

ASARECA's Strategic Plan 2007-2016

Agricultural Research-for-Development in Eastern and Central Africa

Table of Contents

Executive Summary

Chapter 1 – An Introduction to ASARECA

- 1.1 Origin and Evolution
- 1.2 Vision
- 1.3 Mission
- 1.4 Structure

Chapter 2 – The Strategic Planning Process

Chapter 3 – Situation Analysis

- 3.1 Population Distribution and Agricultural Land Use
- 3.2 Agroecological Conditions and Agricultural Potential
- 3.3 Access to Markets
- 3.4 Agricultural Development Domains
- 3.5 GDP and Agricultural GDP
- 3.6 Agricultural Productivity and Growth
- 3.7 Agricultural Production, Consumption, and Trade
- 3.8 Hunger and Malnutrition
- 3.9 National Agricultural Research Systems
- 3.10 Development Partners

Chapter 4 – Strategic Priorities for Agricultural R4D in ECA

- 4.1 Business-as-Usual
- 4.2 Priorities Among Commodities for Countries and Country Groups
- 4.3 Priorities Across Agricultural Development Domains
- 4.4 Priorities Along the Production-to-Consumption Continuum
- 4.5 Potential Benefits from Regional Coordination
- 4.6 Summary

Chapter 5 – Responding to the Priorities

- 5.1 Addressing Priority Commodities
- 5.2 Addressing Priority Themes
- 5.3 Addressing Priority Development Domains
- 5.4 Enhancing Services to NARS and Development Partners
- 5.5 Rationalizing and Integrating Networks, Programs, and Projects
- 5.6 Addressing Staffing Needs and Functions
- 5.7 Lowering Transaction Costs and Sustaining the Organization
- 5.8 Conclusions

References

Executive Summary

Created in 1994, ASARECA is a non-political association of directors of research institutes in 10 eastern and central African countries: Burundi, Democratic Republic of Congo (DRC), Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania, and Uganda. The 10 ASARECA countries cover an area of 8.5 million km² with a total population of more than 280 million people, most of whom are rural dwellers pursuing agricultural livelihoods. ASARECA serves as a forum for promoting agricultural research and strengthening relations between NARS and the international agricultural research system. Its informal status as an association has provided it with flexibility in adapting to changing circumstances and opportunities.

Box 1: ASARECA Vision

Vision

Regional leader in agricultural research and development for improved livelihoods in Eastern and Central Africa.

1.2 Vision

Agriculture-led development will make it possible to achieve the Millennium Development Goals relating to poverty and hunger. This will result from enhanced commitment of national policy makers and donors to agricultural research and development (i.e., business unusual) and appropriate commodity and targeting strategies for agricultural research for development.

ASARECA will be a force for agricultural development in Eastern and Central Africa. It will focus on solving agricultural research for development issues to attain economic growth, food security and eradicate poverty through the development of efficient, effective and sustainable agriculture. As a result, the ECA region will enjoy improved livelihoods of people in the region through science and technology. Improved capacity and collaboration among NARS will assist in the transformation of agriculture from subsistence farming to efficient and sustainable modern agriculture. There will be increased benefits from intra-regional and inter-regional trade. The region as a whole will be seen as attractive to investors in both agricultural science and technology and research for development.

ASARECA will facilitate the NARS in their goal of becoming centers of excellence spearheading generation and transfer of improved and appropriate technologies and methodologies in collaboration with its partners and clients in the quest for sustainable agricultural development.

It was reaffirmed that ASARECA would best achieve these objectives while remaining a non-political association.

1.3 Mission

Box 2: ASARECA Mission Statement

Mission

Enhance regional collective action in agricultural research for development, extension and agricultural training and education to promote economic growth, fight poverty, eradicate hunger and enhance sustainable use of resources in Eastern and Central Africa.

ASARECA is an association of Directors of national agricultural research institutes in 10 countries of eastern and southern Africa working in concert with donors, key partners and stakeholders in agricultural research for development. It is a vehicle for regional cooperation and collective action that facilitates agricultural and institutional innovation and the sharing of gains from research. ASARECA is an institution that serves its members and investors through: 1) strategic guidance on research for development priorities in the subregion; 2) representation and an institution memory of the region in international and emerging Africa-wide fora, 3) maintenance of multiple mechanism to facilitate collaboration at the subregional level (e.g., networks, competitive grants, exploratory initiatives), and 4) facilities for on-going monitoring and evaluation of regional programs supported by multiple donors. As the both the creation and instrument of national agricultural research institutes ASARECA adds value to their work particularly where regional collective action is required. The ownership of ASARECA by its members and its openness to its investors gives it a unique character in subregional organizations.

ASARECA will help the NARS to improve the welfare of the people of the region by increasing productivity, value addition and utilization of commodities through enhancement of the scientific knowledge base, generation, adaptation and transfer of improved technologies while conserving the natural resource base.

ASARECA will succeed in its mission through performing the following core functions:

1. Develop a shared vision and regional goals
2. Coordinate collective action at the regional level
3. Contribute to improving networking in the region
4. Contribute to the development of appropriate knowledge, methodologies, information and technologies
5. Facilitate the transfer of knowledge, information and technology
6. Mobilize and allocate resources for research through its various mechanisms

7. Strengthen capacity for agricultural research for development
8. Make the NARS operate as a true system at the national level
9. Facilitate sharing of research outputs and benefits among NARS
10. Enhance eastern and central Africa's reputation in regional and international fora as a desirable place to invest in research.

Central to ASARECA's vision and mission is recognition of the value of regional collaboration and, beyond that, the need for regional collective action among member countries and their partners. Also central to ASARECA's vision and mission is the notion of agricultural "research-for-development" (R4D) i.e., agricultural research convened and facilitated by ASARECA must further such development aims as broad-based growth and poverty reduction.

ASARECA comprises four components working in concert to improve the well being of agricultural producers and consumers in eastern and central Africa through agricultural research for development: the Committee of Directors (its governance body); a Secretariat headed by an Executive Secretary based in Entebbe; various operational mechanisms including its Networks, Programs and Projects (NPPs); a Competitive Grant Scheme, Secretariat-based services, an Endowment Fund (in creation); and a range of partners and stakeholders who participate in the full research cycle of planning, execution and evaluation of its research impact.

Box 3: ASARECA Hierarchy of Objectives

Super Goal: Increased economic growth and improved livelihoods in the ECA while enhancing the quality of the environment.
Goal: Enhanced sustainable productivity, value added and competitiveness of the sub-regional agricultural system.
Purpose: Enhanced utilisation of agricultural research and development innovations in Eastern and Central Africa.

The Strategic Planning Process

The ASARECA Strategy translates a vision of agriculture in 2015 in the eastern and central Africa region into direction for agricultural research for development and the particular contribution that ASARECA can make as an organization. The Committee of Directors endorsed a revision of the 1998-2007 strategy recognizing that a number of major changes had taken place in the social, economic, political, technical and institutional environment of the institution and this required a revision of the strategy and priorities of ASARECA.

The strategic planning process included elements of all three. It worked within an innovation systems framework that encompassed new concerns with policy and institutions, production-to-consumption chains, and broader economic and political influences. Strategic inputs to the plan came from many sources including: a study of strategic priorities for agricultural development and agricultural R4D in ECA; a survey of NARS priorities and researchable constraints in five sectors: crops, animal agriculture,

natural resources management, socio-economics, and policy and post-harvest; two strategic planning retreats between ASARECA and its NARS focal points; strategic planning and priority setting within ASARECA's networks, programs and projects; the development of an overarching strategy for the five NPPs oriented to natural resources management; and Consultation and interaction with the Committee of Directors, key partners, and broader initiatives at the continental level such as COMESA and NEPAD.

Situation Analysis

300 million hectares (roughly one-third) of ECA's total land area is devoted to agricultural uses. Agriculture is therefore the most common occupation in ECA, and agriculture looms large in national economies throughout in the region. Overall, agriculture accounts for 43 percent of regional GDP. In five countries (Burundi, the Democratic Republic of the Congo (DRC), Ethiopia, Sudan, and Tanzania) agriculture's share of GDP exceeds 50 percent. Only in Eritrea, Kenya, and Madagascar does agriculture contribute less than 30 percent to GDP. The distribution of the region's GDP closely matches that of the region's agricultural GDP (AgGDP). Countries with relatively large (small) national economies also have relatively large (small) agricultural economies.

Land productivity (i.e., agricultural output per hectare) in ECA has increased steadily in recent decades, but labor productivity (i.e., agricultural output per worker) has declined substantially. The contraction has been so marked that the region actually produced less per worker in 2000 than it did four decades earlier. This region-wide contraction in labor productivity has of course been based on contractions in a number of ECA countries, most notably in Tanzania, Madagascar, DRC, and Kenya. Labor productivity in Ethiopia, Rwanda, Sudan, and Uganda has recovered substantially in recent years.

Given these trends in agricultural productivity in ECA, it is not surprising that average yields for ECA's major crops currently fall well below those elsewhere in Africa, and even further below global levels. Only for cassava, beans, coffee, and tea do ECA yields compare favorably with average African and global levels. These trends in productivity growth have translated into poor overall agricultural growth rates in individual ECA countries, and for the region as a whole. Overall performance for ECA agriculture in the 1993-2003 period was slightly better than in the preceding decade. But at 2.34 percent, agricultural growth did not keep pace with population growth, which stood at close to 3 percent over this period. Only countries with low agricultural growth rates initially—i.e., those emerging from civil strife—registered growth rates high enough to offset population growth.

The bleak picture for agricultural productivity growth in ECA has major implications for aggregate relationships among agricultural production, consumption, and trade in the region. Most countries in ECA are net importers of most agricultural commodities. Only coffee, tea, and fruits and vegetables are consistent exports. Kenya, Tanzania, Uganda, and Ethiopia account for the bulk of those exports. Kenya is also the region's principal importer of agricultural commodities.

Given that the bulk of the region's population resides in rural areas and depends on agriculture for income and sustenance, and given the low levels of productivity growth in the sector, hunger and malnutrition have deepened in ECA in recent years. Between

1979 and 2000, the proportion of malnourished adults in ECA grew at a rate of 5 percent, compared to 2.4 percent on average for Africa, and compared to a 2.9 percent population growth rate. Child malnutrition and mortality remain high across the region. Child undernourishment ranged from a low of 17 percent (of children under 5 years of age) in Sudan to a high of 47 percent in Ethiopia. The child mortality rate which is closely linked to malnutrition ranged from a high of 207 deaths per 1000 (DRC) to a low of 108 (Sudan). The average for developing countries was 88.

The picture that emerges for ECA is therefore one of a region comprising countries progressively less able to meet the needs of their burgeoning populations. With agriculture looming so large in most national economies, sluggish growth in agricultural productivity has translated into sluggish overall growth and generally low per capita income levels. High levels of agricultural importation particularly of staples appear to be only partially filling the consumption needs of a population lacking purchasing power, resulting in high levels of adult and child malnutrition and towering child mortality rates.

In 2000, the overall agricultural research capacity for eight out of the ten ASARECA member countries stood at 3,600 full-time equivalent researchers, equivalent to \$341 million. National agricultural research institute (NARIs) represent about 57 percent of the region's agricultural research capacity, other governments agencies 24 percent, universities 17 percent, and the non-profit and for-profit private sectors 1 percent each. On average, 23 percent of the agricultural researchers in the region hold a PhD, 49 percent an MSc, and 28 percent a BSc degree. Throughout the 1990s, agricultural research staff throughout the region grew slowly at 1.6 percent per annum, while agricultural research spending almost stagnated with an average growth rate of 0.7 percent per annum. Nearly half of all funding for agricultural research in 2000 came from external donors.

In addition to the reported national agricultural research capacity, the region also receives support and collaborates with international agricultural research organizations, some of which have their headquarters in the region. Weaknesses include limited financial support, inadequacy of human resources, weak communications, poor coordination and internal linkages among actors, structural impediments to collaboration and coordination problems. Opportunities center on shared themes such as technology and institutional foresight, socioeconomic analysis, communications and information, and monitoring and evaluation where coordinated regional efforts or common facilities may be useful.

Two key partner organizations for ASARECA are the Consultative Group on International Agricultural Research (CGIAR) and the Forum for Agricultural Research in Africa (FARA). The CGIAR is concluding its Priorities and Strategies, after a long period of analysis, consultation and decision making. There is considerable overlap in international and regional public goods. In response to two sub-Saharan Africa Task Forces on programmatic and institutional alignment of the CGIAR centers, the CGIAR has called for the preparation of an integrated medium term plan with governance mechanisms to ensure that the CGIAR responds to the needs of the NARS and SROs. ASARECA has agreed to work with the Centers on eastern and southern Africa.

FARA's programs on integrated natural resources management, development of sustainable market chains, policies for sustainable agriculture and science capacity

building add value to ASARECA's work. The ASARECA Secretariat will serve as the institutional memory of the eastern and central African region and the means of aggregating NARS perspectives in regional fora.

On the political front, the African Union, NEPAD and COMESA are becoming key partners to advance the work of agricultural organizations. NEPAD's Comprehensive African Agricultural Development Program (CAADP) is an emerging framework in which the technical and political agendas come together. ASARECA has taken a pro-active role in promoting this link that research organizations have lacked with the policy-making and high-level donor environment. ASARECA also takes an active role in the CAADP-Support Group at the regional level to ensure that agricultural R4D is appropriately represented in debates on technical, institutional and policy issues.

Strategic Priorities for Agricultural R4D in ECA

When ECA is viewed as a region, milk emerges as the most important commodity sub-sector for growth-inducing investment in R&D based on simulated cumulative contributions to overall GDP to 2015. Oilseeds, cassava, and fruits and vegetables also rank highly. Viewed together, staples sub-sectors result in the largest GDP gains, followed by livestock products, fruits and vegetables, and oilseeds.

Significant differences in priorities exist between regional and national priorities. Priorities for Tanzania, Uganda, and Kenya closely match those of the region. Regional priorities appear to be less relevant for Ethiopia, Eritrea, and Sudan, with cereals and milk being more important in these countries than in the others. Regional priorities appear to have little relevance for Burundi, DRC, Madagascar, and Rwanda. In Burundi and Rwanda, bananas, potatoes, and sweet potatoes are crucial. In DRC, oilseeds and cassava are paramount. In Madagascar, rice is central.

Important differences also exist across commodities in the distribution of gains across countries. Whereas growth in the cassava and milk sub-sectors generate largest aggregate gains, such gains would be concentrated in a handful of countries. Fruits and vegetables, beef, oilseeds, and maize emerge as commodity sub-sectors in which growth would yield gains that were both large and widespread.

The high potential, low access, low population density (HLL) agricultural development domain emerges as the clear priority for efficient, equitable, and sustainable agriculture-led growth and poverty reduction in ECA. Scope for broad-based benefits from regionally conceived initiatives in agricultural development resides primarily in this domain. That scope would appear to be substantial based on growth in oilseed, fruit and vegetable, beef, maize, coffee, and tea sub-sectors. Agriculture-based growth in the LLL, HHH, and HLH domains is also important and likely offers scope for both poverty reduction and benefits from regional cooperation. But due to constraints borne of population pressure (HHH and HLH) and biophysical fragility (LLL), such potential is likely to be more difficult to achieve. Given the large number of people residing in these areas, research aimed at overcoming these constraints through improved natural resource management is of high priority.

