ReSAKSS Working Paper No. 4

July 2008

Strategic Analysis and Knowledge Support Systems (SAKSS)

A Guidebook for Practitioners

Michael Johnson and Kathleen Flaherty

Regional Strategic Analysis and Knowledge Support System (ReSAKSS)

ReSAKSS Working Paper No. 4

July 2008

Strategic Analysis and Knowledge Support Systems (SAKSS)

A Guidebook for Practitioners

Michael Johnson and Kathleen Flaherty

About ReSAKSS

The Regional Strategic Analysis and Knowledge Support System (ReSAKSS) is an Africa-wide network of regional nodes supporting the Common Market of Eastern and Southern Africa (COMESA), the Economic Community of West African States (ECOWAS), and the Southern African Development Community (SADC), in collaboration with the International Food Policy Research Institute (IFPRI) and the Africa-based centers of the Consultative Group on International Agricultural Research (CGIAR) to facilitate the implementation of the AU/NEPAD's Comprehensive Africa Agriculture Development Programme (CAADP).

The ReSAKSS nodes offer high-quality analyses to improve policymaking, track progress, document success, and derive lessons for the implementation of the CAADP agenda. ReSAKSS is jointly funded by the United States Agency for International Development (USAID), the UK Department for International Development (DFID), and the Swedish International Development Cooperation Agency (SIDA). The nodes are implemented by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the International Institute of Tropical Agriculture (IITA), the International Livestock Research Institute (ILRI), and the International Water Management Institute (IWMI), in collaboration with regional and national partners.

About the Working Paper series

The goal of the ReSAKSS Working Paper series is to provide timely access to preliminary research and data analysis results that relate directly to strengthening ongoing discussions and critical commentaries on the future direction of African agriculture and rural development. The series undergoes a standard peer-review process involving one reviewer either from within the ReSAKSS network of partners or from an external organization. It is expected that most of the working papers eventually will be published in some other form and that their content may be revised further.

For more information, contact:
Coordinator
Regional Strategic Analysis and Knowledge Support System
c/o International Food Policy Research Institute
2033 K Street, NW
Washington, DC 20006-1002
Telephone: +1 202 862 5667
Facsimile: +1 202 467 4439
E-mail: resakss-africa@cgiar.org
www.resakss.org

The authors

The authors are researchers in the Development Strategies and Governance Division of the International Food Policy Research Institute (IFPRI).

Acknowledgements

The authors acknowledge the helpful comments of a number of reviewers during the preparation of this guidebook. The contribution of many other researchers within and outside of IFPRI during the initial inception and later refinement of the SAKSS concept is well noted. In particular, the early thinking of Peter Hazell (while still serving as a Division Director at IFPRI), Jeff Hill (USAID, Bureau for Africa), and Stanley Wood (IFPRI), shaped many of the ideas inherent in this concept for Africa. The authors are indebted to them. In later years, Shenggen Fan (IFPRI) and the entire Development Strategy and Governance Division at IFPRI helped refine the concept as it moved from concept to application in many of the Division's country support programs. The assistance and earlier writings of Danielle Resnick, and later those of Tsitsi Makombe, were also very helpful.

Johnson, M. and Flaherty, K. 2008. *Strategic Analysis and Knowledge Support Systems: A Guidebook for Practitioners. ReSAKSS* Working Paper No. 4. International Food Policy Research Institute (IFPRI).

Except where otherwise noted, this work is licensed under a Creative Commons Attribution 3.0 License.

Table of Contents

List of Figures and Tables

Acronyms

AGORA	Access to Global Online Research in Agriculture
AKIS	Agricultural Knowledge and Information System
APSF	Agricultural Policy Support Facility (Nigeria)
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AU	African Union
CAADP	Comprehensive Africa Agriculture Development Program
CGE	Computable General Equilibrium
CGIAR	Consultative Group on International Agricultural Research
CIDA	Canadian International Development Agency
COMESA	Common Market of East and Southern Africa
CORAF/WECARD	West and Central African Council for Agricultural Research and Development
CSSP	Country Strategy Support Program
DFID	Department for International Development (UK)
DREAM	Dynamic Research EvaluAtion for Management
DSG	Development Strategy and Governance
ECOWAS	Economic Community of West African States
EDRI	Ethiopian Development Research Institute
EMM	Economywide Multimarket
ESSP	Ethiopia Strategy Support Program
FAO	Food and Agriculture Organization
FMAWR	Federal Ministry of Agriculture and Water Resources
GIS	Geographic Information Systems
GSSP	Ghana Strategy Support Program
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICT	Information and Communication Technology
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IMPACT	International Model for Policy Analysis of Agricultural Commodities and Trade
IPAR	Institute of Policy Analysis and Research (Rwanda)
ISNAR	International Service for National Agricultural Research
IWMI	International Water Management Institute
M&E	monitoring and evaluation
MDGs	Millennium Development Goals
MoFA	Ministry of Food and Agriculture
MoFEP	Ministry of Finance and Economic Planning
NAC	National Advisory Committee
NARS	National Agricultural Research System
NEPAD	New Partnership for Africa's Development
NSSP	Nigeria Strategy Support Program
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PMA	Plan for the Modernization of Agriculture (PMA)
PRSP	Poverty Reduction Strategy Paper
R&D	research and development

RECs	Regional Economic Communities
REKSS	Rural Economy Knowledge Support System
ReSAKSS	Regional Strategic Analysis and Knowledge Support System
SADC	Southern African Development Community
SAKSS	Strategic Analysis and Knowledge Support System
SAM	Social Accounting Matrix
SCRIP	Strategic Criteria for Rural Investments in Productivity
SIDA	Swedish Agency for International Development Cooperation
SNV	Netherlands Development Organization
USAID	United States Agency for International Development
USSP	Uganda Strategy Support Program
WFP	World Food Program (UN)
WSM	Water Simulation Model

Preface: A Brief History of SAKSS

Originally, a Strategic Analysis and Knowledge Support System (SAKSS) was defined as a system that provides timely, credible, and evidence-based knowledge and analysis to inform agricultural and rural development strategies. The SAKSS concept was conceived by researchers at the International Food Policy Research Institute (IFPRI) based on its many years of providing key data analysis, policy research, and capacity strengthening to governments and donors in Africa as they formulated and implemented their development strategies. We offer a brief history of its inception here.

Evolving out of a small IFPRI project in Uganda, the SAKSS concept was initially adopted in 2003 by the United States Agency for International Development (USAID) as a tool to support the design and implementation of the U.S. Presidential Initiative to End Hunger in Africa (IEHA). The SAKSS program helped USAID articulate its strategy and investment priorities within regional and select country programs. This program involved undertaking strategic analysis designed to fill knowledge gaps quickly, prioritize future investments, and provide guidance for monitoring and evaluation of impact (see Johnson et al. 2003). It did not take very long for the SAKSS concept and the results of analysis for IEHA to begin to generate interest among African governments and the broader development community. The launching of the ASARECA/IFPRI report (2004) played a key role, by illustrating how a logical series of analyses can contribute to the priority setting exercises of development strategy.[1] The report came out at a time when African governments were increasingly being challenged, especially by the Poverty Reduction Strategy Paper (PRSP) process, to show evidence of how their chosen strategies would lead to growth and poverty reduction.

The demands for greater evidence-based decisionmaking in Africa occurred during a period when IFPRI was also undergoing some structural changes of its own. In addition to the creation of a new research division on development strategies and governance, the institution moved towards greater decentralization with the setting up of country and regional program offices in Asia, Latin America, and Africa. Within Africa, the application of the SAKSS concept quickly proved to be a constructive framework for launching new IFPRI country programs—later referred to as Country Strategy Support Programs (CSSPs). The CSSPs in Ethiopia, Ghana, Uganda, and Nigeria have since expanded on the original SAKSS concept to include a broader range of analyses and knowledge systems approaches.

At the multi-country level, the SAKSS concept was also adopted as a framework to establish a regional information and knowledge support system for supporting the implementation of the Comprehensive Africa Agriculture Development Program (CAADP) of the African Union (AU) and the New Partnership for African Development (NEPAD). Referred to as Regional Strategic Analysis and Knowledge Support Systems (ReSAKSS), a node was set up in each of three African regional economic communities (Common Market of East and Southern Africa (COMESA), Southern African Development Community (SADC), and Economic Community of West African States (ECOWAS)) under the guidance and cooperation of IFPRI and four other African-based CGIAR centers (International Livestock Research Institute (ILRI), International Institute

[1] This report was later published as Omamo et al. 2006.

of Tropical Agriculture (IITA), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and International Water Management Institute (IWMI)).

Today, both the country and regional programs share the SAKSS principles of a) providing timely and credible analysis and data to policymakers and development practitioners to strengthen the evidence during deliberations about future investments and policies; b) promoting locally relevant research and analysis based on need; and c) working to strengthen local capacities for analysis and evidence-based dialogue. The country programs' priorities are guided by national advisory committees while ReSAKSS nodes are guided by steering committees headed by each of the major regional economic communities. The committees are designed to represent key stakeholders from the government, universities, private sector, policy think-tanks, and donors at both the country and regional level. On the supply side, the programs bring together a collaborative mix of local and international teams of researchers, practitioners, and institutions to promote the sharing of data, expertise, and tools.

As the demand for the establishment of a country SAKSS in many African countries continues to grow, especially in support of CAADP implementation, the need for IFPRI to prepare a guidebook on SAKSS has become critical. The target audience is initially the ReSAKSS nodes currently operating and tasked with setting up country SAKSS (whenever such demand exists) as part of their support to CAADP. However, the guidebook can also serve as a practical guide for any other non-governmental or governmental organization that wishes to set up similar systems.

The guidebook primarily builds on the experience of IFPRI and its country support programs which have been in operation for at least one to three years. It also builds on the experience of the regional programs which have been in full operation for a lesser period of time. Both sets of programs offer a real-world opportunity to test the application of the SAKSS concept, draw comparative lessons, and guide future efforts at establishing similar systems elsewhere in Africa and the developing world. Moreover, as it is being applied in different countries (and regions) and under a different set of initial conditions, a review of experiences to date will also help improve our understanding of how such systems can become more effective at linking the suppliers of knowledge, the knowledge itself, and the users of knowledge during the design and implementation of strategies.

Introduction

More than 1 billion people worldwide are living in extreme poverty—meaning they earn less than US$1 per day—and many suffer from hunger and malnutrition. In developing countries, about 25 percent of children under the age of five are malnourished. Encouragingly, many developing countries have committed to the Millennium Development Goals (MDGs) including halving poverty and hunger by 2015. In Sub-Saharan Africa, where the problem is particularly acute, policymakers have been called on to allocate more resources and design strategies to accelerate agricultural growth in order to meet the poverty and hunger MDG. Their efforts are reflected in the poverty reduction and agricultural and rural development strategies being formulated by individual countries, and in regional development initiatives such as the Comprehensive Africa Agriculture Development Program (CAADP) of the African Union (AU) and the New Partnership for African Development (NEPAD).

Challenges and lessons of development planning and implementation

The push for effective strategies to meet specific development goals has revived questions about the process of creating and implementing those strategies. Many past studies have documented the failure of planning for implementation (Brinkerhoff 1996; Crosby 1996; Killick 1976; Montjoy and O'Toole 1979; Wildavsky 1973). In particular, the inadequacies of central planning in the past have led to calls for strategy formulation that is evidence-based, decentralized, participatory, and accompanied by integrated monitoring and evaluation (M&E) systems, under the assumption that such mechanisms improve the implementation and outcome of a strategy. Strategies are now seen as "living" documents that allow adaptation to changing conditions in recognition of the non-linear and dynamic nature of the strategy design and implementation process. Many different variables can affect how well a strategy is implemented, including leadership, participation, prioritization, timing, and degree of organizational and process integration (Gijsbers et al. 2001). In addition to these factors, the availability of political, financial, and technical resources to implement the strategy must be taken into account during the strategy design process (Thomas and Grindle 1990).

The complexity of these new strategies necessitates the use of evidence to accurately assess the choices available to a government and the tradeoffs inherent in any choice they make. To supply this evidence, the country must have a solid foundation of analytical capacity throughout its planning agencies and academic institutions. In addition, governments need policymakers who have the motivation and ability to demand and use the information (Omamo 2004). Knowledge systems can help bridge the distance between supply and demand by establishing effective mechanisms by which both sides can be more closely tied as part of ongoing dialogue and decisionmaking processes. These mechanisms effectively link suppliers and users of knowledge through the creation and use of knowledge products.

Knowledge systems for informing strategy are lacking in many African countries. Data collection and analysis suffer from a shortage of attention and resources. Knowledge sharing is often minimal, with planning ministries operating in isolation, and uncoordinated ministries, research institutes, and statistical bureaus. Government

agencies, nongovernmental organizations (NGOs), and development partners carry out parallel and overlapping processes of information gathering. Often development partners have more input into the strategy process than the national civil society does. The M&E frameworks of many strategies rarely deal with issues of causality and attribution between investments, policy changes, and outcomes. Knowledge itself is not value-neutral, as it reflects the power structure, discourse, and narratives of the institutions in which it is created.

Recent studies on bridging research and policy highlight many of these gaps. One of the largest systematic evaluations of research-policy links in developing countries found that political context had the greatest effect on whether research influenced the policymaking process (Court and Young 2003). More open political systems and processes and strong demand from policymakers can increase the use of research, while opposing vested interests can limit its impact. Other important factors are the relevance and credibility of the research, the extent of external influences, and the type of knowledge systems in place to help link researchers and policymakers. These links, categorized as feedback, dialogue, and collaboration, are the basis for communication and involve perceptions of trust, legitimacy and participation. Networks and policy communities, both formal and informal, were found to improve such research and policy linkages. In particular, feedback loops among the stakeholders and throughout the design, implementation, and monitoring processes can help to identify problems and allow adjustments to be made if needed.

Many factors ultimately influence the direction and effectiveness of a strategy design and its successful implementation. A strategy must rely on the best scientific and local knowledge available. It must be tailored to local conditions and needs, but must also embrace the interests of a diverse group of stakeholders. It must remain flexible and dynamic so as to accommodate refinements in its design and objectives over time as socioeconomic and political conditions change. It is a complex and daunting task indeed.

The large capacity gap in Africa is especially challenging and exacerbates the already weak links between supply and demand of knowledge and information. For example, local universities rarely undertake research directly relevant to local decisionmaking needs. National institutions and agencies seldom have sufficient capacities and experience to provide the kinds of analysis and information needed to guide strategy formulation and implementation. The **Strategic Analysis and Knowledge Support System (SAKSS)** framework and concept has been developed in response to these serious capacity gaps typically found in many African countries.

Defining SAKSS

SAKSS is defined as a collaborative network that acts as a mechanism by which relevant evidence is generated and utilized to inform agricultural and rural development strategy formulation and implementation. SAKSS brings together two important concepts – *strategic analysis* and *knowledge support systems*.

Strategic analysis is an integrated framework of analysis that helps identify policy and investment options for achieving high-end development goals. This type of analysis can

guide a credible action plan of policy and investment priorities for the sectors that contribute to the achievement of desirable development outcomes (e.g. growth and poverty reduction). Such prioritization implies finding answers to a range of strategic questions such as: What is the role of agriculture in promoting overall economic growth and poverty reduction in the different stages of development given a country's natural resource endowments? How should public resources be mobilized and allocated among different sectors, sub-sectors, and regions? Answers to these questions can help arm policymakers with useful evidence on the kinds of tradeoffs and outcomes associated with their policy and investment choices.

The strategic analysis is carried out within the context of a *knowledge support system* which provides a dynamic network platform for serving the evidence needs of strategy formulation and implementation. This network includes individuals such as researchers, policymakers, and development practitioners and institutions such as government agencies, research institutes, development organizations, and private and civil society groups. These individuals and institutions are linked through collaborative strategic analysis, capacity strengthening, and dialogue. Through this network platform, information, data analysis, and knowledge can be compiled, synthesized and packaged into evidence that is supplied on a timely and reliable basis to be of use during strategy processes.

Goals of SAKSS

The overall goals of SAKSS are to:

> Create *networks* of institutions and individuals who supply and use data and information.
>
> Bring *strategic analysis* to bear on identifying key investments, institutional mechanisms, and policy options, as well as the implementation of selected options. This includes harmonizing and generating standardized information for development planning and M&E, to be available as *global public goods*.
>
> Develop effective *knowledge management systems* that build upon existing data and information, analytical tools, accumulated knowledge, and African and international analytical capacity, in order to inform and guide future agricultural and rural development strategies.
>
> Build and strengthen *national and regional capacities* for policy analysis, monitoring and evaluation, and strategy formulation, and in the process, bridge the research and policy divide.

The goals are intended to be broad and ambitious by design to allow sufficient flexibility of how programs that adopt such systems can evolve and adapt to local conditions while still maintaining their public goods nature. Therefore, how these hefty goals have been translated and adopted within each program on the ground, either as part of IFPRI's country support programs (CSSPs) or as part of the multi-country Regional Strategic Analysis and Knowledge Support System (ReSAKSS) effort, has differed depending on local demand, existing institutional linkages and capacities for data and analysis, and level of interest and funding within each country. For example, at the multi-country level,

the ReSAKSS nodes have initially focused much of their attention on mobilizing networks of individuals and organizations within each of their regions. Through these networks, the nodes are helping to fill critical knowledge gaps, as well as bringing together a stock of knowledge, expertise, and tools, as countries begin to shape and align their agricultural strategies within the CAADP framework. The networks are in turn helping to strengthen local capacities to produce and apply credible evidence during policy dialogues about shaping future development priorities.

Drawing lessons from application

At the country level, SAKSS programs associated with IFPRI's CSSPs have helped contribute to the increased awareness and confidence among African countries and their development partners of the important role of agriculture for growth and poverty reduction. This recognition is based on a range of SAKSS-type analyses that clearly show the significance of agriculture for achieving both growth and poverty reduction objectives (see, for example, Diao et al. 2007). Additionally, the work has helped draw attention to the need for expanding investments in rural roads, productivity improvements (especially for staple crops and livestock), and harmonization of trade, grades, and standards across borders (Johnson 2005).

The question of how much SAKSS programs have been able to effectively maximize the link between suppliers and users of information and knowledge at either the country or regional level is more difficult to discern without a more structured and qualitative assessment.[2] Some of the early lessons (reviewed in more detail in section 5) substantiate the evidence in the general literature on bridging the research and policy divide. The lessons provide a useful guide and benchmark upon which existing SAKSS programs can be evaluated and improved on in the future. These include:

> The SAKSS framework should be flexible enough to adapt to and take into account local conditions in terms of the stage of development, the social and political context, institutional capacity, and the structure of the economy, as well as the effectiveness of existing knowledge systems in linking research evidence with the decisionmaking environment;
>
> Evidence-based policy research is most successfully translated into policies when demand for policy information comes from the policymakers themselves. Policymakers pay more attention to policy research results when they are timely and credible, easily accessible, when they are jointly generated with their own staff, and when they are convinced that their interests have been acknowledged by the researchers;
>
> Implementation of policy advice is enhanced when attention is paid to continuous policy dialogue with key policymakers, executive government officials, and parliamentarians. This offers the best way to impact or influence specific policies

[2] Several researchers at IFPRI have launched a comparative and qualitative analysis of existing country and regional SAKSS programs in order to draw useful lessons and guide future efforts to improve the links between suppliers and users of information, and ultimately impact on policies and strategies. Details of the study can be shared upon request.

or decisions even though it is often difficult to systematically trace how people have used the information that was generated and disseminated;

Policy research and analysis capacity has to be built incrementally and sustainably, which means on-going support for key government policy agencies as well as encouragement of a think-tank culture for producing high quality, policy relevant research products;

The information and analysis generated, analyzed, and communicated must be perceived by the end-user (local practitioners, analysts, government, private sector, and farming community) as salient and relevant to local knowledge, expectations, and needs.

One important lesson derived from the experience of existing SAKSS programs and substantiated in the literature is the mechanism by which knowledge and information is generated and shared in order to effectively contribute to policy dialogue and decisionmaking. It must be a mechanism or process that is perceived as country-driven and country-owned. In other words, it is generally through locally derived mechanisms or processes that policy research and analysis has more effectively led to extensive policy dialogue, capacity building, and impact at the national level. It is not only the quality of analysis and research that matters, but the process by which it is generated and communicated.

Drawing lessons from the application of the SAKSS concept is a useful research activity in its own right. Using a "learning-by-doing" approach, different approaches and mechanisms in which information and knowledge is generated, analyzed and communicated can be tested with respect to how well they inform and impact on different decisionmaking processes and environments. After all, the design and implementation of development strategies is a process, not a static and one time effort. Moreover, such processes involve local political and socio-economic realities that will vary widely across countries and thus require different approaches in how analytical and scientific evidence can come to bear on strategy formulation and implementation. To summarize, we provide a definition of what SAKSS is and is not in Table 1.1 below.

Table 1.1 What SAKSS is and is not

	What it is	**What it is NOT**
Overall	A collaborative network that acts as a mechanism by which relevant evidence is generated and utilized to inform agricultural and rural development strategy formulation and implementation. It brings together two important concepts –strategic analysis and knowledge support systems.	A silver bullet and a "one-size-fits-all" approach to informing the design and implementation of development strategy
As a Strategic Analysis Approach	An integrated framework of analysis that helps identify policy and investment options for achieving high-end development goals. The analysis uses a combination of tools, approaches and synthesis in a flexible manner in order to consider diverse local circumstances and needs with respect to: capacity	A single integrated model, analytical framework, or a prepackaged and comprehensive tool box, for assessing investment and policy priorities for achieving

	for generating and using analytical evidence; extent of data availability; existing knowledge gaps; national goals; and timing of the strategy design and implementation process.	high-end development goals
As a Knowledge Support System	Provides a dynamic network platform for serving the evidence needs of strategy formulation and implementation. This network includes individuals such as researchers, policymakers, and development practitioners, and institutions such as government agencies, research institutes, development organizations, and private and civil society groups. Through this network platform, information, data analysis, and knowledge can be compiled, synthesized and packaged into evidence that is supplied on a timely and reliable basis to be of use during strategy processes. These individuals and institutions are linked through collaborative strategic analysis, capacity strengthening, and dialogue.	A top down development planning and monitoring and evaluation system to serve the interests of national governments and donors while promoting policy research and analysis as an end in itself
Contribution to Research	Provides an experimental and learning-by-doing environment for researchers interested in improving our understanding of how to make credible evidence and analysis come to bear during the process of designing and implementing development strategies, including the alternative approaches for strengthening these links under different circumstances.	A single "how to" manual on bringing research to bear on the development and implementation of development strategy

Purpose of the Guidebook

The purpose of this guide is primarily to present a useful and practical guideline on how the SAKSS concept can be applied elsewhere at the country level based on these experiences to date. The need for such a guidebook has come about due to a growing demand for the kinds of applications offered by the SAKSS as many more countries express their wish to establish similar knowledge support systems. This demand is occurring at a rapid pace in Sub-Saharan Africa as countries are challenged with staying committed to shared development goals (e.g. achieving the MDG and CAADP goals). The endorsement of the SAKSS concept by NEPAD, African governments, the donor group of eight (G8), and other development partners has also fueled the demand. The establishment of the ReSAKSS nodes is one of the responses to this growing demand, to help to facilitate and guide the establishment of country SAKSS as an integral part of the CAADP agenda.

The guidebook is therefore intended to serve:

Practitioners who are helping to set up country SAKSS nodes via the ReSAKSS nodes,

African government and development partners who wish to use SAKSS for their evidence needs, and

Policy analysts and researchers who wish to participate in such a network.

The guidebook has been organized around four principal areas. The first two sections review the SAKSS concept to provide a background definition of its objectives and underlying principles. The first section discusses the strategic analysis component which is intended to answer a logical and sequential set of questions that are typically asked during the process of formulating and implementing strategies. The corresponding methods and tools used to answer such questions are reviewed in more detail in the Appendix. The second section presents and discusses a broader framework for a knowledge support system that links producers and users of locally relevant data, information, and knowledge to inform and guide country and regional strategy. This system essentially combines the strategic analysis, other knowledge products, with various mechanisms to link them with the many actors on both the supply and demand side. The last two sections provide guidance on how to set up a country SAKSS program, drawing from the experience among existing programs. Finally, an appendix offers a series of economic tools useful for strategic analysis, including a terms of reference of a SAKSS program coordinator or manager, a communication strategy of a SAKSS program, and a glossary of the definition of terms.

The Strategic Analysis Concept[3]

In the context of SAKSS, *strategic analysis* is an integrated framework of analysis that helps identify investment and policy options for achieving high-end development goals. For most developing countries, the goals are economic growth and poverty reduction and targets might include a certain increase in average incomes or, as with CAADP, a 6 percent agricultural growth rate and 10 percent share of government spending in agriculture. The analysis is *strategic* so long as it is part of a broader framework to identify future development options for reaching these high-end development targets.

The framework consists of a series of logically sequenced questions that help guide the analysis and lead to the identification and implementation of key investment and policy options for achieving national goals and targets. The sequence and types of analysis are not fixed, however. Different local contexts may require a different set of analyses. SAKSS has been primarily developed for countries with a large agricultural sector. Therefore it focuses on options that target rural development and smallholder agriculture as a source of economic growth and poverty reduction.

In this chapter, we review some of the strategic level questions typically asked during the formulation and implementation of an agricultural and rural development strategy. Various economic tools and methodologies exist which can be used to analyze some of these questions further, with varying degrees of sophistication and known limitations. Which tools and approaches are used will not only depend on the question being asked but on many other important considerations such as: the availability of data and expertise, time to undertake the analysis, cost, access to analytical tools and economic models, and so forth. Appendix A summarizes these in more detail. Where there are already existing studies and sufficient evidence to draw from, new analysis may not be necessary.

The chapter is organized and sequenced around five goal-level questions, each with a corresponding series of follow up questions that help provide key evidence for informing *the political process* of designing and implementing a development strategy:[4]

1. What are the economy-wide options and trade-offs for reaching high-end development goals?
2. How can development strategies be targeted to address the diversity of opportunities and challenges within a country?
3. How should resources be mobilized and allocated across the different economic sectors and geographic regions?
4. How can the strategy be best designed and sequenced to improve the effectiveness of its implementation?
5. What has been the impact of policies and investments on outcomes?

