

Report on

An Assessment of National Agricultural Innovation Systems In Botswana, Ghana, Kenya and Zambia

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The 2012 NAIS Assessment was piloted in 4 countries: Botswana, Ghana, Kenya and Zambia. Data were collected through a survey questionnaire, open-ended interview questions, and data mining of secondary sources. A team of colleagues led by a national coordinator took charge of data collection from various partner organizations in each country.

1. KEY FINDINGS AND RECOMMENDATIONS:

Diffusion of AIS paradigm: Study participants indicated that FARA's previous initiatives in promoting multi-stakeholder networking in the agricultural sector (through SCARDA, DONATA, UniBRAIN, ANAFE, etc), had helped the diffusion of AIS paradigm from continental to national levels. This point was most emphasized in Zambia where participants from the Ministry of Agriculture credited their continental exposure through FARA-assisted activities, with enabling them to become familiar with AIS perspective as a collaborative model.

In Botswana, a SCARDA offshoot was a value chain innovation platform on the small stock subsector, although the initiative lost momentum due to the lack of a 'broker' in the form of capacity building and funding. In Ghana, DONATA was credited with helping innovations in the delivery of agricultural extension at least on a pilot basis in the tuber subsector which could be replicated and expanded to other subsectors.

Agricultural institutional arrangements: Ghana, Kenya and Zambia had in recent years launched new national policies on the agriculture sector, while Botswana was in the process of developing a new policy to replace the one approved in 1991. Kenya had also launched national policies on agricultural research, agricultural extension, bio safety, and the use of genetic resources. Furthermore the Kenya Agricultural Research Institute KARI had a 5-year strategic plan showing how agricultural research will be transformed from the current focus on technology, which is biased on the side of biological sciences, to a focus on product value chains involving an interdisciplinary research approach and collaboration.

Increased agricultural production, productivity, and profitability are among the common objectives being emphasized in the study countries. The respective national policies also call for stronger participation of the private sector in agriculture, but there is no agreed model on how to make this happen. Respondents from the private sector called for improvement in rural infrastructure (roads, electricity, water, telecommunications and transportation) in order to reduce the cost of agribusiness transactions and to incentivize agro-allied microenterprises. Private sector also calls for improved financial settlement mechanisms to encourage trade within sub-regions. While there are indications of a gradual shift in paradigm from the NARS concept toward the AIS model at the policy level in the pilot countries, there are still gaps in the downstream domain where each stakeholder group seems to be operating in isolation of the other key actors in subsector value chains. The notion of value chain innovation platforms which pilot initiatives such as FARA's SSA-Challenge Programme and the DFID-funded Research Into Use Programme have reported to help agricultural innovation, has not become commonplace in the study countries.

It is therefore recommended that FARA should focus on the promotion of value chain innovation platforms in selected crop subsectors in each of the study countries, as a way of producing a cadre of 'innovation brokers' who could eventually operate as independent

service providers especially in commercialized crop subsectors. This is already happening in Kenya in the tea and horticulture subsectors which are fully commercialized, and in Zambia through the Zambia Agribusiness Technical Assistance Centre (ZATAC), an independent service provider.

Public expenditure on agriculture: None of the study countries had achieved the continental benchmark of spending on agriculture at least 10% of the total national public expenditure (based on the years for which data was available). However the continental benchmark has helped to focus the debate and the aspirations of the stakeholders. One of the issues related to public spending on agriculture in African countries is that most of the allocated public funds to the sector are spent on recurrent commitments such as staff salaries and maintenance, leaving little if any for new research initiatives. Therefore, irrespective of the whether the study countries had met this continental benchmark or not, there was a general dissatisfaction with the inadequate funds available for new research in innovation in key subsectors. It is therefore recommended that FARA should urgently propose to the Africa Union, a reasonable benchmark which should be established specifically on public expenditure on agricultural research by member countries.

Regional agricultural productivity programmes: Two major World Bank-funded regional agricultural productivity programmes (RAPPs) are currently being implemented in East Africa (EAAPP) and West Africa (WAAPP), under the coordination of FARA's sub-regional partner-organizations (ASARECA & CORAF-WECARD). Ghana is implementing a 10-year WAAPP intervention focusing on the development of its root and tuber crops subsector which currently contributes about 50% of the agricultural GDP of the country. WAAPP is envisaged to make Ghana the regional centre of excellence and regional innovation leader on root and tuber crops, while each of the other West Africa member countries are pursuing different designated subsectors considered suitable to their agro-ecological zones, historical cropping profiles, expertise and strategic objectives. Similarly, Kenya is implementing the EAAPP intervention with the focus on dairy, and this is envisaged to make Kenya the regional innovation leader on the subsector.

These regional-scale interventions have the potential to permanently shape the trajectory of agricultural innovation in the participating countries and regionally. The achievement of competitive advantage and leadership in designated subsectors by each member country is envisaged to place each member country in a position to actively engage with other member countries in intra-regional agricultural trade, as well as achieve some of its national food security objectives. This is part of the expressed strategy of regional economic integration which African countries have struggled with for nearly four decades now, in the form of COMESA, ECECA, ECOWAS and SADC. However, the underlying, even if unstated, assumptions upon which this grand vision is based may not have being fully understood.

It is recommended that FARA as part of its continental leadership in agricultural research, initiates exploratory studies on the possible future impact of the EAAPP and WAAPP interventions on the such issues as subsistence farming which supports rural household food security, and the possibility of trade wars resulting from each country having supremacy over a designated crop subsector. Furthermore, it is evident that post-colonial African countries have a stronger tradition of exporting agricultural produce to countries in other continents than within Africa. Hence the financial settlement mechanisms for intra-regional trade might need to be developed to accommodate the envisaged intra-regional trade. For example, under

the DFID-funded RIU programme, a transaction in which Sierra Leone and Nigeria exchanged industry resources (poultry feed concentrates and training) encountered a six-month delay in the settlement of the financial terms due to the remittance being routed through a European bank which had never handled a transaction involving payment from one African country to another. This type of challenge indicates the institutional innovations that need to occur before the EAAPP and WAAPP can contribute significantly to economic integration in the respective regions. Botswana's success in exporting 95% of its beef production to South Africa, and its regional leadership in innovation in the livestock sector, offers useful lessons on the feasibility and potential benefits of the envisaged regional economic integration. FARA can provide leadership in targeting these types of exploratory studies.

2. INTRODUCTION

2.1 About FARA¹

The Forum for Agricultural Research in Africa (FARA) is a continental resource organization for agricultural research for development in Africa. It is an umbrella organization to enable coalitions of major stakeholders in agricultural research and development across the continent. FARA advocates and coordinates roles for agricultural research-for-development, while respective national agricultural research systems (NARS), advanced research institutions (ARIs) and international agricultural research centres (IARCs) develop improved technologies along the research-to-development continuum in their respective countries and mandated coverage areas.

FARA, the implementing agent for Pillar IV of the Comprehensive Africa Agriculture Development Program (CAADP), focuses on the generation, dissemination and adoption of agricultural innovations. Such envisaged diffusion of innovations are, in turn, would enhance the effectiveness, efficiency and relevance of agricultural research institutions and services in addressing the challenges facing African agriculture, thereby to propel agricultural productivity, efficiency, rural livelihoods, poverty reduction, and economic development.

FARA's mission involves supporting Africa's sub-regional organizations in strengthening the capacity of their stakeholders to innovate technologically, socially, organizationally, and institutionally in order to achieve improvements in agricultural productivity, competitiveness and markets.

FARA performs its mandate through four overlapping and mutually reinforcing Networking Support Functions (NSFs), namely: Advocacy and Policy (NSF1/3); Access to Knowledge & Technologies (NSF2); Capacity Strengthening (NSF4); and Partnerships and Strategic Alliances (NSF5). The NSFs mobilize and support FARA's constituents and partners to undertake activities that generate continental spillovers and public goods. The 2012 NAIS Assessment was commissioned by NSF4 which works on Capacity Strengthening.

2.2 Assessment of National Agricultural Innovation Systems in Sub-Saharan African Countries

In July 2012, FARA commissioned a consultancy to assess the functionality of national agricultural innovation systems (NAIS) in selected pilot countries in Africa. A Joint Partners Development Workshop (JPDW) was organized and conducted in July 2012, attended by FARA's Sub-Regional partner-organizations (SROs). The JPDW participants reviewed and validated the proposal and methodology for the NAIS Assessment, and pledged their respective support in implementing it. The proposal and methodology were further reviewed and validated by FARA's NSF Directors and the Executive Director.