Agriculture-based growth in the LHH, HHL, LLH, and LHL domains is unlikely to be large enough to warrant major investments in agricultural R4D. Best-bet growth enhancing options in these areas are likely to lie outside agriculture. Any agricultural R&D undertaken in these areas would be justifiable based only on strong

equity concerns, and only in the absence of more direct avenues for addressing constraints on growth.

The analysis indicates that GDP gains due to growth in demand would be equivalent to those due to comparable growth in supply. Gains from growth in these two areas would be significantly higher than those from growth due to greater than proportionate reductions in barriers to domestic and international trade.

Finally, significant returns to regional cooperation in agricultural R&D are identified. Regional spillovers from innovations originating in a small subset of ECA countries could equal 40 percent of total regional benefits from agricultural R&D.

Responding to the Priorities

The situation analysis and assessment of strategic priorities suggests that to have a large impact on the Millennium Development Goals of reducing poverty and hunger, ASARECA's NPPs should continue to address basic staples and commodities with a growing domestic market (cereals, livestock, dairy products, edible oils). These offer a larger impact and broader distribution of gains than either traditional exports with mature markets or niche exports with thin markets. ASARECA will move to strengthen its coverage of commodities with the capacity to reduce poverty. The prominent role of livestock calls for strengthening support to the work of A-AARNET, which has a broad portfolio but narrow funding. ASARECA will study the opportunity to undertake an initiative in oilseeds, a commodity sub-sector that has demand potential but its potential for regional action may be more limited. Fruits, vegetables and horticultural crops are the third area in which increased attention is indicated.

The priority assessment identifies three thematic areas critical for strengthening: applied social sciences in agricultural research; integrated natural resources management; and technology uptake and up-scaling. These three issues highlight the need for greater integration of ASARECA's technical portfolio. Commodity networks have moved vigorously to incorporate the production-to-consumption chain in their analysis. They have all tried experiences with technology uptake in some fashion and have all identified weaknesses in their capacity to do policy analysis, applied social sciences and marketing. Institutional analysis is absent. The strengthening of technology transfer will benefit from the participatory approaches of the natural resources management-oriented networks and programs. ASARECA will move to address these weaknesses through strengthening its own capacity to identify cross-cutting problems, effectively find and recruit partners and consultants to initiate new activities, and manage cross-network collaboration on policy, economic and institutional constraints.

NARIs and the NPPs are faced with the challenge of mainstreaming critical issues like HIV/AIDS, gender, and climate change. ASARECA will never have the capacity to lead the technical response, it could spearhead internalization of the implications of these topical issues in ECA.

The strengthening of ASARECA's program management and program integration is a precursor and a precondition for serious efforts to rationalize the portfolio, structure and management of NPPs.

Four agricultural development domains have been identified as priority based on their potential for agriculture-led development. The highest priority is a quantitatively significant area of high potential, low market access, and low population density (HLL).

This area is strategic because all commodities in growing demand can be produced, there are fewer constraints from population density, and the package of investment that increases market access can unleash potential. It accounts for 38 percent of the area in ECA and is found in most countries. However, there is urgency to make strategic investments before the land is occupied in inefficient ways. Two other priority areas have high potential but either low access or low population density. They are small niches that can be productive but cannot bring about mass reduction in poverty. The fourth area is LLL, containing 15 percent of the population and significant improvement can be made through R4D.

In responding to these priorities, ASARECA will have to pay attention to the full range of requirements for innovation i.e., policies, institutions/organizations, information, infrastructure, technology, and learning processes. Also key will be the need to match commodity and domain priorities, often focusing on new commodities (e.g., oilseeds and fruits and vegetables). Considerable areas of DRC, Uganda, and Southern Sudan all fall in the HLL development domain and hopefully will soon be ready for post-conflict rehabilitation. ASARECA could play a role in mobilizing the knowledge needed for strategic agricultural development in these areas.

Aiming to strengthen NARS and link them regionally, ASARECA will expand its initiatives and leadership in linking research to the political dialogue possible in COMESA, NEPAD and the G-8. To do this ASARECA will monitor political and institutional change in the global research environment and provide representation in such fora.

ASARECA will work to facilitate donor entry to the region by lowering transactions costs to development and scientific partners. It will do this by providing better information, established institutional arrangements and a forum for contacting stakeholders in one place.

ASARECA will provide a vehicle for aggregating and allocating funds, monitoring and reporting and impact assessment, all functions that individual donors require but cannot afford to organize individually.

ASARECA will improve collaboration with the CGIAR by providing clear signals on regional needs that allow an effective division of labor and partnerships based on complementarity, and by creating robust mechanisms to promote collaboration and collective action toward sustainable production of regional public goods.

To meet the expectations of its many partners and investors, ASARECA will maintain multiple mechanisms, applying those best suited to particular tasks. Among its current mechanisms are: Networking; a Competitive Grants Scheme; a Secretariat with planning, monitoring, and evaluation capability; management of the sub-regional Challenge Program of the CGIAR; and an Endowment Fund. These mechanisms will be applied in ways that minimize ASARECA's exposure to a range of external risks. The balance of funding allocated to each of these mechanisms and their attachment to the ASARECA strategy and goals will be assessed in light of ASARECA's broader response to its strategic priorities, in agreement with its partners.

ASARECA will move strategically to integrate its portfolio of NPPs by seeking cross network synergy and rationalization of their efforts at the operational, managerial and governance levels. The near-term strategy will call for studies of 1) program coverage and the need for new initiatives in commodities and themes; 2) rationalization

of governance where clusters of networks can integrate better and reduce governance costs through joint steering committees, and 3) integration of cross-cutting themes, through reinforcement of program direction in the Secretariat. This integration will have an immediate impact on the effectiveness of technology up-scaling-.

The Secretariat will seek support of its members and investors to provide the resources to strengthen its effectiveness in three critical areas:

1. Integrative Program Leadership. The integration of ASARECA's program portfolio (the work of its NPPs) calls for a senior program leader to promote and oversee the exchange of knowledge and resources among the networks, programs and projects. The terms of reference of the position of Head, Program Management Unit, are extensible to providing this leadership.
2. Leadership of Policy Foresight and Strategic Initiatives. Effective participation in global and regional fora, and informed leadership in steering activities arising under NEPAD and the RECs, requires the sub-regional organizations to bring professional positions to the table. A capacity to help NARS mainstream cross-cutting issues can be Secretariat-based. This would also be a focal point for strategic initiatives in support of countries in post-disaster or post-conflict situations. A strengthened policy unit, or dedicated resources for ECA/PAPA to perform this role, will be sought.
3. Professionalized communications. A key product of a facilitating organization is a flow of targeted communications adapted to their audience. RAIN is strengthening the capacity of partners to manage distributed information. ASARECA will seek to develop a strong communications pillar that can ensure that the output of ASARECA's NPPs is communicated effectively, strengthen the technology transfer capability of its networks, and effectively mount a public awareness and fund raising program for ASARECA itself.

Conclusions

The ASARECA of this Strategy will become a force for development in the region and a true vehicle of its members. It will reduce transactions costs for members and partners in ways that make ECA a preferred place to do agricultural research for development. As a body that is based on collective action, it will carry out activities that further the aims of all its member countries in an even manner. The core functions that ASARECA performs for its members represent economies to the countries that would otherwise be unable or unwilling to perform them individually. For donor organizations, the functions that ASARECA provides allows them to support a much larger program at the field and laboratory level than they would otherwise sustain. Sustainability of ASARECA is of mutual interest to NARS and donors alike and requires commitment from both sides.

Chapter 1 – An Introduction to ASARECA

1.1 Origin and Evolution

ASARECA is a non-political association of directors of research institutes in 10 eastern and central African countries: Burundi, Democratic Republic of Congo (DRC), Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania, and Uganda (Figure 1.1). The 10 ASARECA countries cover an area of 8.5 million km² with a total population of more than 280 million people, most of whom are rural dwellers pursuing agricultural livelihoods.

Created in 1994, ASARECA served as a forum for promoting agricultural research and strengthening relations between NARS and the international agricultural research system. Its informal status as an association has provided it with flexibility in adapting to changing circumstances and opportunities. As such it has become recognized as a valuable going concern.

Figure 1.1: The ASARECA Region



ASARECA has evolved over 10 years in several significant ways. Moving beyond the forum function, it has accepted programmatic oversight, and in some cases managerial responsibility, for 17 Networks, Programs and Projects (NPPs). Within this context, it is introducing an impact orientation culture among the NPPs and partner

NARS). It has reduced transactions costs to donors and partners by taking on information and reporting functions that would not be supportable by donors on a project-by-project basis. It is providing flexible leadership in linking research for development to a broader policy and development environment, particularly as new agendas are transacted in the NEPAD-CAADP framework. It has provided a forum for members to generate and share innovative ideas and develop a common voice on global, regional and sub-regional issues.

Box 1: ASARECA Vision

Vision

Regional leader in agricultural research and development for improved livelihoods in Eastern and Central Africa.

1.2 Vision

Agriculture-led development will make it possible to achieve the Millennium Development Goals relating to poverty and hunger. This will result from enhanced commitment of national policy makers and donors to agricultural research and development (i.e, business unusual) and appropriate commodity and targeting strategies for agricultural research for development.

ASARECA will be a force for agricultural development in Eastern and Central Africa. It will focus on solving agricultural research for development issues to attain economic growth, food security and eradicate poverty through the development of efficient, effective and sustainable agriculture. As a result, the ECA region will enjoy improved livelihoods of people in the region through science and technology. Improved capacity and collaboration among NARS will assist in the transformation of agriculture from subsistence farming to efficient and sustainable modern agriculture. There will be increased benefits from intra-regional and inter-regional trade. The region as a whole will be seen as attractive to investors in both agricultural science and technology and research for development.

ASARECA will facilitate the NARS in their goal of becoming centers of excellence spearheading generation and transfer of improved and appropriate technologies and methodologies in collaboration with its partners and clients in the quest for sustainable agricultural development.

It was reaffirmed that ASARECA would best achieve these objectives while remaining a non-political association.

1.3 Mission

Box 2: ASARECA Mission Statement

Mission

Enhance regional collective action in agricultural research for development, extension and agricultural training and education to promote economic growth, fight poverty, eradicate hunger and enhance sustainable use of resources in Eastern and Central Africa.

ASARECA is an association of Directors of national agricultural research institutes in 10 countries of eastern and southern Africa working in concert with donors, key partners and stakeholders in agricultural research for development. It is a vehicle for regional cooperation and collective action that facilitates agricultural and institutional innovation and the sharing of gains from research. ASARECA is an institution that serves its members and investors through: 1) strategic guidance on research for development priorities in the subregion; 2) representation and an institution memory of the region in international and emerging Africa-wide fora, 3) maintenance of multiple mechanism to facilitate collaboration at the subregional level (e.g., networks, competitive grants, exploratory initiatives), and 4) facilities for on-going monitoring and evaluation of regional programs supported by multiple donors. As the both the creation and instrument of national agricultural research institutes ASARECA adds value to their work particularly where regional collective action is required. The ownership of ASARECA by its members and its openness to its investors gives it a unique character in subregional organizations.

ASARECA will help the NARS to improve the welfare of the people of the region by increasing productivity, value addition and utilization of commodities through enhancement of the scientific knowledge base, generation, adaptation and transfer of improved technologies while conserving the natural resource base.

ASARECA will succeed in its mission through performing the following core functions:

1. Develop a shared vision and regional goals
2. Coordinate collective action at the regional level
3. Contribute to improving networking in the region
4. Contribute to the development of appropriate knowledge, methodologies, information and technologies
5. Facilitate the transfer of knowledge, information and technology
6. Mobilize and allocate resources for research through its various mechanisms
7. Strengthen capacity for agricultural research for development
8. Make the NARS operate as a true system at the national level
9. Facilitate sharing of research outputs and benefits among NARS

10. Enhance eastern and central Africa's reputation in regional and international fora as a desirable place to invest in research.

Central to this mission is recognition of the value of regional collaboration and, beyond that, the need for regional collective action among member countries and their partners. A rising tide floats all ships and collective action improves the environment for research in the ECA region. Collaboration offers the potential of spillovers and spill-ins by which one country benefits from research in neighboring countries. Collaboration can also allow participants to generate economies of scope and scale. Collective action will further allow ECA countries to address shared and transboundary that individual countries do not have incentives to address on their own. Finally, solidarity among countries of the region will require transfers of skills or resources to the smaller, less favored members or those recovering from human and natural disaster. The benefit is a joint profile for the region as a whole that raises the attractiveness to scientific and development partners.

Also central to ASARECA's mission is the notion of agricultural research-for-development (R4D). Following the Comprehensive Africa Agriculture Development Programme (CAADP) of the New Partnership for Africa's Development (NEPAD), the agricultural research convened and facilitated by ASARECA must further such development aims as broad-based growth and poverty reduction. The basic line of reasoning is that different agricultural R4D priorities imply different patterns of investment in agricultural R4D, which, in turn, imply different impacts on growth within agricultural sectors, on growth in wider economies, and on overall poverty rates.

ASARECA's Guiding Principles

Although the members of ASARECA are quite different, the association binds them together through a set of guiding principles that are backed by actions of solidarity. The following principles have guided ASARECA's evolution.

1. Non-political: ASARECA serves its member NARIs, donors and stakeholders in the pursuit of shared objectives on a non-political basis.
2. Balanced objectives: ASARECA respects national priorities with respect to economic growth, social welfare and environmental quality
3. Holistic approach: ASARECA strives to strengthen agricultural innovation systems at the commodity, national and regional levels while validating the role of NARIs
4. Enhances capacity: strengthens the role and capacity of member NARIs to meet new challenges and seize new opportunities
5. Practices solidarity: makes conscious efforts to support smaller NARS and those emerging from crisis
6. Facilitates regional collective action: serves as a vehicle of the member NARIs
 - Make spillovers happen across national boundaries
 - Achieve economies of scale and scope in research
 - Produce regional public goods
 - Provide a mechanism to share benefits and costs of collective action
 - Find research solutions to transboundary problems
7. Scientific excellence and creativity are enhanced through collaboration
8. Impact orientation: Applied in all regional activities impact orientation will promote impact at people level

Box 3: ASARECA Hierarchy of Objectives

Super Goal: Increased economic growth and improved livelihoods in the ECA while enhancing the quality of the environment.
Goal: Enhanced sustainable productivity, value added and competitiveness of the sub-regional agricultural system.
Purpose: Enhanced utilisation of agricultural research and development innovations in Eastern and Central Africa.

1.4 Structure

ASARECA comprises four components working in concert to improve the well being of agricultural producers and consumers in eastern and central Africa through agricultural research for development. The four components of ASARECA are the:

1. Committee of Directors – its governance body;
2. Secretariat – headed by an Executive Secretary based in Entebbe;
3. Operational mechanisms – its Networks, Programs and Projects (NPPs), Competitive Grant Scheme (CGS), Secretariat-based services, commissioned studies and Endowment Fund (in creation); and
4. Partners and Stakeholders – who participate in the full research cycle of planning, execution and evaluation of its research impact.

The 17 NPPs overseen and coordinated by ASARECA with support from a range of international research organizations were the following (the relevant international bodies are shown in parentheses):

1. **A-AARNET** -- ASARECA Animal Agriculture Research Network. (International Livestock Research Institute) A regional approach to livestock research for development. <http://www.asareca.org/a-aarnet/>
2. **AHI** -- African Highlands Initiative (World Agroforestry Center, the International Food Policy Research Institute, International Center for Tropical Agriculture) Methods and approaches for integrated natural resource management in productive, yet fragile highland zones. <http://www.asareca.org/ahi/index.htm>.
3. **BARNESA** -- Banana Research Network for Eastern and Southern Africa (International Network for Improvement of Banana and Plantain, International Plant Genetic Resources Institute) Research and development on bananas as a basic food and fruit. <http://www.asareca.org/barnesa/index.htm>
4. **CORNET** -- Coffee Research Network (CAB International). Regional solutions to coffee diseases and other common problems.