[3] Section 2 is based on Johnson, M. and D. Resnick. 2004. "Strategic Analysis and Knowledge Support Systems for Rural Development Strategies in Sub-Saharan Africa." DSGD Discussion Paper 14. Washington, D.C.: IFPRI.

[4] The emphasis on political process is purposeful. Local stakeholders must be involved throughout the process of generating and disseminating results of analysis, not only in order to validate the assumptions and data in the analysis, but to ensure the questions being addressed by the analysis are timely, salient and relevant. This process is described further in the 'knowledge support system' component of a SAKSS in the next chapter.

Under each of these, we review: Why is this question important? What are some corresponding questions for strategy? What is needed to answer these questions? Are there applications to draw from?

What are the economy-wide options and trade-offs for reaching high-end development goals?

Why is this question important?

Most developing countries have set targets for achieving high-end development goals such as economic growth, poverty reduction and food security. From the outset, therefore, it is useful to first establish the country's current situation and whether its trajectory will lead to the achievement of its goals. It should do so within the context of the country's overall economy in order to highlight a broad set of strategic options and tradeoffs. This context is needed because policies at the macro level, such as trade and market liberalization, can have a profound impact on agriculture and the rural economy and can determine whether growth is pro-poor (Dorward et al. 2004). At the same time, policies that directly affect rural areas and agriculture can have an impact on the overall economy and in turn have feedback effects on the rural sector. By examining many of these policy options within the context of the broader economy, key relationships and welfare implications can be assessed in ways that lessen any potential adverse impacts on the poor.

The economy-wide perspective, therefore, permits higher-level strategic questions to be posed for shaping an agriculture or rural development strategy within the context of overall national development goals, and thus provides the greatest strategic leverage to priority setting (Byerlee 2000). The potential role of agriculture and the rural economy can then be explored with respect to how it contributes to economy-wide growth and national development priorities (e.g. the MDGs) and ultimately informs national debates concerning broader development strategies such as the PRSP process. Within this normative mode of analysis, questions regarding the long-term distributional consequences of alternative investment and policy choices for meeting these targets can also be explored. Specific to rural sector strategies, sector-wide investment options can also be examined more closely, especially with regard to how they affect the incentives for rural agricultural production and commercialization.

What are some corresponding questions for strategy?

Exploring a country's economy-wide options and tradeoffs for reaching high-end development goals introduces a series of strategic questions that require answers, such as:

> What is the current state of affairs or initial conditions with respect to development? Is the country on track to achieving its national growth and poverty goals?
>
> What are the contributions of different sectors to growth and poverty reduction?

What is the role of agriculture in the economy?

Where agriculture is a key sector, what level of effort and performance is required to meet the overall growth and poverty reduction targets?

What are the key sources of growth within agricultural sub-sectors and which ones are more likely to be pro-poor?

Are there sufficient demand and market opportunities to absorb any rapid increases in supply within selected sub-sectors? What are the key constraints and/or bottlenecks for commercialization?

Are there opportunities for leveraging regional growth dynamics through greater multi-country cooperation and economic integration?

What is needed to answer these questions?

In addition to a situation analysis of a country's current status of development and progress towards achieving its national development goals, an economy-wide simulation can help to answer many of the strategic questions raised above. The Computable General Equilibrium (CGE) model is well suited for this purpose. CGE models can help analyze the effects of policy shifts and alternative sector growth scenarios on overall economic growth and poverty reduction. It has the advantage of capturing both direct and indirect effects of policy changes on poverty and income distribution given a country's overall economic structure. The effects are channeled through changes in employment, wages and relative prices while considering forward and backward linkages in the economy.

Where data is limited and a CGE is not available, an economy-wide multimarket (EMM) model can be more suitable in its place (see Appendix A). Although less sophisticated, the model is actually better suited for answering questions specific to agriculture. It can treat the agricultural sector in more detail by incorporating useful market and trade linkages across various commodities and locations and by combining a system of demand and supply equations that allow for interactions across commodities. To partially maintain an economy-wide perspective, a non-agricultural sector can also be modeled to capture potential agricultural linkages with this sector.

Are there existing applications to draw from?

A number of examples that apply this level of strategic and economy-wide analysis involve the work that has been undertaken by IFPRI researchers in a number of countries in Africa (e.g. Ethiopia, Mozambique, Rwanda, Zambia and Malawi). In a recent study that uses a CGE model for Mozambique, Thurlow (2008) finds that current growth rates in agriculture will not be sufficient to meet the national goal of halving poverty by 2015. Model results conclude that additional growth driven by maize and other cereal crops has a larger impact on poverty reduction than similar growth in export-oriented crops. This impact occurs because yield improvements in food crops not only benefit households directly, by increasing incomes from agricultural production, but also by allowing farmers to diversify into higher-value crops. Cereals are already an

important sector in Mozambique and have strong growth-linkages to non-agriculture, which stimulates broader economy-wide growth and poverty reduction.

How can development strategies be geographically targeted to address the diversity of opportunities and challenges within a country?

Why is this question important?

Many of the challenges and opportunities that national development strategies must negotiate are spatially heterogeneous. For example, access to markets, and the livelihoods that are enabled by such access, follow complex geographical patterns that may have implications for understanding untapped development potentials of different areas. Livelihood options and constraints are quite different for more remote and food insecure areas versus areas located in close proximity to large market centers. Interventions should be specifically targeted towards the unique characteristics of the area. Therefore, an important step in designing a development strategy is to quantify the extent and distribution of poverty and malnutrition across geographic areas and population groups (Babu and Per Pinstrup 1994).

With the increasing availability of spatially disaggregated data and tools to understand those data, it is possible to map indicators of the micro-level comparative advantages of different development options. Agroclimatic endowment, access to markets, and population density are some of the more important dimensions of development potential. By seeing these spatially related conditions through an economic opportunity lens, assumptions can be made about how different development investments will impact the poor and how changing agricultural land uses may have environmental costs. Taken together, these conditions provide an enhanced picture of the costs and benefits of different investments, allowing better targeting towards the goals of sustainable growth, poverty reduction, and environmental sustainability.

To enable such decision-support tools, there is a need to compile relevant, georeferenced and harmonized datasets with national coverage. In many countries, relevant data exist but are not often brought together for policy analysis. Furthermore, there is a need for analytical capacity (and knowledge of local conditions) to define geographic domains (or build other analytical frames) which reflect real constraints and opportunities for local development options.

Cross-sectoral perspectives should also be considered when analyzing spatially disaggregated data. For example, environmental factors may play a role in affecting agricultural productivity in various regions of a country. The analysis could look at the potential externalities of increased productivity on the surrounding natural resources and assist in identifying “hot spots,” i.e., locations where the goals of economic development and natural resource conservation may be in competition with each other.

What are some corresponding questions for strategy?

Taking on a spatial perspective helps target interventions. The typical questions to answer include:

What are the distribution and extent of income, poverty and malnutrition across different locations in the country?

What kinds of opportunities and challenges affect rural economic livelihoods in different parts of the country?

For agriculture, what are the key development domains based on agriculture potential, market access and population density?

Which development domains offer the greatest potential for high investment impact among the key sub-sectors and economic activities identified as key sources of growth in the economy-wide analysis above?

What kinds of interventions (infrastructure, R&D and extension, institutional, etc.) are needed to spur productivity and income growth among select domains?

Among the poorest domains in terms of resource assets and livelihood options, what are the alternatives for poverty reduction and food security?

What is needed to answer these questions?

Exploring answers to these questions requires sufficient access to spatially oriented data, including agro-climatic conditions, land-use, production, urban and markets centers, infrastructure, household consumption, and welfare. Useful tools that help to map out geographically referenced data include Geographic information Systems (GIS) and remote sensing (see Appendix A.4 for more details). What is often missing, however, is a more integrated role for spatial analysis to target public sector interventions. In addition to highlighting micro-level comparative advantages and thus livelihood options, the information can be integrated with economic behavioral and normative models to identify targeted investment and policy alternatives.

Data limitations will most likely define the type and degree of disaggregation possible, especially when dealing with socio-economic data which is often not geo-referenced. It is therefore important to consider undertaking spatial analysis whenever the questions for strategy involve more micro-level level targeting and if the costs for doing so are not exorbitantly high. It must also complement other sector-wide, thematic (e.g. physical infrastructure and policy environment) or economy-wide level analysis to maintain a focus on ultimately achieving high-end national development goals.

Finally, for spatial analysis to prove useful in guiding strategic policy decisions, there are a few important considerations:

1. There must be an effort to assemble spatial information from a variety of sources;
2. Cross-sectoral expertise must be brought to bear on the development of meaningful spatial analysis and information tools;
3. The means of disseminating spatially-based information to non-specialist users must be identified; and
4. Spatial information must find its way into existing government networks of information flow and mechanisms for inclusion in the strategic planning process.

Are there applications to draw from?

A number of examples illustrate the usefulness and application of spatial analysis for targeting investments in agriculture. The study by Omamo et al. (2006) is especially noteworthy. Spatial analysis tools were used to map out key development domains for agricultural production, market access and population density across political boundaries in eastern and central Africa. This mapping was subsequently complemented by various economic analyses to assess future agricultural growth options and research priorities in the region.

How should resources be mobilized and allocated across the different economic sectors and geographic regions?

Why is this question important?

An essential component of a development strategy is its plan for prioritizing investments and mobilizing resources. A strategy grounded in a country-specific context must be based on a thorough assessment of the public investment situation and potential to contribute to the development goals. Public investments can be thematic (e.g. roads, marketing institutions), sector-wide (e.g. research and extension, irrigation), and sub-sector specific (e.g. commodity-based research).

All these investments affect rural poverty through many channels. For example, public investment in agricultural research, rural education and health, and infrastructure increases farmers' income directly by increasing agricultural productivity and lowering transaction costs of both inputs and outputs, which in turn reduces rural poverty. Indirect impacts come from higher agricultural wages and improved nonfarm employment opportunities induced by growth in agricultural productivity and increases in market opportunities. Growth in agricultural output from rural investment often yields lower food prices, again helping the poor indirectly because they are often net buyers of food crops. Redistribution of land caused by higher agricultural growth also has important impacts on rural poverty. In addition to their productivity impact, public investments in rural education, health, and infrastructure directly promote rural wages, nonfarm employment, and migration, thereby reducing rural poverty. For example, improved infrastructure access will help farmers set up small nonfarm businesses in rural areas such as food processing and marketing enterprises, electronic repairs shops, transportation and trade, and restaurant services. A key underlying assumption is that public and private investments are complements (Anderson et al. 2006), so that an increase in public goods and accumulation of capital stock raises the productivity of all factors in agricultural production, which in turn leads to higher farm wages and incomes and poverty reduction.

Investments in the rural sector not only contribute to growth, more employment opportunities, and higher wages in rural areas, but also help the development of the national economy by providing labor, human and physical capital, cheaper food, and markets for urban industrial and service development. This type of growth in the national economy can then help reduce poverty in both rural and urban sectors. Understanding these different effects provides useful policy insights to improve the effectiveness of government poverty reduction strategies. In particular, it provides information on how public investment can be used to strengthen links between poverty reduction channels to increase efficiency in targeting public resources on poverty

reduction. More efficient targeting has become increasingly important in an era of macroeconomic reforms in which governments are under pressure to reduce budgets. For examples of tools and approaches to measure the impact of investments, see Appendix A.5 and Benin et al. (forthcoming).

What are some corresponding questions for strategy?

The question of how resources should be mobilized and allocated across the different economic sectors and geographic regions is essentially answering a range of high-end questions that inform the design and evaluation of a development strategy, such as:

> What have been the trends of government expenditures by sector, and what have been the reasons for their changes?
>
> How has public investment been financed, and how has the burden of financing investment policy been distributed in society?
>
> What have been the returns to various types of government expenditures in terms of their growth, poverty reduction, and other human development effects?
>
> What level of effort in public spending is required to achieve targeted goals for agriculture and overall economic growth?

Analyzing these series of questions not only helps identify the kinds of public sector investments which offer the highest economic rate of return, but they also help assess the extent to which past investments have been efficient and effective (a topic covered in question 5 below).

What is needed to answer these questions?

The type of questions addressed by this analysis requires sufficient sub-national data on the level and distribution of public sector expenditures and investments over time. It also requires household survey data on consumption, production, and welfare measures. Using econometric tools, the analysis draws upon the cross-sectional variation of the data to measure and attribute differences in these variables to the accumulated stock of past investments. Where time series data are also available on the same cross-sectional data, more detiled work can be done to determine the dynamics and lagged effects of public investments. When combined with independent estimates of the unit costs of different investments, cost/benefit ratios can also be calculated.

Results from the econometric analysis can also be useful for estimating future growth requirements in public investments for generating desired income growth targets. Using elasticity estimates of the marginal impact of a percent change in the dollars invested in agriculture on a change in agricultural income, plus the marginal impact of a percent change in agricultural income on a change in poverty, one can estimate the level of resources required to achieve desired growth and poverty goals.

Are there any applications to draw from?

The early work undertaken by Fan et al. (2004) for Uganda is a good example. Their study shows that the returns to past public investments were particularly high for agricultural research and development (R&D), rural feeder roads, and education. For every shilling invested in agricultural R&D, another 12.4 shilling was generated due to increased agricultural incomes. The recent study by Fan et al. (2008) uses elasticity estimates of this and other sources to estimate the level of resources required to achieve the CAADP goal of 6 percent agricultural growth.

How can the strategy be best designed and sequenced to improve the effectiveness of its implementation?

Why is this question important?

The success of development strategies depends not only on the appropriate policy choices, but also on the capacity for policy implementation. The performance and efficiency of the provision of public services and infrastructure and its outreach to the poor determines how effectively public investment contributes to pro-poor growth. For example, on the sequencing of public investments, an evaluation of lessons from India suggests that large rural infrastructure investments (roads, irrigation, and agricultural research and extension), including institutions (access to finance, regulatory environment), are fundamental prerequisites to development (Johnson et al. 2003, Doward et al. 2004). The challenge is ensuring that the scale of infrastructure investment is targeted to those areas where there are greater economic returns from investment.

Another challenge is designing programs and policies that are more likely to be implemented effectively. An especially important step is to analyze the political and operational feasibility of implementing various policy options. However, this analysis is often the most neglected link. To determine whether evidence may be of use in designing interventions that are actually implemented, Omamo (2004) suggests a thorough diagnostic analysis, taking into consideration the kind of evidence, the political and social context of the research-policy nexus in which the evidence originated and would be employed, and the facilitative environment for implementation.

What are some corresponding questions for strategy?

How to design and sequence investment programs and policies that are effective is one of the most difficult and neglected areas for which answers to the following questions are least known:

> Among the chosen portfolio of investments and policy priorities in a strategy, how should programs be designed, sequenced, and managed?
>
> What is the political and operational feasibility of implementing various policy options?
>
> What is the role for public versus private sector? What of public-private partnerships?

What are the key ingredients of success or failure based on past experience and lessons learned?

What is needed to answer these questions?

To help answer some of these difficult questions, a review of best practice approaches and lessons learned can be particularly useful. This assessment would draw heavily on a country's own experiences, and be supported by a thorough review of lessons learned elsewhere. At other times, a thorough diagnostic and feasibility analysis may be required. All must account for the existing capacities to facilitate and implement the chosen programs and policies, as well as the political and social environment within which they are going to be implemented.

Are there applications to draw from?

A recent review of successes in Africa provides a rich source of experiences on what type of interventions have worked and been successful over the years (see Gabre-Madhin and Haggblade 2003 and Haggblade 2004). Among the case studies reviewed, the most successful interventions were found to be those related to: soil and water conservation, replication of proven commodity-specific breeding and processing successes (e.g. cassava), marketing and information systems, vertical supply chains to improve efficiency, and improving regional cooperation in trade and agricultural technology. Overall, the evidence from the successes reviewed suggests two fundamental prerequisites for sustained agricultural growth in Africa: good governance and sustained funding for agricultural research and extension.

What has been the impact of policies and investments on outcomes?

Why is this question important?

A critical part of any rural development strategy is the establishment of an M&E system to track progress, performance, and assess impact over time. Not only does M&E help justify resource investments and ensure accountability, it also helps inform what has (or has not) been working. As a result, strategies can either be adjusted or maintained depending on the progress towards achieving development targets. M&E plays an integral role in the strategy development process, which, if it is to be successful, has to be amenable to adjustments as lessons are learned during implementation. It therefore allows us to come full circle in following through the series of strategic questions for prioritizing investments and policies that will lead to the preferred development outcomes. We review these by looking at them from both an *ex-post* and *ex-ante* impact assessment perspective.

What are some corresponding questions for strategy?

The evaluation part of an M&E system is intended to answer the broader questions of impact, both from an ex-post and ex-ante perspective. The ex-post looks at the impact of past investments to answer questions such as:

> Are investments on track to meet the MDGs of halving hunger and poverty by 2015? If not, what needs to be altered?
>
> What factors have shaped (positively and negatively) the level of impact achieved to date?
>
> How can the impact of these investments be traced to improvements in the diversity, productivity, and long-term viability of production systems, food processors, agro-industries, markets, and trade?
>
> How have these improvements affected incomes and the poverty status of rural and urban households?
>
> What was the distribution of these intermediate impacts, e.g. on smallholders, on equity, on gender, on other spillover impacts?

However, a desirable M&E system is one that can encompass not only the assessment of impacts already realized (ex post analysis), but can also re-assess the likely magnitude and distribution of future impacts (ex ante analyses), particularly those likely to be achieved by key target dates (e.g. 2015, as established by the MDG goals). By obtaining insights into what has influenced the realization of past impacts, and updating projections of future impact, a good M&E system can provide key information to guide decisions on adjustments to the scale and mix of investment priorities needed to keep a country's development agenda on track.
Future impacts can be derived from both the continuing effects of past investment, as well as the additional impact of new investments yet to be made. The questions that are typically associated with ex ante type analysis are:

> What are the projected impacts (keeping track of those derived from past versus future investments) if investment activities proceed as planned?
>
> Are these projected impacts compatible with the goal and target impacts of the existing strategy?
>
> Could we obtain greater or better distributed impacts by reconfiguring current policies and investment portfolio?
>
> What are the different policies and types of investments that can lead to greater and more sustainable growth as well as greater and better distributed outcomes and impacts?
>
> What new targets can be set for implementing these new policies and investment portfolio for specified milestones in the future?
>
> What are the resources needed for implementing these policies investments to achieve the desired outcomes and impacts?

The expectation is that a country strategy should require the above questions to be posed and addressed on an annual basis, so as to monitor progress and refine operational targets for the coming years. Both past and future perspectives should encompass the overall strategy and investment cycle, i.e., against baseline conditions at the start and against target benchmarks at the time the strategy is expected to end.

What is needed to answer these questions?

To begin with, a key element in the development of an M&E system is to select a series of indicators to monitor and assess progress of implementation over time. Details on how to select these indicators are provided in Appendix A.7.[5] Here we only emphasize the broader criteria that the indicators adequately describe the chain of causality between inputs, outputs, and outcomes, or address questions such as:

> What is the planned level of investments and effort for each selected type of intervention?
>
> What is the planned level of provision, use (adoption), and coverage for each selected type of intervention?
>
> What is the expected impact on the environment, assets, and activities that affect income growth? What is the targeted distribution of these impacts?
>
> What is the ultimate target of the higher-level goals – e.g. income growth, poverty, and hunger?

Once the indicators are known, M&E analysis can be undertaken using a combination of a simple descriptive assessment and a more sophisticated impact analysis. Simple descriptive narratives of trends among a set of key indicators—investment flows, output indictors (e.g. productivity), and outcomes (e.g. growth and poverty)—can help assess whether investments are having a desired impact in general. At best, this assessment helps to answer the question "*have expectations in terms of achieving the growth and poverty- and hunger-reduction targets been met so far?"* However, it does not answer the key hypotheses, "*how effectively have different types of policies and investments impacted on the goals so far*?" and "*what factors have shaped the level of impact that has been achieved?*" To fully answer these and the other questions raised above, more complex analyses using econometric and simulation models will be needed. These analyses involve isolating the measurement and attribution of impact over the life of the strategy's program activities, both before and after, and with and without investments, while accounting for any windfall gains or losses due to confounding factors (e.g. a period of unseasonably good rains).

Finally, because formal analytical methods have their known limitations and can only provide partial evaluations of projects that are amenable to a quantitative set of analyses and modeling techniques, complementary qualitative analysis will still be necessary to provide a more comprehensive assessment. Additionally, the periodic impact assessment of individual select projects can also be useful for examining more closely

[5] Also see IFAD (2002) for some practical guidelines.

whether project investments are directly impacting on the observed outcomes (either in terms of the level or distribution of impact). Here the question of attribution can be addressed more explicitly. Such studies would also help generate additional knowledge on important lessons learned, especially in revealing conditions under which successes occurred.

Details of the methods available have also been documented in Benin et al. (forthcoming), which discusses a variety of integrated approaches and tools for monitoring and analyzing the impact of public investments.

Are there applications to draw from?

Very little work has been done in developing comprehensive M&E systems of the nature described above, i.e., ones that are intrinsically linked to impact assessment. Inherent difficulties hinder the development of such systems, such as inadequate access to data to measure counterfactual information, poor knowledge of the chain of causality between inputs and outcomes, and the amount of time and cost involved in managing such systems. The ongoing work by IFPRI to develop a simple framework for CAADP is one attempt to develop such a system (see Appendix A.7). However, the system remains to be put to the test.

The Knowledge Support System Concept

A *knowledge support system* is defined as a dynamic network platform for serving the evidence needs of strategy formulation and implementation. This network includes individuals such as researchers, policymakers, and development practitioners and institutions such as government agencies, research institutes, development organizations, and private and civil society groups. These individuals and institutions are linked through collaborative research (strategic analysis in the case of SAKSS), capacity strengthening, and dialogue. Through this network platform, information, data analysis, and knowledge can be compiled, synthesized and packaged into evidence that is supplied on a timely and reliable basis to be of use during strategy processes.

Conceptual Framework

Strategic analysis is unlikely to be considered relevant and timely during the strategy process unless it is linked to stakeholder dialogue and decisions about future polices and strategies. The knowledge support system part of SAKSS is concerned about such linkages, ultimately bringing credible evidence to bear on policy and investment decisions. Many efforts to bridge the research-policy gap have focused on the links between researchers and policymakers, and the ways in which communication might be improved. For example, policymakers may typically depend on in-house research departments to provide evidence, while others rely on external consultants commissioned on an ad-hoc basis. Without a broad-based pool of resources to draw from, the knowledge produced by these methods may not satisfy the criteria of timeliness, relevance, legitimacy, and credibility. Knowledge systems, combining knowledge management and networks, can help smooth out the information flows between policymakers and both government and non-government researchers throughout the stages of the strategy process.

The term “knowledge support systems” is derived from the more general concept of “knowledge systems.” Although the term knowledge system is often used ambiguously, encompassing a wide range of definitions, applications, and structural arrangements, it usually refers to the process of “effectively connecting those who know with those who need to know, and converting personal knowledge into organizational knowledge” (Creech and Willard 2001: 8). Therefore, how effectively these systems bring knowledge to bear during decisionmaking depends on how well individuals (both the actors who know and those who need to know) and the organizations they represent (e.g. research institutions, nongovernmental organizations, private organizations, and government agencies) are linked to promote dialogue around the knowledge products (i.e., information and results of research).[6]

Knowledge systems can come in various formats and are designed for different purposes. For example, large institutions engage in knowledge management to improve the efficiency and effectiveness of their operations. Extension and market information systems for farmers and entrepreneurs represent another type of knowledge system (e.g. the World Bank and FAO’s Agricultural Knowledge and Information System, or

[6] Cash et al. 2003 provide some useful real world examples.

AKIS). Other knowledge systems include Internet-based platforms for improving access by researchers and policymakers to high quality, relevant, and timely agricultural information (e.g. the Access to Global Online Research in Agriculture, or AGORA, which provides free or low-cost access to major scientific journals in agriculture and related sciences to public institutions in developing countries).

Regardless of the type of knowledge system, most depend on formal or informal networks with other individuals and institutions. Networks can be broadly understood to mean a combination of people and/or institutions that are usually dispersed over wide geographic areas but are connected through appropriate communication technologies. Indeed, formal networks have evolved rapidly with the emergence of information and communications technologies (ICTs), which have enabled more people to become engaged around shared interests or communities of practice regardless of geographic location. In the arena of international development, the rise in networks has also been driven by the awareness that development issues are highly complex and cannot be solved by narrow approaches, and by a belief that networks offer a better means for researchers to exchange ideas and interact with practitioners to impact public policy. However, networks do not necessarily operate effectively. Certain characteristics can improve or impede their ability to affect policy, including size, representation, quality, leadership, communication and ICT capabilities, organizational and management structure, and sustainability (Perkin and Court 2005).

Knowledge networks vary immensely in terms of structure and goals. For example, the most common networks are passive and simply transfer knowledge to interested individuals through electronic or published media. Others only include individuals with expertise in a particular field. In contrast, formal knowledge networks consist of "… a group of expert institutions working together on a common concern, to strengthen each other's research and communications capacity, to share knowledge bases, and develop solutions that meet the needs of target decision makers at the national and international levels" (Creech and Willard 2001: 19). Formal networks can be more productive and have greater potential to influence policies.

SAKSS involves a formal network, but goes beyond a simple association of stakeholders and institutions, as it is designed to perform an integral support role within the strategy formulation and implementation process. Therefore, SAKSS employs a knowledge *support* system as illustrated in Figure 3.1. The supportive role emphasizes its unique structure which directly *services* the immediate needs of the actors and organizations involved in the process of formulating and implementing strategies. By providing a platform upon which information, data analysis, and knowledge can be compiled, synthesized, and packaged in a useful and timely fashion, SAKSS can both inform and become an integral part of the priority setting and review processes that are essential for managing development strategies over time. Within such a setting, the strategic analysis component emphasizes the strategic nature of the research demanded of policy analysts, to search for best-bet investment and policy options that can lead to the high-end goals sought after by a development strategy.

Figure 3.1 shows SAKSS situated within the strategy process. This process is dynamic and non-linear with many feedback loops and influencing factors. Strategy formulation begins with leadership and governance. The political system and the choices made by country governments will determine the path taken during the next stages of the process, planning and implementation. M&E should be on-going throughout

implementation, allowing for adjustments along the way and impact assessment of the outcomes of the strategy. The lessons learned should then inform the next strategy. SAKSS brings together the stakeholders involved in the different stages of the strategy process through its strategic analysis, capacity strengthening, and dialogue activities. The types of activities that SAKSS will undertake will depend on where the country is in the strategy process.