¹ Information about FARA in this section was obtained/synthesized from various FARA documents, available online at www.fara-africa.org

Subsequently, the selected countries, through their respective national ministries of agriculture or the equivalent agencies, had opportunity to express interest in participating in the assessment, and nominate a National Focal Person (National Coordinator) that would drive the process in collaboration with FARA, working in concert with the designated Consultant. Fourteen countries were initially selected and contacted for the pilot phase of the assessment, and nine countries indicated interest (Figures 1 and 2). Each interested country nominated a focal person to lead the process. On October 9, 2012, a one-day NAIS Assessment Orientation Workshop was hosted at the FARA Secretariat in Accra, Ghana, for the nominated national coordinators.

The orientation workshop provided enabled the national coordinators to review the objectives and methodology of the NAIS Assessment, and have a shared understanding on the roles, responsibilities and other terms of reference of the national coordinators, focal persons of partner-organizations, and the lead consultant for the Assessment. Draft questionnaires (both survey and open-ended questions) were reviewed, amended and adopted by the workshop participants.

2.3 Integrating e-Capacities Facility and the NAIS Assessment

In order to ensure cost-effectiveness in the implementation of the NAIS Assessment, and to offer something of practical benefit to the participating organizations, it was initially planned to concurrently implement the NAIS Assessment and the e-Capacities. The e-Capacities was commissioned by FARA to serve as an online database for capturing, analyzing and tracking data on the supply of, and demand for, skilled human resources in targeted fields of expertise or disciplines related to Agriculture. The technology, which was contracted to FARA to a UK-based software development consultant, was envisaged for use by organizations involved in agriculture-related training and sector policymaking, such as universities, research centres, technical colleges and the Ministry of Agriculture.

In Ghana, the e-Capacities technology was demonstrated to the orientation workshop participants on 9 October, 2012, at the University of Ghana (Legon campus) and the Ministry of Agriculture Head-Office. The participants asked questions and floated ideas on how the e-Capacities software could be fine-tuned to be more useful in their respective organizations and countries, under various contexts. The software developers noted the participants' questions and comments, and were urged by FARA to improve the software in response to the participants' comments.

2.4 National Agricultural Innovation System – A Theoretical Construct

The question of how to increase agricultural productivity, efficiency, cost-effectiveness, economic value and the quality of life of farming families, has continued to challenge policymakers, scholars, smallholder farmers, and related micro-, small- and medium-scale enterprises (MSMEs), particularly in sub-Saharan Africa. Over the past four decades, various ideas, policy and research approaches to agricultural development have evolved in an attempt to address this key question. Scholars, including Hall *et al* (2006), Spielman and Birner (2008), Klerkx *et al* (2012) have sufficiently profiled various theoretical constructs that have

evolved and shaped both the discourse and the practice in this field. Therefore, this report gives only an outline of the evolution in the theoretical perspectives over the past five decades.

Starting in the 1960s, three interrelated conceptual frameworks have successively influenced agricultural and rural development theory, policy and practice in Africa. Broadly, the frameworks are (i) the Agricultural Research System (NARS); (ii) the Agricultural Knowledge and Information System (AKIS); and (iii) within the past 10 – 15 years, the National Agricultural Innovation System (NAIS). Klerkx *et al* (2012) have profiled the characteristics, synthesis and evolution of these theoretical perspectives, and we now briefly introduce as follows:

The *National Agricultural Research System* (NARS) evolved in the 1960s, and emphasized the diffusion of innovation or technology transfer as a means of increasing agricultural productivity. This justified a robust public investment in the development of specialized agencies for agricultural research and technology development, agricultural technology dissemination agencies, and various other agencies. While well-intentioned, this technology supply-push policy construct, according to critics, seemed to have overemphasized the lack of new technology as the only constraint facing African agriculture, and also assumed that any technologies developed by scientists were appropriate to farmers' needs. Furthermore, critics point out that the NARS framework seemed to have overvalued the codified knowledge of the formal scientists, while the tacit knowledge of appeared underappreciated. Consequently, African farmers were not accorded their deserved recognition and respect as sources and bearers of authentic knowledge who should be incorporated as important and equal partners in agricultural research.

In the 1970s, in order to address some of the above-mentioned weaknesses, the notion of *Early Farming Systems Research* was incorporated into the NARS framework. Here, the policy thrust was on enabling a multidisciplinary pursuit of new or modified technology packages led by scientists and extension; research on farmers' constraints; and a consideration of agro-ecological and other context-specific variables. This construct viewed farmers as sources of information, and the role of the scientist in the context of the relationship with the farmer became somewhat extractive.

The *Agricultural Knowledge and Information System* (AKIS) framework emerged in the 1990s as an off-shoot of the NARS framework. AKIS viewed agricultural research as part of a tripartite or equilateral triangular arrangement of which extension services and formal education were the other planks; the farmer was placed at the centre of this arrangement and it was believed that knowledge and information were the key resources that these parties would trade among each other in seeking agricultural innovation and development. The AKIS framework, according to Röling and Engel (1991), conceived of “*a set of agricultural organisations and/or persons, and the links and interactions between them, engaged in such processes as the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilisation of knowledge and information, with the purpose of working synergistically to support decision-making, problem-solving and innovation in a given country's agriculture or domain thereof*”. The key elements of the AKIS framework include participatory and collaborative research on the production of knowledge and technologies, farmer empowerment, and demand-led diffusion of knowledge, methods and processes.

The *Agricultural Innovation System* (AIS) or National Agricultural Innovation System (NAIS) evolved from the AKIS framework in the 2000s and is currently still the dominant perspective in agricultural theory, policy and practice. The AIS construct considers not just the agricultural system, but the entire political, socio-cultural, economic and ecological complex within which agriculture is taking place. The AIS framework recognizes and supports a trans-disciplinary and multi-stakeholder involvement in processes aimed at value chain development, and institutional learning and change. Private sector participation in the application of collaboratively produced knowledge and technologies is a key element of the NAIS perspective.

In recent years, lessons from major experimental programmes (e.g. the DFID-funded Research Into Use Programme and the FARA's SSA Challenge Programme) are confirming that agricultural innovations do not emanate from a single source or follow a linear path. Rather, they can originate from diverse sources in different or locations, and follow multiple trajectories, due to diversity and complexity of interests, actors, interactions and influences both from within and outside the particular commodity chain (RIU Programme Impact Assessment Report 2013; Kraemer-Mbulu 2011; Lundvall 2007; Hall et al 2005; Freeman, 1987; Lundvall 1992; Nelson, 1993)

The NAIS paradigm is not yet well acquainted with at the national level in most African countries. However, it has already been strongly embraced at the continental agricultural policy level, with the Comprehensive Africa Agricultural Development Programme (CAADP) and the Forum for Agricultural Research in Africa (FARA) leading the drive to promote the diffusion of paradigm across Africa. Unfortunately, despite the obvious weaknesses of the NARS paradigm, it is still enshrined in many African countries. Therefore, it has been the role of FARA to engage with such countries and with other relevant partners such as sub-regional organizations (SROs), the inter-governmental agencies (IGAs) and international development resource organizations (IDROs), to raise awareness and capacitate the countries to embrace the NAIS perspective.

2.5 The 2012 NAIS Assessment

A 2005 continental assessment commissioned by FARA focused exclusively on the NARS infrastructure in the study countries (see FARA 2006/ISBN 9988-0-9033-1). However, the study report revealed various organizational capacity needs in the agricultural system, to which FARA responded in the form of various programme interventions. Based on the subsidiarity principle, FARA initiated these capacity development interventions which were implemented through, and in partnership with, sub-regional organizations (SROs) – namely ASARECA, CORAF/WECARD and SADC/FANR. The initiatives included:

1. SCARDA (Strengthening Capacity for Agricultural Research in Africa), in 10 countries (Burundi, Botswana, Democratic Republic of Congo, Gambia, Ghana, Lesotho, Mali, Rwanda, Sudan and Zambia); and
2. UniBRAIN (Universities, Business and Research in Agricultural Innovations), a project that aims to link university education, research and business in sustainable

agriculture, through an emerging Agribusiness Innovation Incubator Consortia (AIIC) that will support private sector participation in agricultural innovation.

Other capacity-development interventions by FARA included DONATA (Dissemination of New Agricultural Technologies in Africa); TEAM-Africa (Tertiary Education for Agricultural Mechanism in Africa); SABIMA (Strengthening Capacity for Safe Biotechnology Management in sub-Saharan Africa); RAILS (Regional Agricultural Information and Learning System); PREPARD (Platform for African-European Partnerships for Agricultural Research and Development); and the SSA-CP (Sub-Saharan Africa Challenge Programme).

