa At the Abidjan Interministerial Conference in early 1998, the African Development Bank suggested that a regional fund could be one means for promoting agricultural research as "a regional or sub-regional task, serving the priority interest of groups of countries and not single states" (Badiane & Dione, 1998 11) Similar arguments have been made with respect to agricultural research 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 offer a means for addressing important human capital development concerns and for tapping 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 agricultural research, accelerating applied research at the national level by supplying public goods-types 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 agricultural research 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 (Frison et al , n d , see also 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 & 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

V LESSONS FOR FINANCIAL SUSTAINABILITY

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 IV 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, this section 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, institutional innovation that involves financial, organizational and policy reforms Individual AR/NRM institutions cannot travel this road alone, nor is the path clearly marked

A Financial Mechanisms 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 successful implementation Specifically, the transition to sustainable financing depends upon a core management capacity for several activities, including program management, budgeting/accounting, and human resources development 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, the establishment of 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 resource mobilization and allocation will depend upon the ability of research leaders 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, and benefits of research in terms that various policy-makers 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) 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 research and technology transfer goods and services, they need to draw upon several different types of mechanisms for resource mobilization and allocation The

mix of mechanisms may evolve over time, but research managers must be able to fashion mobilization and allocation mechanisms according to a range of criteria, including the geographic focus, the commodity orientation, and the 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 remuneration 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

1 Mobilization of Resources

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

In part, 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 The first involves the implications of services and contracts on the diversion of scarce scientific research personnel The second involves 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 budgetary reductions some institutions have sought to pursue the quickest and easiest targets Often this means leasing 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 research, technology transfer, and dissemination objectives 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 with respect to 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 responding to non-commercial producers or to non-commercial environmental and natural resources 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 They not useful for pursuing research on multiple commodities or agro-environmental issues, or for basic research

2 Resource Allocation

Government block funding is critical to a viable national agricultural and NR research system Despite the widely recognized decline in national budgetary allocations for AR/NRM and the criticism that block funding as an allocation mechanism has encouraged non-responsive and non-performing research systems, there remains an important place for continued block funding Public funding for core research capacity needs to be made available, this is necessary for maintaining key scientific and support personnel, research and technology transfer infrastructure and recurrent operating costs, as well as strategic research decision-making Block funding 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 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 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 an 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

B 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 to allocate financial resources Without attention to the organizational components presented in Figure 1, no AR/NRM institution can aspire to sustainability Commonly identified strengths include basic operational and management capacity, the ability to plan strategically and to take a proactive stance for linkages and inter-institutional collaboration, and 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 In summary, AR/NRM institutions need a well-rounded set of strengths in order both to mobilize and to allocate financial resources, along with 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 issues (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 constraining 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, and ongoing effort on the part of 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 often underestimate the need to mold organizational reforms to specific circumstances Organizational change often appears easy and straightforward Such an approach, however, commonly overlooks the multiple and overlapping influences and constraints

on AR/NRM institutions that Figure 1 illustrates Despite the need for adapting reforms to each situation, a crosscutting feature of organizational change is the need for increased organizational autonomy and flexibility to deal more effectively with a multiplicity of influences and constraints

Organizational change for SFI takes time If past experience with efforts to change agricultural research helps to inform current practice, then it is going to take more than a change in donor priorities to bring about long-term and sustainable changes in the research funding A phased approach and a clearly articulated strategy that recognizes the relationship between short- and long-term financial sustainability will be an important part of a transition process 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 by scientists, research managers and policy-makers 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 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 Each country must have the capacity at both policy and management levels to articulate the contribution of a regional approach

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, thus they can allocate and use existing financial resources more efficiently 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, and more focus on the management capacities of those partners

C 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 BDUs, 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 for SACCAR, policy decisions by the Botswana government and SADC have had a clear impact on prompting the Center to confront sustainability and financing issues head-on This lesson suggests that a policy component should be considered as integral to SFI reform efforts