Underlying principles and approaches

Within the framework of knowledge support systems described above, several principles have been distilled from both literature surveys and experiences to date with SAKSS, in terms of their usefulness for supporting development strategy. These principles in turn serve as useful guidelines for establishing a new country SAKSS program.

Participation/Collaboration

From the beginning, the set up of a country SAKSS program should be country-owned and driven and its processes participatory and transparent. Consequently, a continuous consultative process with key partners on both the supply and demand side is needed. This process must include organizing regular dialogue and workshops to bring together research and analytical teams, various stakeholders, and national policymakers to share information and ideas, agree on priorities, roles and responsibilities, and to plan activities of the program. The strategic analysis and any other knowledge management activities should be undertaken in a collaborative manner to promote local involvement and ownership. This collaborative approach demands that researchers share their choice of methodology and preliminary results at various stages throughout the process of undertaking the analysis. Only by facilitating such a continuous iterative process will the analysis and information generated remain accountable to the perspectives, concerns, and issues, of both researchers as suppliers and policymakers and their stakeholders as users (Cash et al. 2003).The involvement of stakeholders early in the research design process has been shown to increase the chances for policy impact (Court and Young 2003; Ryan and Garrett 2003; Wangwe 2005).

Flexibility

Given the general consensus that there is no “one-size-fits-all” development model, SAKSS should always remain flexible enough to adapt to different country conditions involving institutional capacity and political context, especially as it relates to the ongoing process of strategy design and implementation. Any research and analysis activities of SAKSS must be able to take into account the broader context underlying a country’s own unique development challenges and opportunities, such as natural resources and geography, stage of development and human welfare, underlying social and political conditions, and overall structure of the economy. These underlying conditions can vary widely across countries, even among neighboring countries. As described in section 5, SAKSS programs have been set up in countries with different initial conditions and expectations. Consequently, this has resulted in a varying sequence of analyses and knowledge systems approaches according to each country’s own unique demands and priorities. The structure of the programs and networks being established has also varied

depending on existing stock of institutional capacity, availability of information and knowledge, political context of government and donor relations, level and source of funding, and degree of awareness in the value of scientific evidence in influencing ongoing national dialogue and decision-making processes.

High level dialogue

Evidence-based policy research is most successfully translated into policies when demand for policy information comes from the policymakers themselves. Policymakers pay more attention to policy research results when they are jointly generated with their own staff and when they are convinced that their interests have been acknowledged by the researchers. Implementation of policy advice is enhanced when attention is paid to continuous policy dialogue with key policymakers, executive government officials, and parliamentarians. This dialogue offers the best way to impact or influence specific policies or decisions, even though it is often difficult to systematically trace how people have used the information that was generated and disseminated. The degree of proximity of outside research institutions to in-house policy analysis units (e.g. within legislative and executive branches of government) has been found to have an important effect on how well research results are communicated and received by policymakers (Ryan 1999). The existence of close, personal links between individuals (researchers and policymakers) can also be just as effective (Court and Young 2003; Timmer 1998). For example, in South Africa, there has been a sizeable overlap among policymakers and outside researchers, resulting in regular contact between the groups, and contributing to the effectiveness of linking research results with policy dialogue (Bhorat 2007; Court and Young 2003). A potential disadvantage is when too close a relationship marginalizes the contributions of other researchers and research institutions, limiting the diversity of views to which policymakers have access (Stone et al. 2001).

SAKSS country programs share in this experience, as described in Section 5. Many of the programs that have witnessed greater success in translating results into national dialogue processes have been those that have either established strong links with key policymaking figures and/or with government agencies that have a high degree of proximity to such key figures. However, these programs maintained a careful balance to ensure research integrity was not sacrificed for political influence. To balance this relationship, the programs established formal networks that were transparent and had broad participation. The programs maintained a high degree of credibility and legitimacy by setting up a Steering Committee or national advisory group that represented a broad range of key stakeholders within the policymaking environment.

Credibility and legitimacy

Knowledge systems and formal knowledge networks should be structured in a way that adheres to the same criteria for credibility and legitimacy that is applied to policy research (Cash et al. 2003). Knowledge networks are credible when the participants represent shared and common institutional mandates rather than personal research interests. The degree of credibility is only enhanced when membership is limited to those institutions with a strong reputation for their expertise and for their capacity to influence the policy process (Ryan and Garrett 2003).

When the network has a broader concentration, such as rural development, the issue of legitimacy also becomes increasingly challenging. Incorporating researchers from multiple disciplines rather than solely economics is one way of increasing the legitimacy of the network. Another way is to have closer links between foreign and local research institutions. Local institutions have the respect of the domestic policymaking community, can offer more local knowledge, be more cognizant to domestic policy concerns, and may also be viewed as being less ideologically driven as foreign institutions (Jayne et al. 1999; Wangwe 2005). On the other hand, foreign institutions can provide a basis for enhancing the credibility of the research, bringing in better access to international research resources and standards, as well as on-the-job learning, to strengthen domestic research capacity (Jayne et al. 1999). If sustained over the long-term, together with sufficient higher degree training, such efforts can go a long way in promoting and sustaining a think tank culture that effectively influences national dialogue and decisionmaking about future policies and strategies.

Sustainability

Policy research and analysis capacity have to be built incrementally and sustainably, which means on-going support for key government policy agencies as well as encouragement of a think-tank culture for producing high quality, policy relevant research products. Therefore, countries ultimately need to have ownership of SAKSS from the beginning to enable its principals and tools to become institutionalized within local government agencies and research institutions over time. To accomplish this, both in-country researchers (as suppliers) and stakeholders (as end-users) need to be actively engaged early on to commit to a long-term institutionalization process that involves knowledge synthesis and generation, compiling lessons from "learning by doing," institutional arrangements or platform for linking research to policy, and human and institutional capacity strengthening. As Cash et al. (2003: 8090) point out, "strategies to promote such systems require a sufficiently long-term perspective that takes account of the generally slow impact of ideas on practice, the need to learn from field experience, and the time scales involved in enhancing human and institutional capital necessary for doing all these things." Indeed, knowledge systems that have been the most successful in sustaining themselves over time started small. It is therefore essential that the system initially provides information around a narrow set of issues, especially those that have important and timely relevance within each region, and are consistent with development goals. They have also been more successful whenever sufficient attention has been given to strengthening the capacity of both suppliers and users to comprehend and value research-based evidence and policy analysis.

Capacity strengthening[7]

The SAKSS concept is founded on the recognition that many developing countries lack the capacity to generate reliable research-based information and analysis needed to inform and guide development strategies. Therefore, strengthening the capacity of countries to provide much needed credible information and knowledge systems for strategy development and implementation must be integral to the ongoing activities of a country SAKSS program. Without it, as pointed out earlier, the efforts of the program cannot be sustained beyond the life of the project. The core assumption is that as

[7] Earlier input provided by Suresh Babu on this topic is acknowledged.

relevant and timely information is increasingly provided from local sources to the policy dialogue and design of strategies in each region, a greater appreciation and reliance on empirical evidence would emerge and lead to sustained improvements in sector governance and policy impact over time. A SAKSS program, therefore, must play a catalytic role in developing a capacity strengthening strategy that promotes and improves the capacities of local partner institutions best placed to apply the SAKSS concept and among policymakers to use the results during dialogue and deliberations about future development priorities.

There are at least two stages required to develop a capacity strengthening strategy. The first considers both the supply and demand side perspectives.

On the *supply side*, this includes:

> Initially assessing the distribution of research capacities, skills, and knowledge base across a variety of local institutions and organizations in each region.
>
> Identifying best placed partner institutions and individuals to collaborate with on SAKSS, in close consultation with country and regional stakeholder organizations
>
> Identifying potential areas for collaboration on SAKSS across partner institutions based on existing capacities and knowledge (data, analysis, and knowledge management)
>
> Outsourcing training needs to local academic institutions who can be quickly familiarized with sophisticated analytical tools, to help fill the demand for such skills among a pool of local students in higher education and practitioners.

On the *demand side*, this includes:

> Assessing and identifying specific capacity needs of partner institutions and individuals (including academic institutions) with which a SAKSS program would be collaborating in order to fill gaps. This in turn will also help define the kinds of training, materials, and courses needed.
>
> Building awareness and capacity more generally among policymakers and policy analysts at country and regional level to better comprehend results of research and data analysis.

In the second stage, training materials and courses will need to be developed to help transfer the applied tools and skills among local partner institutions and individuals on a needs basis. The contents of capacity strengthening should initially focus on existing tools and/or components of analysis being applied by a SAKSS program, such as: economy-wide modeling, spatial characterization of development domains, investment and policy analysis, and impact assessment. It is the partner institutions that will in turn take the lead over time in providing knowledge and the technical know-how. As noted earlier, the involvement of local universities to help with training is essential for improving and expanding the pool of local experts in the long run.

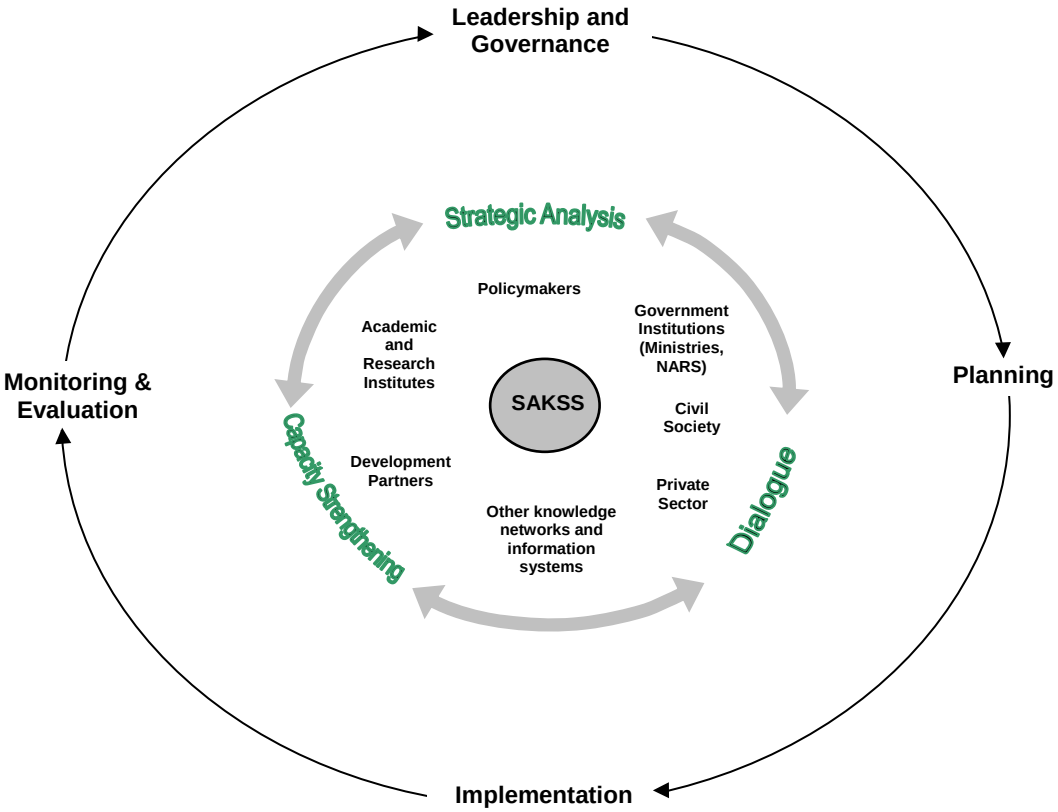
In order to enhance and sustain the core capacities at all levels of operation among local partner institutions/organizations, as a general principal, a three-pronged approach must be aimed at:

Individual-level capacities – by concentrating on increasing the skills of individuals to better manage the tasks at hand

Organizational level capacities – by helping to promote improved resources and working environment of the organization to ensure that the trained individuals are capable of implementing their task; and

Institutional capacity – by helping to promote a broad set of improved rules, governance structures and policies which otherwise hinder the effective utilization of the acquired capacity.

Figure 3.1: The Structure of a SAKSS Knowledge Support System within the Strategy Process



From Concept to Application: Establishing a Country SAKSS

The successful application of SAKSS depends on how well it adheres to several underlying principles and/or meets certain criteria, many of which were reviewed in the previous section.

Clear and stated demand: First and foremost, it must only be established whenever there has been a clear and stated demand for it. It is only under these circumstances that we offer this guideline of how to go about establishing the program.

Local partners shape its relevance: Key partner organizations (e.g. research institutions, government ministries, universities, and NGOs) must perceive and be engaged to help fashion its relevance and utility. Only through such levels of institutional engagement will SAKSS be able to provide improved and commonly accepted approaches that can foster, enhance, and improve synergies among the varied and multiple development efforts.

Adapts to local conditions: It must be able to be institutionalized and maintained in ways that enable it to adapt to local conditions and serve as a national and regional public resource.

Broad representation of stakeholders: Its organizational and governance structure must be established in a way that allows a broad representation of key stakeholders (government, university, think tanks, development practitioners, civil society, and development partners) to maintain its relevance.

Strong links with a local partner(s): It must be able to develop strong links with local partner institutions and organizations to help strengthen their capacities to provide and sustain the SAKSS in the long run.

Sufficient resources exist: Finally, but not least importantly, it must be able to mobilize sufficient resources and interest among government and private donors to sustain it.

With these important considerations in mind, we now review in more detail the operational steps required to set up a country SAKSS program. As section 5 will demonstrate, not every SAKSS program has been set up in the same manner among those that exist today. This is essentially because its structure and design are inherently dependent on many country-specific factors, which may include some or all of the following:

The types of demands and expectations articulated by national stakeholders and development partners.

Local conditions of existing capacities for policy research and analysis (both human and institutional), as well as its use.

The current state of affairs with policy and strategy making processes (e.g. PRSP, approved agricultural strategy).

The actors and organizations involved on both the supply and demand side.

The existing individual, organizational, and institutional relationships between suppliers and users of policy research and information (this also includes government and donor relations, type and degree of private sector and civil society participation, etc.).

The state of development and political commitments for improving agricultural and rural development.

Despite these differences, certain common steps and criteria have been found to be useful when establishing a country SAKSS (as will also become evident in section 5). The steps are not strictly linear and might overlap, be carried out simultaneously, or in a different order, depending on the particular country or regional circumstances and strategy processes. We highlight some of the more critical steps here.

Step One: Conducting stakeholder analysis and needs assessment

First, a preliminary survey of the current state of existing knowledge systems is needed, to avoid duplication of effort and to situate the planned SAKSS node in its optimal location to fill any knowledge and capacity gaps. Stakeholder analysis can be useful at this point to determine the key actors and institutions on both the supply and demand side of policy analysis (See Start and Hovland (2004) for guidelines).

On the demand side, this would include:

Needs assessment: A needs assessment among key stakeholders for establishing a SAKSS program (knowledge and capacity needs, institutional relationships, donor and government relations and expectations, funding levels, and so forth);

Strategy design process: Reviewing the status of strategy processes in the country and region, especially with regard to their degree of reliance on evidence and analysis;

Local policy processes and decisionmaking environment: A mapping of the policy processes and decisionmaking (who makes decisions, who has influence in shaping the policies, when can evidence come to bear during the policy process? Who are the key players? What are the key entry points?).

On the *supply side*, this would essentially involve undertaking some broad surveys that include:

Data availability and coverage: Assessing local data collection efforts and their adequacy from the standpoint of national coverage, sufficient coverage of key regions or production systems in major agro-ecological zones, sampling methods

and accuracy, and management systems, highlighting the extent to which certain data needs, critical for SAKSS, are unmet;[8]

Identifying local potential partner(s): Identifying local partner agencies or research institutions that are best placed (by virtue of staff expertise, location, data collection systems in place, etc.) to support the analytical and M&E agenda of a SAKSS;

Reviewing current state of knowledge: This involves a review of available studies (completed or ongoing) by national agencies, research institutes or researchers, other donor agencies, and IARCs, that will help inform any SAKSS analysis and knowledge base.

Finally, it is critical to examine the kinds of relationships and linkages that currently exist between the demand and supply side, such as:

Existing structures of relationships between suppliers of policy research and information and policymaking bodies (both within government, and between private, academic and government sources);

Linkages between different stakeholder groups (government, donor, and private sector).

While these kinds of assessments and stocktaking exercises are essential at the beginning, they are rarely carried out in a comprehensive fashion, as will be seen in section 5. The cost and demand for setting up SAKSS programs quickly has often limited the degree to which these assessments are undertaken in principle. However, the benefits of these studies to a SAKSS program are expected to be large enough to warrant serious attention for completing them early in the set up process. Underlying the need for these studies is the likelihood that the program will have a high degree of relevance and salience when it adequately addresses local needs and expectations, and thus ultimately impacting on policy decisions and promoting greater evidence-based decisionmaking in the long run.

Step Two: Formalizing an operational and governance structure

Once the stakeholder analysis and needs assessment has been conducted, the next step is to set up a good operational and governance structure of the program. The operational elements must include both an institutional and organizational plan of action that is agreeable to the core group of stakeholders demanding the SAKSS.

The institutional structure involves deciding on a *primary host for the SAKSS program*. Ideally the structure should be one that has the following characteristics:

Is well regarded and respected by government, academics, private sector, civil society, and donors. This entity could have one or two members who are well respected within government and non-governmental bodies and who can serve as champions of the program.

[8] Examples of such a stocktaking exercises can be provided upon request.

Has direct links or a direct line with important figures or decisionmaking bodies within government. Some examples include a department within a government ministry or a semi-independent think tank.

Has a reputed image of producing quality products and promoting dialogue on key policy issues facing the country.

Is willing to consider the SAKSS program as a joint partnership effort with an internationally-based implementing partner who can provide in-kind support for the day-to-day running of the program (e.g. office space, administrative support, and equipment).

Can benefit from the SAKSS program by gaining skills and expertise that it would otherwise not have – ultimately being able to carry on the work of a SAKSS in the long run.

From the organizational perspective, the SAKSS program is likely to be more effective if it is directly linked and accountable to an implementing partner that has the expertise and know- how to undertake policy research and analysis (similar to IFPRI or any other policy research think tank). The organizational structure should have a program leader or coordinator who belongs to the implementing institution which is being held accountable for managing the entire program – its policy research and analysis activities, database and knowledge management systems, capacity strengthening activities, reporting and outreach, and so forth.

The overall governance of the SAKSS program on the other hand should be intrinsically linked to the stakeholder group to ensure a demand-led process. This means sitting within the local host institution while a national Steering Committee determines the direction and overall management set up of the SAKSS node. In some cases this may involve the SAKSS Coordinator/Manager reporting jointly to the local host institution and implementing partner under a management and administrative arrangement between the two institutions.

Setting up a National Advisory or Steering Committee

A national *advisory or steering committee* is composed of key stakeholders, including representatives from government, universities, private sector, policy think-tanks, and development partners. A broad-based committee can ensure the credibility of the system so that it is independent and autonomous from any strong sectoral or political influence. At the same time, it ensures country ownership and relevance to local needs and expectations.

Within government, it is especially useful not to limit representation to the Ministry of Agriculture only, but to include others such as the Ministry of Finance. The latter not only has influence on the budget but is also just as keen to understand the role of agriculture in driving economic growth and development.

The committee would be responsible for:

Establishing clear roles and responsibilities of the SAKSS program and partners;

Providing overall oversight;

Guiding the activities and operations;

Defining local needs for planning and M&E; and

Linking with broader regional and continental processes.

Program management and administration

A *secretariat* or *program office* composed of a coordinator (or program officer) and a few technical and administrative staff is often sufficient. The secretariat should be associated with a credible implementing partner, who can serve as a country or regional host (as in the IFPRI Country Strategy Support Programs (CSSPs).

The local host institution of a country SAKSS (whether governmental or non-governmental) must meet certain criteria if possible:

It must be a well established and credible data, policy analysis, and/or research institution;

Respected in the research, government, and donor community;

Linked with (or well regarded by) key government units and local universities (e.g. policy analysis units in the Ministry of Agriculture, Ministry of Finance, Ministry of Trade and Industry, President's office);

Linked with (or well regarded by) the international research and development community at large (international bodies, sub-regional organizations, etc.); and

Have a policy of open access data and knowledge sharing.

In Mozambique, for example, all partners chose to have the country SAKSS hosted within the Economic Directorate of the Ministry of Agriculture. This selection has its pros and cons. In most African countries, the Ministry of Agriculture has a weak influence on national development strategy priorities. Therefore, placing it within a weak ministry may have its drawbacks in effectively influencing the setting of future priorities. Nevertheless, by strengthening its capacity to generate evidence and clearly outline priorities needed in the sector, it may actually improve its effectiveness in influencing decisions at a higher level. Moreover, the lack of capacity within poor countries emerging from years of war, such as Mozambique and Rwanda, may require this more practical approach of embedding the SAKSS within the Ministry directly.

Because the SAKSS coordinator or manager is expected to play a critical role in running the day-to-day operations of the SAKSS program, manage data and knowledge bases, undertake some data analysis, facilitate a network of data providers, researchers, and analysts, as well as maintain strong links with policy advisors and decision makers,

he/she must be familiar with analytical tools and research methods in addition to having experience with knowledge management and policy processes. These skills require unique individuals who have either sat on both sides of the boundary between research and policy during their career history or have been exposed to working with similar SAKSS-like outfits (e.g. other boundary organizations/institutions/networks within government or the private sector that straddle the boundary between research and policymaking). Generic terms of reference of the kinds of duties, experience and skills required of a country SAKSS Coordinator/Manager are provided in Appendix B.

A SAKSS program work plan is typically organized around three areas:

Strategic analysis
Capacity strengthening
Dialogue

These three elements together, especially once they are well integrated with local policy and strategy design processes, embody a knowledge support system. Activities under all three components should be designed to be complementary to each other. For example, any analysis undertaken should be collaborative in nature, working with local institutions and individuals in order to transfer skills and expertise in the process. The analysis activities should also take into consideration the need for dialogue to ensure timeliness and relevance. Outreach to policymakers and stakeholders before undertaking research can lead to more useful analysis and more open receptiveness to results.

In developing a SAKSS work plan, therefore, it is important that the activities are directly linked to those identified and agreed to by all key stakeholders. Final approval of a work plan should be made by the advisory or steering committee.

Step Three: Developing a collaborative strategic analysis agenda

It is critical that the process leading to an agreed set of priority areas for strategic analysis is a collaborative and negotiated one between the demand and supply side. However, there are two good reasons for maintaining limited control on the supply side. First, it avoids the program becoming a consultancy service for one or two powerful stakeholders (e.g. a government agency or single donor). Second, it preserves a sufficient level of independence to avoid political capture while maintaining scientific credibility. A strong and well-regarded local or international institution is desirable for hosting the SAKSS program because it can uphold credibility on the supply side and legitimacy on the demand side.

For international institutions, establishing legitimate ties with the demand side requires more work. It is best accomplished by forming close collaborative ties with an in-country institution or government agency, including individuals, that are well connected to the strategy development and implementation processes in the country. For example, working with the Ministries of Agriculture and/or Finance is critical as they are often responsible for developing a country's agricultural and rural development strategy. Collaboration with local technical and research institutions is desirable when the issue at hand is best handled by such institutions, including: policy analysis units within government, the national statistical bureau, national agricultural research and/or policy

institutes, university departments of economics or agricultural economics, independent policy research institutes or think tanks, and individual consultants.

Maintaining credibility on the supply side cannot be taken for granted. The program must never lose sight of the immediate need to produce high quality products, ones that will generate constructive policy dialogue and debate, in addition to providing practical solutions for development strategy. At the same time, however, the work should remain salient to the local knowledge base and experience. To ensure credibility and salience, it is generally good practice to maintain strong partnerships with a broad set of local institutions and agencies, as the examples in section 5 will show.

Step Four: Developing a Monitoring and Evaluation system

One of the key elements of the strategic analysis agenda of a country SAKSS is helping to collect and compile key information to monitor and assess impact of ongoing investments and policy changes. As pointed out earlier, the monitoring and evaluation of progress is essential to answering the question of whether current investment portfolios and policy climate is having a desirable impact on development goals. Not only is M&E useful for reporting progress during the implementation of a development strategy, but it can help readjust the current portfolio and level of investments to stay on track towards achieving targeted goals.

There are several challenges that need to be considered in developing a sufficiently effective and credible M&E system. To be effective, the system will need to be established under a systematic framework, one that combines various aspects such as: i) the state of affairs in the socio-economic and natural resource environment; ii) performance monitoring of strategy implementation; iii) evaluating results and assessing impact; and (iv) reporting and disseminating the M&E analysis (see Dalal-Clayton and Bass 2002). From an analytical perspective, the framework will need to incorporate both internal and external types of M&E. Internal M&E is useful for management purposes (see section 4.7 for further discussion in relation to SAKSS) while the external type is geared towards impact assessment as described in section 2.5.

To maintain credibility, an M&E system will also need to utilize sound baseline data and analysis in order to measure any counterfactual with respect to the “before and after” and “with and without” impact from investment. Therefore, developing a sufficiently robust M&E system that links strategy implementation with outcomes introduces many challenges. First, it is difficult to track information on intermediate outputs, e.g. productivity, wages, transaction costs, etc., that ultimately affect outcome goals like income. Second, there is the analytical challenge of measuring and explaining the causality and attribution between inputs (expenditures) to output and outcomes, given many other potential confounding factors. Finally, there is the general caution of neither overdoing the analysis of impact assessment nor the selection of indicators if the M&E system is going to be usable and practical to policymakers. Appendix A.7 presents an M&E system under design for CAADP. This example offers a practical guideline on how to go about selecting a series of indicators, as well analyzing and reporting them (also see Benin et al. 2008 for more details).

A country SAKSS program does play an important role in providing M&E support, especially given its access to a range of tools for impact assessment, whether *ex-ante* or

ex-post. It can also help guide the selection of indicators for monitoring progress of sector performance, investments, outputs (e.g. yields), and outcomes (e.g. poverty) following a simple causal framework of the strategy from investments to outcomes. As part of a SAKSS program work plan, therefore, ample attention should be given to an M&E activity designed to help identify and compile some of the key indicators needed to assess progress and impact of development strategies.

