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AGRICULTURAL R&D: INVESTING IN AFRICA'S FUTURE

Analyzing Trends, Challenges, and Opportunities

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Theme 4: Aligning and Rationalizing Institutional Structures of Agricultural R&D

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1. THE ROLE OF AGRICULTURE AND ITS NEW CHALLENGES

Agriculture is a major contributor to economic growth in Sub-Saharan Africa (SSA) given that (1) the vast majority of the SSA countries are agriculture-based; (2) in many countries, agriculture contributes over 30 percent to gross domestic product (GDP; and (3) 50 percent or more of the region's economically active population is involved in agriculture. South Africa and Botswana have a different economic structure compared with the rest of SSA, and as a result agriculture contributes less than 10 percent to GDP in these countries. Despite diverse socioeconomic and ecological conditions, and different agricultural systems, agriculture-based countries share some generic features. To achieve the first of the Millennium Development Goals, African countries have set a target of 6 percent growth in agricultural GDP (AgGDP). Through the Comprehensive Africa Agriculture Development Programme (CAADP), African governments have committed to raising agricultural productivity by 6 percent per year and to raising the agricultural sector's value-added as a share of GDP by 4–5 percent per year.

New Challenges

Agricultural development in SSA is challenged by the complex and unpredictable influence of (1) globalization and regionalization; (2) protected domestic and regional markets; (3) marginalization; and (4) climate change. Accelerated growth requires more radical innovation in a variety of areas and at different scales.

2. THE ORGANIZATION OF AGRICULTURAL RESEARCH

Most public agricultural research is organized along national lines. The countries of SSA have a complex array of institutes responsible for planning, funding, and implementing agricultural R&D activities: government research agencies represent 81 percent of total research capacity of national agricultural research systems in SSA; universities constitute 18 percent; and the private and nonprofit

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sectors contribute the remaining 1 percent. Agricultural research systems in most SSA countries are characterized by low capacity and vulnerability to funding volatility.

The challenges facing small countries in agricultural research include (1) limited ability to take advantage of economies of scale and scope; (2) difficulty maintaining the required core staff capacity to ensure programmatic and operational continuity; (3) lack of in-country degree programs in agricultural and related disciplines; and (4) vulnerability to funding fluctuations. Small-country agricultural research systems are generally thought to be vulnerable and even unviable based on lack of both capacity and resources. It was generally agreed that the recommended solution would be a consolidated research institution of limited research scope primarily focused on the adoption and adaptation of borrowed technology. Despite the challenges, however, small-country research systems in SSA should not be considered unviable; world-class research programs can be found in several small countries.

3. NEW PARADIGMS IN AGRICULTURAL RESEARCH AND DEVELOPMENT

With reduced funding, agricultural R&D systems are forced to raise questions about their continuing relevance, approaches, accountability, and impact. Funding for research and support services is no longer isolated from broader development questions. The financial and other constraints facing agricultural research in the region are forcing a paradigm shift in the way agricultural research in both managed and conducted. This shift is underway, with some islands of success, and R&D processes are currently being influenced by four impact-oriented and complementary principles: (1) the agricultural innovation system (AIS) perspective; (2) value chain analysis (VCA); (3) impact orientation; and (4) integrated research for development (IR4D).

Within an AIS perspective, “research converts money into knowledge, and innovation converts knowledge into money.” The three critical elements of the innovation process (conceptualized as a three-legged stool) are (1) education or knowledge; (2) the ability to translate (that is, realize) knowledge into tangible products and services; and (3) the ability to communicate (that is, market) the resulting products, services, and information to the world. These three “legs” are held together by the customer (that is, the end-user) and are supported by the government, society, and institutions). If any of these five elements change, the overall system could potentially become unstable.

The activities involved in the stages of the innovation process are invention, translation/realization, commercialization, and utilization. To be called an innovation, an idea must be replicable at an economic cost and must satisfy a specific need. The single-most important feature for innovation to occur is understanding users’ needs and translating them into action across all functional areas. The AIS perspective does not undermine the value of research, good communication, or effective extension services; these are necessary preconditions. Furthermore, an innovation systems approach does not put forward a generic model for innovation; there is no uniform theory. In progressing from knowledge and technology generation to innovation, the roles and responsibilities of individual actors change. This reality needs to be recognized and acknowledged by all R&D practitioners. Institutionalizing an AIS perspective within the context of an agricultural research for development system understandably offers both opportunities and challenges.

4. INVESTMENT IN AGRICULTURAL RESEARCH

Public investment in agricultural research in SSA is low: most countries invest less than $25 million purchasing power parity (PPP) dollars per year. This low investment negatively affects all aspects of the research endeavor, including the quantity and quality of research staff, the infrastructure and research equipment available, and ultimately the research output. The private sector can, and is already, playing an important role in agricultural research and development in SSA. Governments can encourage more private technology introduction by continuing to introduce liberalizing reforms to (1) allow local and foreign firms to enter; (2) provide firms with a stable policy and regulatory environment; (3) strengthen intellectual property rights; (4) stop taxing agriculture; and (5) develop biosafety regulations to allow the use of safe genetically modified organisms.

5. REGIONALIZATION OF AGRICULTURAL RESEARCH

Most public agricultural research is organized along national lines. The impact of a part of the public agricultural research effort does not stop at "artificial" national borders. The same knowledge and technology can be used on both sides of the border, if not across multiple countries. This leads to what in economic terms is called "spillovers"—economic benefits accruing to farmers and consumers who did not share the costs. This is because many countries in Africa have small economies and limited capacities and resources to undertake their own basic research. For this and other reasons, greater regional cooperation in R&D offers important economies of scale and scope economies. The need for greater regionalization of R&D is well recognized among national R&D systems, as is evident in the establishment of the Forum for Agricultural Research in Africa (FARA), Association of Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), and the West and Central African Council for Agricultural Research and Development (CORAF/WECARD).

Subregional organizations (SROs) have grappled with the problem of country buy-in and funding, but have gradually secured regional cooperation around CAADP and the Framework for African Agricultural Productivity (FAAP). One of the largest sources of finance for agricultural research in SSA is the World Bank, which has also taken a regional approach. Two large subregionally based programs, the East African and West African agricultural productivity programs (EAAPP and WAAPP), are already in operation, and a similar program is proposed for Southern Africa. These initiatives mark a change in the World Bank's approach to financing agricultural research in SSA. So far, these programs have not directly funded research in the region's smaller countries, but a number of such countries were selected in 2011 for inclusion in the next phase of WAAPP. Subregional cooperation in research will help promote regional integration and increase productivity, but at this early stage, questions remain.

6. CONCLUSION AND REFLECTIONS

Agricultural Innovation Systems

- Empirical evidence of the application of the AIS perspective, its utility, and resulting value addition is limited.
- Innovation processes evolve over time, demanding a long-term commitment by all actors.
- It remains to be seen whether (commodity-focused) innovation platforms are sustainable or whether macro platforms would be more viable.

Private Investment

- A shortage of well-trained scientists is a major constraint to the growth of private sector R&D in all African countries, raising the question of which is the best way forward.

Agricultural Advisory Services

- Returns to investment for advisory services are not immediate, are somewhat uncertain, and their establishment is very costly, begging the question, “Are they justifiable?”

Supranational Collaboration

- The key limitation is high transaction costs based on the numerous institutional and administrative barriers that need to be managed and coordinated.
- FARA and the SROs are still dominantly funded through donor support; questions remain as to the role of African Union and whether regional economic communities can step in.