5. **EAPGREN** ó Eastern Africa Plant Genetic Resources Network (International Plant Genetic Resources Institute) Support for a regional approach to maintaining useful collections of plant biodiversity. <http://www.asareca.org/Networks/EAPGRENDOC.htm>
6. **EARNNET** -- East Africa Root Crops Research Network. (International Institute for Tropical Agriculture). Increased productivity, improved varieties, and diversified uses for cassava. <http://www.asareca.org/earnnet/>
7. **ECABIO** – Eastern and Central Africa Biotechnology Program. (various scientific partners). A regional approach to the adaptation of cutting-edge technologies and biosafety frameworks. <http://www.asareca.org/biotech/>
8. **ECABREN** -- East and Central Africa Bean Research Network (International Center for Tropical Agriculture). Increased productivity, improved varieties, and increased trade in *Phaseolus* beans. <http://www.asareca.org/ecabren/>
9. **ECAMAW** -- Eastern and Central Africa Maize and Wheat Research Network (International Maize and Wheat Research Center) Promoting increased productivity and trade. <http://www.asareca.org/ecamaw/>
10. **ECAPAPA** -- Eastern and Central Africa Program for Policy Analysis. (International Food Policy Research Institute). Focused on policy and regulatory reforms to promote and open regional markets, starting with seeds, fertilizers, dairy products, and natural resource management. <http://www.w1.co.ug/asareca/htdocs/ecapapa/>
11. **ECARSAM** -- Eastern and Central Africa Regional Sorghum and Millets Network Better production and utilization in drier areas (International Center for Research on the Arid and Semi-Arid Tropics) <http://www.asareca.org/ecarsam/index.htm>
12. **ECARRN** ó Eastern and Central Africa Rice Research Network. Regional sharing of technologies and knowledge on rice. (West African Rice Development Agency).
13. **FOODNET** (nternational Institute for Tropical Agriculture)_Promotes open access to market and trade information over the web, through mobile phones, on the radio, etc., and also supports post-harvest enterprise development. <http://www.foodnet.cgiar.org/>
14. **PRAPACE** -- Regional Potato and Sweet potato Improvement Programme in Eastern and Central Africa (International Potato Center). Increased productivity and market promotion for potato and sweet potato. <http://www.asareca.org/prapace/>
15. **RAIN** ó Regional Agricultural Information Network (various partners) <http://www.asareca.org/rain>
16. **SWMnet** -- Soil and Water Management Research Network (International Water Management Institute) <http://www.asareca.org/swmnet/>
17. **TOFNET** -- Trees on Farm Network (World Agroforestry Center) Better management of agroforestry and woodlots on small farms. <http://www.asareca.org/tofnet/>

The NPPs have were the major vehicle through which ASARECA promoted the regional agenda. The original networks were identified strongly with outreach activities of the

international centers; ASARECA's coordination of their activities was a first step in strengthening the hand of the NARS in their partnership with the centers.

Chapter 2 – The Strategic Planning Process

The ASARECA Strategy translates a vision of agriculture in 2015 in the eastern and central Africa region into direction for agricultural research for development and the particular contribution that ASARECA can make as an organization. The Committee of Directors endorsed a revision of the 1998-2007 strategy recognizing that a number of major changes had taken place in the social, economic, political, technical and institutional environment of the institution and this required a revision of the strategy and priorities of ASARECA.

As noted in Chapter 1, ASARECA has moved forward to its current stage of development by evolution. It has taken on new challenges building on its flexibility as an association. In the planning exercise that culminated in this strategy document, ASARECA adopted a mixture of the rational, evolutionary and processual approaches (van der Heijden, 1996). It recognized that a purely rational approach alone would assume too much predictability, clear intentions, and reasonable behavior to give direction. On the other hand, a purely evolutionary strategy would give only a perspective on emergent behavior but would assume that some transmissible memory of successful events could guide decisions. The processual approach calls for an integration of experience, sense-making and action through flexible processes and learning.

The strategic planning process included elements of all three. It worked within an innovation systems framework that encompassed new concerns with policy and institutions, production-to-consumption chains, and broader economic and political influences. Strategic inputs to the plan came from many sources:

1. A study of strategic priorities for agricultural development and agricultural R4D in ECA (ASARECA/IFPRI, 2005);
2. A survey of NARS priorities and researchable constraints in five sectors: crops, animal agriculture, natural resources management, socio-economics, and policy and post-harvest (ASARECA, 2005a);
3. Two strategic planning retreats between ASARECA and its NARS focal points;
4. Strategic planning and priority setting within ASARECA's networks, programs and projects;
5. The development of an overarching strategy for the five NPPs oriented to natural resources management (ASARECA, 2005b); and
6. Consultation and interaction with the Committee of Directors, key partners, and broader initiatives at the continental level such as COMESA and NEPAD.

Outputs emerging from each of these initiatives were shared with a wide range of stakeholders, debated at length, revised accordingly, synthesized, and utilized as appropriate in this strategy document.

Chapter 3 – Situation Analysis

Agricultural performance both derives from and conditions deeper socioeconomic and biophysical realities. In particular, it determines and reflects spatial distributions of human population and associated access to cultivable land, agricultural potential as captured by agroecological conditions, and access to markets. This chapter describes these realities. A basic argument underlying the analysis is that areas exhibiting different (or similar) combinations of these characteristics are often associated with different (or similar) management practices and livelihood strategies, and thus overall agricultural performance. Much of the discussion therefore revolves around a series of mapped and tabular representations of population density, agricultural potential, market access, and development domains that identify areas endowed with similar realizations of these three attributes. Trends and conditions in ECA's national agricultural research systems (NARS) are outlined, along with features and concerns of key development partners.

3.1 Population Distribution and Agricultural Land Use

The land:labor ratio has consequences for land management and production technology choice. Holding other factors constant, farmers in areas of high population density are more likely to undertake labor-intensive production strategies than are those in areas of low density. Population density is therefore a potentially useful window through which to build understanding of fundamental opportunities and constraints facing agriculture in ECA.

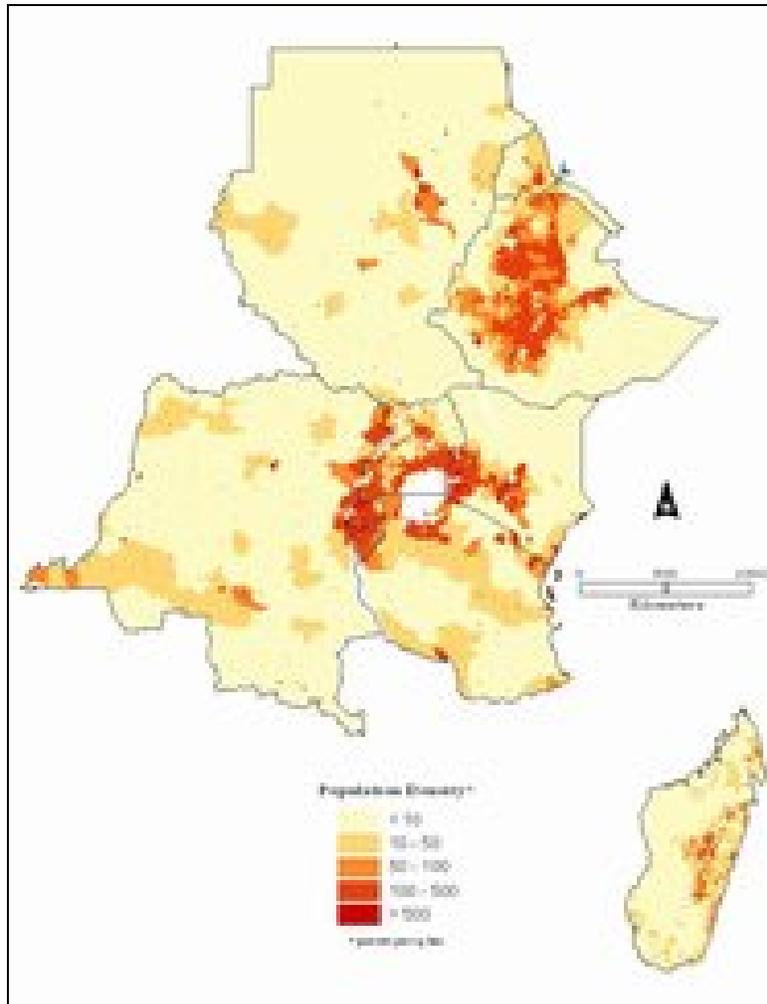
Figure 3.1 shows the distribution of population in ECA. The temperate and subtropical highland areas of Ethiopia, Kenya, Uganda, Rwanda, and Burundi are the predominant high density areas of the region (>100 persons/km²). Smaller pockets of high population density are found in northeastern DRC, areas bordering Lake Victoria, east-central Sudan, and the northern and southern border of Tanzania. The remaining areas have relatively low population density (<100 persons/km²).

300 million hectares (roughly one-third) of ECA's total land area is devoted to agricultural uses. Roughly 80 percent of agricultural land is rangeland and pasture. The remainder is under crops, primarily annuals. The relative extent, distribution, and mix of crop- and livestock-based agriculture varies widely across the region (Figure 3.2).¹ The agricultural area of the DRC is slightly less than that of Kenya or Madagascar but only about one-tenth of the total land area of the country. At the other extreme, in small countries such as Burundi, Eritrea and Rwanda, agriculture accounts for at least three quarters of the total land area.

The distribution of agricultural production matches that of human population. The joint effects of conducive rainfall and temperature conditions and proximity to water bodies and rivers define the distribution of both people and agriculture.

¹ The map shows both the spatial intensity of cultivation or rangeland within an area by darker shading, and the relative mix of crop and livestock based activities based on the mix of colors: from fully green to represent almost pure crop-based (including integrated crop livestock systems) to fully brown for almost pure, extensive pastoral areas.

Figure 3.1: Population Density in ECA



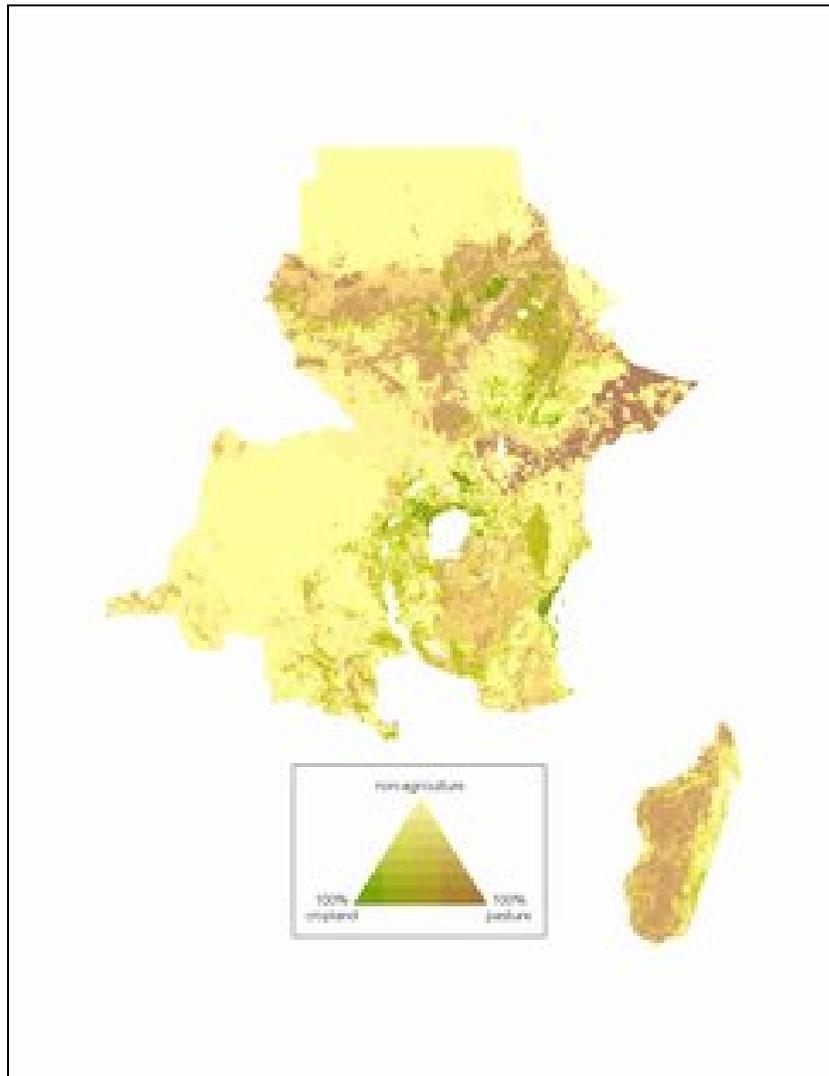
In many parts of the region, crop production is only feasible under irrigated conditions. However, Sudan with nearly two million hectares of irrigated area, and Madagascar with just over one million hectares account for 84 percent of the region's irrigated area. Ethiopia and Tanzania are the only other countries with major irrigated areas (190 and 170 thousand hectares, respectively). As a whole, only 6 percent of ECA's cropland is irrigated, with Madagascar's 30 percent and Sudan's 12 percent representing the highest shares. In the more humid environments of DRC, Rwanda, and Uganda, irrigation accounts for under half of one percent of cropped areas.

High concentrations of people in particular areas (Figure 3.1) suggest that access to agricultural land in ECA is constrained. For the region as a whole, cultivated land per capita stands at 0.2 hectares (ha). However, less than 11 percent of the rural population resides in areas where per capita cultivated land area is close to the regional average. Almost 70 percent of the population lives in areas with less than 15 percent of the

regions cultivated land; for these rural dwellers, the availability of cultivated land is only one-fifth of the regional average.

National averages of cultivated land per capita range from as low as 0.11 ha for Ethiopia and Kenya to 0.64 ha for Sudan. In small countries like Burundi and Rwanda, per capita cultivated land is more equally distributed across size classes than in large countries like DRC and Sudan. With the exceptions of Burundi and Rwanda, 60-80 percent of rural inhabitants live in areas with below average levels of per capita cultivable land.