Step Five: Developing a knowledge management and communication strategy

Most successful systems have been those that have involved people to people networks, rather than huge systems with extremely broad mandates, so it is essential from the start to involve committed partners and local champions in building up a knowledge system and network. Indeed, the people aspects of partner networks remain the most important, even with the presence of ICT systems. Over time, this approach provides a unique opportunity to increase the role of other partners (universities, research institutions, and think tanks), not only in contributing to the knowledge system, but in helping to meet the changing information and knowledge needs of a broader range of end-users.

Communication is an essential component of a SAKSS program. Written communications, such as policy briefs and issues papers, should be prepared on a regular basis. In addition, the SAKSS coordinator should participate in and contribute to relevant policy forums. In countries where SAKSS has been established, the coordinators and SAKSS contributors have participated in processes relating to agricultural sector strategies and PRSPs. The coordinator must determine the best methods of dissemination, depending on such factors as type of audience, timeliness, and ICT capabilities in the country. Regional SAKSS programs can also provide support with communication processes, by providing a platform for sharing regional experiences and best practices across country SAKSS programs and with bridging the research and policy divide.

Studies have shown that the most successful knowledge systems—linking researchers, products, and policymakers—have been those that invested significant resources in communication, translation, and mediation between researchers and end-users at all levels (Cash et al. 2003; Creech and Willard 2001). Clearly, having a good communication strategy as part of the knowledge system, especially with the target policymaking audience, can help foster a process of dialogue, feedback, and learning that informs the analysis and improves the effectiveness of research in policy formulation and implementation processes (Court and Young 2003).

Certain key steps are required in preparing and managing a good communication strategy:[9]

Stating the goal,
Analyzing the current situation and environment,
Identifying and researching the audience,
Creating messages,

[9] From a communication strategy prepared by Marcia MacNeil, Communications Specialist, Development Strategy and Governance (DSG), IFPRI .

Selecting appropriate vehicles to deliver the messages,
Anticipating barriers to the successful delivery of the message, and
Implementing the strategy.

It is also important to evaluate the steps, make adjustments, and ensure that the strategy is working. A generic example of a communication strategy for a SAKSS program has been provided in Appendix C.

Step Five: Developing a capacity strengthening strategy

Improvement of local capacity is critical for sustaining a credible supply of knowledge, information, and analysis over time while also generating demand by enabling a thorough understanding of its value and utility. A key function of SAKSS is to determine the capacity gaps for supplying and demanding strategic analysis and the best methods of promoting and transferring skills. The methods of transferring skills could be formal, through training workshops and support to degree programs, or informal through collaborative research. In some cases, capacity strengthening may be needed before being able to proceed with analysis. For example, in Ghana, a Social Accounting Matrix (SAM) was required before being able to create a CGE model which would improve understanding of the dynamics of the economy. Training workshops were conducted with the Ghana Statistical Services and other institutions on how to build a SAM, and CGE modeling workshops are planned for the future. An evaluation of capacity on both the supply side and demand side would be useful before beginning any research, so that capacity strengthening activities can be well integrated with research activities. The evaluation can also serve as a baseline for impact monitoring of the program.

Step Six: Managing for results and drawing lessons

The overarching goal of SAKSS is to achieve economic growth and poverty reduction through improved development strategies. A SAKSS program will not reach this outcome on its own, but it can help enable an environment that is more supportive of such outcomes by acting as a mechanism to improve the timeliness and relevance of evidence within agricultural and rural development strategy processes. A SAKSS program should have three major outputs: (1) enhanced knowledge, information, data, and tools for strategic analysis; (2) strengthened capacity for government agencies, research institutions, and other stakeholders to supply and demand strategic analysis; and (3) improved dialogue and communications linkages among policymakers, policy analysts, and policy beneficiaries.

Figure 4.1 provides an example of a possible work breakdown structure for a SAKSS program, detailing the program's goal, purpose, and outputs. Further details of indicators that can guide M&E of these outputs can be found in Table 4.1, which provides a sample log frame for a SAKSS program. The log frame also lists potential activities that the program might undertake or coordinate. Initial SAKSS activities usually include surveys of data, knowledge, capacity, and communication gaps. These baseline studies can then serve as useful input into subsequent M&E of the impact of the program. Independent qualitative assessments of the program's achievements and impact every few years is encouraged to capture those elements that cannot be measured, such as institutional capacities, use of evidence in influencing policy

dialogue, and perceptions among key target groups and stakeholders of the program's success and usefulness. This could be done as a **SWOT** analysis, for example, to identify the programs **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats. Further information on setting up program M&E can be found in Creech (2001), Hovland (2007), and the World Bank (2004).

Figure 4.1: Example of a SAKSS Program Work Breakdown Structure

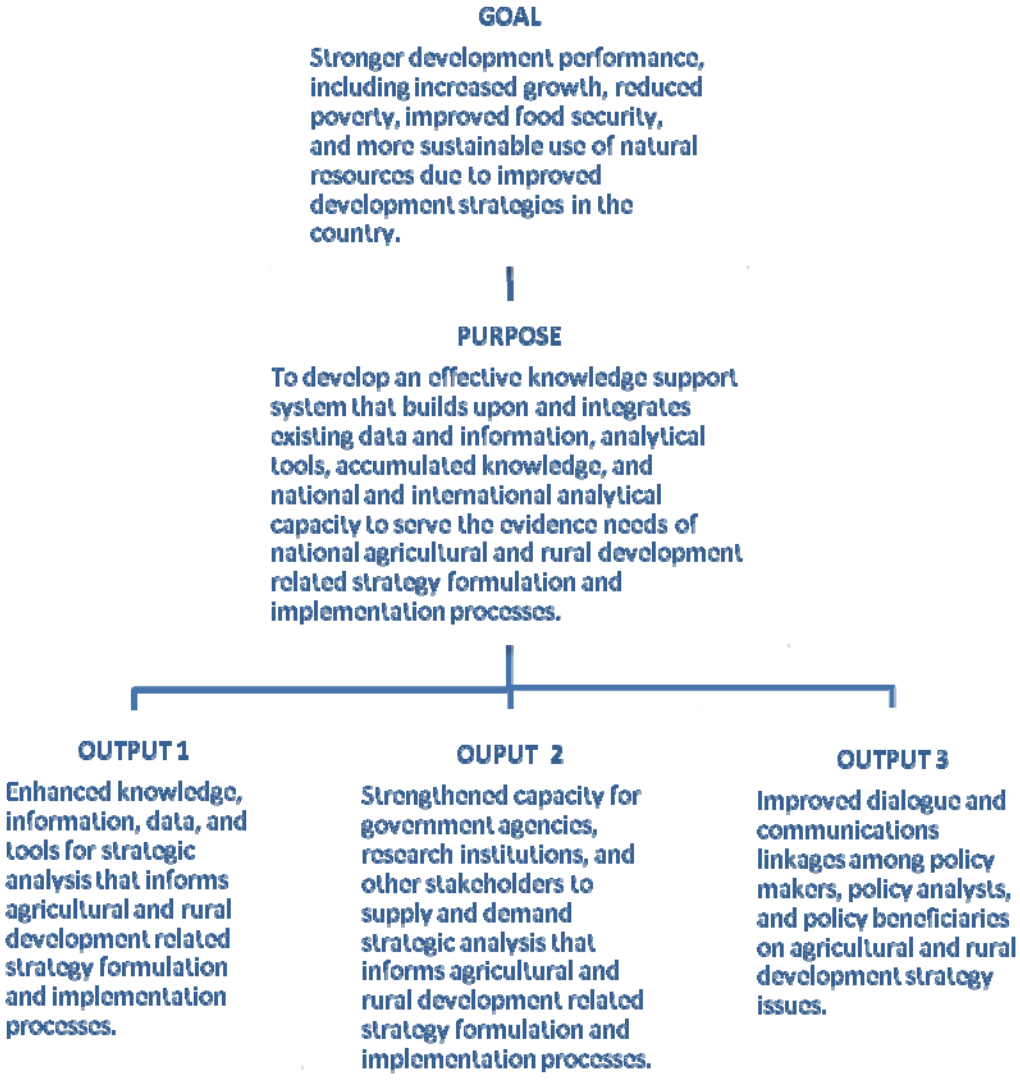


Table 4.1: Example of a Logical Framework for a SAKSS Program

Goal	Impact	Performance Indicators[10]	Assumptions
Stronger development performance, including increased growth, reduced poverty, improved food security, and more sustainable use of natural resources due to improved development strategies in the country.	Contribute to increased investment in the agricultural and rural sector. Contribute to increased agricultural productivity, particularly of low-income, small-holder farmers. Contribute to pro-poor rural growth and reduced rural poverty.	Indicators of the improved policies: Agricultural and rural development policies improved Quality of policy environment improved Public investment in agriculture increased Indictors of intermediate responses to improved policies: Increased private investment in agriculture Increased productivity Increased small holder sales/commercialization Net increase in agricultural trade Export portfolio diversification Indicators of improved welfare: Farm income and/or farm returns increased Household income rises Absolute and relative poverty decreased Food and nutrition improved.	Strong political commitment to adopted strategies. Political climate allows participation of a broad range of stakeholders. Government is willing to allocate sufficient resources to agricultural and rural development sectors.
Purpose	Outputs	Performance Indicators	Assumptions
To develop an effective knowledge support system that builds upon and integrates existing data and information, analytical tools, accumulated knowledge, and national and international analytical capacity to serve the evidence needs of national agricultural and rural development related strategy	Enhanced knowledge, information, data, and tools for strategic analysis that informs agricultural and rural development related strategy formulation and implementation processes.	Analyses are completed that address strategic issues within the agriculture and rural development sectors. Datasets are built that support strategic analyses. Analytical tools are developed that enable strategic analyses and monitoring and evaluation.	Low staff turnover and stability in collaborative relationships. Sufficient reliable national data. No institutional barriers or resistance to change. No political interference in data collection, utilization, and dissemination, especially in relation to sensitive
	Strengthened capacity for government agencies, research institutions, and other stakeholders to supply and demand strategic analysis that informs agricultural and rural development related strategy formulation and implementation	Individuals trained. New curriculum developed. Strategic analyses contribute to the analytical capacity of researchers in key stakeholder institutions. Evidence for agriculture and rural development strategies demanded.	

[10] As appropriate, data for all indicators should be disaggregated by region, and/or other relevant social inclusion identifiers (e.g. gender).

formulation and implementation processes.	processes.		regional economic and social information.
	Improved dialogue and communications linkages among policymakers, policy analysts, and policy beneficiaries on agricultural and rural development strategy issues.	Broader range of stakeholders participates in agricultural and rural development sector conferences and workshops. Communication networks between stakeholder groups are institutionalized. Technical committees and user groups formed. Datasets from various stakeholders are publicly available and disseminated. Libraries are strengthened. Reports and briefs are published and disseminated. Improved communication products are high quality, timely and relevant. Dialogue on agricultural issues is more evidence-based.	
Activities		Inputs	
I. Establishment of the SAKSS program/node. Recruitment of Coordinator and Secretariat staff. Program Inception Workshop to introduce program objectives to senior policymakers and broad stakeholders. Establishment of modalities for National Advisory Committee (NAC). NAC holds first meeting and sets SAKSS priorities. Host institution chosen.		Personnel Workshop costs NAC travel and per diem Office overheads o Rent o Facilities (reproduction, equipment, supplies, telecommunications, etc.)	
II. Strategic Analysis Assessment of gaps in data, tools, and knowledge for conducting strategic analyses. Assessment of evidence gaps in agricultural and rural development strategy processes. Compilation of key agricultural and rural development (and often spatially referenced) data at the micro, meso, and macro levels. Compilation and refinement of practical analytical tools relevant to national planning needs. Strategic analyses carried out in priority areas. Development of monitoring and evaluation systems to assess country		Personnel Collaborator contracts In-country travel ICT platform for sharing tools and data	

performance against planned goals.		
III. Capacity Strengthening Assessment of capacity strengthening needs of stakeholders who supply and demand evidence in agricultural and rural development strategy processes. Capacity strengthening of local research community through training and collaborative work. Design and implementation of training modules on key strategic analysis tools and methods. Institutionalization of strategic analysis tools and methodologies in national institutions (e.g. government ministries and universities) through appropriate training and transfer of data and software. Organization of study tours abroad for researchers and policymakers on relevant topics. Establishment of links to broader regional and international research community. Support for regional learning opportunities through ReSAKSS.	Personnel Collaborator contracts National, regional, and international travel Training module/workshop costs Training material Software Equipment rental	
IV. Dialogue Assessment of stakeholders, networks, existing knowledge systems, and general level of dialogue in agricultural and rural development strategy processes. Establishment of data access mechanism for all researchers and analysts through website or other data sharing platforms. Dissemination of analyses, briefs, workshop proceedings and other publications. Workshops and seminars to bring together stakeholders to facilitate and inform strategy dialogue on key issues.	Personnel Collaborator contracts National, regional and international travel Conference/workshop/seminars costs Publication costs ICT platform setup and maintenance	

From Concept to Application: Examples

The following examples offer highlights of the experiences of applying the SAKSS concept at country and regional levels, and describe instances where SAKSS-based programs have provided tangible outputs that have proved timely and relevant in contributing to strategy processes (dialogue, design, and implementation). We begin with the experiences generated from IFPRI's own set of country strategy support programs (CSSPs) of which SAKSS is an integral part of and those being set up as part of the broader regional SAKSS efforts in support of CAADP implementation. The brief overview of experience covers five main areas where possible:

- The process of how it was established
- Its organizational structure and donor support
- How SAKSS is integrated into the program
- Outputs generated and impact
- Future plans

Upon reviewing the individual programs, we provide a brief summary of any lessons and observations related to establishing a country SAKSS program.

Uganda

In Uganda, there was much demand for the wealth of information and knowledge generated for almost five years under IFPRI's Strategic Criteria for Rural Investments in Productivity (SCRIP) project – the predecessor of what is now the Uganda Strategy Support Program (USSP). In recognition of the relevance of the SCRIP analyses and databases, the Ugandan government requested that IFPRI contribute to key policymaking fora. IFPRI became a member of three of the thematic working groups that reviewed and advised development plans and M&E relating to the Plan for Modernization of Agriculture (PMA), the Ugandan government's main policy process for implementing the PRSP for the rural sector. IFPRI also began a longer-term collaboration with the Parliamentary Committee on Agriculture, an influential group that sets down the legislative agenda and develops the legal and regulatory frameworks and policy implementation timetable.

A number of research products came out of the SCRIP project, laying the foundation of what would become the strategic analysis component of SAKSS. A series of briefs covering development domains, commodity related growth scenarios, and production issues in Uganda are available on the SCRIP website[11], in addition to various databases, reports, and presentations from the project. More recent SAKSS related research includes a study on the impact of public expenditure on agricultural growth and rural poverty (Fan et al. 2004). The public investment studies and other research findings under USSP have been cited in key policy documents in Uganda, including the Poverty Eradication Action Plan and the Marketing and Agro-Processing Strategy. Moreover, USSP's research on spatial analysis in Uganda has generated a lot of demand, most recently within the framework of the development and institutionalization of a National Spatial Data Infrastructure in Uganda.

How far these efforts have contributed to national dialogue and influenced decisions is not yet clear. The initial thrust of this SAKSS-like program has mostly been a supply

[11] http://www.foodnet.cgiar.org/SCRIP/index.htm

driven process—providing strategic analysis of key investment options and research results defined mostly to serve donor interests and concerns. As such, the program has wavered between servicing some needs in government while maintaining an overall level of irrelevance to the setting of future national priorities.

More recently, however, the program has since set up a country SAKSS node within a government department—the Plan for the Modernization of Agriculture (PMA)—working closely with national partners, donors, and the Ministries of Agriculture and Finance. This move may very well change the way in which research by international institutions such as IFPRI will have a more direct impact on the national dialogue and decisionmaking about future development for the agricultural and rural sector in Uganda. Finally, the fact that the Director of PMA is himself a former Coordinator of the Regional Strategic Analysis and Knowledge Support System (ReSAKSS)[12] provides a champion within government to help steer the direction of the program while also maintaining strong ties with regional efforts to promote the sharing of experience across countries in the region.

Ethiopia

In stark contrast to Uganda, the Ethiopia Strategy Support Program (ESSP) was originally developed in 2004 upon request from the Government of Ethiopia, with leadership from the Economic Adviser to the Prime Minister, the Minister of Agriculture, and the State Minister of Finance and Economic Development. A National Advisory Committee (NAC) was formed very early in the process. The NAC has been instrumental in setting ESSP priorities for knowledge management, research, and capacity building ever since. The institutionalization of the project within a semi-autonomous policy research institute, and close to the Prime Minister's office, was also a direct result of decisions led by the NAC. ESSP is linked directly with the Ethiopian Development Research Institute (EDRI) and collaborates with it on research and training workshops. The program is housed in the main IFPRI-Ethiopia office on the ILRI campus in Addis Ababa but maintains an active research and outreach base at EDRI.

The program structure is organized around three major pillars which include:

1. A rural economy knowledge support system (REKSS) to integrate knowledge and to conduct analyses on the rural economy, and to track the impact of rural investments and activities;
2. Actionable applied research to improve or fill gaps in knowledge on rural development; and
3. Policy analysis capacity strengthening through targeted training and related activities.

The overall organizational structure of ESSP emphasizes the need to preserve a degree of independence and identity as a think tank in order to maintain the role of the implementing institution, which in this case is IFPRI. The REKSS component is intended to serve as the outreach and servicing arm of ESSP, organized around the SAKSS concept. The REKSS includes a GIS laboratory housed in EDRI and carries out training workshops, seminars, and other capacity strengthening activities through EDRI and together with activities under the other two pillars.

[12] The ReSAKSS is discussed in Section 5.7

This CSSP with REKSS component model has proved useful for IFPRI in setting up other country support programs elsewhere in Africa, in order to retain its identity and some degree of independence and control over its research. Although many of the CSSPs were subsequently set up with the SAKSS concept as the overriding framework, the presence of an IFPRI office to manage the SAKSS and other research activities, along with IFPRI's well established reputation for research, is helping to maintain the credibility of the outputs produced, as shown in the next few examples.

Results from macro-economic modeling and simulations carried out under the program have become critical in re-establishing the importance of staple foods for future agricultural investments in the country. The modeling also advanced the analysis of progress towards the MDGs, and created substantial demand for further MDG work through ESSP by the government and donors. Most recently, the first *Atlas of the Ethiopian Rural Economy* has been produced and disseminated, and will be housed in EDRI. An external review called the *Atlas* a "major research resource" that "bodes well for future institution building efforts" (Colman and Mellor 2007). Another important ESSP product has been the paper "Growth Options and Poverty Reduction in Ethiopia: An economy-wide model analysis" by Diao and Nin Pratt (2007). This study examined which subsectors within agriculture had the best potential to improve growth and poverty reduction.

In response to the REKSS team's outputs, IFPRI researchers have been contacted by both national (Addis Ababa University, Electrical Power Corporation, etc.) and international (World Bank, Netherlands Development Organization (SNV), Natural Resources International Limited, etc.) policy researchers and analysts for consultations and inputs into their on-going work. Also, local media have cited the team's work on enhancing access to spatial and non-spatial information on the national rural economy. The REKSS team has been asked to take a leading role in establishing a national professional society for GIS for Ethiopian Development. The databases created and maintained by the team have been requested by policy analysts, researchers and students from many regions in the country. In addition, the training materials developed for ESSP's workshop series Spatial Analysis for Rural Economic Policy have been highly requested and have been the basis for several other training activities conducted independently.

Owing to tremendous success of the first three years of ESSP, the program has attracted a new round of commitments by the Government of Ethiopia, IFPRI, and donors to extend ESSP into a five-year second phase from January 2008 to December 2012. The program's second phase is structured to increasingly expand the capacity strengthening pillar to prepare for the eventual transition to full country ownership. During the second phase more than 60 percent of the activities of the program will be launched from the lead partner institution, EDRI, and by 2010 about 80 percent of the project activities are expected to be implemented by Ethiopian professionals.

Ghana

Building on previous IFPRI projects in Ghana, and several months of preliminary missions and discussions with potential stakeholders and collaborators, the Ghana Strategy Support Program (GSSP) was established in 2005 with high-level support from

the Ministry of Finance and Economic Planning (MoFEP) and the Ministry of Food and Agriculture (MoFA). The Ghana program began under the same auspices as Uganda in which it was set up initially at the request of a single donor. But unique to Ghana, it was also set up with the establishment of a country SAKSS in mind. The initial groundwork to set up a SAKSS involved many consultations with government, donors, and other stakeholders (university, think tanks, non-governmental bodies and organizations). This groundwork was important to scope whether there was a sufficient demand for a SAKSS, and if so, how to go about setting up the program such that there would be sufficient country ownership. Based on these initial consultations and negotiations it was agreed that IFPRI should establish a country support program, one that would be based on the model in Ethiopia. This would allow IFPRI to maintain an active in-country presence in order to deliver quality outputs and deliver on the expectations inherent in the SAKSS concept.

Today, the GSSP is considered to be a research, communication, and capacity-strengthening program office of IFPRI in Ghana. The office has core funding from USAID/Ghana, but with a mandate to develop a multi-donor-funded program. Committed to the expectations of a SAKSS-like program, GSSP is working with local stakeholders to help with generating information, improving dialogue, and sharpening decisionmaking processes essential for effective formulation and implementation of development strategies.

Initial research was completed on development opportunities in Ghana using spatial analysis and a study of growth scenarios based on an economy-wide multimarket model. The modeling work in particular has been in great demand by the government and was prioritized by the program's NAC, made up of representatives from government, research institutes, and the private sector. Several capacity strengthening trainings relating to modeling have been successfully conducted, including SAM building and multiplier analysis workshops with the Ghana Statistical Services, MoFEP, and the Bank of Ghana among other institutions. Research in the second year of the program expanded to include studies on the returns to public investment, the effectiveness of public service provision, and options for strengthening capacity at MoFA.

The program leader of GSSP contributed to the dialogue held during the process of revising Ghana's Food and Agricultural Sector Development Policy (FASDEP). The revised FASDEP also cites one of the collaborative studies produced by the SAKSS program, "Regional Disparities in Ghana: Policy options and public investment implications" by Ramatu Al-Hassan of the University of Ghana, Legon and Xinshen Diao of IFPRI (2007). This study was presented both nationally and internationally to solicit feedback.

Nigeria

With recognition of the knowledge, capacity, and communication weaknesses of Nigeria's Federal Ministry of Agriculture and Water Resources (FMAWR), IFPRI developed a concept note for a SAKSS type program in Nigeria in late 2004. After consultations with stakeholders and stocktaking activities, IFPRI launched the Agricultural Policy Support Facility (APSF) in partnership with FMAWR in March 2007 with financial support from the Canadian International Development Agency (CIDA). The APSF is now an initiative of IFPRI's Nigeria Strategy Support Program (NSSP). The

purpose of APSF is to strengthen the capacity of the federal government and researchers in Nigeria to design and implement evidence-based, pro-poor, gender-sensitive, and environmentally sustainable agriculture and rural development policies and strategies. The desired outcomes include improved policy analysis for rural and agricultural development, enhanced capacity in Nigeria for undertaking such analysis, and increased and improved consultations on agricultural policy issues between key stakeholders within and outside of government.

APSF includes two major components of activities:

Collaborative policy research to address specific pressing knowledge gaps, growth options for attaining development targets, and options for agricultural sector growth that is pro-poor, gender sensitive, and environmentally sustainable; and to ensure that vulnerable households benefit from agricultural and rural development and economic growth.

The establishment of a rural economy knowledge support system (REKSS), to improve the enabling environment for agricultural and rural development related strategy formulation and implementation, and work towards the establishment of a Nigeria-owned REKSS.

Research activities are currently underway and preliminary findings were presented at a stakeholder workshop "Developing Evidence for Agricultural and Rural Development Policies and Strategies in Nigeria" in May 2008 in Abuja. The workshop brought together policymakers, researchers, farmer organizations, and development partners. Several briefs on the research were distributed at the workshop, with subjects including agricultural policies and strategies, public expenditure on agriculture, and an evaluation of the impact of a community development project. A major challenge in Nigeria is access to existing information for policy design and implementation. APSF is working with information managers within the FMAWR and librarians of lead agriculture universities and research institutions to strengthen their capacity for sharing policy research information.

The APSF program has been highly consultative in identifying the research gaps, capacity strengthening needs, and communication linkages. In addition to three consultation workshops and two stakeholders' workshops, four of the collaborative research teams have held individual consultation meetings with staff of government agencies, research institutions, extension programs, development partners, and the private sector. Many of these teams have met with the same people but held very different detailed discussions. The collaborative research teams consist of IFPRI researchers and representatives from locally established institutions, mainly universities. This collaborative approach helps to strengthen capacity of the institution or university faculty. This new capacity among faculty could be transferred to university students if the new tools and methods are incorporated into the curriculum.

Several questions have arisen from the Nigeria program experience, which may be of value to consider when establishing a SAKSS: When is there too much consultation? Is there an approach that can maintain the high-level of consultation but minimizes the time burden of those involved, especially those being consulted individually or through workshops? Finally, is it more effective and sustainable to work specifically to strengthen the capacity of one research institution such as the Ethiopia program or to spread the capacity strengthening through collaborative research to a large number of institutions?

Rwanda

Rwanda, as the first country to hold a CAADP Roundtable, is at the forefront of countries aligning their development strategies with the CAADP framework. As part of the CAADP implementation process, a Rwandan country SAKSS program will be set up to help provide the information and knowledge support to guide and review progress of agricultural sector performance. In preparation for the Roundtable, stocktaking reports and analyses were undertaken to answer critical questions, such as "Agricultural Growth and Investment Options for Poverty Reduction in Rwanda" (Diao et al. 2007). The country SAKSS will naturally build on this work by coordinating research, capacity strengthening, and dialogue to address further policy questions that will arise as the new economic and agricultural sector development strategies are implemented.

Following the signing of the compact in March 2007, efforts to begin the process of setting up a country SAKSS initially moved very slowly, in part due to the demand that it be maintained as an integral part of any post-CAADP Compact follow up in the country. With little guidance on how this would be done, the set up of a country SAKSS in Rwanda lost an entire year during 2007. Efforts are now well underway by IFPRI, in collaboration with the ReSAKSS-ECA node[13] at the International Livestock Research Institute (ILRI) in Nairobi, to consult with the Rwandan partners and stakeholders in 2008.