Sub-regional organizations (SROs) and relevant umbrella groups have been capacitated and given opportunities to serve as implementing partners for various initiatives with FARA. These key partners include the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA); the Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA); and the West and Central African Council for Agricultural Research and Development (WECARD/CORAF). Other relevant umbrella groups that FARA has capacitated in various ways include the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM); the Réseau pour l'Excellence de l'Enseignement Supérieur en Afrique de l'Ouest (REESAO); and the Regional Tertiary Education Networks (RTENs)

2.6 Paradigm Shift: from NARS to NAIS

These diverse and widespread responses from FARA since 2006 have transcended the NARS paradigm which was the focus of the 2005 Assessment. In other words, FARA, through these initiatives involving national and sub-regional partners, introduced a commenced a gradual shift toward the NAIS paradigm across the African continent. To formalize the start of the paradigm shift, however, FARA, in 2012, commissioned a formal assessment of national agricultural innovation system capacity in selected sub-Saharan African countries. The 2012 NAIS Assessment was primarily intended to find out the agricultural innovation trajectories and progress of the selected African countries, in their transition from the NARS perspective.

Another driver of this paradigm shift from NARS to NAIS was the Research Into Use Programme (www.researchintouse.com), a major international experimental project funded by the United Kingdom's Department for International Development (DFID). The five-year programme was implemented from 2006 to 2011 in 12 countries (6 in sub-Saharan Africa and 6 across Asia). In addition to the 6 full-fledged country programmes in Africa, the RIU Programme launched stand-alone Best Bet initiatives in Kenya, Uganda, Ghana and other sub-Saharan African countries.

The RIU country programmes and the Best Bet projects were designed to test and learn practical lessons on a number of organizational, financial, technological, social and policy approaches for promoting agricultural innovation in each country. The programmes promoted the use of "Innovation Platforms" – essentially multi-stakeholder networks – as effective vehicles for enhancing a shared interest and collective responsibility in the development of agricultural commodity value chains and achieve integrated agricultural research for development (IAR4D). From the inception of FARA, the DFID-funded RIU Programme was

envisages as a programme ally and co-driver of IAR4D and innovation systems perspective in Africa. Hence, the establishment of the SSA-CP by FARA coincided with the implementation of the RIU programme in some countries (e.g. Nigeria), and the two programmes reinforced each other impelled the start of a paradigm shift from NARS to NAIS.

2.7 Objective of 2012 NAIS Assessment

FARA's overarching objective of commissioning the piloting of the 2012 NAIS Assessment was to strengthen the knowledge of all stakeholders on the situation in pilot country: to increase the knowledge of the community of practice, on the configuration of organizations, institutions (i.e. policies, mechanisms or practices), economic actors, opportunities and constraints that are linked to national agricultural innovation systems. Such knowledge would enable FARA to be more effective in performing its continental mandate in while forming alliances at organizational, national, sub-regional and global levels. The assessment was mandated to recommend appropriate actions to be taken by FARA, its programme partners and other stakeholders, to strengthen specific identified aspects of the assessed agricultural innovation systems.

3. METHODOLOGY & DESIGN

An assessment of a national agricultural innovation system (NAIS) could be done using any single or combination of methodological and analytical approaches. The design of this study is informed by the perspective that NAIS is a complex space in which multiple scales, multiple stakeholders and diverse interests are continuously interacting and affecting each other in dynamic ways. A traditional analytical approach would, for example, compare each study country to a predetermined, idealized point-of-reference set of indicators or benchmarks representing a fancied ‘best practice’. A possible key assumption for such an approach would be that each of the study countries was aspiring and striving to attain the idealized benchmarks.

Innovation benchmarks are well known in the field of science and technology, and the process typically involves computing a single composite indicator from various collected and combined indicators, and comparing a study country’s innovation performance to this composite indicator. However, critics have pointed out that the often-unstated but erroneous assumption in benchmarking approach is that innovations follow similar trajectories in all countries or regions. In AIS perspective, the emergence and patterns of innovations are strongly influenced by context specifics (see Kraemer-Mbulu 2011).

Such an analytical approach could prove problematic in the context of the NAIS assessment in sub-Saharan African countries, for several reasons. First, African agricultural systems are collectively very dissimilar to those of developed Western economies in terms of the size and number of individual farms, scale of production, efficiency, technology application, scale of private investment and macroeconomic policy contexts (Hall *et al.*, 2005). Second, within Africa itself, the agricultural systems are diverse, due to differences in geophysical ecology, crops and commodities, agronomic practices, technological applications, agro-related socio-cultural organization, institutional arrangements, political climate, macroeconomic policy environment, and the level of development in science, technology and public infrastructure.

Third, while the principles of AIS are, no doubt, compatible with the ideals of democracy, open society and economic egalitarianism, no set of paradigm-principles can necessarily be ‘the universal best option’ for all countries. There are multitudinous diversities within and across African countries, and these diversities represent both strengths and constraints to democracy and open society ideals.

Therefore, this report of the 2012 NAIS assessment does not get involved in comparing the study countries to predefined, idealized set of static ‘best practice’ indicators that are exterior to the study country, for that might seem judgemental and of little practical use to FARA and FARA’s programme partners. Where such a comparison has been made in the report – for example in relation to public expenditure on agriculture, national agriculture’s contribution to GDP, and annual growth rate of agriculture – the purpose was simply to describe or illustrate the AIS context, rather than show how much better or worse the study countries performed relative to each other or to other independent benchmark indicators.

At the time of data collection for the 2012 NAIS assessment, each study country was in the process of shifting from the NARS paradigm to a more inclusive NAIS paradigm. Therefore, this report primarily chronicles the changes that were taking place in each study country in terms of the reconfiguration of the organizations, stakeholder power-blocks, institutional arrangements, investment profiles, science and technology, human resources development,

and access to input and output markets. Based on that, the report recommends possible investment opportunities for FARA and FARA's programme partners to propel each study country along the agricultural innovation system (AIS) trajectories that are suited to, or emerging in, the country.

3.1. Respondents and Data

For each study country, a short survey questionnaire was administered to stakeholder-organizations in agriculture. Furthermore, in-depth interviews using open-ended questions were conducted with representatives some of the partner-organizations. The data gathered from these two sources, in addition to secondary data from published or other sources, constituted the data for the country, and the basis of the report.

All primary data collected through the administration of survey questionnaire and the key-informant interviews were qualitative (though descriptive or narrative or analytical). The secondary data collected were partly quantitative, partly qualitative. Combined, these data constituted:

- (1) An inventory of key organizations active in the study country's agricultural and related systems;
- (2) An inventory of the institutional arrangements in the agriculture and related systems;
- (3) Identification of key national priorities, processes and activities relevant to emerging agricultural innovations in the country;
- (4) Identification of lingering or emerging opportunities ideas, policies, products and alliances in the country's agriculture and related systems;
- (5) Identification of the lingering or emerging constraints or challenges facing the study country's agriculture sector.
- (6) Respondents' recommended ways of seizing and capitalizing on the identified opportunities, or addressing the identified challenges.

An initial list of 14 countries was proposed for the study and the countries were invited to express interest by attending an orientation workshop. Nine of the countries expressed interest and attended the orientation workshop in July 2012 hosted by FARA in Accra, Ghana. Of the countries which attended the workshop, four countries completed the readiness procedures and took part in the piloting of the 2012 NAIS assessment (see maps on next page).

A total of 66 partner-organizations participated in the surveys and interviews conducted in the four pilot countries. The organizations that participated in the survey also responded to open-ended interview questions which were sent to them through emails or in some cases handed to them by hand. Table 1 shows an analysis of the stakeholder categories and number of respondents to both the survey and open-ended questions in each study country.

MAPS OF 2012 NAIS ASSESSMENT COUNTRIES




 <p>• 14 Countries Invited to Orientation Workshop</p>	<p><u>14 Countries Invited</u> Botswana Burkina Faso Ethiopia Gambia Ghana Kenya Lesotho Madagascar Malawi Rwanda Senegal Tanzania Uganda Zambia</p>
 <p>• 9 Countries Attended the Orientation Workshop</p>	<p><u>9 Countries Attended</u> Botswana Burkina Faso Ghana Kenya Lesotho Malawi Senegal Uganda Zambia</p>
 <p>• 4 Pilot Countries in 2012</p>	<p><u>4 Pilot Countries</u> Botswana Ghana Kenya Zambia</p>

Table 1: Survey and Interview Respondents (grouped by stakeholder categories) in the 2012 NAIS Assessment

Stakeholder Category	Botswana		Ghana		Kenya		Zambia	
	Open-ended	Survey	Open-ended	Survey	Open-ended	Survey	Open-ended	Survey
Policy, Ministry of Agriculture, Planning Commission	3	6	1	1	2	1		4
Agric Extension (public sector led)	4	3	1	4	1	1	1	2
Agric Extension (private sector led)			1				3	1
Agric Research, Training/Education	4	7	7	4	3	8	4	7
Private Sector, Agro-allied business, MSMEs, Banks/financial service providers	7	9	2	6	1	2	4	4
Civil Society; NGO/CBO Service Provider							4	
Total*	18	25	12	15	7	12	16	18

* Total survey participants = 70

* Total interview participants = 53

* Not all survey participants may have participated in interviews, and it is possible that some interview participants did not complete the survey questionnaire. Some interview participants did not disclose the identity of their organizations, but indicated the subsector or interest group in which the organization belonged. Therefore the study did not reconcile the number of survey participants who also completed the open-ended questions or vice versa.