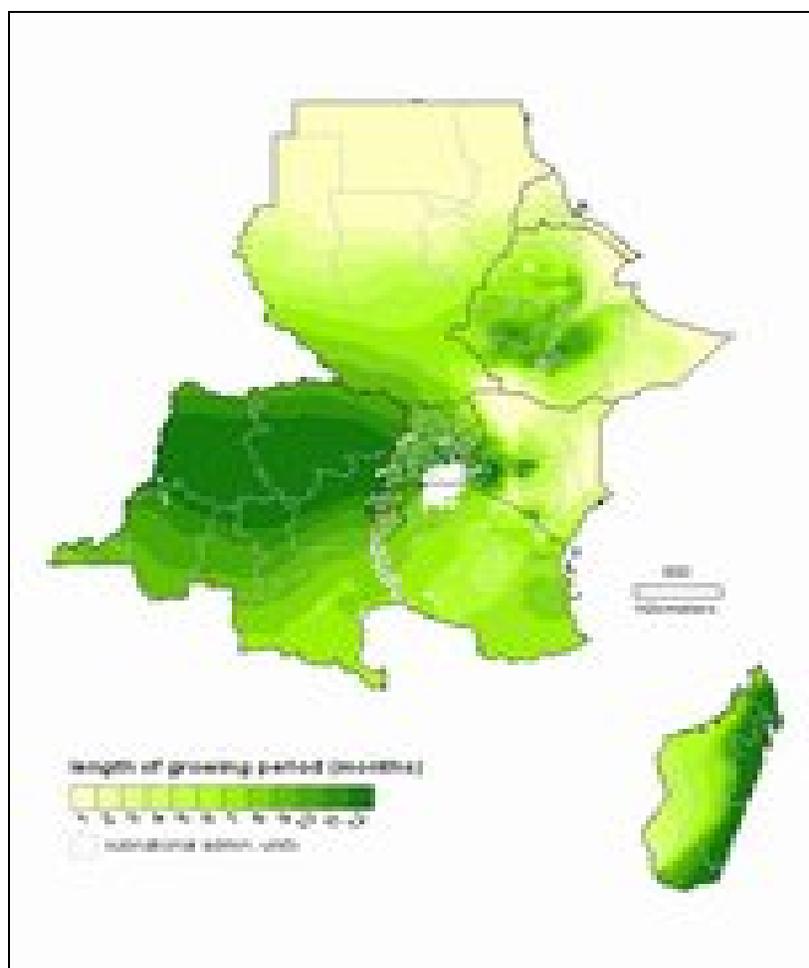
Figure 3.2: Agricultural Land Use in ECA



3.2 Agroecological Conditions and Agricultural Potential

As signaled by the distribution of agricultural land use, opportunities and constraints in agricultural production vary by location and by type of production systems. Within ECA where agriculture is dominated by subsistence-oriented smallholders, the three most binding constraints influencing agricultural production potential are the availability and variability of water supply, soil fertility, and the biotic pressure from pests and diseases. In theory, all these attributes should be reflected in any measure of agricultural potential. In practice, paucity of appropriate data at appropriate scales renders such treatment infeasible. The availability of water, be it from rainfall, local groundwater or surface water use, or formal irrigation schemes, is generally the most binding of constraints. Figure 3.3 shows the distribution of the length of growing period (LGP) across the ECA region. The LGP measures the total length of time (shown here in months) when rainfall exceeds evapotranspiration, leaving sufficient excess water to support the growth of crops and pasture.

Figure 3.3: Agricultural Potential in ECA: Length of Growing Period Layer (months)



Source: FAO/IIASA Global AEZ (2001)

3.3 Access to Markets

To fully understand how a location's absolute agricultural potential translates into comparative advantage for different production activities requires information on access to markets. Opportunities for gathering market information, obtaining credit, buying inputs, and selling outputs depend upon a wide range of socioeconomic, institutional and cultural factors. Unfortunately, data describing such conditions in ECA are patchy and of questionable quality. Constructing a market access spatial layer therefore resides firmly in the domain of modeling. Reliable data on some of the above-mentioned factors are combined and extrapolated in theoretically defensible manners to yield a picture of market access in ECA that, while incomplete, comprises a useful entry point into this crucial determinant of agricultural opportunities and constraints.

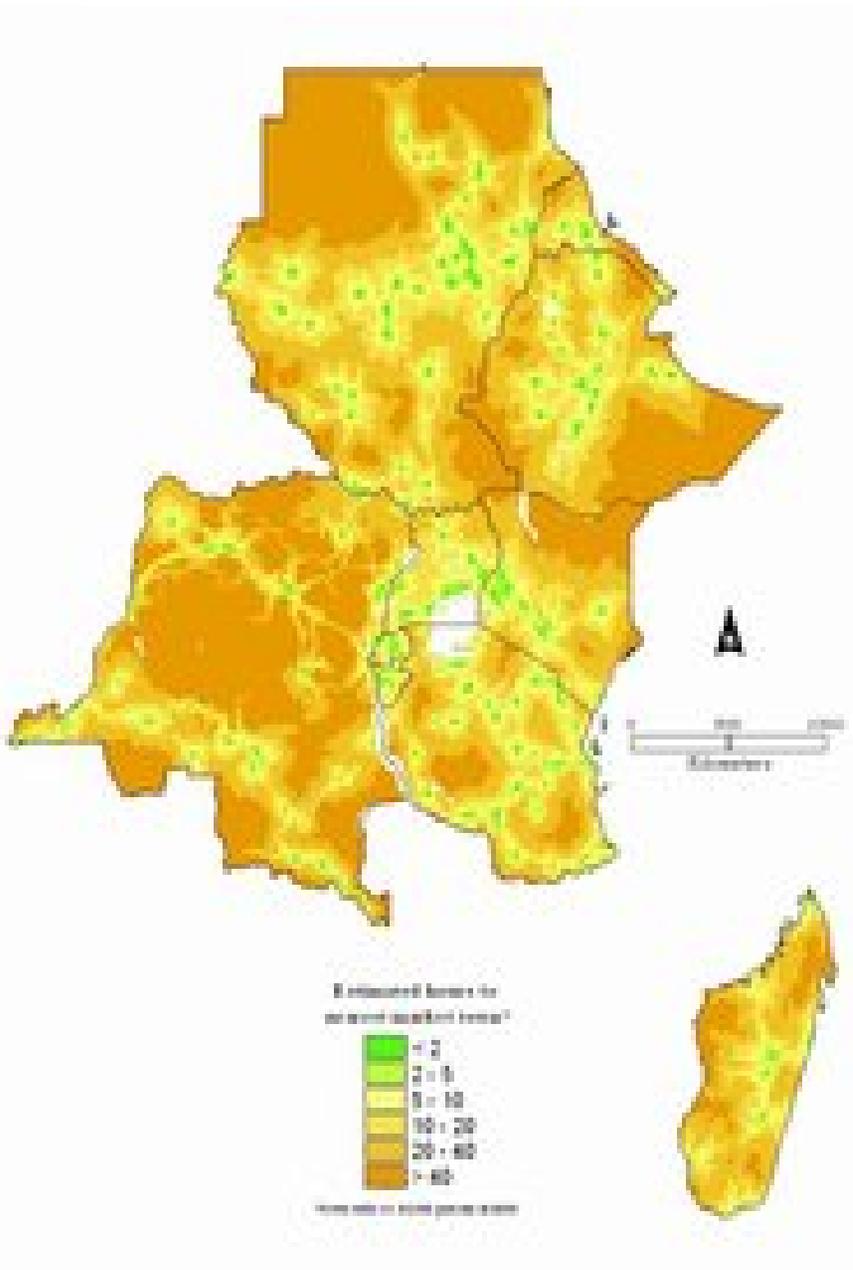
This study focuses on a set of criteria that reflect the physical accessibility of a range of markets in terms of expected travel times. Five distinct types of market opportunity are identified: localized trade/exchange, sub-regional trading centers, central urban markets, trans-border trade (by road, rail or water), and international "fresh markets" accessed by airports. For each type of market, individual measures of market access are generated spanning the whole region. Information on road location and quality, slope, and off-road land cover is combined to assess travel times to target market locations. Figure 3.4(a) shows the results for one type of market—sub-regional trading centers—that are defined as having a population of more than 50,000 people. Significant areas in Northern Sudan, Eastern Ethiopia, Northern Kenya, and Central DRC are very remote from regional trading centers. For the region as a whole, over 40 percent of rural population and cropland areas are more than 8 hours travel away from such markets, and only 14 percent are within two hours travel. In Burundi, Rwanda and Uganda, just over half the population is within four hours of travel from a regional market. Conversely, in DRC and Tanzania over half the rural population are more than 8 hours away.

A similar analysis is performed for central urban, trans-border, and high value air-freight markets, using as market targets, capital cities (and other major cities such as Mombasa in Kenya), border crossing points, and international airports respectively. In all these cases, areas within 3 hours travel of target markets are classified as having high access levels. In the case of local trade/exchange, a different measure is used. The opportunity for local trade/exchange is considered high for any location for which 300 or more people live within a 5km radius.

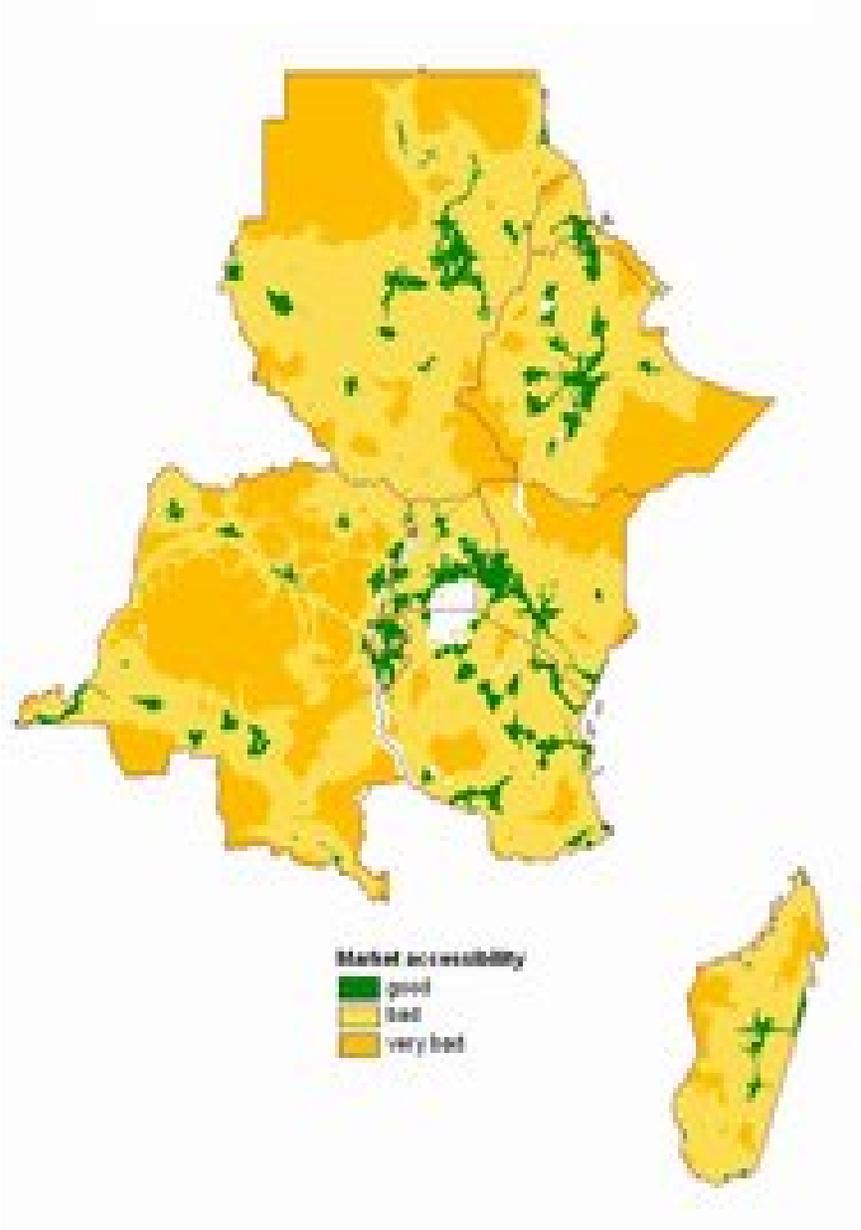
To assess the overall level of market access of any location, the number of different types of market to which that location had high levels of access are added together. Figure 3.4(b) shows locations having high levels of access to two or more types of market. Areas proximate to the major trade corridors show up as "high access", as do areas surrounding capitals in the high-density highlands of Ethiopia, Rwanda and Burundi. Elsewhere, high access areas are more restricted; they are those contiguous with urban centers.

Figure 3.4: Agricultural Market Access in ECA: Travel Times to Regional Market Centers and Aggregate High/Low Market Access Classes

(a) Travel time to regional market centers (hours)



(b) Aggregate High/Low Market Access Classes



3.4 Agricultural Development Domains

Figure 3.5 illustrates the intersection of the three socioeconomic and biophysical layers strongly related to the feasibility and attractiveness of specific development and livelihood strategies: population density, agricultural potential, and market access. The distinct areas delineated on this map are defined as *agricultural development domains* i.e., areas for which a given agricultural development strategy is likely to have similar relevance (Wood et al., 1999). Development domains are defined using consistent data and criteria across the region, thus helping diagnose development constraints, and formulate and evaluate strategic intervention options in comparable ways.

To facilitate analysis and communication, only eight domain types are defined. This is done by classifying each of the three key factors into two values: 'high' or 'low'. Population densities are assumed to be 'high' at densities of 100 persons per square kilometer or greater and 'low' otherwise; agricultural potential is assumed to be 'high' where LGP is 180 days or more, and 'low' otherwise; market access is assumed to be 'high' in locations with high levels of access to at least two of the five types of market, and 'low' otherwise. Domains are described by their high or low status in the sequence: agricultural potential, market access and population density as shown in the legend to Figure 3.5. For instance, HHH denotes high agricultural potential, high market access, and high population density.

Despite the limited number of domains, the spatial variability of domains can be quite complex, especially in highland areas, reflecting any marked local changes in agricultural potential, market access or population density. Domains straddle national and sub-national boundaries where development conditions are similar.

Table 3.1 summarizes the distribution of some key measures within the eight domain types.² The largest individual domain is HLL (38 percent of ECA land area) followed by LLL (20 percent). Areas with high agricultural potential and high market access account for only 4.4 percent of the land area but include more than 11 percent of cropland and 19 percent of the rural population. The proportion of cropland to total land area falls markedly as areas become less suitable. Domain HHH has 2 percent of total land and over 7 percent of cropland, HLL has 38 percent of land area and about the same percentage of crop area, while LLL has 21 percent of land area and 16 percent of cropland. Over 60 percent of the rural population and almost 60 percent of the cropland can be found in the 45 percent of ECA area with high potential. But over 40 percent of the population and almost 50 percent of the cropland are located in areas with low market access.

² The 'not included' category refers to protected and very remote areas not captured in the classification schema.