Mozambique

Mozambique began serious efforts to set up a country SAKSS in 2007 following consultations between the Ministry of Agriculture, the Swedish Embassy through the Swedish International Development Cooperation Agency (SIDA), and the CGIAR centers implementing the Regional Strategic Analysis and Knowledge Support System for Southern Africa (ReSAKSS-SA): the International Water Management Institute (IWMI), the International Crops Research Institute for Semi-Arid Tropics (ICRISAT), and IFPRI. The program was envisioned from the start to provide credible information, using the SAKSS approach, on the kinds of investment and policy options needed to achieve targeted goals of the national strategy. At this time, Mozambique was in the process of designing a new agricultural strategy, slated to be completed by the end of the year. To be timely and useful, a set of proposed strategic analysis and research activities were planned for during the first year, combining short-term and demand-based approaches for strategic analysis that will help identify key investment and policy alternatives for agriculture in Mozambique. The work plan was reviewed and validated among several local key partners.

The primary activities in the work plan included:

- *Monitoring and evaluation* of agricultural investments and performance;
- *Strategic analysis* of future investment and policy options, including short-term studies on emerging issues;

[13] The ReSAKSS-ECA node is discussed in Section 5.7

Knowledge sharing and policy dialogue – to further promote local capacities for generating and sharing information and analysis with policymakers to strengthen the utility of evidence-based decisionmaking; and
Capacity Strengthening (an integral part of all four activities above) – to strengthen local capacities for undertaking strategic analysis and knowledge support during the process of designing and implementing agricultural and rural development strategies in Mozambique.

In its inception in 2007, the program organized a number of seminars based on some preliminary results of ongoing work undertaken with local partners. The process of setting up a NAC also began, especially after the Ministry of Agriculture formally endorsed the program and requested that the SAKSS program be hosted within its Economic Directorate. The expanded program will be formerly launched in 2008 under the guidance of a NAC.

Africa-wide efforts to support CAADP and regional strategy

At the Africa-wide level, three ReSAKSS nodes have been set up in each of the major regional economic communities (RECs): Common Market for Eastern and Southern Africa (COMESA), Economic Community of West Africa States (ECOWAS), Southern Africa Development Community (SADC) in collaboration with five CGIAR centers (IFPRI, ICRISAT, IWMI, the International Livestock Research Institute (ILRI), and the International Institute of Tropical Agriculture (IITA)). Launched in September 2006, the nodes have been developing a network of regional research partners and information suppliers and an ICT web-based environment to connect them. The nodes have also been providing support to the CAADP Roundtable process and the establishment of country SAKSS in the post Roundtable period.

The ReSAKSS nodes are located at three Africa-based CGIAR centers: IITA in Ibadan, Nigeria; ILRI in Nairobi, Kenya; and IWMI in Pretoria, South Africa, jointly with ICRISAT. IFPRI is helping to coordinate a common agenda across the three nodes, is providing technical and analytical support, and is helping maintain and strengthen links with a broad network of CAADP partners. The nodes are governed via Steering Committees chaired by the respective RECs. The Steering Committees provide overall oversight and help to ensure that the ReSAKSS agenda remains relevant to development priorities, CAADP, and regional strategies.

Joint collaboration across the three ReSAKSS nodes is headed by a small Steering Committee composed of division or department directors from each collaborating CGIAR center and a single representative each from NEPAD and the donor community. The Committee meets once per year to review progress, ensure shared goals, and make decisions by consensus. A working group composed of regional and Africa-wide SAKSS coordinators meets twice a year to develop and review in detail an integrated work plan and communication and outreach strategy, as well as share experiences of implementation. The full-time coordinator oversees the day to day research, analysis, and outreach activities of the SAKSS, coordinating with each node to ensure consistency and avoid duplication, and filling any gaps based on each node's comparative skills and existing networks. This means working with a diverse group of local and international partners (including other CGIAR centers) to build on any existing analysis and knowledge that can provide the state of the art research and technical

support needed to populate the knowledge system over time. Coordination at the Africa-wide node level is headed by IFPRI and in collaboration with the AU and NEPAD.

ReSAKSS is playing a critical role in the process by helping to facilitate improved access to high-quality information and analysis, thereby providing policymakers with credible evidence on which to base decisions. In close collaboration with the RECs and their member states and local and regional partners, ReSAKSS provides support in the following three areas:

Strategic analysis
Knowledge management and communications
Capacity strengthening.

The strategic analysis activities help fill critical knowledge gaps identified by regional stakeholders and help assist member states in assessing their progress toward realizing the CAADP goals of allocating 10 percent of the national budget to agriculture, achieving a 6 percent annual agricultural growth rate, and meeting the first MDG of halving poverty and hunger by 2015. In addition, IFPRI has been leading ReSAKSS efforts to develop a monitoring and evaluation framework, indicators, and benchmarks to inform CAADP implementation (see Benin and Johnson 2008).

Under the knowledge management and communications component, ReSAKSS and its network of partners are collecting data on key indicators such as public spending; integrating and building upon existing data, analytical tools, and knowledge; and facilitating timely access of the knowledge by African policymakers and development partners to allow for more evidence-based decisionmaking. To this end, ReSAKSS is developing interactive knowledge platforms such as websites and compact discs that will help inform CAADP review and dialogue processes.

Finally, ReSAKSS is helping to build and strengthen institutional and technical capacity by promoting collaboration in generating and disseminating data and providing access to knowledge and information products. A key element under capacity strengthening has been to provide technical support to the CAADP Roundtable process and setting up country SAKSS at countries' requests. The latter is intended to allow for proper follow up to Roundtable outcomes and subsequent policy debates and decisionmaking. The support to the Roundtable process has involved IFPRI working closely with the RECs, ReSAKSS nodes, other local and international partners, to facilitate stocktaking exercises and provide technical support for the analytical work that is required prior to each CAADP Roundtable as countries move to align their agricultural strategy with the CAADP framework and prepare investment compacts.

A number of country level analyses to inform the country CAADP Roundtables have been completed or are underway by IFPRI in collaboration with RECs. The analyses were completed for Rwanda, Malawi, Kenya, Uganda, and Zambia in 2006 and 2007 using a SAKSS analytical approach of organizing the analysis around a logical sequence of questions designed to identify future growth options and level of effort required to achieve growth, poverty-reduction, and food security targets:[14]

[14] See Diao et al. 2007 (on Rwanda); Benin, S. et al. forthcoming (on Malawi); Thurlow, J. et al. forthcoming (on Uganda); Thurlow, J. et al. forthcoming (on Zambia); and Thurlow, J. et al. 2007 (on Kenya). Also see Thurlow, J. (2008) on Mozambique.

Is a 6 percent growth rate in agriculture sufficient to reach the poverty reduction MDG in the country? If not what would be the required rate of agricultural growth (MDG growth rate)?
What are the most promising sectors and sub-sectors to accelerate growth and reach the 6 percent or required MDG growth target?
What is the level of investment to accelerate growth in these sectors and sub-sectors to reach the 6 percent or required MDG growth rate?
What other additional investments are needed, and in which areas, to support growth in the priority sectors and achieve the 6 percent or required MDG growth rate?
How much of the required investment would a budget share of 10 percent be able to cover?
What would be the funding gap to meet the required investments?
What additional measures need to be taken to ensure that the faster growth priority sector translates into better distribution and nutrition outcomes?

The analysis adopted three primary methodologies to answer the questions: (i) economy-wide simulation analysis combined with detailed spatial disaggregation of economic sub-sectors and sub-national regions to determine sources of growth and poverty reduction,(ii) assessment of public investment options based on their relative economic rate of return, and (iii) estimation of total public resources required. The level and detail of analysis varied depending on availability of data and already existing analytical work in these countries. The results of analysis have been received well within each country, having been undertaken in collaboration with in-country partners. They are serving as critical input into the stakeholder dialogue and preparation of a Roundtable compact within each country.

As additional countries launch their own process towards aligning their agricultural strategy with the CAADP agenda, the ReSAKSS nodes are likely to take a more active role in coordinating future capacity needs for the stocktaking and analysis exercises required ahead of the CAADP Roundtables. Now that the nodes are more established, they can draw more easily on their own network of data suppliers and analysts within each country and beyond (e.g. from institutions like IFPRI and other international partners). The nodes are also increasingly in a better position to help set up other country SAKSS based on demand. The current efforts to set up the Mozambique and Rwanda country SAKSS programs have involved the active participation of the East and Central Africa (ECA) and Southern Africa (SA) ReSAKSS nodes, in collaboration with IFPRI. Their involvement from the start has been critical to begin establishing clear lines of communication and information flows between these country SAKSS and ReSAKSS programs, as well as with IFPRI's own country support programs.

Summary of early lessons learned

The country and regional examples illustrate how the SAKSS concept has been applied differently in response to local conditions. SAKSS is not meant to replace any other existing country or regional networks, but instead strengthen and build on them. In some countries there may already be strong capacities among existing networks and institutions providing critical data and analysis for policy dialogue and strategy formulation.

Among the programs reviewed above, many are at very different stages in their development. Those that are an integral part of IFPRI's country support programs have focused more attention on assisting local partners with improving data and spatial analysis techniques and reporting capacity. Much attention has been placed on generating timely research papers and briefs to feed into emerging policy issues and dialogue. Overall, they have maintained a strong institutional identity with IFPRI, as they are an integral part of IFPRI's CSSPs. The exception is Uganda, which has placed a SAKSS manager within the secretariat of the PMA. Similar models are now being considered for future IFPRI-led programs in Mozambique and Malawi.

Among all programs, certain early observations and experiences are worth noting:[15]

Dialogue with the local policymakers, analysts, and existing networks is essential at the early stages to determine the local needs and capacity.

Having local champions of SAKSS has had an important impact on the effectiveness and speed at which SAKSS and ReSAKSS nodes were set up. For example, the placement of a former ReSAKSS Coordinator as the new Director in the Ugandan PMA has helped set up a SAKSS node that is more directly linked with the PMA Secretariat.

Stronger ties with local partner institutions and government bodies have helped maintain the relevance of a SAKSS program as country-led and owned.

The ability to maintain quality products that have been produced in close collaboration with local partners and institutions raises the credibility of the program while also maintaining its relevance among stakeholders.

The presence of an active champion within the Steering Committee helps to establish stronger ties among the network data and analysis suppliers, as well as the relevance of its outputs among users (government agencies, policymakers, development partners, and so forth).

The existence of multiple donors and a sufficient level of resources strengthen the program's perception as a public good and in support of local interests and capacity needs.

[15] These points are not based on any serious comparative analysis across the programs but are simply observations by the authors. A separate comparative study is now underway.

Summary Conclusion

The SAKSS concept is intended to provide a framework which promotes the linkages between analyses and decisionmaking and thus help maintain a strategic approach in the research and analysis undertaken. The manual has provided a background on the SAKSS concept, a review on the kind of tools and approaches needed for the knowledge support system, and a guide on how to go about setting up such systems at country level. It began with a preface that described the evolution of the SAKSS concept, from the time of its inception and through its transformation into IFPRI CSSPs and regional-wide programs in Africa.

The application of SAKSS via the CSSPs and regional ReSAKSS programs allows for lessons to be drawn, improving our understanding of how such systems can be made more effective in bringing evidence to bear during policy dialogue and decisionmaking on current and future development strategies. While it is still too soon to determine the success of these programs without a more detailed comparative analysis, certain lessons and principles were highlighted. We summarize some of these here again.

Local partners must shape the relevance of a SAKSS: Key partner organizations (e.g. research institutions, government ministries, universities, and NGOs) must perceive and be engaged to help fashion its relevance and utility. Only through such levels of institutional engagement will SAKSS be able to provide improved and commonly accepted approaches that can foster, enhance, and improve synergies among the varied and multiple development efforts. Dialogue with local policymakers, analysts, and existing networks is essential at the early stages to determine the local needs and capacity.

Adapt to local conditions: It must be able to be institutionalized and maintained in ways that enable it to adapt to local conditions and serve as a national and regional public resource.

Maintain broad representation of stakeholders: Its organizational and governance structure must be established in a way that allows a broad representation of key stakeholders (government, university, think tanks, development practitioners, civil society, farmer organizations, and development partners) to maintain its relevance.

Establish strong links with a local partner(s): It must be able to develop strong links with local partner institutions and organizations to help strengthen their capacities to provide and sustain the SAKSS in the long run. Strong ties with local partner institutions and government bodies help maintain the relevance of a SAKSS program as country-led and owned.

Produce collaborative quality products: The ability to maintain quality products that have been produced in close collaboration with local partners and institutions raises the credibility of the program while maintaining its relevance and utility among partners and stakeholders.

Have a local champion: The presence of an active champion within the Steering Committee helps to establish stronger ties among the network data and analysis

suppliers, as well as the relevance of its outputs among users (government agencies, policymakers, development partners, and so forth).

Inherit multiple donor support: The existence of multiple donors and a sufficient level of resources strengthen the program's perception as a general public good in support of local interests and capacity needs.

Of course there is no single blueprint of a country SAKSS. The experience of existing programs highlights the unique settings that exist within each country with respect to stakeholder needs; human and institutional capacity; stock of knowledge; funding levels; data availability; and relationships between government, donors, and the research community. These ultimately shape the SAKSS program in each country with respect to its governance and institutional structure, relationships with local partners, and analytical agenda, for instance. However, as illustrated in the previous sections, there are some basic principles, definitions, and objectives underlying the SAKSS concept and the process of establishing a country SAKSS program. We laid out a step-by-step guideline for setting up a country program, drawing on the experience of existing programs and those from other similar efforts more generally.

We hope this conceptual background and guidebook can serve the purpose of guiding the set up of other country SAKSS programs should such demands arise. These guidelines have become especially critical as the AU and NEPAD begin to request the regional ReSAKSS programs to assist with establishing country SAKSS nodes as part of the broader CAADP implementation process. The guidelines are not exhaustive for good reason. How a country SAKSS is shaped and managed within each individual country will depend on many factors, as already highlighted above. What is far more important is to focus attention on:

Filling key data, analysis, and knowledge gaps (strategic analysis),
Strengthening the links between suppliers and users of such information (dialogue) , and ultimately
Promoting greater use of evidence during the process of formulating and implementing agricultural and rural development strategies, based on the conditions and demands within each country (capacity strengthening).

References

Al-Hassan, R. and X. Diao. 2007. "Regional Disparities in Ghana: Policy options and public investment implications." IFPRI Discussion Paper 693. Washington, D.C.: IFPRI.

Anderson, Edward, Paolo de Renzio and Stephanie Levy. 2006. "The Role of Public Investment in Poverty Reduction: Theories, evidence and methods." ODI Working Paper 263. London: ODI.

Babu, S.C. and Per Pinstrup-Andersen. 1994. "Food Security and Nutrition Monitoring: A conceptual framework, issues and challenges." *Food Policy* 19 (6): 218-233.

Benin, S., Thurlow, J., Diao, X., Lungren, C. and Simtowe, F. (forthcoming) "Agricultural Growth and Investment Options for Poverty Reduction in Malawi." IFPRI Discussion Paper. Washington D.C.: IFPRI.

Benin S., Nin Pratt, A., Fan, S., Breisinger, C., Mogues, T., Thurlow, J., and Diao, X. (forthcoming). "Growth and Poverty Reduction Impacts of Public Investments in Agriculture and Rural Areas: Assessment techniques, tools and guide for practitioners." ReSAKSS Working Paper. Washington, D.C.: IFPRI.

Benin, S. and M. Johnson. 2008. "Monitoring and Evaluation for the CAADP." Draft ReSAKSS Report prepared for the African Union and NEPAD. Washington, D.C.: IFPRI.

Bhorat, Haroon. 2007. "The Nine Commandments: A South African case study identifies roles for applied research institutions." In Ayuk, Elias T. and Mohamed Ali Marouani (eds). *The Policy Paradox in Africa: Strengthening Links between Economic Research and Policymaking*. Trenton and Ottawa: Africa World Press and the International Development Research Centre (IDRC).

Breisinger, C., Diao, X., Thurlow, J. and Al-Hassan, R.M. (forthcoming). "Agriculture for Development in Ghana: New opportunities and challenges." IFPRI Discussion Paper. Washington D.C.: IFPRI.

Brinkerhoff, D. 1996. "Process Perspectives on Policy Change: Highlighting implementation." *World Development* 24 (9): 1395-1401.

Byerlee, D. 2000. "Targeting Poverty Alleviation in Priority Setting for Agricultural Research." *Food Policy* 25: 429-45.

Cash, David W., William C. Clark, Frank Alcock, Nancy M. Dickson, Noelle Eckley, David H. Guston, Jill Jager and Ronald B. Mitchell. 2003. "Knowledge Systems for Sustainable Development." *Proceedings of the National Academy of Sciences* 100 (14): 8086-8091.

Colman, D. and J. Mellor. 2007. "Phase I Review of the Ethiopia Strategy Support Program (ESSP)."

Court, J. and J. Young. 2003. “Bridging Research and Policy: Insights from 50 case studies.” ODI Working Paper 213. London: ODI.

Creech, H. 2001. “Measuring While You Manage: Planning, monitoring and evaluating knowledge networks.” Winnipeg: International Institute for Sustainable Development (IISD).

Creech, H. and T. Willard. 2001. *Strategic Intentions: Managing knowledge networks for sustainable development*. Winnipeg: IISD.

Crosby, B. 1996. “Policy Implementation: The organizational challenge.” *World Development* 24 (9): 1403-1415.

Dalal-Clayton, B. and S. Bass. 2002. *Sustainable Development Strategies: A resource book.* London: Earthscan Publications.

Diao, X. and A. Nin Pratt. 2007. “Growth Options and Poverty Reduction in Ethiopia: An economy-wide model analysis.” *Food Policy* 32 (2): 205–228.

Diao, X., S. Fan, S. Kanyarukiga and B. Yu. 2007. “Agricultural Growth and Investment Options for Poverty Reduction in Rwanda.” IFPRI Discussion Paper 689. Washington, D.C.: IFPRI.

Diao, X. P. Hazell, D. Resnick, and J. Thurlow. 2007. “The Role of Agriculture in Development: Implications for Sub-Saharan Africa.” IFPRI Research Report 153. Washington, D.C.: IFPRI.

Dorward A., J. Kydd, J. Morrison, and I. Urey. 2004. “A Policy Agenda for Pro-Poor Agricultural Growth.” *World Development* 32 (1): 73-89.

Fan, S, X. Zhang, and N. Rao. 2004. “Public Expenditure, Growth, and Poverty Reduction in Rural Uganda.” DSGD Discussion Paper 4. Washington, D.C.: IFPRI.

Fan, S., M. Johnson, A. Saurkar, and T. Makombe. 2008. “Investing in African agriculture to halve poverty by 2015.” IFPRI Discussion Paper 751, Washington, D.C.: IFPRI

Gabre-Madhin, E. and S. Haggblade. 2003. “Successes in African Agriculture: Results of an expert survey.” Conference Paper No. 1, presented at the conference “Successes in African Agriculture,” Pretoria, South Africa, December 1-3.

Gijsbers, G., W. Janssen, H. Hambly Odame, and G. Meijerink (eds). 2001. *Planning Agricultural Research: A sourcebook.* Wallingford: ISNAR and CABI Publishing.

Haggblade, S., ed. 2004. “Building on Success Stories.” 2020 Focus Briefs No.12. Washington, D.C.: IFPRI.

Hovland, I. 2007. Making a Difference: M&E of policy research. ODI Working Paper 281. London: ODI.

Hovland, I. 2003. "Knowledge Management and Organisational Learning: An international development perspective." ODI Working Paper 224. London: ODI.

IFAD. 2002. "A Guide for Project M&E - Managing for Impact in Rural Development", Rome, Italy: International Fund for Agricultural Development (IFAD)

IFPRI. 2006. "Regional Strategic Alternatives for Agriculture-led Growth and Poverty Reduction in West Africa." Unpublished draft.

Jayne,T.S., M. Mukumbu, M. Chisvo, D. Tschirley, M.T.Weber, B. Zulu, R. Johannson, P. Santos, and D. Soroko. 1999. "Successes and Challenges of Food Market Reform: Experiences from Kenya, Mozambique, Zambia, and Zimbabwe." Michigan State University (MSU) International Development Working Paper No. 72. East Lansing: Department of Agricultural Economics, MSU.

Johnson, M. and D. Resnick. 2004. "Strategic Analysis and Knowledge Support Systems for Rural Development Strategies in Sub-Saharan Africa." DSGD Discussion Paper 14. Washington, D.C.: IFPRI.

Johnson, M., P. Hazell and A. Gulati. 2003. "The Role of Intermediate Factor Markets in Asia's Green Revolution: Lessons for Africa." *American Journal of Agricultural Economics* 85 (5): 1211-1216.

Kherallah, M., C. Delgado, E. Gabre-Madhin, N. Minot, and M. Johnson. 2002. *Reforming Agricultural Markets in Africa.* Baltimore: Johns Hopkins University Press.

Killick, T. 1976. "The Possibilities of Development Planning." *Oxford Economic Papers* 28 (2): 161-184.

Kiringai, J. and J. Thurlow. 2007. "Rural Investments to Accelerate Growth and Poverty Reduction in Kenya." Report prepared for the Food and Agricultural Organization and the World Bank.

Montjoy, R. and L. O'Toole. 1979. "Toward a Theory of Policy Implementation: An Organizational Perspective." *Public Administration Review* 39(5): 465-476.

Nin Pratt, A. and X. Diao. 2006. "Exploring Growth Linkages and Market Opportunities for Agriculture in Southern Africa." DSGD Discussion Paper 42. Washington, D.C.: IFPRI.

Omamo, S.W. 2004. "Bridging Research, Policy, and Practice in African Agriculture." DSGD Discussion Paper 10. Washington, D.C.: IFPRI.

Omamo, S., X. Diao, S. Wood, J. Chamberlin, L. You, S. Benin, U. Wood-Sichra, and A. Tatwangire. 2006. "Strategic Priorities for Agricultural Development in Eastern and Central Africa." IFPRI Research Report 150. Washington, D.C.: IFPRI and ASARECA.

Perkin, E. and J. Court. 2005. "Networks and Policy Processes in International Development: A literature review." ODI Working Paper 252. London: ODI.

Ryan, J.G. 1999. "Assessing the Impact of Policy Research and Capacity Building by IFPRI in Malawi." Impact Assessment Discussion Paper 11. Washington, D.C.: IFPRI.

Ryan, James G. and James L. Garrett. 2003. "The Impact of Economic Policy Research: Lessons on attribution and evaluation from IFPRI." IFPRI Impact Assessment Discussion Paper 20. Washington, D.C.: IFPRI.

Start, D. and I. Hovland. 2004. "Tools for Policy Impact: A Handbook for Researchers." London: ODI.

Stone, D., S. Maxwell, and M. Keating. 2001. "Bridging Research and Policy." International Workshop funded by the UK Department for International Development, Radcliffe House, Warwick University, UK.

Thomas, J.W. and M.S. Grindle. 1990. "After the Decision: Implementing policy reforms in developing countries." *World Development* 18 (8): 1163-1181.

Thurlow, J. and P. Wobst. 2004. "The Road to Pro-Poor Growth in Zambia: Past lessons and future challenges." DSGD Discussion Paper 16. Washington, D.C.: IFPRI.

Thurlow, J. 2008. "Agricultural Growth and Investment Options for Poverty Reduction in Mozambique." Report prepared for the Mozambique Ministry of Agriculture. Washington D.C.: IFPRI.

Thurlow, J., Benin, S., Diao, X., Kebba, A. and N. Ofwono. (forthcoming). "Agricultural Growth and Investment Options for Poverty Reduction in Uganda." IFPRI Discussion Paper. Washington D.C.: IFPRI.

Thurlow, J., Benin, S., Diao, X., Kalinda, H. and T. Kalinda. (forthcoming). "Agricultural Growth and Investment Options for Poverty Reduction in Zambia." IFPRI Discussion Paper. Washington D.C. : IFPRI.

Thurlow, J., Kiringai, J., and M. Gautam. 2007. "Rural Investments to Accelerate Growth and Poverty Reduction in Kenya." IFPRI Discussion Paper No. 723. Washington D.C.: IFPRI.

Timmer, C. P. 1998. "Adding Value through Policy-Oriented Research: Reflections of a scholar-practitioner." Impact Assessment Discussion Paper 4. Washington, D.C.: IFPRI.

Wangwe, Samuel 2005. "A Review of How External Agencies Can Influence Research Agendas and Research Policy Links." Dar es Salaam: Economic and Social Research Foundation.

Wildavsky, A. 1973. "If Planning is Everything, Maybe It's Nothing." *Policy Sciences* 4: 127-153.

World Bank. 2004. "Monitoring and Evaluation; Some tools, methods and approaches." Washington D.C.: World Bank.

Appendix A: Tools for Analyzing Strategic Priorities and Impact

A.1 Computable General Equilibrium (CGE) Model

What is its purpose?	To capture the inter-linkages between sectors and institutions in the economy and address questions relating to public expenditures and budgeting. A CGE model treats both agricultural and non-agricultural sectors with the same level of detail.
What questions can it help to answer?	What is the role of agriculture in the economy? How does it contribute to economy-wide growth and national development goals? What agricultural growth rates would be needed to reach the MDGs? What sector investments are needed? How would changes in demand side constraints (such as marketing opportunities, transportation costs, and others) influence pro-poor growth? What are the interactions between the agricultural and non-agricultural sectors, as well as between the rural and urban areas, in the growth process? How does growth in each of the major economic sectors and sub-sectors influence poverty reduction? How do the links between economic growth and poverty reduction vary amongst different regions? Are there opportunities for regional linkages that would generate spill-ins or spillovers in the areas of trade and technology?
Under which conditions should it be used?	When it is necessary to capture both direct and indirect effects of policy changes on poverty and income distribution.
Requirements	*Data/information:* Requires Social Accounting Matrix (SAM) constructed from national accounts and survey data. *Time:* 3 months – 1 year *Skills:* Advanced modeling experience *Supporting software:* Excel, Eviews, Gauss, GAMS *Financial cost:* Depends on availability of data and whether SAM has already been built. $25,000-$75,000.
What are its limitations?	Cannot be used to assess monetary policies, such as changes in interest rates, inflation, or money supply. Requires extensive data.
Application Examples	Diao, X. P. Hazell, D. Resnick, and J. Thurlow. 2007. "The Role of Agriculture in Development: Implications for Sub-Saharan Africa." IFPRI Research Report 153. Washington, DC: IFPRI.