Simplistic policy frameworks for AR/NRM lead to poor policy decisions Agricultural and NR research has many of the features of a pure public good, however, simplistic and ideology-based policy approaches to dealing with the public goods nature of agricultural research are not particularly fruitful 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

Discussions of sustainable financing mechanisms need to distinguish clearly between the theoretical notions of agricultural research as a public good and a more empirically-based understanding Borrowing from widely used concepts in institutional economics, some of the SFI policy "solutions" involve the transformation of agricultural research from a public to a private good A more empirical view of agricultural research as a public good recognizes the need to identify how research responds to public needs and especially to 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-approach to agricultural research 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 impact of public management policies concerning public procedures and personnel on finance and budget policies National civil service regulations do not accommodate to the professional careers of research scientists Similarly, it is well known that decentralization creates challenging and often new 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 agribusiness investments in agricultural research and technology development as well as the incentives for the creation of new business partnerships among national actors (farmers, processing industry, transport, research, etc) They affect the possibilities for promoting new and innovative commercial processing enterprises and activities that can increase the demand for specific research products Finally, they influence both the capacity of private and public sector in a range of agriculture market and rural activities as well as the possibilities for farmers to invest in improved agricultural technology

D SFI Operational Lessons

The SFI toolkit has proven to be useful SFI technical assistance shares a number of common elements across the various interventions to date, starting with the development of an SFI work plan in close collaboration with the SFI partner These work plans have had a strategic management focus, and have targeted 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-country 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, where there have been some gaps in communication between the SFI management team and the Bank staff in charge of developing 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 for long-term of sustainable financing This question has been asked about donor agency 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 technical assistance and analytic support are limited Thus an important operational issue is how to make decisions regarding 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 "

VI THE NEXT GENERATION OF SFI

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 to 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

A Underlying Issues

SFI experience to date and other, related initiatives around the world that deal with sustainable financing 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 for thinking about the future of the Initiative

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 Moreover, 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 human resources capability and institution-building 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 one of the repeated findings that arise from SFI activities around the world concerns the need not to overlook various investments in continued human resource and organizational capacity building The next generation of SFI needs to consider ways to meet this challenge

A second issue confronting SFI is of more recent origin and involves understanding the implications and consequences of 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 the ways in which SFI initiatives can be used to assure the broadest access to global advances in knowledge for agricultural research and development strategies that serve local needs We only dimly perceive the implications of new international trade agreements on national agricultural research In contrast to many current initiatives, addressing this issue requires donor agencies and government policy-makers to review research and development 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 those concerned with SFI a basis for responding to relatively recent calls to think more creatively and pluralistically about ways in which to support and promote agricultural research and development in sub-Saharan Africa The challenge lies in how to fashion support for specific research agencies and institutions from a systems perspective that places these organizations within the interrelated spheres of national, regional and global scientific and technology development

B 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 the introduction of 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 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 between research programs that have access to 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 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

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 of commodity sub-sectors that might support the development of a checkoff system to fund agricultural research should be undertaken in selected countries 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 actions might include the preparation of policy and operational guidelines to implement a checkoff system, organizational development support to commodity/farm groups in order to enable them to play a role in and/or manage a checkoff system

2 In countries with relatively strong commercial agriculture against which a cess could be assessed, competitive grant programs to encourage the incorporation of natural resource management and environmental concerns into more standard commodity research programs should be developed 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 financial investments from corporate foundations in support of research activities and/or infrastructure needed to deal directly with issues confronting smallholders with low levels of capitalization

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 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