Figure 3.5: Agricultural Development Domains and Administrative Boundaries in ECA

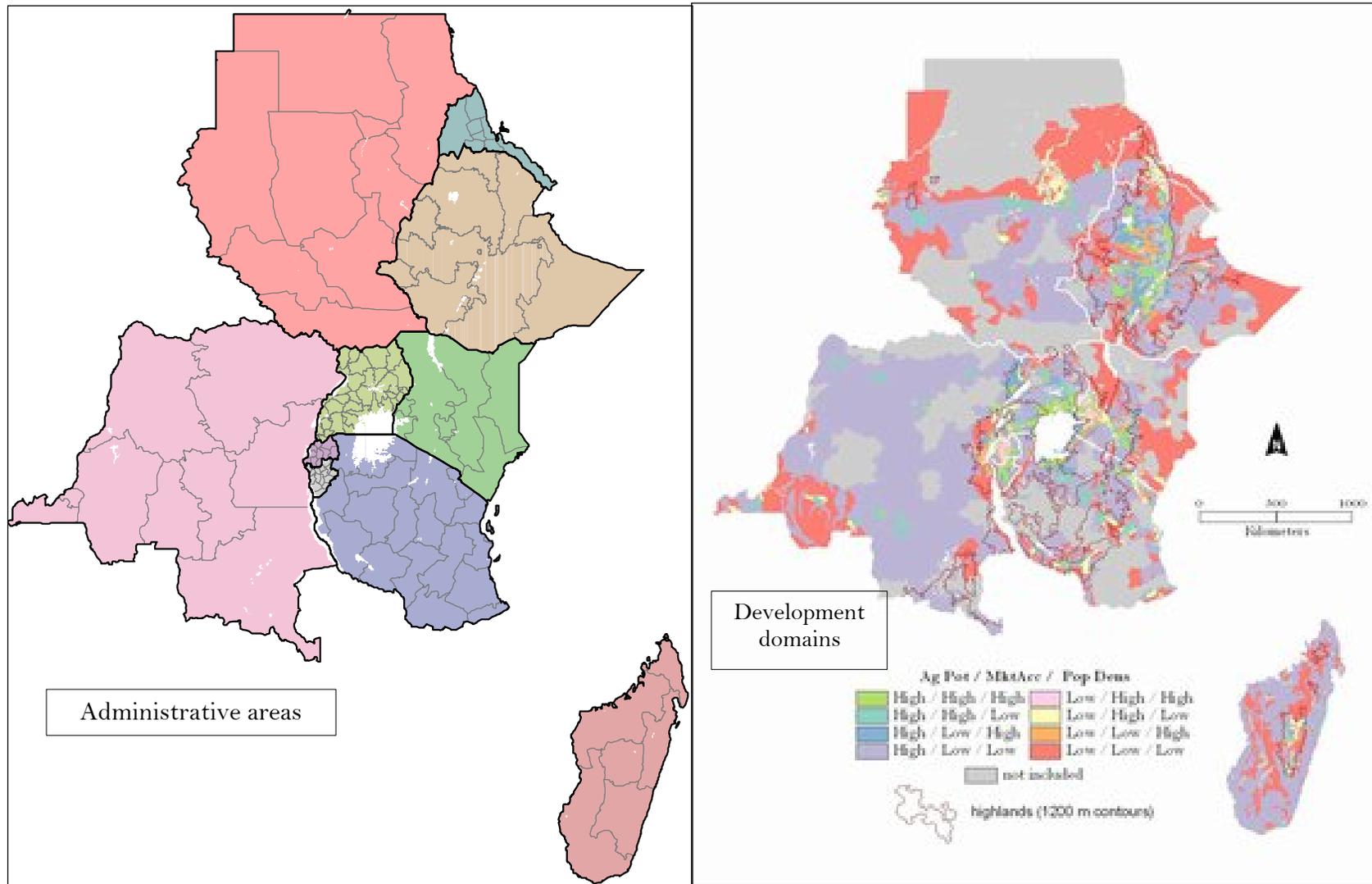


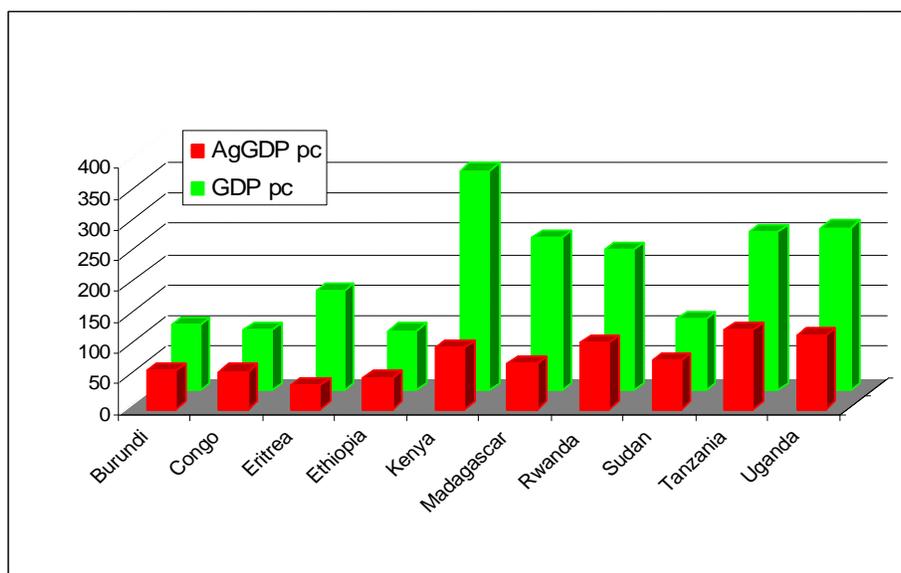
Table 3.1: Distribution of Total and Rural Population, Land, Cropland and Pasture Area, and Cattle by ECA Development Domain

DOMAIN*	Total Population	Rural Population	Land Area	Crop Area	Pasture Area	Cattle
	<i>(person)</i>		<i>(hectares)</i>			<i>(head)</i>
High / High / High	48,426,587	29,484,613	15,455,083	4,841,643	5,597,020	8,247,287
High / High / Low	17,401,314	9,748,804	20,422,786	2,603,418	7,124,266	5,505,638
High / Low / High	36,460,016	31,859,498	21,068,213	5,953,171	7,282,505	11,922,444
High / Low / Low	67,321,092	58,457,657	313,269,857	25,809,309	85,381,313	41,148,856
Low / High / High	28,541,396	14,476,029	6,338,972	1,879,020	2,339,045	3,305,366
Low / High / Low	11,367,976	5,816,946	10,867,730	1,308,882	4,116,101	3,241,843
Low / Low / High	15,142,158	13,197,227	8,299,234	2,288,213	3,111,631	4,420,335
Low / Low / Low	35,420,112	31,374,157	170,617,605	10,386,762	53,824,743	22,289,954
not included	21,559,349	13,125,585	258,650,848	11,815,719	48,959,981	15,794,770
Totals	281,640,000	207,540,516	824,990,328	66,886,138	217,736,605	115,876,493
	<i>(percentages)</i>					
High / High / High	17.2%	14.2%	1.9%	7.2%	2.6%	7.1%
High / High / Low	6.2%	4.7%	2.5%	3.9%	3.3%	4.8%
High / Low / High	12.9%	15.4%	2.6%	8.9%	3.3%	10.3%
High / Low / Low	23.9%	28.2%	38.0%	38.6%	39.2%	35.5%
Low / High / High	10.1%	7.0%	0.8%	2.8%	1.1%	2.9%
Low / High / Low	4.0%	2.8%	1.3%	2.0%	1.9%	2.8%
Low / Low / High	5.4%	6.4%	1.0%	3.4%	1.4%	3.8%
Low / Low / Low	12.6%	15.1%	20.7%	15.5%	24.7%	19.2%
not included	7.7%	6.3%	31.4%	17.7%	22.5%	13.6%
Totals	100%	100%	100%	100%	100%	100%

3.5 GDP and Agricultural GDP

Agriculture looms large in national economies throughout ECA. Overall, agriculture accounts for 43 percent of total GDP in the region. In five countries (Burundi, the Democratic Republic of the Congo (DRC), Ethiopia, Sudan, and Tanzania) agriculture's share of GDP exceeds 50 percent. Only in Eritrea, Kenya, and Madagascar does agriculture contribute less than 30 percent to GDP.³ The distribution of the region's GDP closely matches that of the region's agricultural GDP (AgGDP) (Figure 3.6). Countries with relatively large (small) national economies also have the relatively large (small) agricultural economies. The largest economies are those of Kenya, Tanzania, Uganda, DRC, Ethiopia, and Madagascar; the smallest are Eritrea, Burundi, and Sudan.⁴ Whereas per capita overall GDP levels range from about USD 400 (Kenya) to slightly over USD 100 (Ethiopia), per capita AgGDP levels in most countries in the region cluster around USD 100, with some (e.g., Eritrea, Ethiopia, Burundi, and the DRC) hovering close to USD 50.

Figure 3.6: 2003 Per Capita GDP and Agricultural GDP (USD/year) in ECA Countries



Sources: FAOSTAT, World Bank Development Indicators.

3.6 Agricultural Productivity and Growth

Land productivity (i.e., agricultural output per hectare) in ECA has increased steadily in recent decades, but labor productivity (i.e., agricultural output per worker) has declined substantially (FAOSTAT, 2003). The contraction has been so marked that the region actually produced less per

³ Note, however, that the reasons for these relatively low shares are different for the three countries. Eritrea has little agricultural land; Kenya's structural transformation toward a less agriculture-based economy is more advanced than in other countries in the region; Madagascar's large agricultural potential remains largely untapped.

⁴ Note, however, that with its population of 32 million people, its oil reserves, and its high potential for irrigated agriculture, Sudan may not reside in this category for very long.

worker in 2000 than it did four decades earlier. This region-wide contraction in labor productivity has of course been based on contractions in a number of ECA countries, most notably in Tanzania, Madagascar, DRC, and Kenya. Labor productivity in Ethiopia, Rwanda, Sudan, and Uganda has recovered substantially in recent years.

Given these trends in agricultural productivity in ECA, it is not surprising that average yields for ECA's major crops currently fall well below those elsewhere in Africa, and even further below global levels (Table 3.2). Only for cassava, beans, coffee, and tea do ECA yields compare favorably with average African and global levels. These trends in productivity growth have translated into poor overall agricultural growth rates in individual ECA countries, and for the region as a whole. Overall performance for ECA agriculture in the 1993-2003 period was slightly better than in the preceding decade. But at 2.34 percent, agricultural growth did not keep pace with population growth, which stood at close to 3 percent over this period. Only countries with low agricultural growth rates initially—i.e., those emerging from civil strife—registered growth rates high enough to offset population growth.

Table 3.2: 2003 Agricultural Commodity Yields of ECA, Africa, and Global

Crop	Units	ECA	AFRICA	GLOBAL
Maize	MT/ha	1.39	1.61	4.47
Rice	MT/ha	1.12	1.87	3.84
Wheat	MT/ha	1.38	2.03	2.66
Sorghum	MT/ha	0.67	0.88	1.30
Millet	MT/ha	0.47	0.70	0.82
Potatoes	MT/ha	7.46	11.17	16.45
Sweet Potatoes	MT/ha	4.29	4.32	13.49
Cassava	MT/ha	8.18	8.83	10.76
Beans	MT/ha	0.60	0.62	0.70
Groundnuts	MT/ha	0.62	0.86	1.35
Sugar Cane	MT/ha	4.11	56.75	65.29
Bananas	MT/ha	4.69	6.59	15.25
Coffee	MT/ha	0.57	0.45	0.75
Tea	MT/ha	1.85	1.96	1.33
Barley	MT/ha	1.18	1.24	2.48
Oilseeds	MT/ha	0.51	0.69	1.75
Beef	Kg/animal	127	148	200
Chicken	Kg/animal	0.92	1.17	1.72
Cow Milk	Kg/animal/year	427	496	2197

Source: FAOSTAT

Note: na = not available

3.7 Agricultural Production, Consumption, and Trade

The bleak picture for agricultural productivity growth in ECA has major implications for aggregate relationships among agricultural production, consumption, and trade in the region. ECA's share of global agricultural exports has declined in recent years, from a high of 14 percent in the mid-1980s to less than 6 percent by 2002. Given the prominence of coffee in ECA's agricultural exports, this overall decline has closely matched the region's falling share of the global coffee market. That share has tracked the downward trajectory of global coffee prices.

Most countries in ECA are net importers of most agricultural commodities (Table 3.3). Only coffee, tea, and fruits and vegetables are consistent exports. Kenya, Tanzania, Uganda, and Ethiopia account for the bulk of those exports. Kenya is also the region's principal importer of agricultural commodities.

Between 1996 and 2000, the annual value of ECA agricultural trade amounted to slightly over USD 20 billion per year (Table 3.4). Total exports to non-ECA countries yielded USD 4 billion per year, with traditional exports accounting for 60 percent of that total. Cross-border trade in all commodities within the ECA region yielded just USD 300 million. Non-traditional exports accounted for almost 43 percent of this amount, traditional exports for about 29 percent, staples roughly 20 percent, and other items about 9 percent. Domestic (i.e., within-country) trade in food staples generated almost USD 16 billion—i.e., more than 50 times that of cross-border trade within the region.

3.8 Hunger and Malnutrition

Given that the bulk of the region's population resides in rural areas and depends on agriculture for income and sustenance, and given the low levels of productivity growth in the sector, hunger and malnutrition have deepened in ECA in recent years. Between 1979 and 2000, the proportion of malnourished adults in ECA grew at a rate of 5 percent, compared to 2.4 percent on average for Africa, and compared to a 2.9 percent population growth rate (Table 3.5). DRC, Ethiopia, Tanzania, and Kenya accounted for almost 93 million of the region's 96 million malnourished adults in 2000.

Child malnutrition and mortality remain high across the region (Table 4.6). Between 1990 and 2000, child undernourishment ranged from a low of 17 percent (of children under 5 years of age) in Sudan to a high of 47 percent in Ethiopia. The child mortality rate—which is closely linked to malnutrition—ranged from a high of 207 deaths per 1000 (DRC) to a low of 108 (Sudan). The average for developing countries was 88.

Table 3.3: Net imports of major traded agricultural commodities in ECA, 1000 mt (1998-2001 average)

	Coffee	Tea	Fruits & Vegetables	Maize	Rice	Wheat	Potatoes	Vegetable Oils	Sugar
Burundi	-26.70	-6.44	2.49	6.69	3.01	11.40	0.06	1.29	-0.52
DRC	0.00	0.00	14.78	63.54	57.77	297.61	39.17	25.68	51.96
Eritrea	0.00	0.27	7.05	2.79	2.33	212.51	0.00	9.93	9.16
Ethiopia	-0.17	-105.73	-6.37	24.80	5.35	831.10	-2.81	74.86	0.08
Kenya	-64.30	-233.71	-182.20	281.01	92.88	578.00	-0.21	479.37	145.75
Madagascar	-12.32	-0.30	-20.13	2.39	130.47	94.18	0.20	42.57	32.05
Rwanda	-12.42	-14.14	2.24	19.82	16.01	13.91	0.32	21.55	15.45
Sudan	9.40	20.20	5.21	39.46	31.11	676.44	0.32	114.28	-105.53
Tanzania	-46.82	-22.23	-7.27	115.93	138.58	216.01	7.48	223.01	119.75
Uganda	-186.23	-22.48	0.11	-1.88	41.06	80.07	0.12	137.31	52.30
ECA	-339.55	-384.56	-184.10	554.56	518.57	3,011.22	44.65	1,129.86	320.44

Source: FAOSTAT.

Note: Negative numbers are exports.

Table 3.4: Value, Destination, and Composition of ECA Agricultural Trade (1996-2002 Average)

Traded Items and Destinations	Value (\$ billions)	Share (%)
Traditional exports to non-ECA countries	2.4	11.9
Non-traditional exports to non-ECA countries	1.3	6.4
Other exports to non-ECA countries	0.3	1.5
Cross-border trade within ECA	0.3	1.5
Domestic markets for food staples	15.9	78.7
TOTAL	20.2	100.0

Notes: All figures are 1996-2000 averages except for domestic markets which are 2000 figures. Domestic market demand includes the value of own consumption. Traditional exports = coffee, tea, cotton, tobacco, cashew nuts, sugar, other fibers, cocoa, other nuts; non-traditional exports = fish, vegetables and fruits, oilseeds, oils and fats, and processed food; staples = maize, cassava, other cereals, beans, livestock products.