A.1.1 Conceptual Framework and Methodology

Various analytical tools can be used to assess the impact of policies on *either* growth or poverty. A key challenge when formulating policies, however, is understanding how those policies *simultaneously* affect growth and poverty. Developing such an understanding is difficult because it entails accounting for the actions and interactions of many agents within the economy, including producers, households, enterprises, and governments. Each of these agents has distinct interests and operates in a unique environment. For example, rural households behave differently and have different opportunities compared with urban households, and agricultural producers use different technologies and face different constraints compared with manufacturing producers. Therefore, a method is needed that takes into account the unique characteristics of and agents within the country under consideration.

Understanding how policies affect growth and poverty is further complicated by the many linkages among economic agents. These linkages determine how the immediate effects of policies on some agents trickle down through the economy and affect others. For example, expanding growth in urban-based agro-processing may stimulate demand for agricultural inputs, which in turn may generate employment for rural households. Hence, expanding agroprocessing directly benefits urban households while it indirectly benefits rural households. Accounting for linkages is also important in public investment. Although many studies consider how increasing government spending on education or health will affect poverty, few consider the implications of financing these policies. If, for example, the government must raise taxes to fund a policy, then by how much should they be raised, who will be affected, and how will other areas of the economy be affected? As illustrated in these examples, use of analytical methods that only consider the direct effects of policies may miss many of the indirect effects, with potentially disastrous consequences.

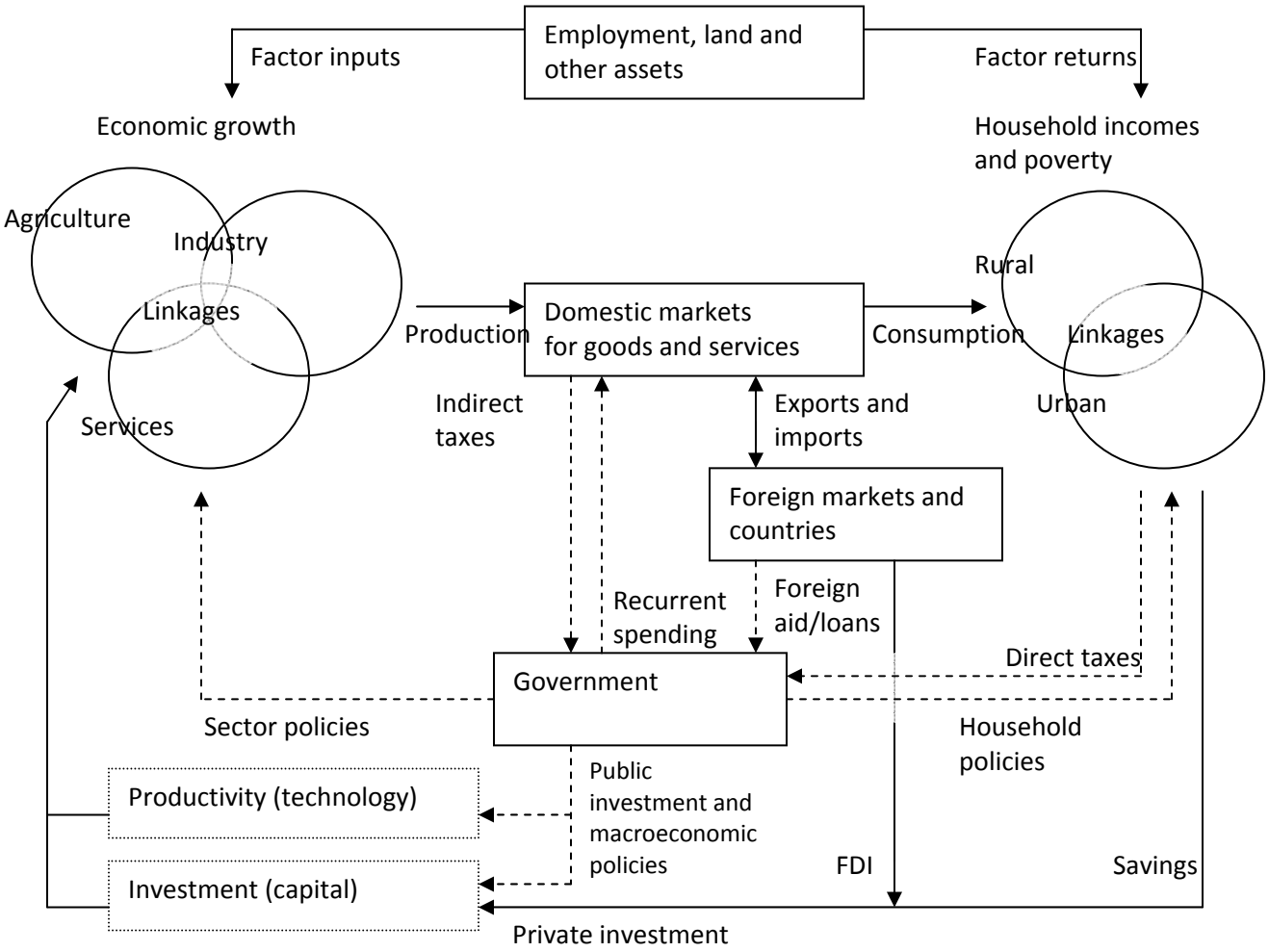
In summary, what is needed is an analytical tool or economic model that accounts for the various economic actors within a country. Such a model therefore has to capture the entire economy (i.e., it must be ‘economy-wide’). Furthermore, the model should not ignore the many linkages between the various actors. In other words, the model must consider how the macroeconomics of production and growth affect the microeconomics of employment and poverty (i.e., it must be a ‘macro-micro’ model). The computable general equilibrium (CGE) model is the prime example of an economy-wide macro-micro model.

The CGE model has two parts. The first part is a purpose-built database called the social accounting matrix (SAM). This data is drawn from a wide range of sources, including household surveys, national accounts, input–output tables, trade data, and so on. The SAM must be constructed before developing the second part of the CGE model which is a set of mathematical equations that describes the behavior of and linkages between the various economic agents in the country’s economy. These equations are then utilized with the data (in a process called calibration) to ensure that the structure and behavior of the model captures the unique characteristics of the country’s economy. (see Figure A.1 for an example of the various agents in the CGE model and some of the linkages among them).

In building a CGE model, the challenge is to link economic growth (the left side of Figure A.1) with household incomes and poverty (the right side of Figure A.1). Unlike typical

macroeconomic models, the CGE model can be more detailed in its treatment of how economic growth is generated because it includes many disaggregated sectors (drawing on input–output tables and national accounts). This disaggregation is important because policy analysts want to understand the sector-specific technologies used by individual producers (for example, their factor inputs and productivity) as well the linkages among sectors (for example, cross-sector demand for intermediate goods).

Figure A.1: Overview of the Agents and Linkages Underlying a CGE Model



Economic growth is achieved by exploiting factors such as labor, land, and other assets to produce goods and services. However, the factors used and goods produced vary from sector to sector. The CGE model takes these details into account by including many disaggregated factors and commodities (drawing on household surveys). For example, the CGE model has the capacity to differentiate between skilled and unskilled labor, male and female labor, and agricultural and nonagricultural capital. Such distinctions are important because, while employment may generate factor returns, it is important to know the distribution of factor or asset endowments across households in the country. For example, some households do not have access to land and therefore are less likely to benefit from policies that improve returns to land. Other households may not have skilled labor and therefore are unlikely to participate in skill-intensive

sectors. Therefore, the income and expenditure patterns of households will depend on their asset endowments, as well as their demographic, geographic, and economic conditions. There are also many linkages among households, especially rural and urban households, through migration and remittances. The CGE model will capture the differences and linkages among households, drawing on household surveys, to allow an assessment of the effects of policies on growth, poverty, and inequality within a single, consistent, analytical framework.

The CGE model captures the effects of trade by allowing producers to supply both domestic and foreign markets, and by allowing import competition once domestic demand is satisfied. Apart from changes in trade policies, the CGE is also able to assess the impact of changes in a country's terms-of-trade on growth and poverty, such as an increase in world oil prices.

The CGE model is a useful tool for assessing a wide range of policies, since the model captures many of the primary functions and constraints of the government (see dotted lines in Figure A.1). For example, one of the main advantages of using a CGE model is that it can assess how public investment and macroeconomic policies affect growth and poverty, as well as how these policies can be financed. This is particularly important in determining whether there are tradeoffs or synergies among different policies. The model will capture the effects of investment on productivity and the accumulation of capital, and how such effects in turn influence growth in different sectors. In addition, the model will enable an assessment of the effects of direct sectoral policies, such as targeted subsidies, as well as household policies, such as state pensions and other transfers. In terms of financing these policies, the model captures a wide range of tax instruments (that is, personal, corporate, sales, and import taxes) as well as alternative sources of funds, such as foreign aid and borrowing. Together, these features make the CGE model a powerful tool for informing policymakers and ensuring consistency between macroeconomic and poverty-reduction strategies.

It should be noted that, although the CGE model is one of the more comprehensive analytical tools available, it cannot answer all questions on its own. For instance, this type of CGE model cannot be used to assess monetary policies, such as changes in interest rates, inflation, or the money supply. Such issues usually require a macro-financial model. Potential complementarities with other policy tools could be explored in the future, but the focus on developing informed and consistent for growth and poverty-reduction policy makes the CGE model an appropriate first step.

References

Löfgren, H., R.L. Harris, and S. Robinson. 2002. "A Standard Computable General Equilibrium (CGE) Model in GAMS." Microcomputers in Policy Research 5. Washington, DC: IFPRI.

A.2 Economy-wide Multimarket (EMM) Model

What is its purpose?	To identify the role that the rural and agricultural economy can play in achieving growth and poverty reduction through its linkage with the nonagricultural sector and with the overall economy.
What questions can it help to answer?	Is there a trade-off between growth and poverty reduction? Is there a trade-off between growth and inequality? Are the sectoral growth targets from national development strategies consistent with overall economic growth and poverty reduction goals? In which sectors is growth the most pro-poor? What are the sources of growth within agriculture? Which sub-sector growth is more pro-poor within agriculture?
Under which conditions should it be used?	When data is too limited to do the more complex CGE model. The EMM model does not disaggregate non-agricultural sectors.
Requirements	*Data/information:* Household income or consumption data *Time:* 1-3 months *Skills:* Previous modeling experience *Supporting software*: Stata, SAS, GAMS *Financial cost*: $15,000-$45,000
What are its limitations?	Cannot capture inter-linkages between agriculture and non-agriculture through factor mobility (especially employment and migration) or backward and forward input-output linkages in production.
Application Examples	Al-Hassan, R. and X. Diao. 2007. "Regional Disparities in Ghana: Policy options and public investment implications." IFPRI Discussion Paper 693. Washington, DC: IFPRI. Diao, X. and A. Nin Pratt. 2007. "Growth Options and Poverty Reduction in Ethiopia: An economy-wide model analysis." Food Policy 32 (2): 205–228. Diao, X. and D. Sarpong. 2007. "Cost Implications of Agricultural Land Degradation in Ghana: An economywide, multimarket model assessment." IFPRI Discussion Paper 698. Washington, DC: IFPRI. Diao, X., A. Fan, S. Kanyarukiga, and B. Yu. 2007. "Agricultural Growth and Investment Options for Poverty Reduction in Rwanda." IFPRI Discussion Paper 689. Washington, DC: IFPRI. Omamo, S., X. Diao, S. Wood, J. Chamberlin, L. You, S. Benin, U. Wood-Sichra, and A. Tatwangire. 2006. "Strategic Priorities for Agricultural Development in Eastern and Central Africa." IFPRI Research Report 150. Washington, DC: IFPRI and ASARECA.

A.2.1 Conceptual Framework and Methodology

The EMM model captures the detailed structure of the agricultural sector. By contrast, the disaggregation of the CGE models is more evenly balanced across agricultural and nonagricultural sectors. Although the CGE models are better at capturing cross- sector growth linkages during the production process, they contain less detailed information on agriculture, such as the production technologies used in the many agricultural subsectors. These differences may not prove too severe, however, because consumption linkages outweigh production linkages in most developing countries during their early stages of development (Vogel 1994). The ability to capture detailed consumption linkages depends largely on the disaggregation of households' income and expenditure patterns. In this regard, both EMM and CGE models should have highly disaggregated representative households and be linked directly to household expenditure surveys to ensure that the most detailed household information is retained. The models can be disaggregated further across regions within each country to capture the geographic heterogeneity of sectors and households.

The EMM model is based on neoclassical microeconomic theory. In the model, there are aggregate producers representing subnational production in each sector and for rural and urban areas. The supply functions are derived under producer profit maximization based on the producer prices of all commodities. In the agricultural sector, these supply functions have two subcomponents: (1) yield functions and (2) land allocation functions responsive to changing profitability across different crops given the total available land. Where data are available, the supply functions are disaggregated further across technologies. For example, the yield functions for farmers employing modern inputs, such as fertilizer or improved seeds, have higher productivity coefficients than those not using modern inputs. The area functions for each crop are also disaggregated according to the use of modern inputs. For example, the area functions for maize production include farmers using fertilizer only, those using fertilizer and improved seeds, or those not using any modern inputs. Further, since irrigation is treated as one of these modern inputs, there are different supply functions for irrigated and rainfed crop production.

Representative consumers are aggregated from household survey data to represent an average household's consumption patterns in rural and urban areas of each subnational region. The demand functions are derived from utility maximization based on prices and income. Income is generated from both agricultural and nonagricultural activities and is an endogenous variable that links supply with demand as in a typical general equilibrium model.

As the name of the model suggests, a multiple market structure is specified. There is perfect substitution between domestically and internationally produced commodities. However, transportation and other market costs distinguish trade in the domestic market from imports and exports. For example, although imported maize is assumed to be perfectly substitutable with domestically produced maize in consumers' demand functions, maize may still not be profitable to import if its domestic price is lower than the import parity price less any transactions costs. Maize imports can occur only when domestic demand for maize grows faster than domestic supply and the local market price rises significantly. A similar situation applies to exported commodities. Even though certain horticultural products are exportable, if domestic production is not competitive in

international markets, owing to either low productivity or high transactions costs, then exports will not be profitable. Only when domestic producer prices plus market costs are lower than the export parity price of the same product does it become profitable to export.

The model does not capture bilateral trade flows across subnational regions, although it does identify subnational regions as being food surplus or deficit by comparing regional level demand and supply for total food commodities. Although producers and consumers in different regions operate in the same national markets for specific commodities, prices can vary across regions owing to differences in transportation and market costs. For example, in the Ethiopian EMM model described in Diao, et al (2007), domestic marketing margins are defined at the regional level according to the distance to Addis Ababa, which represents the central market for the country. For a food surplus region, food crop prices faced by local producers are equal to the prices in the central market subtracting market margins, while for a food deficit region local prices are higher than those in the central market owing to marketing margins.

To analyze the growth–poverty effect, the nationally defined poverty line is adopted in the models rather than using the World Bank's dollar-a-day measure. National poverty lines are typically measured by total household expenditure, since household income is often significantly underreported in developing countries. However, changes in the representative households' expenditures in the model are the results of changes in their incomes (that is, both expenditures and incomes are endogenous variables in the models).

A microsimulation model is used to capture detailed household consumption patterns. More specifically, all sampled households in the household living standard and monetary survey are used to construct the microsimulation model that links with their corresponding representative consumers in the EMM model, which in turn are defined across subnational regions and for both rural and urban areas. A top-down linkage is defined from the EMM model to the microsimulation model. For example, if the results from the Ethiopian EMM model find that a 1 percent increase in GDP causes 1.3 percent increase in annual spending on teff for the household in the EMM model representing the Ethipoian region "rural West Tigray," then there will be 1.3 percent increase in spending on teff by each of the 143 sample households it represents in the microsimulation model. However, the share of teff in each of the 143 households' total expenditure varies. Therefore, 1.3 percent increase in teff expenditure will affect each of the 143 households differently depending on the share of teff in their consumption basket. As a result, the effect on total household expenditure will be larger for households spending a larger share of their income on teff. These differential effects occur across all commodities in the EMM model. According to these differential effects, the EMM microsimulation models are able to estimate national or regional income distributional change.

In general, because of the larger share of staple food in poor households' budgets, the same income elasticity for all rural households can result in different aggregate effects on total expenditures across households. Given a fixed poverty line defined by real expenditure, some poor households whose per capita expenditure is initially below the poverty line may move out of poverty in certain years if their expenditure rises above the poverty line. Using the microsimulation model, the national poverty rates are

recalculated according to updated total expenditure for each sample household for each year in a simulation.

References

Diao, X. P. Hazell, D. Resnick, and J. Thurlow. 2007. "The Role of Agriculture in Development: Implications for Sub-Saharan Africa." IFPRI Research Report 153. Washington, DC: IFPRI.

Vogel, S. J. 1994. "Structural changes in agriculture: Production linkages and agricultural demand-led industrialization." *Oxford Economic Papers* 46 (1): 136–156.

A.3 Int'l Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT)

What is its purpose?	To project the future of global food production and food market performance and the impact of long-term climate change as measured by water availability.
What questions can it help to answer?	How are the following projected to change in the future: crop area, yield, production, demand for food, feed and other uses, prices, and trade; and livestock numbers, yield, production, demand, prices, and trade? How will the role of agricultural commodities change and impact food security and rural livelihoods? What will be the water constraints at regional, national and sub-national levels?
Under which conditions should it be used?	The minimum scale should be national with more robust analysis occurring at larger regional and watershed scales.
Requirements	*Data/information:* production, trade, and consumption data; macroeconomic data; estimated supply and demand systems (elasticities); estimated growth trajectories *Time:* depending on level of analysis *Skills:* microeconomics; hydrological engineering; resource economics; database management (collection, cleaning, maintenance, updating); computer programming; commodity and market analysis *Supporting software:* Excel, GAMS, statistical software *Financial cost*: IMPACT-D is freely available and only requires a PC; the full IMPACT-WATER is embedded in IFPRI projects and therefore difficult to cost.
What are its limitations?	It is a partial equilibrium framework focused on the agricultural sector and therefore must use exogenous assumptions for more macro-scale trends in labor, capital and sector growth.
Application Examples	Rosegrant, M. W., M. S. Paisner, S. Meijer, and J. Witcover. 2001. "2020 Global Food Outlook: Trends, alternatives, and choices." IFPRI Food Policy Report. Washington D.C.: IFPRI. For further information and to download a version of the model: http://www.ifpri.org/themes/impact.htm http://www.ifpri.org/themes/impact/impactd.asp

A.3.1 Conceptual Framework and Methodology

Although improvements in agricultural production have occurred and malnutrition has declined at the global level since the 1960s, serious questions remain about the ability of world agriculture to continue to realize significant increases in developing-country food availability into the 21st century. With suitable arable area throughout much of the world already under crop production and the advancements of the Green Revolution essentially complete, agricultural research and development will be an increasingly crucial variable affecting future food production increases, and contributing to improved food security. The International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) can address these questions and examine alternative futures for global food supply, demand, trade, prices, and food security.
IMPACT covers 32 commodities (which account for virtually all of world food production and consumption), including all cereals, soybeans, roots and tubers, meats, milk, eggs, oils, meals, vegetables, fruits, sugar and sweeteners, and fish in a partial equilibrium framework. It is specified as a set of country-level supply and demand equations where each country model is linked to the rest of the world through trade. In order to explore food security effects, IMPACT projects the percentage and number of malnourished preschool children (0 to 5 years old) in developing countries as a function of average per capita calorie availability, the share of females with secondary schooling, the ratio of female to male life expectancy at birth, and the percentage of the population with access to safe water.

A wide range of factors with potentially significant impacts on future developments in the world food situation can be modeled based on IMPACT. They include: population and income growth, the rate of growth in crop and livestock yield and production, feed ratios for livestock, agricultural research, irrigation, and other investments, commodity price policies, and elasticities of supply and demand. For any specification of these underlying factors, IMPACT generates projections for crop area, yield, production, demand for food, feed and other uses, prices, and trade; and for livestock numbers, yield, production, demand, prices, and trade.

The model has been continuously revised to include additional commodities and greater regional disaggregation and the base year updated. During 1998-2000, the IMPACT-WATER model was developed, which combined the IMPACT model with the Water Simulation Model (WSM) in order to estimate the interactions between water supply and demand and food supply, demand, and trade. New advancements for the suite of IMPACT models (including IMPACT and IMPACT-WATER) include a greater level of spatial disaggregation, the inclusion of additional crops, and an update of the base year to the year 2000. While the primary IMPACT model divided the world into 36 countries and regions, the IMPACT-WATER model uses a finer disaggregation of 69 basins out of recognition of the fact that significant climate and hydrologic variations within regions make the use of large spatial units inappropriate for water resource assessment and modeling.

References

Rosegrant, M., C. Ringler, S. Msangi, S. Cline, T. Sulser. 2005. “International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT-WATER): Model description.” Washington, DC: IFPRI.

A.4 Spatial Analysis of Development Options

What is its purpose?	To identify and map the magnitude and distribution of opportunities and challenges within and across countries in order to better target appropriate development alternatives.
What questions can it help to answer?	What is the extent and distribution of poverty and food insecurity? What are the spatial patterns of livelihood options and constraints? How does agricultural potential correspond to population density and market access?
Under which conditions should it be used?	When the geographic variability of the area would influence the choice of policies. Consultations with key stakeholders are required to verify that the domains correspond to local realities, and also to consider other information not available through data alone.
Requirements	*Data/information:* Agro-climatic data, land-use data, production data, markets and trade data, household census surveys *Time:* 1-6 months *Skills:* Familiarity with Geographic Information Systems (GIS) analysis *Supporting software*: ArcView *Financial cost:* $20,000-$100,000 depending on availability of data and expertise.
What are its limitations?	Often data is not geo-referenced but is summarized at the district or provincial level.
Application Examples	Chamberlin, J., J. Pender and B. Yu. 2006. "Development Domains for Ethiopia: Capturing the geographical context of smallholder development options." DSGD Discussion Paper 43. Washington, D.C.: IFPRI. Omamo, S., X. Diao, S. Wood, J. Chamberlin, L. You, S. Benin, U. Wood-Sichra, and A. Tatwangire. 2006. "Strategic Priorities for Agricultural Development in Eastern and Central Africa." IFPRI Research Report 150. Washington, D.C.: IFPRI and ASARECA.

A.4.1 Conceptual Framework and Methodology

Useful tools in the spatial analysis of development domains are Geographic Information Systems (GIS) and remote sensing. These tools typically involve overlaying several spatial maps that examine environmental and land use systems in order to highlight any correlations that may exist between them and across space (Dalal-Clayton and Bass 2002). Although quite effective at influencing policies, the tools can be easily misleading

if they are not integrated with other more sophisticated behavioral or normative models. Simple correlations do not go far enough to address socio-economic interrelationships that are so often relevant for policymaking. When combined with socio-economic data and analysis, GIS can provide a powerful way to communicate the results of more complex interrelationships (Yeh 1999).

One way to spatially disaggregate the range of rural livelihood options is to define 'development domains' that represent a unique combination of key factors, such as land use, farming practices and income sources, that influence the type of options available at the community level. In Uganda, for instance, Pender et al. (1999) define 'development domains' on the basis of population density, access to markets and agro-climatic conditions. A strong association exists between these three factors and the basic types of livelihood strategies pursued by most communities, including: expanded cereal crop production, intensive livestock/dairy production, agro-processing, and non-agricultural based rural enterprises.

Under different local circumstances, other factors, such as socioeconomic conditions, resource endowments, and vulnerability to production shocks, will also have important implications for characterizing available livelihood options. In some instances, focusing more attention on commercialization issues may be more critical, requiring domain specifications that are distinguished by existing regional and global end-markets for exports and domestic markets, such as large urban centers, for food staples. By adding aspects of market accessibility to the analysis, commodity-specific domains can be mapped out that characterize how end markets are linked to certain attributes along a supply chain.

Ultimately, data limitations will most likely define the type and degree of disaggregation possible. A difficulty inherent in disaggregating socio-economic data by domain is the fact that much of the data is not geo-referenced but is summarized at the district or provincial level. In reviewing some of these types of problems, Wood and Chamberlin (2003) offer possible solutions that involve combining satellite image data with mathematical techniques like maximum entropy. However, from a purely practical perspective, it is important to consider whether conducting the analysis at this higher resolution will provide information that is more valuable than would be produced at a more aggregate level. For example, it may be preferable to analyze sector-wide or thematic issues (e.g. physical infrastructure and policy environment) at the economy-wide level if the costs of doing so are exorbitantly high at the domain level.

Because the 'development domain' characterization can ultimately shape the type of policy intervention and public investment alternatives available to policymakers, consultation with key stakeholders is required to not only validate the domains to local realities, but to also consider other information not available through data alone. Moreover, doing so ensures that any further analysis performed by domain will have local relevance and legitimacy among government decision makers and the broader development community (e.g. practitioners, NGOs, researchers, private sector, and donors).

References

Dalal-Clayton, B. and S. Bass. 2002. *Sustainable Development Strategies: A Resource Book.* London: Earthscan Publications.

Pender, J., P. Jagger, E. Nkonya, and D. Sserunkuuma. 2001. “Development pathways and land management in Uganda: Causes and implications.” EPTD Discussion Paper No. 85. Washington, D.C.: IFPRI.

Wood, S. and J. Chamberlin. 2003. “Enhancing the role of spatial analysis in strategic impact assessment: improving data resolution for regional studies.” *Quarterly Journal of International Agriculture* 42(2):167-187.

Yeh, A. 1999. “Decision Support with Geographic Information Systems.” In G.E. Kersten, Z. Mikolajuk and A. Yeh (eds). *Decision Support Systems for Sustainable Development.* Boston: Kluwer Academic Publishers.