C Efficiency and Effectiveness of AR/NRM Institutions

Addressing management issues has proven to be one of the most difficult tasks confronting most SFI initiatives Whether SFI takes a more national or a more regional approach in promoting agricultural science and technology, experience to date reinforces the centrality of efficient and effective management to sustainable research and technology transfer systems Without efficient and effective management, 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 activities SFI assistance to AR/NRM institutions needs to continue and even to expand in the future Creative ways to leverage the levels of SFI assistance available will need to be explored, this puts a premium on continued donor collaboration and coordination, for example, between USAID and World Bank 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 operational 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 mechanisms or renewed attention to global scientific research programs, SFI might be able to catalyze the development of more institutionalized 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 research as part of a larger process of the development of science and technology In a global era, research partners are found beyond national boundaries and should include closer links with research groups across continents This change in perspective is a key factor in realizing that SFI can advance agricultural science and technology by encouraging efforts to draw upon the scientific capacity from multiple governmental and non-governmental organizations NARSs need to reach out to, and tap the scientific capacity 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 inter-related national, regional and global resources

Program Elements

1 SFI should explore ways in which the research capacity within universities and agricultural training institutions might be encouraged and joined with that currently held in many national research institutes As in the U S , 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 agricultural research

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, building ownership, understanding, and commitment

D 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 that 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 facilitate 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 among AR/NRM and policies relating to food security and nutrition

Program Elements

1 It may be timely for SFI to catalyze another look at the commitment to science and technology R&D throughout sub-Saharan Africa High-level policy decisions will be needed to address 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 under-appreciate 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 policy makers, 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 policy makers concerning the contribution of agricultural research to agricultural and rural development Indicators development and impact assessment methodologies 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 policy-makers 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

REFERENCES

1 APAP/SFI Research Reports

Adoum, C M 1997 CSIR'S Human Resource Skill Base, Market Knowledge, and Commercialization Systems for Institutionalizing the Sustainable Finance Initiative Report No 1015

Armor, T 1997 CSIR Commercialization Strategy Progress with Start-Up of Business Development Units in CSIR Agriculture Sector Institutes Report No 1026

Brinkerhoff, D W 1998 Proposed Action Plan for ASARECA's Competitive Grant System Components, Issues, and Options Report No 1036

Brinkerhoff, D W 1998 Reorganizing SACCAR as a Sector Coordinating Unit Institutional Options, Issues, and Recommendations Report No 1051

Ellsworth, L 1998 Good Practice in Competitive Grant-Making Application to ASARECA-Affiliated Networks Report No 1037

Ellsworth, L 1997 The Road to Financial Sustainability How Managers, Government, and Donors in Africa Can Create a Legacy of Viable Public and Non-profit Organizations Report No 1030, (Also published in USAID's Bureau for Africa, Office of Sustainable Development, SD Publication Series, Technical Paper No 85)

Gage, J D 1996 The Sustainable Financing of SACCAR Understanding the Costs and Implications Report No 1019

Gilbert, F E and Mooney, T J 1996 Towards a Three Year Operational Framework for the Association for Strengthening Agricultural Research In Eastern and Central Africa (ASARECA) Report No 1020

Griffis, G 1997 CSIR Commercialization Pricing, Job Estimating and Job Accounting Report No 1034

Hauffe, N 1996 The Sustainable Financing Initiative (SFI) of CSIR Ghana Survey of Clients/Customers/Partners Report No 1018

Mahone, S 1997 Assessment and Recommendations for SACCAR's Information Unit Report No 1023

Rusike, J and Mano, R 1998 Feasibility of Commercializing Services Produced by the Department of Research and Specialist Services, Zimbabwe Draft, November

2 Other SFI Reports and Publications

Brinkerhoff, D W 1996 Policy Development Supported by USAID's KEPEM Program (Knowledge and Effective Policies for Environmental Management) Review, Assessment, and Recommended Future Directions Report Prepared for U S Agency for International Development/Madagascar, Natural Resources Office, Antananarivo, Madagascar, December