Table 3.5: Adult Malnutrition in ECA (1979-2000)

	Total Population			Growth Rate ²	Number of Adults Undernourished			Growth Rate ²	Proportion Undernourished			Growth Rate ²
	1979-81	1990-92	1998-00	1980-1999	1979-81	1990-92	1998-00	1980-1999	1979-81	1990-92	1998-00	1980-1999
				<i>percent</i>				<i>percent</i>	<i>percent</i>			
ECA Region	118.7	164.6	204.1	2.9	36.7	59.6	96.3	5.0	30.9	36.2	47.2	2.1
Burundi	4.1	5.7	6.3	2.3	1.6	2.8	4.3	5.2	39.0	49.1	68.3	2.9
Congo	26.9	38.5	49.6	3.2	8.9	12.3	36.4	7.1	33.1	31.9	73.4	3.9
Kenya	16.4	24.3	30	3.2	4.0	11.5	13.2	6.5	24.4	47.3	44.0	3.3
Madagascar	9.1	12.3	15.5	2.8	1.8	4.3	6.2	6.6	19.8	35.0	40.0	3.8
Rwanda	5.2	6.4	7.0	1.6	1.2	2.2	2.8	4.5	23.1	34.4	40.0	2.9
Sudan	19.3	25.4	30.4	2.4	5.6	7.8	6.5	0.9	29.0	30.7	21.4	-1.5
Uganda	12.5	17.8	22.6	3.1	4.1	4.1	4.7	0.7	32.8	23.0	20.8	-2.4
Tanzania	18.8	27	34.3	3.2	5.2	9.8	16.2	6.0	27.7	36.3	47.2	2.8
Eritrea	na	na	3.5	na	na	na	2.0	na	na	na	57.1	na
Ethiopia	na	na	61.4	na	na	na	27.1	na	na	na	44.1	na
Sub-Saharan Africa	343.8	474.5	587.5	2.8	125.4	166.4	195.9	2.4	36.5	35.1	33.3	-0.5

Source: FAO (2002) The State of Food Insecurity in the World 2002, FAO, United Nations, Rome

Notes: ¹ Totals for East Africa exclude Ethiopia and Eritrea

² Growth rates are least squares estimates between the three periods (1979/81, 1990/92, and 1998/00)

3.9 National Agricultural Research Systems

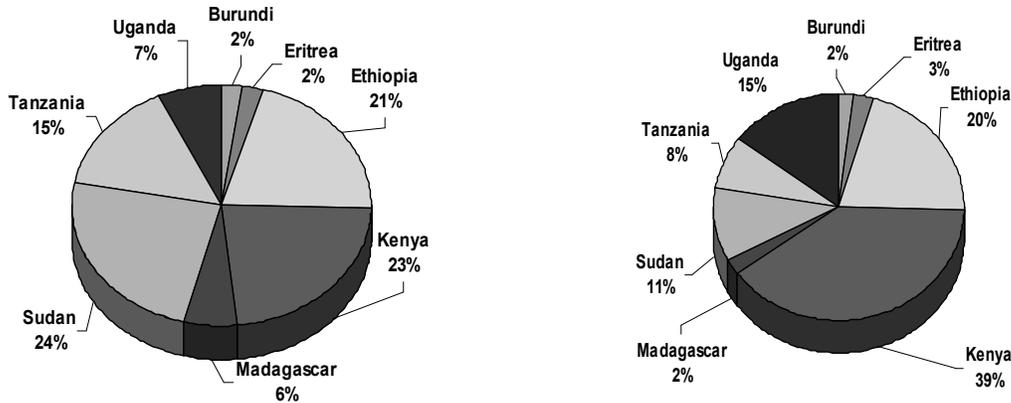
In 2000, the overall agricultural research capacity for eight out of the ten ASARECA member countries stood at 3,600 full-time equivalent researchers, equivalent to \$341 million (ASTI, 2005).⁵ Four countries, Ethiopia, Kenya, Sudan, and Tanzania, stand out as the countries with the biggest NARS and together represent about three-quarters of the total agricultural research capacity in the region (Figure 3.7). The other six countries have relatively small NARS in terms of researchers and spending, except for Uganda which reported relatively high spending, reflecting the temporary presence of substantial World Bank funding (ASARECA, 2005b).

⁵ Due to lack of information, DRC and Rwanda are not included.

Figure 3.7: Agricultural research capacity in the ECA region, 2000

(a) Total number of researchers: 3,600 FTE

(b) Total spending: \$ 341 million (1993 int. prices)



Broken down by institutional categories, the national agricultural research institute (NARIs) represent about 57 percent of the region's agricultural research capacity, other governments agencies 24 percent, universities 17 percent, and the non-profit and for-profit private sectors 1 percent each.

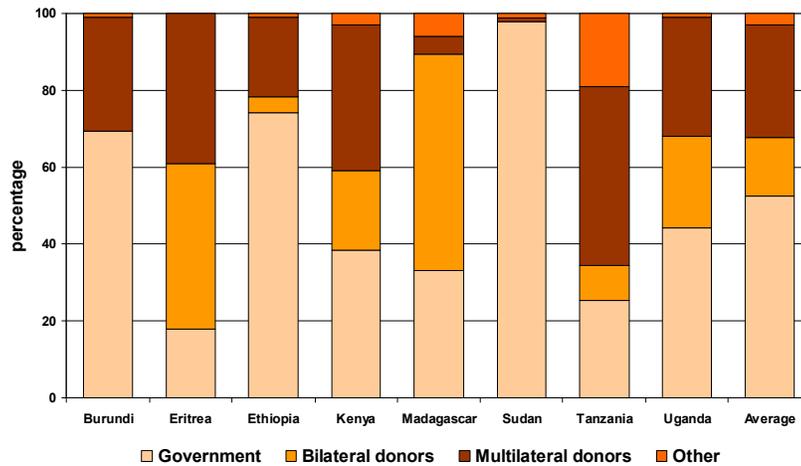
On average, 23 percent of the agricultural researchers in the region hold a PhD, 49 percent an MSc, and 28 percent a BSc degree. Four NARS in the region—DRC, Eritrea, Ethiopia, and Rwanda—still have a classic pyramid structure of research staff with a broad base of BSc-holders in agricultural research positions and relatively few PhD-holders at the top. The other six countries for which data at NARS level is available seem increasingly to require a post-graduate degree for research positions.

Throughout the 1990s, agricultural research staff throughout the region grew slowly at 1.6 percent per annum, while agricultural research spending almost stagnated with an average growth rate of 0.7 percent per annum. These averages hide major differences between countries as well as fluctuations from year to year, in particular regarding financing.

One reason for this high volatility in funding is high dependence on donor funding (Figure 3.8). Nearly half of all funding for agricultural research in 2000 came from external donors. This strong support for agricultural research by donors reflects the importance they give to increasing agricultural productivity in the region as well as a high degree of donor dependence on the part of the NARS.

In addition to the reported national agricultural research capacity, the region also receives support and collaborates with international agricultural research organizations, some of which have their headquarters in the region.

Figure 3.8: Sources of Funding for NARS



Self-reported weaknesses in NARIs identify elements that are under national responsibility: the level of financial support, inadequacy of human resources, weak communications, poor coordination and internal linkages among actors, structural impediments to collaboration and coordination problems. Perceived opportunities center on shared themes—such as technology and institutional foresight, socioeconomic analysis, communications and information, and monitoring and evaluation—where coordinated regional efforts or common facilities may be useful. The expressed opportunities indicate that many conditions favorable to positive reform are in place, including will for change, domestic political and policy support, and donor support.

3.10 Development Partners

ASARECA is a facilitating organization that operates in a rapidly changing external environment. ASARECA has chosen to position itself strategically to be both the advocate of the ECA region and a conceptual player in designing the international and sub-regional agricultural research-for-development system.

The two key partner organizations for ASARECA are the Consultative Group on International Agricultural Research (CGIAR) and the Forum for Agricultural Research in Africa (FARA).

The CGIAR is concluding its Priorities and Strategies, after a long period of analysis, consultation and decision making. The CGIAR has identified priorities in five areas that respect its mandate to produce international public goods and to maintain complementarity of action with the NARS and the sub-regional organizations. These priorities are:

1. Sustaining biodiversity for current and future generations
2. Producing more and better food at lower costs through genetic improvements
3. Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products
4. Poverty alleviation and sustainable management of water, land and forest resources, and
5. Improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger.

The CGIAR Strategy and Priorities also identifies a set of cross-cutting themes (e.g., HIV/AIDS, gender), and treats them as areas of potential partnership with NARIs and SROs based on comparative advantage. There is considerable overlap in international and regional public goods. In response to two sub-Saharan Africa Task Forces on programmatic and institutional alignment of the CGIAR centers, the CGIAR has called for the preparation of an integrated medium term plan with governance mechanisms to ensure that the CGIAR responds to the needs of the NARS and SROs. ASARECA has agreed to work with the Centers on eastern and southern Africa.

FARA is a regional apex created by the sub-regional organizations and their donors to add value to the work of the NARS and SROs. FARA's programs on integrated natural resources management, development of sustainable market chains, policies for sustainable agriculture and science capacity building add value to ASARECA's work. The ASARECA Secretariat will serve as the institutional memory of the eastern and central African region and the means of aggregating NARS perspectives in regional fora.

On the political front, the African Union, NEPAD and COMESA are becoming key partners to advance the work of agricultural organizations. NEPAD's Comprehensive African Agricultural Development Program (CAADP) is an emerging framework in which the technical and political agendas come together. ASARECA has taken a pro-active role in promoting this link that research organizations have lacked with the policy-making and high-level donor environment. ASARECA also takes an active role in the CAADP-Support Group at the regional level to ensure that agricultural R4D is appropriately represented in debates on technical, institutional and policy issues.

Chapter 4 – Strategic Priorities For Agricultural R4D in ECA

Priority setting relates to comparing and ultimately choosing among alternative courses of action. Given its aim to convene and facilitate agricultural research-for-development in ECA, at issue for ASARECA are potential (or foregone) contributions of given R&D choices to growth and poverty reduction in the region. Using contributions to agricultural GDP (AgGDP) and overall GDP to gauge agricultural R4D-based contributions to growth and poverty reduction, this chapter identifies priorities among major commodity sub-sectors at regional and national levels, priorities across agricultural development domains, and priorities along the production-to-consumption continuum.⁶ The picture that emerges is mixed. While priorities across agricultural development domains and along the production-to-consumption continuum are clear, those among commodities at regional and national levels are less so. Potential benefits for regional coordination of agricultural R&D are quantified and found to be substantial.

4.1 Business-as-Usual

As illustrated in the previous chapter, central descriptors and determinants of the challenges currently facing ECA agriculture are the low growth rates in key agricultural sub-sectors. Consider growth rates for three agricultural commodity groups: staples, cash-crops, and livestock products.⁷ Together, these commodity groups account for at least three-quarters of AgGDP in most ECA countries. The first three columns of Table 4.1 report the growth rates of these sub-sectors over the last 5-8 years. Assuming such growth rates, together with similarly recent growth rates for other (smaller) agricultural sectors and two non-agricultural sub-sectors, and projecting these growth rates forward to 2015, the annual growth rates for AgGDP and overall GDP reported in the last two columns are obtained.

Table 4.1: Sectoral Growth Rates (%) to 2015 Under Business-as-Usual

	Staples	Cash crops	Livestock	AgGDP	GDP pc
Burundi	2.43	2.26	0.18	1.77	-0.11
Congo	0.70	1.05	1.73	1.54	-2.29
Eritrea	1.26	0.77	0.76	1.18	-1.30
Ethiopia	1.63	2.60	4.79	2.19	-0.16
Kenya	2.14	1.15	4.91	2.39	0.04
Madagascar	2.91	2.51	1.06	2.93	0.25
Rwanda	3.92	3.12	4.28	3.63	0.27
Sudan	5.33	3.06	1.99	3.33	1.19
Tanzania	2.94	3.39	3.45	2.97	0.78
Uganda	3.56	2.24	5.06	4.19	1.35

⁶ The underlying modeling exercise is described in detail in ASARECA/IFPRI (2005).

⁷ Staples include cereals and root crops; cash-crops include traditional exports (e.g., coffee and tea) and non-traditional exports (e.g., fruits and vegetables); livestock products include meats, milk, eggs, and skins and hides.

These "business-as-usual" outcomes suggest that in all countries except Sudan and Uganda (assumed to continue to register relatively high growth rates as they recover from civil strife), AgGDP and overall GDP would grow at rates below the 3 percent required to keep pace with population growth. Per capita GDP growth rates would therefore stand at below 1 percent in a majority of countries. Kenya's per capita GDP growth to 2015 would be essentially zero; those of Madagascar, Rwanda, and Tanzania would be only marginally higher. Burundi, DRC, Eritrea, and Ethiopia would register negative per capita GDP growth rates.

Clearly, with business-as-usual in agriculture, ECA's future would not feature broad-based economic growth. The Millennium Development Goals (MDGs) would be unattainable, as would other development goals identified by ECA countries—such as increased food and nutrition security. Indeed, with business-as-usual, the gap between demand and supply of major food crops in ECA would widen. For cereals, the supply shortfall would increase to 6 million metric tons by 2015, 50 percent more than that in 2003, 15 percent of total regional demand.

The picture that emerges for ECA is therefore one of a region comprising countries progressively less able to meet the needs of their burgeoning populations. ASARECA and its partners aim to help ECA avoid a future featuring bleak business-as-usual outcomes. In putting together a portfolio of networks, programs, and projects that most strongly support that aim, ASARECA must answer a set of fundamental questions: On which commodity sub-sectors within agriculture should ASARECA focus its efforts, why, where, how?

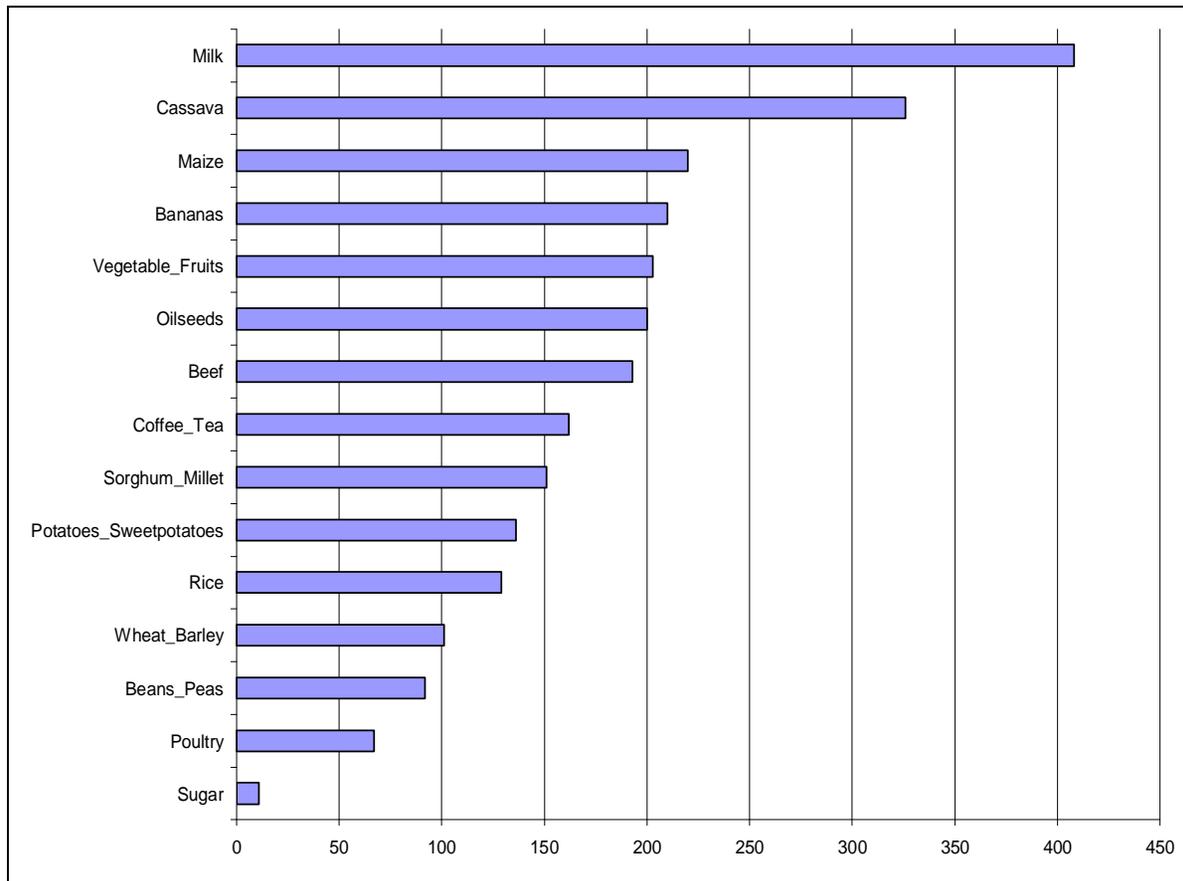
4.2 Priorities Among Commodities for Countries and Country Groups

To answer these questions, the cumulative impacts on AgGDP and GDP of equal percentage increases in commodity sub-sector annual growth rates to 2015 are computed and compared.⁸ When ECA is viewed as region, milk emerges as the most important commodity sub-sector for both AgGDP and GDP generation (Figure 4.1 and 4.2). Oilseeds, cassava, and fruits and vegetables also rank highly in both regards. Viewed together, staples sub-sectors result in the largest GDP gains, followed by livestock products, fruits and vegetables, and oilseeds. Higher growth for hot beverages like coffee and tea—traditional export sub-sectors—results in relatively low GDP gains. Crops like wheat, barley, rice, and pulses (beans and peas) have relatively high current and expected future demand in the region. However, their production bases are relatively small, rendering their aggregate impacts on GDP also relatively small. These results therefore suggest that the greatest agriculture-led growth opportunities in ECA reside in commodities for which, first, there is a relatively large production base to begin with, and, second, there is a large and growing demand within the region.