4. FINDINGS

4.1. Innovation is in progress

The AIS paradigm has been strongly embraced at the continental agricultural policy level by the Comprehensive Africa Agricultural Development Programme (CAADP) and the Forum for Agricultural Research in Africa (FARA) in their drive to promote the diffusion of innovation on the continent. The study found that FARA-assisted interventions such as the SSA-CP, the DONATA, the SCARDA, the PREPARD and other projects, helped to create awareness amongst stakeholders, policymakers inclusive, about the need for, and the potential benefits of, multi-stakeholder networking in addressing agricultural innovation challenges. In Botswana, for example, there was an attempt to establish a platform for economic actors in the small stock value chain as a result of the, but the effort withered off due to the lack of a “champion” or an innovation broker.

Of the 4 study countries, Ghana, Kenya and Zambia already had approved national agricultural policy documents, while Botswana was in the process of developing a new policy to replace the one that was approved in 1991. Similarities in these national agricultural policy documents include the expression of strong support for smallholder farmers by ensuring easier access to improved seed, improved technologies and other agro inputs, all aimed at increasing production and productivity. In various ways, other key issues considered in the policy documents include agribusiness services such as financing, insurance, advisory services, post-harvest storage, processing, packaging and marketing.

However, the policy documents appear to assume that the private sector will invest and thereby raise the economic viability of the struggling subsectors. On the contrary, the respondents representing private sector organizations suggested that indicators of potential viability and profitability of an agricultural subsector were necessary to attract private sector investment. Reconciling these divergent viewpoints would require a sustained dialogue and an agreed course of collective action aimed at innovation. The social space for such dialogue and interactions is part of what, in AIS perspective, is called an “innovation network” or “innovation platform”. This is because, in AIS perspective, however, “innovation includes technology, but also has organizational and institutional elements” (Nederlof and Pyburn 2012), or technical, economic, social and cultural change (Klerkx *et al* 2012). It is not simply a matter of “new technology equal to higher farm yield, although that is part of innovation.

National policy is necessary because it helps to articulate the national aspirations, the direction of effort and the targets. But even command economies do have national policy documents. Therefore, beyond consulting various stakeholder groups as part of the policy development process, it is important for the stakeholders to have a forum for frequent feedback to the policy loop, as well as for debate and networking. Practitioners of AIS approach like to refer to such as forum as an Innovation Platform.

It is recommended that FARA invests in capacitating a cadre of “innovation brokers” by supporting the formation of innovation platforms in each of the NAIS study countries. This is because, in all study countries,

An “innovation platform” can be defined as transitory social space, often loosely-organized and informal, whose membership is based on free entry and free exit self-interested persons or stakeholder groups. The nomenclatures may differ from place to place, but the basic idea is one of having a space for horizontal or vertical networking with a problem-solving objective. For example, a “mango value chain development working committee” in Kenya (Gitika and Hawkins 2011), a “poultry subsector innovation network” in Tanzania (Mugittu and Jube 2011), an “oil palm concertation and innovation group” in Ghana (Adjei-Nsiah, Osei-Anponsah and Sakyi-Dawson 2011), and a “cowpea value chain innovation platform” in Nigeria (Ugbe 2011), all share some similarities. Achieving the national agricultural policy objectives in the study countries will require the actual involvement of all key stakeholders, and diffusion of shared ideas.

4.2. Definition and Indicators of “Agricultural Innovation”

Written open-ended questions were sent to the study participants by email or given to them in person. The participants were requested to provide written responses to the questions. The responses from across the four study countries indicated a general congruence of viewpoints on a number of key open-ended questions.

For example, the keywords in the definitions of “agricultural innovation” included (i) access to new and useful information; (ii) methods and processes of producing, storing, processing, packaging, marketing and utilizing agricultural goods; (iii) achieving higher productivity, efficiency, cost-effectiveness, and profitability at all levels of a commodity value chain; (iv) prudent use of renewable energy (e.g. solar, wind) in place of fossil-based fuels; (v) a stronger collaboration and cooperation among all key stakeholder groups in a value chain (farmers, researchers, extension/advisory service providers, input producers/suppliers, and post-harvest entrepreneurs); (vi) policies mechanisms that reduce barriers to freer movement of agricultural technologies, expertise, farm inputs, and post-harvest goods within a regional framework. Other keywords included working together, multi-disciplinary networking, collaborative planning and joint implementation of subsector research activities.

4.3. Private Sector Participation

Viewpoints were unanimous in support of increased private sector participation in all aspects of agriculture in the study countries. However, there was no shared view on how this could be achieved. The policy documents appeared to assume that the private sector will invest and thereby raise the economic viability of the struggling subsectors; on the contrary, the representatives of private sector stakeholder groups who participated in key-informant interviews, said that the best way of attracting private sector investment to any agricultural subsector was to demonstrate the potential economic viability and profitability of the subsector.

Some respondents called for protocols that would incentivize private investment in the various subsectors. In all study, there were views suggesting the development of memoranda of understanding (MoUs) to safeguard the intellectual property of researchers who collaborate with the private sector. The provision of essential public infrastructure (roads,

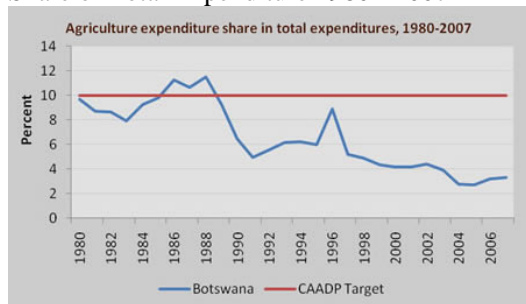
electricity, telecommunications, healthcare, and education services in rural areas, was suggested. This was considered as a way of reducing the cost of doing agribusiness in rural areas, supporting rural-based small-scale agribusiness and related entrepreneurial activities, discouraging rural-urban migration in order to guarantee the availability of labour in the rural economy.

In Kenya, agricultural extension and advisory services have been successfully privatized in highly commercialized and export-oriented subsectors such as tea, tobacco, dairy, and horticulture). This also applies to the Botswana livestock subsector value chain. Input and output entrepreneurs (e.g. seed companies, fertiliser distributors and take the initiative to perform Information, Education and Communication (IEC) activities that can increase farm productivity, quality of produce, and compliance with market requirements. In other words, extension and advisory services are integral to bundled agricultural services provided by the private sector in fully commercialized subsectors, where both the suppliers and the users of the services have a shared economic motivation.

4.4. Public Funding of Agriculture

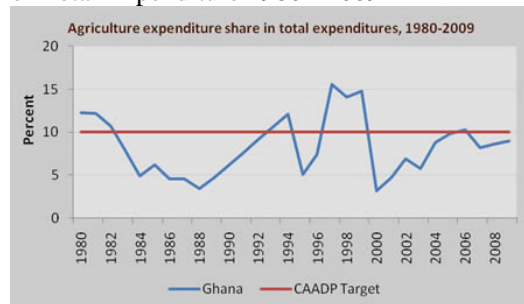
Public funding of agricultural research was viewed as inadequate many respondents in all the study countries. The current continental benchmark on public funding is 10% of total national expenditure. None of the four NAIS study pilot countries had achieved this benchmark, according to the available data at the time of the study (Graphs 1, 2, 3 & 4).

Graph 1: Botswana Agricultural Expenditure Share of Total Expenditure 1980 - 2007



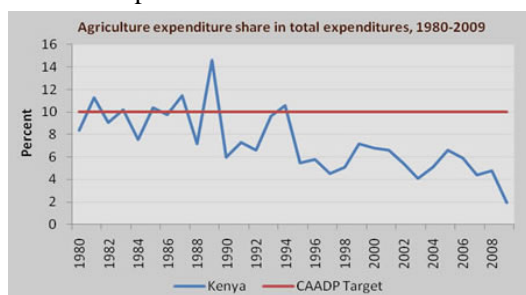
Source: ReSAKSS 2010.