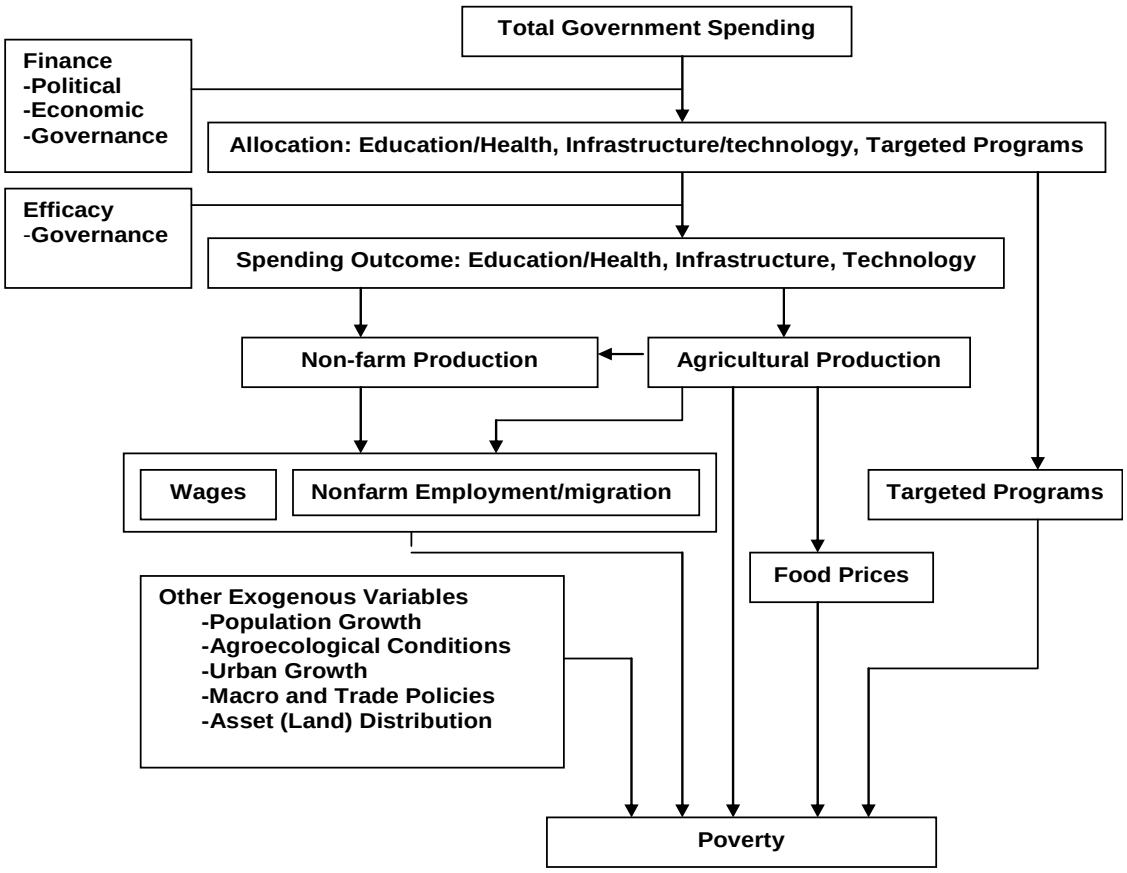
A.5 Econometric impact analysis of public investments

What is its purpose?	To understand the marginal impact that a unit of investment has on a specific outcome variable, such as growth or poverty.
What questions can it help to answer?	What have been the trends of government expenditures by sector, and what have been the reasons for their changes? How has public investment been financed, and how has the burden of financing investment policy been distributed in society? What have been the returns to various types of government expenditures in terms of their growth, poverty reduction and other human development effects? How can public investment be used to strengthen weak links between poverty reduction channels, so as to increase efficiency in targeting public resources on poverty reduction?
Under which conditions should it be used?	When guidance is needed on sectoral spending and when time-series expenditure data is reliable and available.
Requirements	*Data/information:* Time-series expenditure data, household survey (Table A.1) *Time:* 1-6 months *Skills:* Experience with econometrics *Supporting software*: Excel, Stata *Financial cost:* Depends on availability of data. $10,000-$75,000
What are its limitations?	Reliable expenditure data can be difficult to obtain. It may be difficult for the model to capture the indirect effects of public investment or account for unpredictable exogenous shocks.
Application Examples	Fan, S., P. Hazell and S. Thorat. 1999. "Linkages between Government Spending, Growth, and Poverty in Rural India" Research Report 110. Washington, D.C.: IFPRI. Fan, S, X. Zhang, and N. Rao. 2004. "Public Expenditure, Growth, and Poverty Reduction in Rural Uganda." DSGD Discussion Paper 4. Washington, D.C.: IFPRI. Fan, S., L. Zhang, and X. Zhang. 2002. "Growth and Poverty in Rural China: The role of public investments." Research Report 125. Washington, D.C.: IFPRI.

A.5.1 Conceptual Framework and Methodology

Public investment affects rural poverty through many channels (Figure A.2). A key underlying assumption is that public and private investments are complements (Anderson et al. 2006), so that an increase in the public capital stock raises the productivity of all factors in agricultural production, which in turn leads to higher farm wages and incomes and poverty reduction. For example, public investment in agricultural research, rural education and health, and infrastructure increases farmers' income directly by increasing agricultural productivity, which in turn reduces rural poverty. Indirect impacts come from higher agricultural wages and improved nonfarm employment opportunities induced by growth in agricultural productivity. Agricultural output from rural investment often yields lower food prices, again helping the poor indirectly because they are often net buyers of food grains. Redistribution of land caused by higher agricultural growth also has important impacts on rural poverty. In addition to their productivity impact, public investments in rural education, health, and infrastructure directly promote rural wages, nonfarm employment and migration, thereby reducing rural poverty. For example, improved infrastructure access will help farmers set up small rural nonfarm businesses such as food processing and marketing enterprises, electronic repairs shops, transportation and trade, and restaurant services.

Figure A.2: Government Spending and Poverty



Investments in the rural sector not only contribute to growth, employment, and wages in rural areas, but also help the development of the national economy by providing labor, human and physical capital, cheaper food, and markets for urban industrial and service development. Growth in the national economy reduces poverty in both rural and urban sectors. Understanding these different effects provides useful policy insights to improve the effectiveness of government poverty reduction strategies. In particular, it provides information on how public investment can be used to strengthen weak links between poverty reduction channels to increase efficiency in targeting public resources on poverty reduction. More efficient targeting has become increasingly important in an era of macroeconomic reforms in which governments are under pressure to reduce budgets.

There are several challenges in estimating the overall effects of different government spending on growth and poverty reduction.

Endogeneity and Reverse Causality

Government investment may itself be an endogenous variable. Binswanger et al. (1989) argue that government may allocate its investment based on agro-climatic conditions, i.e., high potential areas may receive more resources from government. If this is true, a simple ordinary least squares (OLS) regression technique may result in biased estimates. In this case, the return to public investment in terms of growth may be overstated. On the other hand, if the government targeted its resources to poor areas for poverty reduction purpose, the poverty reduction impact may be understated if the endogeneity problem is not properly dealt with. These biases may vary by regions and by type of investment.

Similarly, the existence of reverse causality between government investment and development outcome may also result in biased estimates if it is not taken into consideration. Reverse causality[16] occurs because income growth may raise the demand for infrastructure or other public capitals. However, more infrastructure or other public capitals may also induce increases in income.

Besley and Case (1994) argued that endogeneity could also be a result of political and economic factors, which vary over time as well as space. In this case, the fixed effects approach used by many economists does not resolve the endogeneity problem since it fails to control for the omitted time-varying differences across space which helps to determine policy and outcome (Van de Walle 1998).

One of the most common approaches to avoid the potential biases in the estimates due to endogeneity and reverse causality is the instrumental variable approach. Broadly speaking, an instrumental variable is a variable that is uncorrelated with the error term but correlated with the explanatory variables in the model. But in reality it is hard to find such an instrument (or instruments). Davidson and MacKinnon (1993) demonstrate that the validity of the choice of instruments may be tested in this context via an auxiliary regression.

[16] For more information on reverse causality see Canning and Bennathan (2000), World Bank (1994), Zhang and Fan (2003), and Kessides (1993).

When panel data is available, the two-way fixed effects model can eliminate most of biases due to time- or regional-invariant fixed effects. For example, if governments always target its resources to a particular region (for example either high potential or poor region), then regional fixed effects model should be able to eliminate the endogeneity bias.

However, an understanding of government budget allocation and political economy may be fundamental to public spending impacts (Besley and Case 1994; Van de Walle 1998; and Pitt, Rosenzweig and Gibbons 1993), which will be addressed in the next section.

Multiple Effects and Simultaneous Equations

Most of the previous studies in estimating the impact of public investment on growth and poverty have used a single-equation approach. There are at least two disadvantages to this method. First, many poverty and inequality determinants, such as income, production or productivity growth, prices, wages, and nonfarm employment, are generated from the same economic process as inequality and poverty. In other words, these variables are also endogenous variables. Ignoring this characteristic leads to biased estimates of the poverty and inequality effects.

Second, certain economic variables affect poverty and inequality through multiple channels. For example, improved rural infrastructure reduces rural poverty not only through improved growth in agricultural production but also through improved wages and opportunities for nonfarm employment. It is very difficult to capture these different effects using a single-equation approach.

As discussed, to avoid the endogeneity problem, the reduced form is often used, and various instruments have been used to instrument the explanatory variables, which are potentially endogenous. But to solve the second problem, a structural equation system is needed.

For the past several years, IFPRI has developed a simultaneous equations model to estimate the various effects of government expenditure on production, inequality, and poverty through different channels (Fan et al. 1999; Fan et al. 2002; Fan et al. 2003). The equations in the model are specified based on economic behavior, and have been used by various scholars in the single equations approach. The empirical model developed mimics the rural economy where government spending is the driving force behind rural poverty reduction, controlling for other factors. The first equation measures the effects of growth in agricultural productivity, improvement in nonfarm employment and wages, and changes in terms of trade (changes in agricultural prices relative to nonagricultural prices) on reduction in rural poverty. The second equation is an agricultural productivity function in which growth in agricultural productivity is a function of government investment in agricultural R&D, and public capital stocks of irrigation, power, education, and rural roads. The third and fourth equations capture the effects of growth in agricultural productivity, increased public capital stock such as roads, education and power on rural wages and nonfarm employment. The next set of equations model how different government expenditures form capital stocks in education, irrigation, roads, and other types of public capitals. Finally, agricultural prices are modeled as functions of agricultural productivity growth since increased supply due to growth in agriculture will depress agricultural prices, affecting rural poverty indirectly.

In addition to its ability to track the relevant linkages between public investments and rural poverty, a systems approach enables other endogenous variables to be properly specified. Once the model is estimated, the total effects of public investment variables on growth and poverty reduction can also be calculated by totally differentiating the equations system with respect to each public investment variable.

The major disadvantage of this approach lies with its requirements of correct specifications of all equations. Even when one equation is mis-specified, the bias will affect the estimated coefficients in all equations in the system. To ensure the reliability of the estimated results, various specification tests should be performed (Greene 1993).

Time Lag of Investment

Government investments in R&D, roads, education, power, health, and irrigation can have long lead times in affecting agricultural production, as well as long-term effects once they kick in. One of the thornier problems to resolve when including government investment variables in a production or productivity function concerns the choice of appropriate lag structure.

Most past studies use stock variables, which are usually weighted averages of current and past government expenditures on certain investments such as R&D. But what weights and how many years lag should be used in the aggregation are currently an issue of some contention in the literature.[17] When there is lack of long time series data on government investment (by types and regions), the stock approach can be used as a crude proxy. Some of the sensitivity analysis from China and India shows that the ranking of different public investment in terms of their growth and poverty reduction effects change very little, but the magnitudes of the effects may change.

However, when the long time series data on investment are available, the following procedures can be used to determine the lag structure or the dynamic relationship between government investment and the final development outcome. A first step is to use statistical tools to test and determine the appropriate length of lag for each investment expenditure. For example, include annual agricultural research expenditures for the past certain number of years in the agricultural production function. How many years should be included depends on the statistical test value. Various procedures have been suggested for determining the appropriate lag length. The adjusted R^2 and Akaike's Information Criteria (AIC) are often used by many economists (Greene 1993). The optimal length is determined when the adjusted R^2 reaches its maximum or ACI reaches the minimum.

However, the coefficients of the annual past government expenditures cannot be used directly in calculating the effects on growth in agricultural production as these variables are often highly correlated, making the estimated coefficients statistically insignificant. To avoid this problem, the most popular approach is to use what are called *polynomial*

[17] Alston et al. argue that research lag may be much longer than previously thought, or even infinite. But for many developing countries, the national agricultural research systems are much younger than those in developed countries (often 30 to 50 years old), and their research are more applied types. Therefore, it is certain that research lags in developed countries are much shorter than those in developing countries.

distributed lags, or PDLs. In a polynomial distributed lag, the coefficients are all required to lie on a polynomial of some degree *d*. *PDLs* with degree 2 are often used. In this case, only three need to be estimated instead of *i+1* parameters for the lag distribution. For more detailed information on this subject, refer to Davidson and MacKinnon (1993).

Spillover Effects

Many types of public investment may have spillover effects, for example, within regions in a country, and between different countries. One typical example is agricultural research.[18] Although it is empirically difficult to estimate these effects, the potential gain from consolidating agricultural research systems is large (Byerlee and Traxler 1996).

There are several types of spillover effects. The most common is technology spillover. For example, a new technology developed by a public research institute may be adopted by other regions within the same country or even by other countries. The effects of public investment may also spillover to other regions or even sectors through prices. Increased road investment will increase food supply in one region, leading to reduction in food prices not only in its own region, but also in other regions or even urban sectors (Fan et al. 1999; and Fan et al. 2003). Investment may also affect other regions through the labor market. In a study of the impact of the green revolution in a sample of Asian villages, David and Otsuka (1994) found that seasonal migration played an important role in spreading the benefits between technology-adopting and non-adopting regions. Ignoring these spillover effects can either lead to understating or overstating economic benefits and poverty reduction impacts.

Impact of Spending at Higher Administrative levels

An issue that has not been dealt with is evaluating spending at higher administrative levels (e.g. federal or central) than the unit of analysis (i.e. district or region). This is especially the case with defense and R&D spending among others. A macro-econometric model, which requires a much longer time series data for estimation, may be needed. Otherwise, one has to first make some assumptions about how such federal or central spending is distributed across districts or regions. If thought of in terms of spillover effects, e.g. information or technology diffusion in the case of R&D, then a variable that is constructed as a function of the distance from the center to the region or district can be included in the econometric regression. Nevertheless, given that spending at the federal or central level will unlikely be distributed proportionally to district- or region-specific spending, there is likely to be an obvious bias in ignoring spending at the central level.

Controlling for Other Factors

There are many other factors that may affect the development outcome in addition to public investment. These variables may include changes in international trade and prices, domestic macro economic conditions, urban development, and regional agro-ecological conditions. For example, institutional changes and policy reforms made large contributions to rapid growth in agricultural and nonagricultural production and to poverty

[18] Roads and education investment have the similar features, although less salient.

reduction in China's rural areas since 1979. In India, market and trade liberalization introduced in the early 1990s also had profound effects on economic growth as well as on poverty reduction. If these variables are not controlled, the estimated effects of public investment on poverty reduction would be biased, and in many cases returns to public investment will be overestimated. A common practice is to use year and regional dummies to control for year- and region-specific fixed effects.

Prioritizing future government spending

Simulation models can be used to guide improved patterns of investment (differentiated by type of investment, type of region, and packaging and sequencing of investments) to achieve specific agricultural growth, rural poverty and equity goals. In general, this will provide guidance for a long-term investment strategy in developing countries. The *ex-post* evidence on public investment impacts will be used as a basis for modeling possible future returns from different public investments. The parameters estimated can also be used for simulation at the economy-wide level. Two types of simulations can be conducted. First, the effects of public investment in rural areas can have economy-wide effects. For example, investment in agricultural R&D affects urban residents through lowered food prices and wages, in addition to its impact on rural residents. Second, certain economy-wide policy affects allocation of public spending to rural areas. For example, how government revenue is financed and allocated would impact government spending on agriculture and rural areas.

To properly capture spillover effects (discussed earlier) as well as those associated with changes in economy-wide variables such as employment, wages and prices, general equilibrium models such as economy-wide multi-market (EMM) and computable general equilibrium (CGE) models become necessary.

References

Anderson, Edward, Paolo de Renzio and Stephanie Levy. 2006. "The Role of Public Investment in Poverty Reduction: Theories, Evidence and Methods." ODI Working Paper 263. London: ODI.

Besley, Tim and Ann Case. 1994. "Unnatural Experiments? Estimating the incidence of endogenous policies." NBER Working Paper 4956. Cambridge: NBER.

Binswanger, Hans, S. Khandker, and M. Rosenzweig, M. 1989. "How Infrastructure and Financial Institutions Affect Agricultural Output and Investment in India." World Bank Working Paper No. 163. Washington, D.C.: World Bank.

Byerlee, D., and G. Traxler. 1996. "The Role of Technology Spillovers and Economies of Size in the Efficiency Design of Agricultural Research Systems." Invited paper presented at the Global Agricultural Science Policy for the 21st Century, 26-28 August, Melbourne, Australia.

Canning, D. and E. Bennathan. 2000. "The Social Rate of Return on Infrastructure Investments." Policy Research Working Paper Series 2390. Washington DC: World Bank.

David, C. and K. Otsuka (eds.). 1994. *Modern Rice Technology and Income Distribution*. Boulder: Reinner.

Davidson, R. and J. MacKinnon. 1993. *Estimation and Inference in Econometrics*. New York and London: Oxford University Press.

Fan, S., C. Fang, and X. Zhang. 2003. "How Agricultural Research Affects Urban Poverty in Developing Countries: The case of China." *World Development* 31: 733-41.

Fan, S., P. Hazell and S. Thorat. 1999. "Linkages between Government Spending and Poverty in Rural India." Research Report 110. Washington DC: IFPRI.

Fan, S., L. Zhang and X. Zhang. 2000. "Growth, Inequality and Poverty in Rural China: The Role of Public Investments." Research Report 125. Washington DC: IFPRI.

Greene, W. H. 1993. *Econometric Analysis*. Hemel Hempstead: Prentice-Hall, Inc.

Kessides, C. 1993. "The Contributions of Infrastructure to Economic Development, A review of experience and policy implications." Discussion Paper No. 213. Washington, DC: World Bank.

Pitt, M., M. Rosenzweig, and D. Gibbons. 1993. "The Determinants and Consequences of the Placement of Government Programs in Indonesia." *World Bank Review* 7 (3): 319-348.

Van de Walle, D. 1998. "Assessing Welfare Impacts of Public Spending." *World Development*. 26 (3): 365-379.

World Bank. 1994. "World Development Report: Infrastructure." Washington, DC: World Bank.

Zhang, X. and S. Fan. 2004. "How Productive Is Infrastructure? New approach and evidence from rural India." *American Journal of Agricultural Economics* 86 (2): 492-501.

Table A.1: Variables Required for Public Investment and Poverty Reduction Study

Serial No.	Variable[1]	Importance[2]
I.	Land, Labor and Population	
I.1	Total land	x
I.2	Agricultural land	xx
I.3	Total cropped areas	xx
I.4	Agricultural labor	xx
I.5	Rural nonagricultural labor	
I.6	Rural labor	xx
I.7	Total population	x
I.8	Rural population	xx
II.	Income and Poverty	
II.1	The percentage of rural population under poverty	xxx
II.2	The percentage of population under poverty	x
II.3	Per capita Income	xx
II.4	Agricultural GDP	xx
II.5	Gross agricultural production value	xx
II.6	Total GDP	x
III.	Government Spending and Public Goods	
III.1	Government expenditure on irrigation	xxx
III.2	Irrigated areas	xx
III.3	Government spending on agricultural R&D	xxx
III.4	Total agricultural research staff	
III.5	% of improved or high-yielding varieties in total cropped areas	xx
III.6	Gvt spending in total roads (total transportation is also ok)	x
III.7	Government investment and spending on rural roads	xxx
III.8	Length of total roads (if possible by grade)	x
III.9	Length of rural roads (if possible by grade)	xx
III.10	Government in total education	x
III.11	Government spending on rural education	xxx
III.12	Literary rate of general population	
III.13	Literacy of rural population	xx
III.14	Average years of schooling for general population	x
III.15	Average years of schooling for rural population	xx
III.16	Government spending on total telecommunications	xx
III.17	Government spending on rural telecommunications	xxx
III.18	Number of telephone	x
III.19	Number of rural telephone	xx
III.20	Government spending on power	x
III.21	Government spending on rural power	xxx
III.22	Electricity consumption	x
III.23	Rural electricity consumption	xx

III.24	Government expenditures for health	xx
III.25	Government expenditures for rural health	xxx
III.26	Number of health personnel	x
III.27	Government expenditures for poverty alleviation	xxx

1. Preferably by region, otherwise national aggregate.
2. XXX - very important; X - least important

A.6 DREAM (Dynamic Research EvaluAtion for Management)

What is its purpose?	To evaluate the economic impacts of agricultural research and development (R&D). Users can simulate a range of market, technology adoption, research spillover, and trade policy scenarios based on a flexible, multi-market, partial equilibrium model.
What questions can it help to answer?	What is the likely economic return and reductions in hunger and poverty resulting from specific investments to overcome production and commercialization constraints? What is the impact on price and trade if certain technology is adopted in the farmer's fields? What are the economic returns for farmers and consumers? What is the rate of return to investment in agricultural R&D? What is the impact and magnitude of technological spillover into other regions/agroecological zones?
Under which conditions should it be used?	DREAM could be used to evaluate the impact of commodity-oriented research and productivity improvement. When data is even too limited to do a multi-market or agricultural sector model, DREAM could be an alternative.
Requirements	*Data/information*: technology impact on yield and cost, adoption rate, base year market data *Time:* 1-4 weeks *Skills:* Undergraduate economic major or 3-day training *Supporting software*: DREAM package *Financial cost:* Freely downloadable from IFPRI website
What are its limitations?	It is a single-commodity model without explicit representation of cross-commodity substitution effects in production and consumption.
Application Examples	Omamo, S., X. Diao, S. Wood, J. Chamberlin, L. You, S. Benin, U. Wood-Sichra, and A. Tatwangire. 2006. "Strategic Priorities for Agricultural Development in Eastern and Central Africa." IFPRI Research Report 150. Washington, D.C.: IFPRI and ASARECA.

A.6.1 Conceptual Framework and Methodology

DREAM is a menu-driven software package for evaluating the economic impacts of agricultural research and development (R&D) (Wood, You, and Baitx 2001). Users can simulate a range of market, technology adoption, research spillover, and trade policy scenarios based on a flexible, multi-market, partial equilibrium model.

With DREAM, a range of technology investment, development, and adoption scenarios can be defined and saved in an integrated database. Scenarios are described using market, R&D, and adoption information for any number of separate “regions." Some factors, such as taxes, subsidies, growth rates, and price elasticities, can be specified as constant or as changing over the analysis period. Each region in which production takes place may have its own pattern of technology adoption. After specifying the initial conditions for each region, the likely effects of technology development and adoption on prices can be simulated; on quantities produced, consumed, and traded; and on the flow of economic benefits to producers, consumers, and government.

DREAM handles simple to relatively complex evaluation problems using a standardized interface. A number of market assumptions are possible: small open economy, closed economy, vertically integrated farm and post-harvest sectors in a single economy, or multiple trading regions. The software also accommodates technology-driven shifts in supply or demand, and users may specify constant or variable shift effects over time in farmers’ fields. Importantly, DREAM’s multiple region specification can simulate various technology “spillover” scenarios wherein a technology may be adopted in more than one region. Changes in the pattern of technology spillovers can significantly alter the size and distribution of R&D benefits.

DREAM has been applied to the evaluation of individual projects in a national context as well as to entire commodity sectors at a subcontinental or continental scale. And while it was designed primarily to evaluate options for R&D that is yet to be undertaken (ex ante assessments), DREAM has also been successfully applied to analyzing the effect of past research (ex post assessments).

DREAM was designed to measure returns to commodity-oriented research in an open-economy setting, allowing for price and technology spillover effects between a country in which the research originates and the rest of the world (Alston, Norton, and Pardey 1998). DREAM is a single commodity model, so there is no explicit representation of cross-commodity substitution effects in production and consumption, but these aspects are represented implicitly by the elasticities of supply and demand. The primary parameterization of the supply and demand equations relies on a set of prices and annual quantities in a defined base period and a set of corresponding price elasticities. The idea is that the linear approximation implied by these elasticities will be good for small equilibrium displacements, such as those implied by single-digit percentage shifts of supply or demand, regardless of the true (nonlinear) functional forms of supply and demand. Small shifts have the added virtue that the cross-commodity and general equilibrium effects are likely to be small, and the total research benefits will not depend significantly on the particular elasticity values used (although the distribution of those total benefits among producers and consumers is sensitive to the elasticity values used).

DREAM parameterization defines the supply and demand curves in the base year to replicate observed market prices and quantities. DREAM also allows for underlying growth of supply and demand to project a stream of shifting supply and demand curves into the future that generates a stream of changing equilibrium prices and quantities, in the “without-research” scenario. These without-research outcomes can be compared to “with-research” outcomes, in which a stream of supply curve displacements also incorporates research-induced supply shifts. The research-induced supply shifts are defined by combining an estimate of a maximum percentage research-induced supply

shift that could be achieved if the innovation is adopted with an assumed profile of the likely levels of adoption over time.

Finally, measures of producer and consumer surplus are computed and compared between the with-research and without-research scenarios, and these are discounted back to the base year to compute present values of benefits. In a situation where there are estimates of the costs of the research that is responsible for the supply shift being modeled, a net present value or internal rate of return can be computed.

References

Alston, J. M., G. W. Norton, and P.G. Pardey. 1998. *Science under Scarcity.* Wallingford, U.K.: CAB International (CABI).

Wood, S., L. You**,** W. Baitx. 2001. Dynamic Research Evaluation for Management (DREAM). Washington, DC: IFPRI.

For further information and to download a version of the model: http://www.ifpri.org/dream.htm

A.7 Selecting Indicators for a Monitoring and Evaluation System[19]

What is its purpose?	To track progress, performance, and assess impact over time of investments and interventions.
What questions can it help to answer?	Are investments on track to meet development goals? If not, what needs to be altered? What are the projected impacts (keeping track of those derived from past versus future investments) if investment activities proceed as planned? Are these projected impacts compatible with the goal and target impacts of the existing strategy? What are the different policies and types of investments that can lead to greater and more sustainable growth as well as greater and better distributed outcomes and impacts?
Under which conditions should it be used?	When a government is committed to effective strategy implementation.
Requirements	*Data/information*: production, trade, consumption, expenditure, macroeconomic, and household data *Time:* Can range widely, easily taking up to a year to finalize, depending on the level of complexity, status of strategy development, data availability, and requirements for stakeholder input and validation of the indicators *Skills:* Basic familiarity with economic theory, project evaluation techniques (e.g. cost benefit analysis), and basic statistics and data measurement *Supporting software*: Spreadsheets and databases *Financial cost:* Unknown, but rises with size and complexity of M&E system, and degree of stakeholder participation
What are its limitations?	An M&E systems is only useful if carefully designed and actively maintained. An overly complicated system is more costly and unlikely to be effective.
Application Examples	Benin, S. and M. Johnson. 2008. "Monitoring and Evaluation for the CAADP." Draft ReSAKSS Report prepared for the African Union and NEPAD. Washington, DC: IFPRI.