Brinkerhoff, D W 1997 Funding Agricultural Research in Africa Implications of the Experience of the Sustainable Financing Initiative for NGOs Background Paper for the European Centre for Development Policy Management, Anniversary Seminar "Alternatives to Cooperation Sustainable Finance as an End to Development," May 12-13, Maastricht, The Netherlands (Published in Dutch as "Financiering van Landbouwonderzoek in Afrika Het Initiatief voor Duurzame Financiering en NGOs " *Derde Wereld*, Vol 16, No 3, pp 280-290, 1997)

3 Other Sources

AGRTN (1995) Competitive Research Grant Systems *Agriculture Technology Notes*

Alston J M , & Pardey, P G (1998) Principles for Public Investment in Agricultural and Natural Resources Research In G J Persley (Ed), *Investment Strategies for Agriculture and Natural Resources Investing in Knowledge for Development* (pp 221-248) Wallingford, Oxon, UK CAB International

Alston, J M , Pardey, P G , & Smith, V H (1998) Financing Agricultural R&D in Rich Countries What's Happening and Why *The Australian Journal of Agricultural and Resource Economics, 42*(1), 51-82

Anderson, J R (1998) Selected Policy Issues in International Agricultural Research On Striving for International Public Goods in an Era of Donor Fatigue *World Development, 26*(6), 1149-1162

Badiane, O , & Dione, J (1998) *Contribution Towards Sustainable Financing of Agricultural Research in Africa* Paper presented at the Interministerial Meeting on Sustainable Financing of African Agricultural Research in West and Central Africa, Abidjan, Côte d'Ivoire

Basler, A (1998) Germany In G J Persley (Ed), *Investment Strategies for Agriculture and Natural Resources Investing in Knowledge for Development* (pp 39-64) Wallingford, Oxon, UK CAB International

Bathrick, D D (1998) *Fostering Global Well-Being A New Paradigm to Revitalize Agricultural and Rural Development* (Discussion Paper 26) Washington, D C IFPRI

Beattie, A (1998) The United Kingdom In G J Persley (Ed), *Investment Strategies for Agriculture and Natural Resources Investing in Knowledge for Development* (pp 3-22) Wallingford, Oxon, UK CAB International

Beynon, J (1996) Financing of Agricultural Research and Extension for Smallholder Farmers in Sub-Saharan Africa *ODI Natural Resource Perspectives*(15)

Beynon, J , Akroyd, S , Duncan, A , & Jones, S (1998) *Financing the Future Options for Agricultural Research and Extension in Sub-Saharan Africa* Oxford Oxford Policy Management

Bingen, R J , Carney, D , & Dembele, E (1995) *The Malian Union of Cotton and Food Crop Producers The Current and Potential Role in Technology Development and Transfer* London ODI Research and Extension Network

Bingen, R J , & Crawford, E W (Eds) (1989) *La Politique Agricole au Senegal* Dakar ISRA

Brenner, C , & Serpa, J (1997) *Intellectual Property Rights and Technology Transfer in Developing Country Agriculture Rhetoric and Reality* (Technical Paper Not to be Quoted) Paris OECD Development Centre

Buringuriza, E (1996) *Sustainable Funding Initiative for the National Agricultural Research Organisation (NARO)* Entebbe, Uganda NARO

Busch, L , & Bingen, R J (1994) *Restructuring Agricultural Research Some Lessons from Experience* (Briefing Paper 13) The Hague ISNAR

Byerlee, D (1998) The Search for a New Paradigm for the Development of National Agricultural Research Systems *World Development, 26*(6), 1049-1055

Byerlee, D , & Alex, G E (1998) *Strengthening National Agricultural Research Systems Policy Issues and Good Practice* Washington, D C The World Bank

Carney, D (1998) *Changing Public and Private Roles in Agricultural Service Provision* London Overseas Development Institute

Clarke, N P (1998) The United States In G J Persley (Ed), *Investment Strategies for Agriculture and Natural Resources Investing in Knowledge for Development* (pp 67-86) Wallingford, Oxon, UK CAB International

Collion, M -H (1994) *Farmers and Researchers The Road to Partnership in Mali* (AFTES Working Paper 14) Washington, D C The World Bank