Graph 2: Ghana Agricultural Expenditure Share of Total Expenditure 1980 - 2009



Source: ReSAKSS 2010.

Graph 3: Kenya Agricultural Expenditure Share of Total Expenditure 1980 - 2009



Source: ReSAKSS 2010.

Graph 4: Zambia Agricultural Expenditure Share of Total Expenditure 1980 - 2007



Source: ReSAKSS 2010.

The 2010 – 2012 agricultural expenditure data for these countries were not yet published by ReSAKSS at the time of data collection for this study. It was reported that Burkina Faso and Cameroun were among the countries that were already in full compliance with the 10% funding benchmark.

Some critics have pointed out that the underlying problem with public expenditure on agriculture in Africa is that most of the spending goes into recurrent commitments such as staff salaries of civil servants, and that inadequate new capital investment in agriculture is the main problem. It is difficult to speculate on what can be done to address this particular issue: a simplistic suggestion to reduce recurrent spending could be taken as a call for payroll reduction (implying either mass termination of appointments or a freeze on perks and promotions, either of which would be resisted by public sector employees in agriculture).

Public expenditure on agricultural research appeared to mirror the same pattern: most of the allocated funding to research institutes seems to be committed to recurrent expenditure, leaving the institutes with inadequate financial capacity to invest in new research.

Recommendations: There is a need for clarity on whether the continental benchmark seeks to inject at least 10% of total national expenditure as a net capital investment each year, or whether a new continental benchmark should be established to minimise the recurrent proportion of public expenditure on agriculture. It is recommended that an Ad Hoc working committee be formed, representing key agricultural stakeholder-groups as part of an innovation platform, to monitor public spending on agriculture for one or two years and give a factual feedback to government and other stakeholders at national and continental level.

A number of compelling, factual reports submitted by such a working committee on this issue could help to convince policymakers of the need to address the issue. The reports could also help to galvanize public opinion and support advocacy for something to be done. This could potentially be another benefit of FARA supporting capacity development in the formation of specific innovation platforms or networks in the study countries. Innovation is needed not just at the level of agricultural technology (new seed, new inputs), but also in resolving issues that involve interlinked systems such as public funding of agriculture.

It is also recommended that FARA should propose to the Africa Union, a reasonable continental benchmark on public funding for agricultural research. Such a benchmark, like the one on public expenditure on agriculture, might not be achieved in the medium term, but it would help to focus the debate and the expectations of stakeholders and national governments. A situation whereby agricultural research is funded as a non-priority item has not helped the sector to innovate.

4.5. Regional Agricultural Productivity Programmes (RAPPs)

To meet the Millennium Development Goals (MDGs), the Africa Union (AU), through the mechanism of the New Partnership for African Development (NEPAD), set a number of targets to be met by member states. The targets included a 3% annual agricultural total factor productivity growth, a sustained 6% annual growth in agricultural GDP over a 12-year period, and at the allocation of least a 10% of annual national expenditure to the agriculture sector.

In pursuit of these targets, the “raising of agricultural productivity” was one of the 8 focus areas of an African Action Plan designed and approved by the World Bank in 2005², to help Africa through its regional groups (ECOWAS, COMESA). Funding from the World Bank enabled the take off of agricultural productivity programmes (WAAPP and EAAPP) in both West and East Africa regions. The agricultural productivity programme will enable Ghana, through WAAPP, to become a centre of specialization and excellence on root and tuber crops, while Kenya, through EAAPP will specialize and become the regional leader in on dairy.

Under regional agricultural productivity programmes (EAAPP³ and WAAPP⁴) each member country will focus on the development of the subsector for which it has the greatest potential competitive advantage. The vision is intra-regional integration through trade and intra-dependence that would benefit every member country, as each will have a competitive advantage in a particular subsector. It is also envisaged to eliminate a wasteful duplication research and technology development effort that would occur if each member country pursues the development of its agricultural subsectors, as has historically been the case.

The ongoing regional agricultural productivity programmes in Africa – the East Africa Agricultural Productivity Programme (EAAPP) and the West Africa Agricultural Productivity Programme (WAAPP) – represent a bold and comprehensive initiative to achieve agricultural innovation within the context of regional integration. Of the four NAIS study pilot countries, Ghana and Kenya are among the implementing countries for WAAPP and EAAPP, respectively. Ghana is massively investing in research, seed multiplication, production and overall value chain development in the root and tuber subsector, while Kenya is doing the same in the dairy subsector.

Regional integration and the achievement of competitive advantage are two of the envisaged key outcomes of the regional agricultural productivity programmes (RAPPs). However, this lofty vision is predicated on the important assumption that the member states within each region would positively embrace the implied intra-regional trade and inter-dependence. However, there could be serious risks associated with such an assumption.

The first risk is that African countries have, generally, not had much experience in trading with each other in the post-colonial era. Most African countries have historically targeted their agricultural exports at markets in other continents outside Africa, rather than within Africa. Consequently, the current mechanisms for financial settlements for intra-regional trade may be inadequate and undeveloped. Botswana presents an exception: 95% of its beef is exported to South Africa, and it has demonstrated the potential viability of intra-regional agricultural exports in Africa, even the appropriate market and political protocols.

² The World Bank, Revised African Action Plan – URL: <http://go.worldbank.org/97EL6N8070>

³ East Africa Agricultural Productivity Programme (EAAPP) - <http://www.eaapp.org/>

⁴ West Africa Agricultural Productivity Programme (WAAPP) - <http://www.worldbank.org/projects/P094084/west-africa-agricultural-productivity-program-waapp?lang=en>

4.6. Possible Follow-up for FARA

It is recommended that FARA should consider initiating a targeted research on, planning to mitigate, the potential risks associated with the envisaged regional integration under the WAAPP and the EAAPP interventions. These RAPPs envisage that member countries will achieve competitive advantage through specialization and excellence in designated subsectors, and then provide leadership to other member countries in that subsector.

It is important to consider the following broad question: what are the potential benefits and risks of the envisaged regional integration and interdependence of member countries on each other or agricultural innovation, food security, and sustenance of rural livelihoods in the context of ongoing concerted efforts to alleviate poverty, especially among subsistence farming communities.

FARA should also encourage partner countries to pursue innovations related to the RAPPs in (1) the development of financial settlement mechanisms to facilitate intra-regional trade; and (2) the development of enforceable regional protocols on the acquisition and use of genetic resources, intellectual property rights, and biotechnology research related to agriculture.

5. COUNTRY SUMMARIES

This section presents summaries on each of the 2012 NAIS study countries with highlights of the key findings and recommendations.

5.1. BOTSWANA



Source: New Agriculturist - <http://www.new-ag.info/en/country/profile.php?a=845>

5.1.1 National Agricultural Profile

The economic mainstay of Botswana is the export of raw diamonds. Agriculture accounted for about 2% of the country's GDP in recent years. Livestock farming is Botswana's agricultural mainstay, accounting for about 2.5 million heads of cattle and a similar number of smallstock (mainly sheep and goats). Only about 20% of the country's land is suitable for grazing. Hence, from a strategic economic viewpoint, assuming an no limit in the output market, any major plan to, say, double Botswana's current livestock and small stock production possibility frontier, would involve a resolution of the country's limited natural (grazing) resource base. But the country's livestock industry has strong export links, with about 95% of the production sold to neighbour-countries in Southern Africa. Dairy production meets about 30% national requirement, and the rest is imported from within the sub-region.

Crop production potential in the country is more limited than livestock production, as only about 0.7% of the total land area is arable. The principal crops produced in the country include sorghum, millet, maize, groundnuts, cowpea and sunflowers, all on a rain-fed, subsistence scale. Botswana's annual production of sorghum and maize meets only about 10% of the national requirement which is about 300,000 tons. The remaining 90% is imported from Zimbabwe and South Africa.⁵

⁵ Sources: Encyclopaedia of the Nations (<http://www.nationsencyclopedia.com/Africa/Botswana-AGRICULTURE.html>); New Agriculturist – (<http://www.new-ag.info/en/country/profile.php?a=845>);

Botswana produces about 41,000 tons of vegetable and fruit, meeting 55% of its national requirement in this category (2012 official data), while the remaining 45% of the requirement is imported. Productivity in country's horticulture is constrained by (i) the lack of a horticultural tradition in Botswana; (ii) poor agronomic practices such as fertilizer application, optimum spacing, water management, pest and disease management, and the high cost of crop production inputs due to import dependency on South Africa.⁶

5.1.2 Organizations in Agriculture

Botswana has no separate, specialized agricultural research agency. Scientific agricultural research functions are performed by the Botswana College of Agriculture, which is under the Department of Agricultural Research, at the Ministry of Agriculture (MoA). The country's livestock subsector is export oriented and private sector driven, with the research in this subsector being highly developed and regarded as a regional leader in Southern Africa.