Developing an M&E system that will actually be utilized by stakeholders and decision makers is not a straight forward exercise. The challenge, especially for those tasked with developing and implementing such a system, is collecting, analyzing, and reporting information that is timely, credible, and well understood in order to inform decisions

[19] Much of the text here is taken from Benin et al. 2008.

about whether to revise priorities or re-allocate resources. With this challenge in mind, a simple and intuitive approach is recommended, but one that maintains a sound theoretical framework of causality between inputs, outputs, and outcomes to be measured in the system. The simpler it is, the less costly to develop and maintain, the lower the likelihood of errors in measurement, and the less complexities inherent in the system to interpret the information that comes out of it. A large and disparate set of information (indicators) that end up not being collected or interpreted has no value to anyone. In reviewing the experience of a wide range of government M&E systems, a recent study by the Independent Evaluation Group (IEG) of the World Bank (see Mackay, 2007) summarizes this well:

> Over-engineering an M&E system is not only wasted effort but can eventually undermine the M&E system;
>
> Simply believing that an M&E system has inherent value is a typical mistake. The information in the system is only valuable if it is used.

With these basic principles in mind, some of the questions one should be asking in developing an M&E system are:

> What should be monitored and evaluated, given the underlying theoretical framework and/or logic that describe the chain of causality between investments (inputs), outputs and outcomes?
>
> What should be the minimum set of indicators that can be utilized to tell a credible story of how particular investments and policies are influencing outputs and results? The final selection of the minimum set of indicators will depend on such criteria as data availability and frequency, timeliness, and quality.
>
> What kind of reporting and frequency is desirable to target local decisionmaking processes?

There are several documents on how to design and implement M&E systems, with substantial attention given to the selection of indicators, which are at the heart of any performance evaluation system (e.g. IFAD 2002). Although there are several proposals of the criteria to be used in selecting indicators, it is generally agreed that the indicators must be **SMART**: **S**pecific, **M**easurable, **A**chievable, **R**ealistic, and **T**imely. For an agricultural strategy, this means that the potential indicators must be the ones that best reflect the range of inputs, outputs, and outcomes associated with the priority investments being implemented. They must also capture critical landmarks along the pathway(s) of impact, i.e. between the relevant investments that are put in place and how they can affect agricultural productivity growth and poverty.

Therefore, before deciding on the set of indicators to monitor and evaluate, it is useful to first look at the underlying logic of the existing agricultural strategy in terms of capturing the complex relationships between investments and outcomes. This in turn can help identify a critical set of indicators that, in addition to being consistent with the impact pathways, possess sufficient information to address the fundamental question of whether a strategy is on track to achieving the desired agricultural growth rate and poverty targets. And if not, what adjustments can be made to potentially put the strategy back on track to achieving its goals and objectives. The idea is to avoid having a long shopping list of indicators, which is typical of many M&E systems that end up not being collected or analyzed, or, even when collected and analyzed, can lead to information overload without having any effective decision being made, if any decision is made at all.

Here we use the example of the CAADP framework to illustrate how an M&E system might be developed. The CAADP framework is designed to guide public and private

investments in agriculture R&D, natural resource management, rural infrastructure, trade, and food security and safety nets (AU/NEPAD 2003). Drawing on the abundance of theories and evidence on the growth and poverty impacts of such investments , Figure A.3 below is organized to show how investments ("inputs") associated with the four pillars of CAADP, including investment in strengthening institutional capacity across the board, lead to specific "outputs" or "capital" in related investment activities, which can be classified broadly as: *physical capital* (e.g. irrigation systems, roads, storage and processing plants, emergency grain reserve facilities, etc.); *genetic capital* (animal and plant genes associated with early maturing, disease and drought resistance, consumer-preferred taste and color, etc); *information and knowledge capital* (e.g. marketing chains, extension systems, early warning systems, policies, sustainable agricultural husbandry, etc.); and *human capital* (e.g. skills and technical capability in policy analysis and formulation, planning, agricultural research and technology development, etc.). The development of any capital depends on the development of other capital, which together leads to "outcomes" in sustainable land management, agricultural production and productivity, food supply, and trade.

The notion underlying the link between outputs and outcomes is that capital embodies productivity-growth traits whose benefits can be realized only when farmers and those engaged in related production activities first acquire and use the capital appropriately. The indicators along this section of the intervention-to-impact pathway should capture actual use of infrastructure and services and adoption of technologies by farmers, which goes beyond the mere provision of infrastructure and services and access of farmers to them.

As the figure shows, and supported by the evidence in the literature, each of the "outcomes" in sustainable land management, agricultural production and productivity, food supply, and trade affects and is affected by the other outcomes, which together affects poverty and hunger ("goals") via their impact on (food) prices and household incomes ("intermediate goals"). Increased agricultural production, for example, is expected to lead to reduced food prices and cause an increase in real incomes (especially incomes of households that are net buyers of food), which in turn is expected to reduce poverty and hunger.

Another important potential impact pathway of the investments is their direct effect on trade, prices, incomes, poverty and hunger through food purchases and employment (e.g. wages and salaries for workers involved in construction of irrigation dams, roads, buildings, etc.) and transfers to households through farm support subsidies and emergency food aid and safety-net programs (e.g. food-for-work, school feeding, etc.). The latter can also contribute indirectly to the growth and poverty-reduction process by raising the productivity of the target groups through investments in their human capital, including training, skills development, and nutrition. However, recipients of such direct transfers may alter their farm labor supply, which may negatively impact agriculture production or their consumption and savings choices such that the net income gain is less than the amount of the transfer (van de Walle 2003). There are also indirect price effects of transfers, particularly arising from farm support subsidies.

As the figure also shows, there are several conditioning and/or exogenous factors that affect the decision of which pillar to investm in and how much to invest, as well as realization of the various outputs, outcomes, and goals. Therefore, these factors also need to be monitored and analyzed for a comprehensive assessment of the progress in the implementation of the CAADP programme and its impact. Only then can we be confident that any observed effect, such as a reduction in transactions costs, an increase in agricultural productivity, or a reduction in poverty is due to the intervention. Again, the roles of these conditioning and/or exogenous factors are well known and well

explained in the CAADP document (AU/NEPAD 2003). We only focus on some of the key ones here. For example, how much government resources are invested in agriculture or rural roads depends not only on the total resources available to the government, but on political economy, institutional, and governance factors (see Birner and Resnick 2005 and Resnick and Birner 2005 for reviews). Governance, for example, is one factor that has attracted particular attention during the last decade regarding the efficacy of public spending or the relationship between the amount spent and actual services provided or received.

Public-private partnership is also emphasized in every pillar of CAADP, which is based on the notion that public and private capital are complements in the production process, so that an increase in the public capital stock raises the productivity of all factors in agricultural production. Thus, having policies and interventions in place that create an enabling environment for private entrepreneurship in, for example, agricultural research, input supply and agro-processing and marketing is critical for the success of CAADP. Thus, it is important to monitor indicators associated with taxation, interest rates, savings, subsidies, licensing, etc. that affect entrepreneurship. However, since agricultural subsidies and other direct transfers of public resources for the financing of private goods and services can have potential market-distorting characteristics and crowd out private investment, it is important to monitor these also. Macroeconomic policies, such as overvalued currencies and industrial protection, also need to be monitored, as they have been shown to have historically taxed agriculture more than direct agricultural policies have (World Bank 2008).

Tracking growth in the non-agricultural sector, employment and rural wages, as well as agriculture–non agriculture terms of trade, is also important because of the link with the agriculture sector, which is not explicitly captured in Figure A.3. Typically, growth in the agriculture sector is seen to provide investment capital for non-farm rural development (e.g. in food processing and marketing, transportation and trade, restaurant services, electronic repairs shops) and for urban industrial and service development (Barro 1990; Hart 1998). The development of the non-farm rural sector can have substantial multiplier effects on the overall economy if it expands the market opportunities for farmers and creates off-farm employment opportunities. The latter is particularly important for absorbing the excess labor and other factors of production that arises as a result of the increased agricultural productivity, which is contrary to early classical thinking that viewed agriculture as a low-productivity, traditional sector that primarily contributed to development of a nation by providing food and employment. Increase in real incomes in rural areas provides market opportunities for urban industrial and service development, through increased derived demand for urban-manufactured goods and services. This feedback linkage is critical for development of the economy as a whole, especially where export opportunities are not sufficient to allow urban industries to achieve competitive efficiency in foreign markets through economies of scale.

Factors associated with the integration of domestic economies into global markets matter too. After all, foreign competition and markets can shape the prospects for agricultural transformation. Here, monitoring trade policies in both African and high-income countries is helpful. As the evidence shows, a combination of poor policies and institutional failures in Africa and developed-country policies limit market access and reduce investment incentives and growth opportunities in African agriculture (World Bank 2008; Anderson et al. 2006; Binswanger and Townsend 2000). In particular, import tariffs, farm support and export subsidies granted to farmers in many countries of the Organization for Economic Co-operation and Development (OECD) tend to boost production in those countries, depress world prices, and reduce the scope for import competition in developing countries. Although it has been argued that such policies can

benefit developing countries that are net importers of agricultural products from developed countries by providing access to the subsidized commodities at lower prices, the evidence is limited. Developing countries may also use high tariffs to protect domestic production—the small country argument. Examples of trade policies to monitor include import and export tariffs and quotas, SPS requirements, international prices, exchange rates, etc.

Other conditioning and/or exogenous factors that matter at various levels of the input-to-impact pathways in Figure A.3 include resource endowments, natural disasters, and conflict, which have been critical factors in explaining the poor performance in African agriculture development (Binswanger and Townsend 2000).

The foregoing suggests a wide range of indicators that can be considered for a CAADP M&E System. Clearly the system cannot incorporate all of them. However, as the interest here is in managing for impact, it is important to ensure that the criteria used in narrowing the set of indicators to use helps to not only assess their trends to monitor progress, but focuses attention on the ultimate objective of whether and how CAADP investments and policies are having desired outcomes and impact. In other words, the selected indicators must be consistent with the causal chain of investment in order to understand not only "what" happened but also "why". Failing to do so limits the utility of the M&E results to apply lessons learned from its activities to improve implementation. The proposed set of indicators (and benchmarks) for tracking progress and laying the foundation for future impact assessments of the CAADP is summarized in more detail in Benin and Johnson (2008).

References

Anderson, K., Martin, W. and Valenzuela, E. 2006. "The Relative Importance of Global Agricultural Subsidies and Market Access." *World Trade Review* 5 (3): 357–76.

AU/NEPAD. 2003. "Comprehensive Africa Agriculture Development Programme." Midrand, South Africa: AU/NEPAD.

Barro, R. 1990. "Government Spending in a Simple Model of Endogenous Growth." *Journal of Political Economy* 98 (5): 103-125.

Benin, S. and M. Johnson. 2008. "Monitoring and Evaluation for the CAADP." Draft ReSAKSS Report prepared for the African Union and NEPAD. Washington, DC: IFPRI.

Binswanger, H. and R. Townsend. 2000. "The Growth Performance of Agriculture in Sub-Saharan Africa." *American Journal of Agricultural Economics* 82 (5): 1075–1086.

Birner, R. and D. Resnick. 2005. "Policy and Politics for Smallholder Agriculture." Paper presented at the Future of Small Farms Workshop. Wye College, June 26-29.

Hart, G. 1998. "Regional Linkages in the Era of Liberalization: A critique of the new agrarian optimism." *Development and Change* 29 (1): 27-54.

IFAD. 2002. "A Guide for Project M&E - Managing for Impact in Rural Development", Rome, Italy: International Fund for Agricultural Development (IFAD)

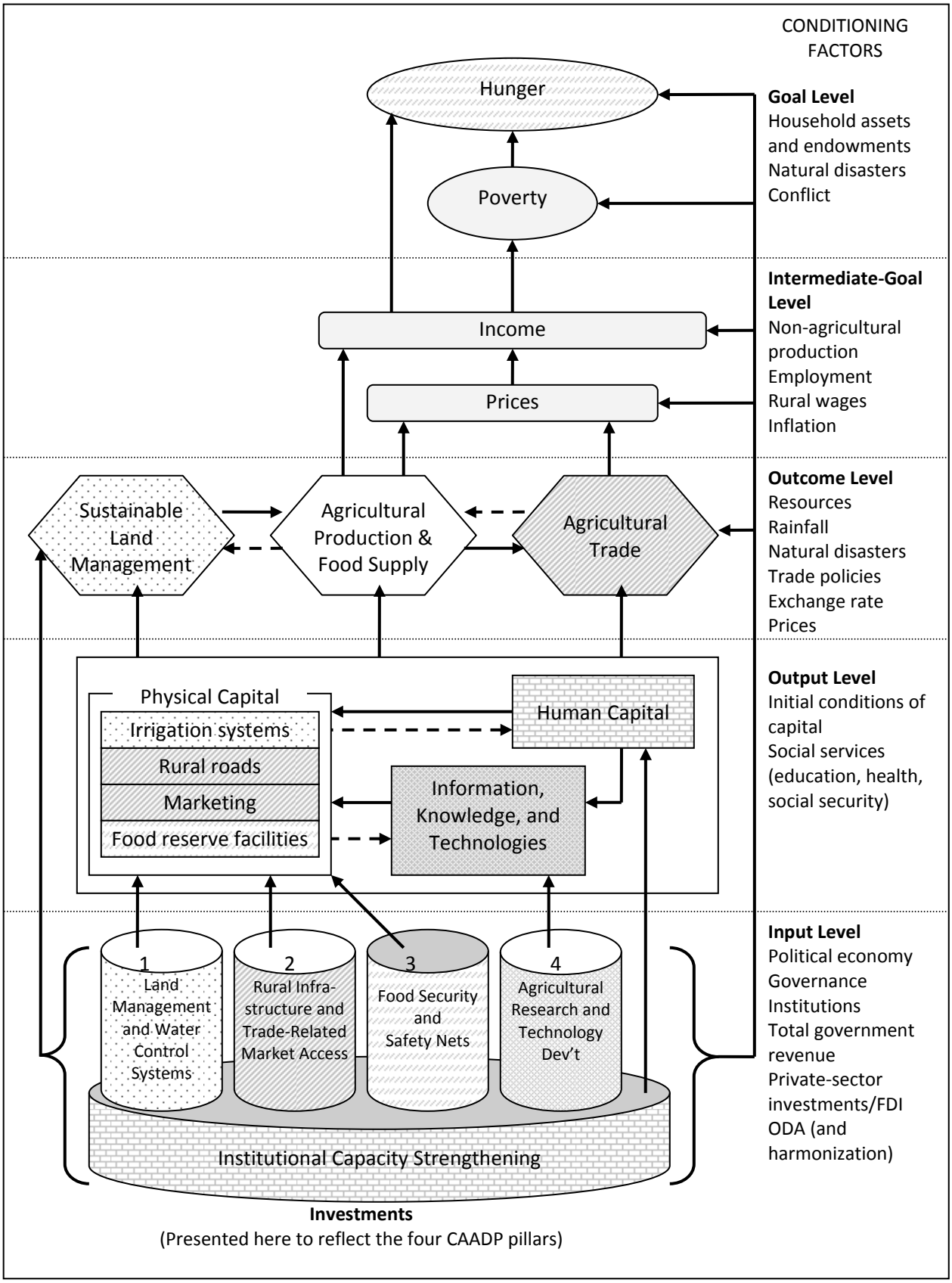
Mackay, Keith. 2007. How to Build M&E Systems to Support Better Government, Washington, D.C.: World Bank

Resnick, D. and R. Birner. 2005. "Does Good Governance Contribute to Pro-poor Growth?: A conceptual framework and empirical evidence from cross-country studies." Development Strategy and Governance Division Working Paper 30. Washington, DC: IFPRI.

van de Walle, D. 2003. "Behavioral Incidence Analysis of Public Spending and Social Programs." In Bourguignon, F. and da Silva, L.A.P. (Eds.). *The Impact of Economic Policies on Poverty and Income Distribution: Evaluation techniques and tools*. Washington, DC: World Bank.

World Bank. 2008. "World Development Report: Agriculture for development." Washington, DC: World Bank.

Figure A.3: An Underlying Logical Framework of CAADP for M&E



Appendix B: Terms of Reference of Country SAKSS Coordinator / Manager

Position Title: Country SAKSS Coordinator / Manager
Hiring Institution: Implementing Institution responsible for SAKSS
Reporting to: Country senior representative of implementing Institution and head of local host institution (e.g. Ministry of Agriculture)

Job Description

[Implementing Institution] seeks to hire a [Country] national to work jointly with the [Implementing Institution] country representative and [Local Host Institution or the Ministry of Agriculture] in the coordination and implementation of a country SAKSS program. The program aims to enhance local capacity for evidence-based policy and data analysis, as well as knowledge and information exchanges, in the areas of agriculture and rural development. It is to be established within a local government body (such as the Ministry of Agriculture) to provide a means to better manage existing and new knowledge on the agricultural sector and rural economy in the country, and ultimately, strengthen the foundation of evidence for policy formulation and for informing development strategy decisions in general. A SAKSS network will be established to fundamentally consist of local and international data providers, researchers and analysts working in the country. The network will help provide key data analysis, knowledge and information exchange, and capacity strengthening needs within the Ministry (or other local host institution).

Duties and Responsibilities

- Establish a SAKSS node for agriculture and rural development policy and program analysis, design, monitoring, and evaluation
- Establish a SAKSS Network of data providers, and analysts and researchers
- Manage the compilation of information on past research and relevant data sets on agriculture and rural development
- Contribute to data analysis upon demand, including spatial data, in order to serve the needs of the strategy development process and ongoing dialogue in a timely fashion.
- Contribute to the preparation of policy briefs and reports based on the data analysis, ongoing research of collaborators, and emerging policy issues.
- Manage the day to day program management and coordination in close collaboration with the implementing institution, local host institution, relevant ministry, and other key local stakeholders.
- Serve as a key liaison and link on the SAKSS program between the Ministry of Agriculture (or other local host institution) and the scientific community, development partners, private sector, non-governmental organizations and civil society
- Serve as the champion for SAKSS in the sense of achieving active participation and support from local institutions, government ministries, donors, private sector investors, farmers' organizations and research institutions and other clients.

Promote greater knowledge and data sharing through various media (e.g. policy seminars, web-based platforms, news media) and the coordination of dialogue linking policy analysis and decisionmaking
Assist with managing program budgets, raising resources and prepare progress reports relevant to diverse stakeholder groups
Coordinate research teams for generating new evidence for policymaking

Qualifications and Experience

MSc in Agricultural Economics, Rural Development, Statistics, Geography, Rural Sociology, or closely related field.
Proven skills in building network linkages, promoting information exchange
Excellent management, interpersonal, networking and team building skill
Experience with the management of databases or library holdings
Proven skills and ability to work with complex quantitative data sets and experience with Geographic Information Systems (GIS).
High level of computer literacy, particularly with software for database and library management, data analysis, and CD and web-page authoring.
Evidence of having a strong attention to detail.
Excellent written and spoken English and main local languages.
Willingness to travel, both in country and abroad

Other Desirable Qualifications

Knowledge of and experience in working with the principal public sector providers of analysis and information in the country.
Experience in research on development issues in the country
Familiarity with quantitative research techniques would be an added advantage.
Possess a holistic and solid knowledge regarding the country's agriculture and policy environment (Government, private sector, NGOs) and its evolution in recent years.

Appendix C: A Generic SAKSS Communication Strategy[20]

A SAKSS program provides policy-relevant information and analyses to improve policymaking, track progress, document success, and to help countries and regions improve their agricultural strategies. The success of the program depends on how effectively its communication strategy has targeted its audience. Here we suggest the following table which summarizes typical audiences, communications goals for each audience, what message a SAKSS program would ideally want to send, and how best to reach them with those messages.

Audience	Goal	Message	Vehicle(s)
Policymakers	Promote evidence-based policymaking, provide timely information and knowledge, support country strategy implementation, not appear too science-driven	SAKSS data and tools are by Africans for Africans; will help meet development goals	**Publications:** short , easy to read **Events:** high-level for visibility **Media:** interviews and coverage in local newspapers, radio, or television news
Policy Advisors	Build awareness and train on how to interpret the results of SAKSS tools (investment priorities, spatial analysis, etc.), make aware of SAKSS data and resources	SAKSS tools and data analysis are resources to be used by all (as a public resource)	**Publications**: training, explanatory materials **Events:** workshops led by well-respected local experts **Web:** tools, data, access to researchers should be available via website; blog for feedback
Regional Economic Communities and NEPAD, AU	Share results among RECs, encourage progress , demonstrate results to NEPAD and AU	SAKSS tools and research are effective for peer and mutual review of progress towards development goals	**Publications:** documentation of research to highlight results, credibility **Events:** high-level conferences with key Ministry, donor officials **Web:** success stories and summaries of research on website **Media:** coverage of events, interviews by REC officials
Academic and research institutes	Provide access to research, data, and tools	Our research and tools are freely available for all to use	**Training:** use of tools **Publications:** research reports of results and training manuals **Web**: tools, data, and contact info for researchers should be

[20] With contributions by Marcia MacNeil, Communications Specialist, Development Strategy and Governance (DSG), IFPRI.

Audience	Goal	Message	Vehicle(s)
			available; Blog for 2-way communication
Private sector/ Local organizations / donors	Demonstrate effectiveness to raise profile and reputation, credibility of program	SAKSS research, tools are effective, relevant, and deserve your support	**Publications**: short, PR pieces; success stories on website **Events:** include in larger more general conferences **Media:** any coverage in mainstream newspaper

Appendix D: SAKSS Stakeholder and Partner Institutions and Organizations[21]

African Governments
(Includes offices of the President, statistical bureaus, and the various ministries involved in agriculture, rural development, irrigation, water resources, infrastructure, transportation, environment, natural resources, women's affairs, national planning, and finance)
Government of Ethiopia
Government of Uganda
Government of Ghana
Government of Nigeria
Government of Rwanda
Government of Mozambique

African regional organizations
African Union (AU)
The New Partnership for Africa's Development (NEPAD)
Forum for Agricultural Research in Africa (FARA)
Common Market for Eastern and Southern Africa (COMESA)
Economic Community of West African States (ECOWAS)
Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)
West and Central African Council for Agricultural Research and Development (CORAF/WECARD)
Southern African Development Community (SADC)

African universities, research and policy analysis, information and knowledge organizations/networks
Food and Natural Resources, Policies Analysis Network (FANRPAN)
Southern African Regional Poverty Network (SARPN)
East and Central African Programme for Agricultural Policy Analysis (ECAPAPA)
Tegemeo Institute of Agricultural Policy and Development

Ethiopia

Ethiopian Development Research Institute (EDRI)
Addis Ababa University
Ethiopian Chamber of Commerce

Uganda

Economic Policy Research Center (EPRC)
National Planning Authority (NPA)
Makerere University

[21] These are not exhaustive. The list is intended to illustrate the kinds of organizations and agencies that a SAKSS program typically partners with to form a network platform.

Ghana

National Development Planning Commission (NDPC)
University of Ghana, Legon
Institute of Social Science and Economic Research (ISSER)

International organizations and institutions
Food and Agriculture Organization of the United Nations (FAO)
United Nations Economic Commission form Africa (UNECA)
U.S. Universities (Michigan State, Purdue, Cornell)
Famine Early Warning System (FEWS Net)
Foodnet (East Africa)
International Development Research Centre (IDRC)
World Agroforestry Centre (ICRAF)
International Research Centre for Maize and Wheat (CIMMYT)
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)
International Food Policy Research Institute (IFPRI)
International Institute of Tropical Agriculture (IITA)
International Livestock Research Institute (ILRI)
International Water Management Institute (IWMI)

Bi-lateral donors
(Includes central, country and regional field offices)
U.S. - United States Agency for International Development (USAID)
Canada - Canadian International Development Agency (CIDA)
Sweden - Swedish Agency for International Development Cooperation (SIDA)
United Kingdom - Department for International Development (DFID)

Multi-lateral donors
The World Bank
African Development Bank (ADB)

Appendix E: Glossary of Selected Terms[22]

Strategic Analysis	In this report, an integrated framework of analysis that helps identify policy and investment options for achieving high-end development goals
Knowledge System	1) In computer sciences, it is a mechanism for storing, organizing and retrieving information. 2) In the research community, it describes the links between *people* (researchers, policy analysts, development practitioners, decision makers, and other stakeholders), *organizations and networks* (policy analysis think tanks, universities, government agencies, non-governmental bodies and private sector), and *evidence* (results of research and analysis, synthesis and trends, local knowledge and information).
Knowledge Support System	In this report, considered similar to Knowledge System, but describes the actual institutional set up to promote such systems.
Knowledge Mgt System	In this report, used interchangeably with knowledge support system.
Policy	A deliberate plan of action to guide decisions and achieve a specific objective
Program	A plan of structured activities or steps to be carried out (or goals to be accomplished)
Strategy	A long-term plan of action designed to achieve a particular goal.
Development Strategy	A long-term policy and investment plan of action designed to achieve high-end development goals
Impact Assessment	A particular type of evaluation that aims to determine whether and to what extent a program / policy / strategy causes changes in the desired direction among a target population or in an environment (Rossi and Freeman 1993).

References

[22] Unless noted, definitions were taken from Wikipedia.

Rossi, P. H. & Freeman, H. E. 1993. *Evaluation: A systematic approach* (5th ed.). Newbury Park, CA: Sage Publications, Inc.

For more information, contact:

Coordinator
Regional Strategic Analysis and Knowledge Support System
c/o International Food Policy Research Institute
2033 K Street, NW
Washington, DC 20006-1002
Telephone: +1 202 862 5667
Facsimile: +1 202 467 4439
E-mail: resakss-africa@cgiar.org
www.resakss.org