Dunn, E G (1997) *Basic Guide to Using Debt Conversions* (Technical Paper 44) Washington, D C USAID, Bureau for Africa, Office of Sustainable Development

Echeverria, R G (1998a) Agricultural Research Policy Issues in Latin America An Overview *World Development, 26*(6), 1103-111

Echeverria, R G (1998b) *Will Competitive Funding Improve Agricultural Research Performance?* (Discussion Paper 98-16) Washington, D C Inter-American Development Bank/ISNAR

Eicher, C K (1989) *Sustainable Institutions for African Agricultural Development* (Working Paper 19) The Hague ISNAR

Elliott, H (1998) Financing Agricultural Research Do Organization and Structure Make a Difference? In S R Tabor, W Janssen, & H Bruneau (Eds), *Financing Agricultural Research A Sourcebook* (pp 115-132) The Hague ISNAR

Ellsworth, L (1998) *The Road to Financial Sustainability How Managers, Government, and Donors in Africa Can Create a Legacy of Viable Public and Non-Profit Organizations* (Technical Paper 85) Washington, D C USAID, Bureau for Africa, Office of Sustainable Development

Eponou, T (1998) Financing Research through Regional Cooperation In S R Tabor, W Janssen, & H Bruneau (Eds), *Financing Agricultural Research A Sourcebook* (pp 247-264) The Hague ISNAR

Global Environment Facility (1999) *GEF Evaluation of Experience with Conservation Trust Funds* Washington, D C World Bank, GEF Council, January

Gilles, J L (1997) *Checkoffs New Approaches to Funding Research, Development and Conservation Programs* (Technical Paper 53) Washington, D C USAID, Bureau for Africa, Office of Sustainable Development

Henzell E F , Crawley, M C , Johnson, R W M , & Wallis, E S (1998) Australia and New Zealand In G J Persley (Ed), *Investment Strategies for Agriculture and Natural Resources Investing in Knowledge for Development* (pp 133-152) Wallingford, Oxon, UK CAB International

Hertford, R (1998) *FONTAGRO's Potential Cooperation with U S Research Organizations* (Special Report 1) Washington, D C FONTAGRO/Inter-American Development Bank

Hobbs, H , Indarte, E , & Lanfranco, B (1998) *The Agricultural Technology Development Fund for Contract Research An INIA (Uruguay) Initiative* (Briefing Paper 40) The Hague ISNAR

Idachaba, F S (1998) *Instability of National Agricultural Research Systems in Sub-Saharan Africa Lessons from Nigeria* (Research Report 13) The Hague ISNAR

Interagency Planning Group on Environmental Funds (1995) *Environmental Funds The First Five Years Issues to Address in Designing and Supporting Green Funds* (A Preliminary Analysis for the OECD/DAC Working Party on Development Assistance and Environment) Paris OECD

Inter-American Development Bank (1996) *The Regional Fund for Agricultural Technology* Washington, D C The Inter-American Development Bank

ISNAR (1998) *1997 Annual Report* (Annual Report) The Hague International Service for National Agricultural Research

Janssen, W (1998) Alternative Funding Mechanisms How Changes in the Public Sector Affect Agricultural Research In S R Tabor, W Janssen, & H Bruneau (Eds), *Financing Agricultural Research A Sourcebook* (pp 137-160) The Hague ISNAR

Janssen, W , Perrault, P , & Houssou, M (1997) *Developing an Integrated Agricultural Research Policy Experiences from Benin* (Briefing Paper 33) The Hague ISNAR

Kaimowitz, D (Ed) (1990) *Making the Link Agricultural Research and Technology Transfer in Developing Countries* Boulder, Colorado Westview Press

Kalaitzandonakes, N G (1997) *Commercialization of Research and Technology* (Technical Paper 43) Washington D C USAID, Bureau for Africa, Office of Sustainable Development