5.1.3 Agricultural Policy in Botswana

Botswana is a unitary state comprising the capital city, nine designated districts and five designated towns, under a parliamentary republic. The country's national agricultural policy and the related bureaucracy are centralized in line with the administrative structure of the country.

From 1966 (when the country gained political independence from Britain) to 1991, the government pursued a policy of national food self-sufficiency, with the ambition of producing all the national food requirement without food imports. In 1991, after over three years of national review and consultative processes which involved all agriculture key stakeholders across the country, a new National Policy on Agricultural Development was approved by the Botswana National Assembly.

The new policy marked a shift from the pursuit of national food self-sufficiency objective to that of national food security. This implied the pursuit of optimality between two main options – food imports and local food production – in a way that made the most economic sense. Emphasis was on livestock and small stock production for which the country had a sub-regional competitive advantage, relative to arable agriculture.

As at December, 2012, Botswana was again in the process of reviewing and finalizing a new national policy on agriculture “to improve food security through diversification into non-traditional products, while promoting greater productivity, environmental sustainability [and] mainstreaming of disadvantaged groups”.⁷ The new policy looks to align and integrate the agricultural sector with (i) both ongoing and emerging sector-specific initiatives that have proved successful; (ii) macro initiatives on poverty alleviation; and (iii) sub-regional and global priorities and processes such as the Millennium Development Goals. Another envisaged policy agenda is the matching of agro-ecological zones to appropriate agricultural

⁶ Morula Morula, in Sunday Standard (Online Edition) 20 September 2012, citing Barutwa Thebenala, Chief Horticulture Officer in the Botswana Ministry of Agriculture.; <http://www.sundaystandard.info/article.php?NewsID=15115&GroupID=3>

⁷ President Seretse Khama Ian Khama, in a State-of-the-Nation address, 5 November, 2012.

commodities in order to target and align investment in arable crops with the competitive advantage of each agro-ecological zone.

The envisaged new policy will seek to re-energize the livestock subsector to maintain its importance as the country's most significant non-diamond export, and an industry for which Botswana has maintained a strong, strategic competition for sub-regional leadership in research, productivity, quality and profitability.

Most initiatives in arable agriculture have been policy-driven, rather than market-driven. The government is seeking to kindle national interest in farming by providing supportive infrastructure and other positive conditions to increase production, productivity and profitability of arable crops, thereby to attract private sector participation. The strategic objective of this policy drive includes reducing foreign exchange spending on food imports, especially cereals. Programmes launched at various times by successive governments during the 1981-2012 timeframe, included the Arable Lands Development Programme (ALDP); the Accelerated Rainfed Arable Programme (ARAP); the National Master Plan for Arable Agriculture and Dairy Development (NAMPAADD); and the Integrated Support Programme for Arable Agriculture Development (ISPAAD).

Similar policy-driven initiatives that have attempted to promote agribusiness include the Citizen Entrepreneurial Development Agency (CEDA), and the Local Enterprise Authority (LEA), which offer soft loans, grants and a number of technical assistance to agro-allied micro, small and medium-scale enterprises (MSMEs).

Despite these strong policy initiatives and support programmes, the national production data for the country's five main arable crops (sorghum, maize, millet, cowpeas and sunflowers) indicate a stagnated output level below 10,000 metric tons per year from 1998 to 2004. This trend seems to suggest the existence of unresolved innovation challenges related to arable agriculture in the country. Some of the challenges are ecologically induced (e.g. drought) or technological (e.g. inadequate irrigation), but some could be organizational (inefficient marketing and distribution of farm produce), institutional (import substitution?), or socio-cultural ("the lack of a strong tradition in arable crops and horticulture"⁸).

100% of the respondents to the open-ended interview questions in the NAIS study in Botswana considered agricultural innovation in the country to involve the successful achievement of full commercialization of several arable crops and horticultural value chains. This view is consistent with the rhetoric of the country's policymakers who have expressed the nation's strong motivation to increase food self-sufficiency beyond the current level of 50%. There was an ongoing incentive programme which allocated free land, seed, fertilizer, and extension services to farmers who sought to cultivate a given minimum acreage of designated arable crops.

5.1.4 Recommendations:

1. Special attention be accorded to Botswana since its climatic conditions are hostile to agricultural production.

⁸Morula Morula, Sunday Standard online Edition (20 September, 2012), quoting Barutwa Thebenala, MoA official

2. A new national policy driving agricultural production and an agricultural research policy be developed. Through this research policy, it is recommended that an agricultural research council or body be established to establish and coordinate linkages amongst all stakeholders. Having established this council, it would now be easier to introduce the concept of the agricultural innovation system. Moreover, through the SCARDA project coordinated by FARA, the agricultural innovation system was introduced to the Ministry of Agriculture in the country and the Ministry adopted the concepts. We recommend that FARA should facilitate this process to further strengthen capacity in the innovation systems approach.
3. FARA should support the reactivation and strengthening of the defunct SCARDA structures and new stakeholders in forming an in-country group that could effectively interact with both the ministry of agriculture and the local private sector in providing input on ways to promote agricultural innovation in targeted subsectors.
4. Assistance in developing and strengthening the farmer organisations, which are primary actors in any commodity value chain, should be given more attention. Public-Private-Partnerships could be used to develop or complement the government and private sector initiatives to develop the agricultural sector in the country using the AIS approach. FARA could then be requested to assist the local service providers (NGOs, training, researchers and policy makers) in strengthening capacity to carry out research using the AIS system.
5. The government of Botswana should significantly increase public funding for agriculture in line with the Maputo Agreement which requires a minimum of 10% allocation to agriculture from the national budget (see Graph 1 above). It is also important to monitor the sub-allocation of the agriculture budget to ensure that research, extension and programme developments have a reasonable share.
6. It is recommended that FARA should urgently propose to the Africa Union, a reasonable benchmark which should be established specifically on public expenditure on agricultural research by member countries.

5.2. Ghana



Source: New Agriculturist - <http://www.new-ag.info/en/country/profile.php?a=854>

5.2.1. National Agricultural Profile

Agriculture accounted for about 30% of Ghana's GDP in 2011, with export crops (cocoa, cashew nuts, timber and horticultural products) constituting about 66% of the economic worth of the agriculture sector, while cocoa is the main export crop.⁹ In 2011-12, Ghana exported about one million metric tons of cocoa beans, the world's second biggest cocoa bean export after Cote d'Ivoire.¹⁰ Ghana's agriculture sector has historically been strong and export-oriented, but data showing the contribution of agriculture to the GDP in recent years does not fairly reflect this strength, perhaps due to the fact that Ghana is now an export of light crude oil. Another export crop in Ghana is cashew nuts, although this is still on a relatively small but growing scale.

Root and tuber crops (cassava, yams, potatoes etc) contribute about 50% of Ghana's agricultural GDP.¹¹ In 2007, Ghana embarked upon a 10-year strategy to increase national production, productivity and economic efficiency of the root and tuber subsector, and also to achieve a competitive advantage in West Africa sub-region. To achieve the strategic objective, Ghana is one of the West African countries currently implementing a World Bank funded project, known as the West Africa Productivity Programme (WAAPP). The project was formulated by ECOWAS, and is coordinated sub-regionally by CORAF/WECARD. Under the WAAPP protocol, each West African country will focus on a single agreed crop subsector, thereby to build its national capacity and become a regional centre of excellence in the subsector.

A West Africa Seed Programme, WASP (sponsored by the USAID and also coordinated by CORAF/WECARD) was being implemented to develop a regional protocol on agricultural seed, in order to facilitate the diffusion of new seed varieties developed by the respective member countries under WAAPP.

⁹ Ghana: Ministry of Food and Agriculture (MoFA), Facts & Figures - http://mofa.gov.gh/site/?page_id=6032

¹⁰ USDA Report- http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Cocoa%20Report%20Annual_Accra_Ghana_3-15-2012.pdf

¹¹ According to Dr Stella Ama Ennin, Deputy Director of the Crops Research Institute (CRI), of the Council for Scientific and Industrial Research (CSIR) - <http://kma.ghanadistricts.gov.gh/?arrow=news&read=41596>

Ghana is a unitary state composed of 10 regions. The country's agricultural research is centralized under the Council for Scientific and Industrial Research (CSIR), which has 12 research institutes of which 8 are directly focusing on various agriculture-related subsectors or themes. These include the Crops Research Institute (CSIR-CRI), Forestry Research Institute of Ghana (CSIR-FORIG), Food Research Institute (CSIR-FRI), Oil Palm Research Institute (CSIR-ORI), Plant Genetics Resources Research Institute (CSIR-PGRRI), Savanna Agricultural Research Institute (CSIR-SARI), Soil Research Institute (CSIR-SRI) and Water Research Institute (CSIR-WRI).¹² It has centralized organizations on agriculture policy on parliamentary system of government. Other agricultural research agencies in Ghana include institutes and faculties of agriculture under the various universities in the country.