Given the diversity of biophysical and socioeconomic conditions across ECA countries, these regional priorities among commodities may not apply for individual countries. Countries may capture different shares of GDP gains accruing to given commodity sub-sectors, and some country gains may be dominated by given commodities.

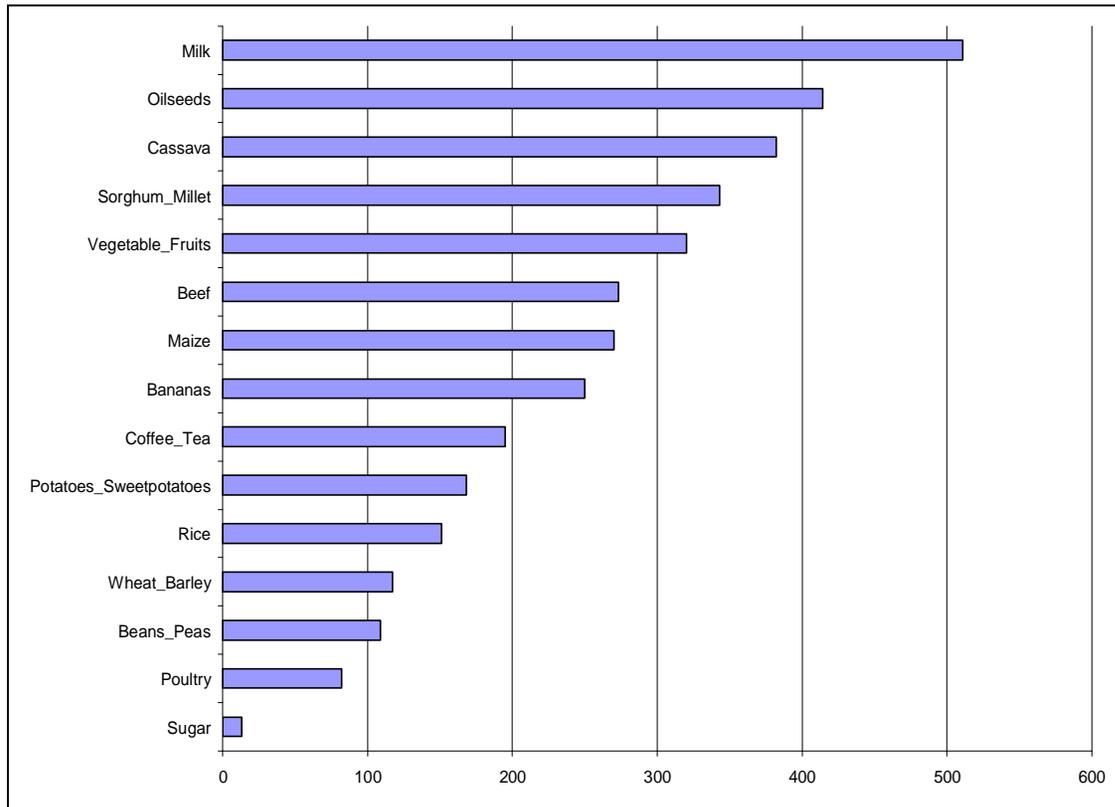
⁸ Details about the computation procedure can be found in ASARECA/IFPRI (2005).

Figure 4.1: Cumulative **AgGDP Gains** in ECA to 2015 from 1 percent Additional Growth in Selected Commodity Sub-Sectors (millions USD)



Source: ASARECA/IFPRI (2005).

Figure 4.2: Cumulative **GDP Gains** in ECA to 2015 from 1 percent Additional Growth in Selected Commodity Sub-Sectors (millions USD)



Source: ASARECA/IFPRI (2005).

In Table 4.2, commodity sub-sectors are ranked, first, based on the *size* of the GDP gains they induce, and, second, based on the *distribution* of those gains across countries in the region. Oilseeds, fruits and vegetables, beef, and maize are superior on both accounts. Sorghum and millet generate high gains on aggregate but exhibit only moderate regional diversity of those gains. Coffee, tea, pulses, and poultry generate relatively low gains on aggregate but have relatively high regional diversity scores and thus, based on this criterion, they may be accorded higher priority than would otherwise be the case. Milk and cassava generate high gains overall but have low regional diversity scores, suggesting sharp tradeoffs between growth and equity from regionally mobilized and implemented R4D investments in these sub-sectors.

Table 4.2: Commodity Rankings Taking Both Size and Distribution of Gains in Account

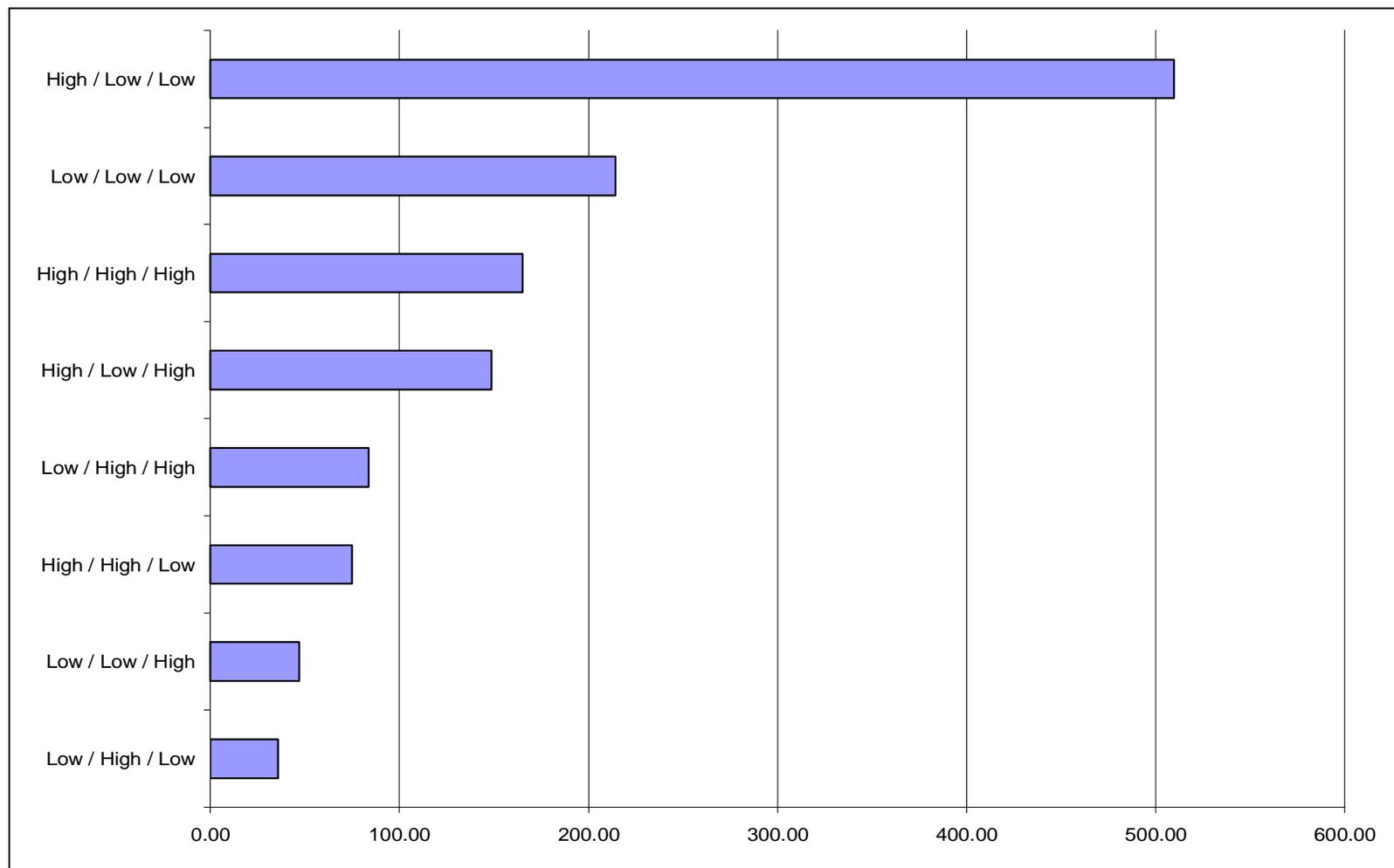
Commodity	Size score	Distribution score	Total
Oilseeds	14	13	27
Fruits & Vegetables	11	15	26
Beef	10	14	24
Maize	9	12	21
Sorghum & Millet	12	7	19
Milk	15	4	19
Coffee & Tea	7	11	18
Potatoes & S-Potatoes	6	9	15
Cassava	13	1	14
Beans & Peas	3	10	13
Bananas	8	3	11
Poultry	2	8	10
Wheat & Barley	4	6	10
Rice	5	2	7
Sugar	1	5	6

Note: The size and distribution scores range from 1-15, with 15 assigned to sub-sectors that yield the highest size and greatest spread of gains, and 1 to the lowest.

4.3 Priorities Across Agricultural Development Domains

Figure 4.3 shows the distribution of GDP gains across the 8 agricultural development domains. The high potential, low market access, low population density (HLL) domain emerges as by far the one with the highest growth-enhancing potential in the region. As noted in section 3.4, this domain accounts for close to 30 percent of regional population and almost 40 percent of land area, cropped area, pasture area, and livestock population. Large segments of all ECA countries fall in this domain and large shares of all commodities are produced therein (cf. Table 3.1). Complications raised by potential growth-equity tradeoffs are therefore likely to be minimal from growth originating in the HLL domain. This domain's low population density also suggests relatively low pressure on natural resources, and thus potentially few tradeoffs between growth and sustainability.

Figure 4.3: Cumulative GDP Gains in ECA to 2015 by Agricultural Development Domain from 1 percent Additional Growth in Commodity Sub-Sectors



The remaining 7 domains can be grouped into two sets: first, the LLL, HHH, and HLH domains; and, second, the LHH, HHL, LLH, and LHL domains. The three domains in the first set are clearly lower priority domains than the HLL domain, but they are also clearly higher priority domains than the four domains in the second set. The LLL, HHH, and HLH domains can therefore be considered moderately high priority; the LHH, HHL, LLH, and LHL domains can be considered low priority.

Among the three moderately high priority domains, the relatively high GDP gains generated in the LLL domain reflect the prominence of livestock in this zone. Milk and beef rank high among commodities in this respect, as do cassava and maize, both of which are important in this domain. The HHH and HLH zones produce relatively large gains because of their importance as suppliers of milk, poultry, bananas, fruits and vegetables, wheat, barley, and legumes.

Growth in the LLL, HHH, and HLH domains raises the possibility of tradeoffs between growth and sustainability. In LLL zones, concerns arise from the fragile and uncertain environments; in HHH and HLH areas, concerns spring from high population pressure. In both cases, productivity gains may be possible only at relatively high cost. Agriculture-based growth in these domains is unlikely to be large enough to warrant major investments in agricultural R4D. Best-bet growth-enhancing options in these areas are likely to reside outside agriculture.

4.4 Priorities Along the Production-to-Consumption Continuum

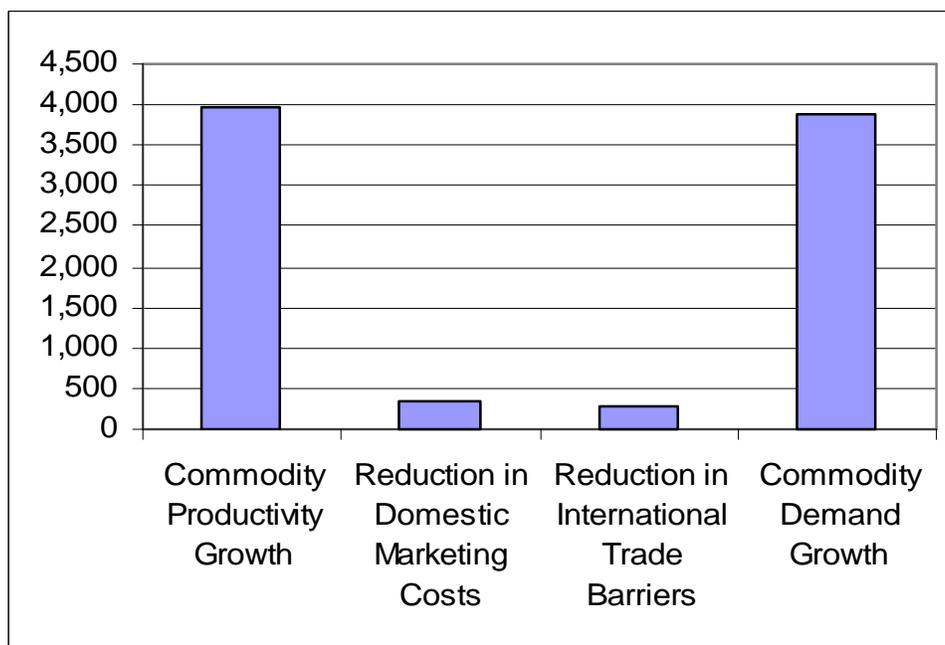
Increasingly, economic rents in agricultural commodity supply chains are to be found in areas outside production. Not only are processes of production important, so, too, are those of product development aimed at value addition. Efforts to reduce costs of product transformation along the production-to-consumption continuum are therefore important. Those efforts relate to transformations in form (via processing), over space (via transportation), over time (via storage), and in expectations (via insurance). The value added by such transformations generates market demand for agricultural products, further stimulating growth. Such improvements help guard against the depressed prices and reduced farm incomes that can accompany increased supply of agricultural products. Where along the agricultural production-to-consumption continuum are investments in R&D likely to be most fruitful, and why?