Lowi, T J (1964) American Business, Public Policy, Case Studies and Political Theory *World Politics, 16*, 677-715

Mentz, D (1998) Asia In G J Persley (Ed), *Investment Strategies for Agriculture and Natural Resources Investing in Knowledge for Development* (pp 153-184) Wallingford, Oxon, UK CAB International

Mruthyunjaya, & Ranjitha, P (1998) The Indian Agricultural Research System Structure, Current Policy Issues, and Future Orientation *World Development, 26*(6), 1089-1101

Nestel, B , & McMahon, M (1998) Latin America and the Caribbean In G J Persley (Ed), *Investment Strategies for Agriculture and Natural Resources Investing in Knowledge for Development* (pp 87-116) Wallingford, Oxon, UK CAB International

Noor, M A (1996) Successful Diffusion of Improved Cash Crop Technologies In S A Breth (Ed), *Achieving Greater Impact From Research Investments in Africa* (pp 55-66) Mexico City Sasakawa Africa Association

Pardey, P G , Alston, J M , Roseboom, J , & Wyatt, T J (1998a) *Financing African Agricultural R&D Strategic Policy Issues and Options* (Review Draft) Washington, D C IFPRI

Pardey, P G , Roseboom, J , & Beintema, N M (1997) Investments in African Agricultural Research *World Development, 25*(3), 409-423

Pardey, P G , Roseboom, J , & Fan, S (1998b) Trends in Financing Asian and Australian Agricultural Research In S R Tabor, W Janssen, & H Bruneau (Eds), *Financing Agricultural Research A Sourcebook* (pp 341-355) The Hague ISNAR

Pee, T Y (1977) *Social Returns from Rubber Research in Peninsular Malaysia* Unpublished Dissertation, Michigan State University, East Lansing, MI

Pray, C E , & Umali-Deininger, D (1998) The Private Sector in Agricultural Research Systems Will It Fill the Gap? *World Development, 26*(6), 1127-1148

Roseboom, J , & Rutten, H (1998) The Transformation of the Dutch Agricultural Research System An Unfinished Agenda *World Development 26*(6), 1113-1126

Rosenberg, C E (1976) *No Other Gods On Science and American Social Thought* Baltimore The Johns Hopkins University Press

Rukuni, M , Blackie, M J , & Eicher, C K (1998) Crafting Smallholder-Driven Agricultural Research Systems in Southern Africa *World Development 26*(6), 1073-1087

Schweikhardt, D B (1989) *Financing Agricultural Research in a Federal System of Government Optimal Cost-Sharing for State and National Investments* Unpublished Dissertation, Michigan State University, East Lansing, MI

Tabor, S R (1998a) Recurrent-Operating Cost Policies for Agricultural Research In S R Tabor, W Janssen, & H Bruneau (Eds), *Financing Agricultural Research A Sourcebook* (pp 47-64) The Hague ISNAR

Tabor, S R (1998b) Towards an Appropriate Level of Agricultural Research Finance In S R Tabor, W Janssen, & H Bruneau (Eds), *Financing Agricultural Research A Sourcebook* (pp 3-28) The Hague ISNAR

Terry, E (1998, April 2-3) *Interministerial Summit (IMS) Policy Brief* Paper presented at the Interministerial Meeting on Sustainable Financing of African Agricultural Research in West and Central Africa, Abidjan, Côte d'Ivoire

Terry, L D (1998) Administrative Leadership, Neo-Managerialism, and the Public Management Movement *Public Administration Review 58*(3 (May/June)), 194-200

USAID/AFR/SD/PSGE (1996) *Endowments in Africa A Discussion of Issues for Using Alternative Funding Mechanisms to Support Agricultural and Natural Resources Management Programs* (Technical Paper 24) Washington, D C USAID, Bureau for Africa, Office of Sustainable Development

West Africa Rural Foundation (1998) *WARF, Report of Activities 1996-97* (Annual Report) Dakar, Senegal WARF