5.2.2. Policy

The Food and Agriculture Sector Development Policy (FASDEP) first launched in 1996, and re-launched as FASDEP II in 2002 to reflect a stronger emphasis on the sustainable use of natural resources, commercialization of selected subsectors, and the pursuit of private sector participation through the provision of incentives. FASDEP II also pursues a market-driven approach on the development of targeted crop value chains.

Ghana's agricultural extension approaches evolved from a focus on export crop production in the 1960s to food crop production in later years. A Unified Extension System (UES) was subsequently introduced, promoting a training and visit (T&V) model which soon became regarded as ineffective and too rigid (Okorley 2007). In 1997, the UES was decentralized in order to get the services to the people at the district levels.

Current extension approaches carried out by the public sector still include training and visits (T&V), but also farmer field schools (FFS) and the use of ICT in the delivery of essential messages and information. The public sector organizations involved in these approaches include the Directorate of Agricultural Extension Services (DAES), the Ministry of Environment Science and Technology (MEST), and the Ministry of Local Government and Rural Development (MLGRD).

Apart from government agencies, a number of firms in the private sector are involved in agricultural extension and advisory services in Ghana, especially in agro input production and supply to farmers through farmer associations and cooperatives in the export crops such as cocoa and cashew nuts. Non-governmental organizations and donors have also played their part either as capacity development resource organizations or as direct providers of advisory services. These include local community-based organizations (CBOs) and international organizations such as the Presbyterian Agricultural Services, HarvestPlus, Catholic Relief Services (CRS), CARE International, Africare, ActionAid, and Care Gulf Agriculture and

¹² Source: The Council for Scientific & Industrial Research - <http://www.csir.org.gh/institutes.aspx>

Natural Resources (CGANR). Farmer-based organizations (FBOs) are the frontline groups that have partnered with non-state resource organizations who seek to combine capacity building of local FBOs with direct extension and advisory services.

It is important for some of the FBOs or other service providers to become self-financing. In Kenya, KENFAP has become a major provider of extension and advisory services, while in Zambia, ZATAC and a number of smaller freelance operators are providing services. The key for the service providers to carve a niche through alliance with reputable agro input producers or agro-based manufacturing firms that utilize produce from farmers, especially in commercialized crop sectors such as cocoa and cashew in Ghana.

5.2.3. Recommendations:

1. It is recommended that FARA works with AFAAS in creating a forum for selected FBOs from Ghana to meet their counterparts from Kenya and Zambia, and thereby to synergize on how to increase their relevance in agricultural innovation.
2. It is important for some of the FBOs or other service providers to become self-financing. In Kenya, KENFAP has become a major provider of extension and advisory services, agro-input supply and distribution, and access to local and export produce markets which enable farmers to produce with certainty to sell. In Zambia, ZATAC and a number of smaller freelance operators are providing similar services both in the cash crops and food crops subsectors. The key is for the service providers to carve a niche through alliances with reputable agro input producers or agro-based manufacturing firms that utilize produce from farmers, especially in commercialized crop subsectors such as cocoa and cashew in Ghana.
3. Graph 1 above indicates that Ghana's public expenditure on agriculture in recent years (since 2009) has neared 10% which is the continental benchmark under the Maputo Declaration. However, it is not clear how much of the national budget allocated to agriculture is used on recurrent expenditure and how much goes into supporting new research, extension, and the promotion innovations. There is need for segregated data on these important aspects.
4. It is recommended that FARA as part of its continental leadership in agricultural research should initiate exploratory studies on the possible future impact of the WAAPP interventions on issues such as subsistence farming which supports rural household food security, and the possibility of trade wars resulting from each country having supremacy over a designated crop subsector.
5. Furthermore, it is evident that post-colonial African countries have a stronger tradition of exporting agricultural produce to countries in other continents than within Africa. Hence the financial settlement mechanisms for intra-regional trade might need to be developed to accommodate the envisaged intra-regional trade. For example, under the DFID-funded RIU programme, a transaction in which Sierra Leone and Nigeria exchanged industry resources (poultry feed concentrates and training) encountered a six-month delay in the settlement of the financial terms due to the remittance being

routed through a European bank which had never handled a payment transaction between two African countries. This points to the institutional innovations that need to occur before WAAPP could significantly contribute to economic integration in the region. Therefore, interventions to harmonise agricultural trade policies across the ECOWAS countries is hereby strongly recommended. The USAID for example, is funding the harmonization of policies on seed trade within West Africa through the WASP intervention.

6. It is recommended that FARA should urgently propose to the Africa Union, a reasonable benchmark which should be established specifically on public expenditure on agricultural research by member countries.

5.3. KENYA



Source: New Agriculturist - <http://www.new-ag.info/en/country/profile.php?a=1787>

5.3.1. National Agricultural Profile

Kenya has 10 full-fledged Ministries in the agriculture sector. These are (1) Ministry of Agriculture; (2) Ministry of Livestock Development; (3) Ministry of Cooperative Development and Marketing; (4) Ministry of Fisheries Development; (5) Ministry of Water and Irrigation; (6) Ministry of Lands; (7) Ministry of Regional Development Authorities; (8) Ministry of Environment and Mineral Resources; (9) Ministry of Forestry and Wildlife; and (10) Ministry of the Development of Northern Kenya and other Arid Lands.

To ensure that the work of these 10 sector Ministries are synchronized with each other and with the overall national development plans and processes, an Agricultural Sector Coordinating Unit (ASCU), serves as the clearing house for information as well as the country's CAADP Focal Point (the link-office between the national and the continental levels of agricultural policy in the country).

Agricultural research is centrally governed by the Kenya Agricultural Research Institute (KARI), which has 22 centres and a network of sub-centres and stations across the country. The respective mandates of these centres align with the crop subsectors prevalent in the respective agro-ecological zones of the country.

Under the East Africa Agricultural Productivity Programme (EAAPP), Kenya is implementing a mandate on dairy. The mandate is aimed at establishing Kenya as the regional leader in dairy research, production technology, productivity, packaging, branding and marketing in the region. In addition to KARI various universities have schools or faculties of agriculture which conduct formal educational training in agriculture or related disciplines, and targeted research and extension services. These include the Jomo Kenyatta University of Agriculture and Technology (JKUAT) and the Kenyatta University's School of Agriculture and Enterprise Development, both of which participated in the NAIS study.

Other key organizations in Kenya's agriculture sector include the Kenya National Federation of Agricultural Producers (KENFAP), Kenya Private Sector Alliance (KEPSA) and various service-provider organizations, such as the African Centre for Technology Studies (ACTS), the World Agroforestry Centre (ICRAF) and other international policy organizations based in

the country. Among African countries, Kenya perhaps demonstrates the highest exposure and familiarity with global and continental agricultural policy trends and agendas, due partially to its being a host country and a hub for many of the organizations that are leading these agendas.

5.3.2. Institutional Arrangements

Kenya has well-developed national policy documents covering (1) Agriculture Sector Development Strategy 2010–2020¹³; (2) National Agricultural Research System Policy¹⁴; and (3) National Agricultural Sector Extension Policy¹⁵. The recognition of, and provisions for, the roles of the formal and informal private sector are expressed in each of these policy documents. The National Agricultural Sector Extension Policy, for example, identifies three models, namely (i) fully state-sponsored, free of cost to users; (ii) co-pay or cost-sharing model which partially subsidizes in subsectors that have limited commercialization; and (iii) fully private sector-led model in highly commercialized subsectors e.g. tea, tobacco, dairy and horticulture.

All these policy documents express an alignment of objectives with Kenya’s macroeconomic policies and as embodied in the Vision 2030 document. Other national policies address important issues such as land use, Bio safety and the use of Genetic Resources in the country.

*“If you have a clear vision and a healthy body,
your feet will take you there”¹⁶*

Essentially, these configuration of organizations, institutional arrangements, collaborations (at the local, national, sub-regional and global levels), and the organizational transformation that has occurred within the Ministry of Agriculture (ISO 9001:2008 Certification was achieved in March 2011) are indicative of the innovation that has already occurred at the philosophical, policy, political, organizational and enforcement levels. At the time of data collection for 2012 NAIS Assessment, a National Agricultural Census, with technical assistance from the FAO, was underway in Kenya. An interview participant observed that *“we see the Ministry of Agriculture operating as a business organization . . . and the rest of the sector can only follow this direction.”*¹⁷

5.3.3. New Constitution

Kenya was scheduled to have general elections in March, 2013, and a new Constitution, earlier approved by a national referendum, was to come into effect. This will involve decentralization and devolution of administrative authorities across the country. The current 10 Ministries in the agriculture sector will likely be merged into a fewer number of entities, the bureaucracy streamlined and many of the personnel deployed to the new administrative structures which are aimed at taking the government closer to the people in the countryside.