It is not straightforward to compare investments along the continuum. For instance, a 1 percent increase in productivity due to improvements in production inputs and processes implies quite different types and levels of investment than does a 1 percent decrease in domestic marketing costs, or a 1 percent increase in demand due to reductions in barriers to demand growth. Further, a key recognition is that full benefits of investments at any point on the production-to-consumption continuum arise only when investments at other points have been made. Despite these difficulties, consideration of the likely relative magnitudes of impacts of R4D-based growth and cost reduction at different points in agri-food chains is useful.

Figure 4.4 shows regional GDP gains to 2015 for 1 percent increases in growth rates due to supply-side improvements for the commodities included in the multi-market model, 1 percent increases in growth rates for demand for these commodities, and 10 percent reductions in domestic marketing costs and international trade barriers. Two results stand out. First, GDP gains from growth due to improvements in production processes, and from growth due to enhanced demand are significantly higher than are gains from growth due to greater than

proportionate reductions in barriers to domestic and international trade. Second, gains due to growth in demand are equivalent to those due to comparable growth in supply.

Figure 4.4: Regional GDP Gains to 2015 from Growth/Change Along the Production-to-Consumption Continuum (US\$ million)



The first result should not be interpreted to mean that reductions in domestic and international barriers to trade are unimportant. On the contrary, sustained expansions in both supply and demand depend crucially on such reductions. The point here is that by themselves such reductions lead to income gains that are relatively small. Their value derives from their impacts on supply and demand.

The second result—that demand-side growth leads to GDP gains that are proportionate to those from supply-side growth—is the crucial one. R&D activity in post-farm productivity improvement that spur demand growth should be as intensive in ECA as that aimed at spurring productivity growth on-farm.

4.5 Potential Benefits from Regional Coordination

In theory, regional integration and collective action in agricultural R&D among neighboring countries can lead to economies of scale and spillover benefits that permit research systems to jointly achieve the critical masses and cost savings needed to address problems beyond the capacities of individual systems. Such considerations drive to the core of ASARECA's vision and mission. Table 4.3 reports returns to R&D investments in key agricultural commodity sub-sectors under alternative assumptions about technology spillovers across national borders. Such spillovers add more than 50 percent to aggregate gains (column 2). Benefits accruing to non-innovating countries would be substantial (column 4). Despite differences in the distribution of spillover gains

(column 5), most ECA countries would gain significantly from regionally coordinated agricultural R&D.

Table 4.3: The degree and scope for agricultural R&D spillovers in ECA

Commodity	Regional gains	Incremental spillover gains (\$,000/yr) ¹	Gain to	Gains	Degree of variation of spillover gains outside innovating countries ³
	<i>without</i> spillovers (\$,000/yr) ¹		region from spillovers (%)	outside innovating countries (%)	
	A	B	B/A	B/(A+B)	
Cassava	\$5,200	\$2,581	50	33.4	2.29
Cow milk	\$4,456	\$2,984	67	40.8	1.71
Plantain	\$6,575	\$659	10	9.2	2.49
Maize	\$5,659	\$1,477	26	20.7	1.99
Beef	\$3,741	\$2,409	64	39.2	1.44
Coffee	\$2,566	\$1,461	57	37.7	2.22
Sorghum	\$1,064	\$2,059	194	66.3	1.83
Vegetable	\$1,742	\$956	55	35.4	1.09
Dry beans	\$1,701	\$626	37	27.0	1.09
Rice	\$854	\$1,355	159	61.3	2.51
Mutton/Lamb	\$467	\$1,399	300	75.6	1.75
Groundnuts	\$553	\$1,254	227	69.5	2.07
Potato	\$982	\$490	50	33.7	1.32
Cotton	\$427	\$251	59	37.1	1.64
Cashew nut	\$396	\$5	1	1.6	3.00
ECA TOTAL	\$36,381	\$19,965			

4.6 Summary

This chapter has outlined strategic priorities for agricultural R4D in ECA along a number of dimensions. When ECA is viewed as a region, milk emerges as the most important commodity sub-sector for growth-inducing investment in R&D based on simulated cumulative contributions to overall GDP to 2015. Oilseeds, cassava, and fruits and vegetables also rank highly. Viewed together, staples sub-sectors result in the largest GDP gains, followed by livestock products, fruits and vegetables, and oilseeds.

The analysis reveals significant differences in priorities between regional and national priorities. Priorities for Tanzania, Uganda, and Kenya closely match those of the region. Regional priorities appear to be less relevant for Ethiopia, Eritrea, and Sudan, with cereals and milk being more important in these countries than in the others. Regional priorities appear to have little relevance for Burundi, DRC, Madagascar, and Rwanda. In Burundi and Rwanda, bananas, potatoes, and sweet potatoes are crucial. In DRC, oilseeds and cassava are paramount. In Madagascar, rice is central.

The analysis also reveals important differences across commodities in the distribution of gains across countries. Whereas growth in the cassava and milk sub-sectors generate largest aggregate gains, such gains would be concentrated in a handful of countries. Fruits and vegetables,

beef, oilseeds, and maize emerge as commodity sub-sectors in which growth would yield gains that were both large and widespread.

The high potential, low access, low population density (HLL) agricultural development domain emerges as the clear priority for efficient, equitable, and sustainable agriculture-led growth and poverty reduction in ECA. Scope for broad-based benefits from regionally conceived initiatives in agricultural development resides primarily in this domain. That scope would appear to be substantial based on growth in oilseed, fruit and vegetable, beef, maize, coffee, and tea sub-sectors. Agriculture-based growth in the LLL, HHH, and HLH domains is also important and likely offers scope for both poverty reduction and benefits from regional cooperation. But due to constraints borne of population pressure (HHH and HLH) and biophysical fragility (LLL), such potential is likely to be more difficult to achieve. Given the large number of people residing in these areas, research aimed at overcoming these constraints through improved natural resource management is of high priority.

Agriculture-based growth in the LHH, HHL, LLH, and LHL domains is unlikely to be large enough to warrant major investments in agricultural R4D. Best-bet growth enhancing options in these areas are likely to lie outside agriculture. Any agricultural R&D undertaken in these areas would be justifiable based only on strong equity concerns, and only in the absence of more direct avenues for addressing constraints on growth.

The analysis indicates that GDP gains due to growth in demand would be equivalent to those due to comparable growth in supply. Gains from growth in these two areas would be significantly higher than those from growth due to greater than proportionate reductions in barriers to domestic and international trade.

Finally, significant returns to regional cooperation in agricultural R&D are identified. Regional spillovers from innovations originating in a small subset of ECA countries could equal 40 percent of total regional benefits from agricultural R&D.

Chapter 5 – Responding to the Priorities

This chapter specifies the implications of the strategic planning process for ASARECA's future.

5.1 Addressing Priority Commodities

The situation analysis and assessment of strategic priorities suggests that to have a large impact on the Millennium Development Goals of reducing poverty and hunger, ASARECA's NPPs should continue to address basic staples and commodities with a growing domestic market (cereals, livestock, dairy products, edible oils). These offer a larger impact and broader distribution of gains than either traditional exports with mature markets or niche exports with thin markets. ASARECA will move to strengthen its coverage of commodities with the capacity to reduce poverty. The prominent role of livestock calls for strengthening support to the work of A-AARNET, which has a broad portfolio but narrow funding. ASARECA will study the opportunity to undertake an initiative in oilseeds, a commodity sub-sector that has demand potential but its potential for regional action may be more limited. Fruits, vegetables and horticultural crops are the third area in which increased attention is indicated.

5.2 Addressing Priority Themes

The priority assessment identifies three thematic areas critical for strengthening: applied social sciences in agricultural research; integrated natural resources management; and technology uptake and up-scaling. These three issues highlight the need for greater integration of ASARECA's technical portfolio. Commodity networks have moved vigorously to incorporate the production-to-consumption chain in their analysis. They have all tried experiences with technology uptake in some fashion and have all identified weaknesses in their capacity to do policy analysis, applied social sciences and marketing. Institutional analysis is absent. The strengthening of technology transfer will benefit from the participatory approaches of the natural resources management-oriented networks and programs. ASARECA will move to address these weaknesses through strengthening its own capacity to identify cross-cutting problems, effectively find and recruit partners and consultants to initiate new activities, and manage cross-network collaboration on policy, economic and institutional constraints.

NARIs and the NPPs are faced with the challenge of mainstreaming critical issues like HIV/AIDS, gender, and climate change. ASARECA will never have the capacity to lead the technical response, it could spearhead internalization of the implications of these topical issues in ECA.

The strengthening of ASARECA's program management and program integration is a precursor and a precondition for serious efforts to rationalize the portfolio, structure and management of NPPs.

5.3 Addressing Priority Development Domains

Four agricultural development domains have been identified as priority based on their potential for agriculture-led development. The highest priority is a quantitatively significant area of high potential, low market access, and low population density (HLL). This area is strategic because all commodities in growing demand can be produced, there are fewer constraints from population density, and the package of investment that increases market access can unleash potential. It accounts for 38 percent of the area in ECA and is found in most countries. However, there is urgency to make strategic investments before the land is occupied in inefficient ways. Two other priority areas have high potential but either low access or low population density. They are small niches that can be productive but cannot bring about mass reduction in poverty. The fourth area is LLL, containing 15 percent of the population and significant improvement can be made through R4D.

In responding to these priorities, ASARECA will have to pay attention to the full range of requirements for innovation i.e., policies, institutions/organizations, information, infrastructure, technology, and learning processes. Also key will be the need to match commodity and domain priorities, often focusing on new commodities (e.g., oilseeds and fruits and vegetables). Considerable areas of DRC, Uganda, and Southern Sudan all fall in the HLL development domain and hopefully will soon be ready for post-conflict rehabilitation. ASARECA could play a role in mobilizing the knowledge needed for strategic agricultural development in these areas.

5.4 Enhancing Services to NARS and Development Partners

Aiming to strengthen NARS and link them regionally, ASARECA will expand its initiatives and leadership in linking research to the political dialogue possible in COMESA, NEPAD and the G-8. To do this ASARECA will monitor political and institutional change in the global research environment and provide representation in such fora.

ASARECA will work to facilitate donor entry to the region by lowering transactions costs to development and scientific partners. It will do this by providing better information, established institutional arrangements and a forum for contacting stakeholders in one place.

ASARECA will provide a vehicle for aggregating and allocating funds, monitoring and reporting and impact assessment, all functions that individual donors require but cannot afford to organize individually.

ASARECA will improve collaboration with the CGIAR by providing clear signals on regional needs that allow an effective division of labor and partnerships based on complementarity, and by creating robust mechanisms to promote collaboration and collective action toward sustainable production of regional public goods.

To meet the expectations of its many partners and investors, ASARECA will maintain multiple mechanisms, applying those best suited to particular tasks. Among its current mechanisms are: 17 Networks, Programs, and Projects (and their governing mechanisms); a Competitive Grants Scheme; a Secretariat with planning, monitoring, and evaluation capability; management of the sub-regional Challenge Program of the CGIAR; and an Endowment Fund. These mechanisms will be applied in ways that minimize ASARECA's exposure to a range of external risks. The balance of funding allocated to each of these mechanisms and their attachment to the ASARECA strategy and

goals will be assessed in light of ASARECA's broader response to its strategic priorities, in agreement with its partners.

5.5 Rationalizing and Integrating Networks, Programs and Projects

ASARECA will move strategically to integrate its portfolio of NPPs by seeking cross network synergy and rationalization of their efforts at the operational, managerial and governance levels. The near-term strategy will call for studies of 1) program coverage and the need for new initiatives in commodities and themes; 2) rationalization of governance where clusters of networks can integrate better and reduce governance costs through joint steering committees, and 3) integration of cross-cutting themes, through reinforcement of program direction in the Secretariat. This integration will have an immediate impact on the effectiveness of technology up-scaling.

5.6 Addressing Staffing Needs and Functions

NPP coordinators will remain critical to ASARECA's success. They will have a continuing role in strengthening NARS for network leadership and in serving as program resource persons in future configurations of ASARECA. They will play a specialist role in guiding calls for competitive grants to ensure that ASARECA's strategy guides the CGS.

The Secretariat will seek support of its members and investors to provide the resources to strengthen its effectiveness in three critical areas:

1. **Integrative Program Leadership.** The integration of ASARECA's program portfolio (the work of its NPPs) calls for a senior program leader to promote and oversee the exchange of knowledge and resources among the networks, programs and projects. The terms of reference of the position of Head, Program Management Unit, are extensible to providing this leadership.
2. **Leadership of Policy Foresight and Strategic Initiatives.** Effective participation in global and regional fora, and informed leadership in steering activities arising under NEPAD and the RECs, requires the sub-regional organizations to bring professional positions to the table. A capacity to help NARS mainstream cross-cutting issues can be Secretariat-based. This would also be a focal point for strategic initiatives in support of countries in post-disaster or post-conflict situations. A strengthened policy unit, or dedicated resources for ECAPAPA to perform this role, will be sought.
3. **Professionalized communications.** A key product of a facilitating organization is a flow of targeted communications adapted to their audience. RAIN is strengthening the capacity of partners to manage distributed information. ASARECA will seek to develop a strong communications pillar that can ensure that the output of ASARECA's NPPs is communicated effectively, strengthen the technology transfer capability of its networks, and effectively mount a public awareness and fund raising program for ASARECA itself.

5.7 Conclusions

The ASARECA of this Strategy will become a force for development in the region and a true vehicle of its members. It will reduce transactions costs for members and partners in ways that make ECA a preferred place to do agricultural research for development. As a body that is based on collective action, it will carry out activities that further the aims of all its member countries in an even manner. The core functions that ASARECA performs for its members represent economies to the countries that would otherwise be unable or unwilling to perform them individually. For donor organizations, the functions that ASARECA provides allows them to support a much larger program at the field and laboratory level than they would otherwise sustain. Sustainability of ASARECA is of mutual interest to NARS and donors alike and requires commitment from both sides.

References

- ASARECA/IFPRI. 2005. *Strategic Priorities for Agricultural Development and Agricultural Research-for-Development in Eastern and Central Africa*. Entebbe: Association for Strengthening Agricultural Research in Eastern and Central Africa.
- ASARECA. 2005a. *Survey of Agricultural Research Priorities at the National and Sub-regional levels: Preliminary Results*. ASARECA Strategic Planning Background Paper No. 12. Entebbe: Association for Strengthening Agricultural Research in Eastern and Central Africa.
- ASARECA. 2005b. *Natural Resources Management for Agriculture in Eastern and Central Africa: ASARECA NRM Strategy 2005-2015*. Entebbe: Association for Strengthening Agricultural Research in Eastern and Central Africa.
- ASTI. 2005. *Agricultural Science and Technology Indicators*. www.asti.org.
- FAOSTAT. Various. Online FAO database. <http://faostat.fao.org>. Rome: Food and Agriculture Organization of the United of the Nations, Rome.
- Van der Heijden, K. 1996. *Scenarios: The Art of Strategic Conversation*. New York. Wiley.
- Wood, S., K. Sebastian, F. Nachtergaele, D. Nielsen, and A. Dai. 1999. *Spatial Aspects of the Design and Targeting of Agricultural Development Strategies*. EPTD Discussion Paper No. 44. Washington DC: International Food Policy Research Institute.