¹³ Government of Kenya (2010). 3rd Reprint. Agriculture Sector Development Strategy (ASDS) 2010-2020

¹⁴ Government of Kenya (2012). National Agricultural Research System Policy. July 2012.

¹⁵ Government of Kenya (2012). National Agricultural Sector Extension Policy. June 2012.

¹⁶ Mrs. Agnes Kyalo, National Coordinator, FARA-sponsored 2012 NAIS Assessment, Nairobi

¹⁷ Dr. John Mutunga, CEO, Kenya National Federation of Agricultural Producers (KENFAP)

These will be very significant changes, and the extent to which the various organizations, policies and collaborations will be impacted remains to be seen.

The principle of bringing government closer to the citizens to enhance citizen participation in governance and socioeconomic activities seems certain to stimulate local economies through employment in the public sector, benefit the agriculture sector and all of its stakeholders.

5.3.4. Recommendations

1. Kenya was in the midst of positive events and changes, and unfortunately, the high level of organization and innovation already achieved at the policy level could likely be unsettled by the devolution of administrative structures as the implementation of the new constitution took effect. FARA should allow some time for these processes and the associated challenges and impact to unravel before reassessing the situation.
2. As shown in Graph 1 above, Kenya's public expenditure on agriculture has been shrinking rather than increasing since 1990. However, it is unclear whether the ReSAKSS data in Graph 1 were based on budgetary allocations to only one Ministry or to all the ten Ministries in the agricultural sector in Kenya. It is hereby recommended that the national expenditure on agriculture should be increased to meet the continental benchmark of at least 10% share of total national expenditure. The ASCU office should also work with ReSAKSS to clarify whether the data applies to only one Ministry or to all the Ministries in the agriculture sector.
3. While this situation in Kenya might still be in flux due to ongoing devolution of administrative structures, it is recommended that the National Coordinator for the 2012 NAIS Assessment in Kenya should be supported by FARA to document any changes that might be taking place due to the impact of the ongoing reorganization. Of particular note would be whether the number of Ministries in the agriculture sector will increase or decrease and how that will impact the sector as a whole.
4. FARA should encourage and support other sub-Saharan African countries to send a team of policymakers to learn from Kenya's policy approaches and organization of its agricultural sector. One of the elements that other countries could learn from Kenya is the organization and implementation of its national agricultural census which was ongoing at the time of the 2012 NAIS study. The study tour to Kenya should include representatives of SROs and high level national delegations. Of course, Kenya's consent should be solicited and obtained before such a study tour is proposed to the regions. Kenya is clearly in a position to "show and tell" some of its organizational advancements and innovations to encourage other African countries in their effort to innovate at the level of policy; this is where the pace of change appears to be the slowest.
5. It is recommended that FARA as part of its continental leadership in agricultural research, initiates exploratory studies on the possible future impact of the EAAPP interventions on the such issues as subsistence farming which supports rural household food security, and the possibility of trade wars resulting from each country having supremacy over a designated crop subsector.

6. Furthermore, it is evident that post-colonial African countries have a stronger tradition of exporting agricultural produce to countries in other continents than within Africa. Hence the financial settlement mechanisms for intra-regional trade might need to be developed to accommodate the envisaged intra-regional trade. For example, under the DFID-funded RIU programme, a transaction in which Sierra Leone and Nigeria exchanged industry resources (poultry feed concentrates and training) encountered a six-month delay in the settlement of the financial terms due to the remittance being routed through a European bank which had never handled a payment transaction between two African countries. This points to the institutional innovations that need to occur before EAAPP could significantly contribute to economic integration in the region. Botswana's success in exporting 95% of its beef production to South Africa, and its regional leadership in innovation in the livestock sector, offers useful lessons on the feasibility and potential benefits of the envisaged regional economic integration. FARA should consider supporting exploratory studies on financial settlement mechanisms involving agricultural trade in Central Africa.
7. It is recommended that FARA should urgently propose to the Africa Union, a reasonable benchmark which should be established specifically on public expenditure on agricultural research by member countries.

5.4. ZAMBIA



Source: New Agriculturist - <http://www.new-ag.info/en/country/profile.php?a=2621>

5.4.1. National Agricultural Profile

Agriculture has contributed about 20% of Zambia's GDP in recent years.¹⁸ The national staple crops include maize, cassava, rice, millet, sorghum, sweet potatoes, beans and groundnuts all produced by rain-fed, smallholder farms. Cash and export crops produced include soya beans, groundnuts, cashew nuts, sesame, maize, cotton, tea, coffee, sugar, paprika, tobacco, marigold, herbs and spices. Commercial maize production, though having a strong potential for growth, appeared to have fallen by 80% (from 350,000 tonnes to 60,000 tonnes) in 2011-2012.¹⁹

Though lucrative, the production and productivity of the cash and export crops are depend on the performance of rain-fed, smallholder farms, subject to adverse weather conditions, poor access to financing, and global market volatility. Export-oriented floriculture is also strongly emerging, with over 60 varieties of fresh roses accounting for 95% of production in this subsector, and earning the country about US\$40 million in foreign exchange.

Zambia is landlocked, although it has abundant fresh water that can support commercial agricultural irrigation, with a resource such as River Kariba, the world's largest reservoir by volume (180 cu km).

The key objectives of Zambia's National Agricultural Policy are: (1) nationwide and year-round household food security; (2) adequate supply of raw materials for a sustained agro-based industrial development; (3) increased agricultural export to enhance agricultural sector's contribution to the national balance of payments; (4) generate income and employment through increased agricultural production and productivity and (5) ensure conservation and sustainable management of natural resource base for use by future generations.²⁰

Zambia's national agricultural policy document expresses a strong recognition and support for the roles of non-state actors (e.g. private sector, farmer groups and NGOs), participating

¹⁸ Government of Zambia (2010). – National Policy on Agriculture. Review Paper.

¹⁹ New Agriculturist - <http://www.new-ag.info/en/country/profile.php?a=2621>

²⁰ Government of Zambia (2004). Ministry of Agriculture and Cooperatives (MACO): National Agricultural Policy 2004–2015.

in the provision of extension and rural advisory services, either directly or through the provision of capacity building assistance to local structures. There is a strong history of this trend in the country. For example, the Zambia Agribusiness Technical Assistance Center (ZATAC) was established and nurtured for many with funding from the USAID. The centre is now an independent organization providing a range of technical and business advisory services, including extension, to clients in the agriculture sector.

Other smaller independent groups (community-based organizations) are also offering freelance services to farmers and post-harvest processors across the country. While the emergence of these freelance services was necessitated by inefficiencies associated with state-run agricultural extension and advisory services, there is potential for their viability as microenterprises.

Lessons drawn from programme experiments carried out by DFID-funded Research Into Use Programme, in six sub-Saharan African countries including Zambia, suggest the need for ‘innovation brokers’ or intermediaries to facilitate transactions, interactions and reconciliation among various competing interests and entities within a commodity value chain. Agro input producers could benefit from the services of these freelance extension providers. Clearly, these types of brokerage roles are essential to innovation, but fall outside the routine of state-run extension services. Their emergence in Zambia is an indication of “innovation” occurring in the domain of agricultural extension and rural advisory services. However, it is important that the capacity development support, similar to previous investments on ZATAC by the USAID, and on innovation platforms by the DFID-RIU programme, should continue.

5.4.2. Recommendations:

1. It is recommended that FARA should support the nurturing of a cadre of ‘innovation brokers’ in Zambia, to complement the roles of the emerging freelance service providers such as ZATAC and GTAZ. The National Coordinator for 2012 NAIS study in Zambia could be supported financially by FARA to convene and nurture a group that would explore broad based strategies for strengthening the capacity of freelance innovation brokers in the country. It should, however, be noted that agricultural innovations are not homogenous across societies and countries. Therefore, there is a need for FARA and its partner resource organisations to localize interventions in order to meet context specific challenges.
2. FARA should also revamp a defunct SCARDA structures in Zambia and refocus the efforts to address one or two specific innovation challenges that could be identified, in order to build confidence among the participants as part of a broad-based multi-stakeholder agricultural innovation coalition.
3. It is recommended that FARA should urgently propose to the Africa Union, a reasonable benchmark which should be established specifically on public expenditure on agricultural research by member countries.

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