

BOTSWANA

Report on 2012 National Agricultural Innovation System Assessment



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Sponsored by



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Acronyms

ABF	Agri-Business Forum
BAMB	Botswana Agric Marketing Board
BCA	Botswana College of Agriculture
BHC	Botswana Horticulture Council
BHM	Botswana Horticultural Market
BIDPA	Botswana Institute for Development Policy Analysis
BVTC	Borolong Vocational Training Centre
CEDA	Citizen Entrepreneurial Development Agency
DAR	Department of Agricultural Research
FNB	First National Bank
KBPA	Kgatleng Beef Producers Association
LEA	Local Enterprise Authority
MoA	Ministry of Agriculture
MoADAB	MoA, Department of Agricultural Business
MoADAP	MoA Depart of Animal Production
NDB	National Development Bank
NFTRC	National Food Technology Research Centre
RIPCO	Rural Industries Promotions Company (Botswana)
RVS	Ramatea Vocational School
SIFB	Smallstock Industry Federation of Botswana

Sector Affiliation of Participating Organizations in NAIS 2012 Study in Botswana

Sectors	Number of Participating Organizations
Agric Extension (Public Funded)	3
Agric Extension (Independent Funded)	
Agric Research (Public Funded)	1
Agric Research (Independent Funded)	1
Agric Education/Training (Public Funded)	4
Agric Education/Training (Independent Funded)	1
Civil Society	2
Agro-Business (Public Funded)	6
Agro-Business (Independent Funded)	2
NGO/Non-profit	
Policy (Public Funded)	2
Policy (Independent Funded)	4
Total	26

Chart 1:

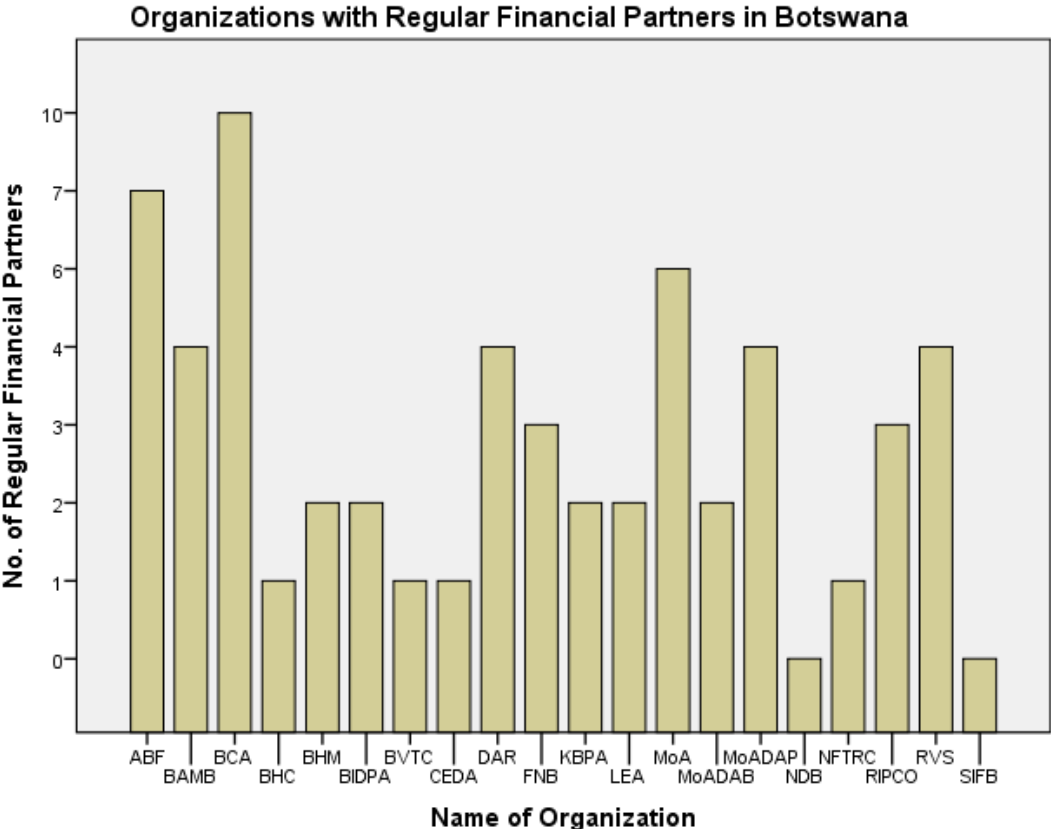


Chart 2:

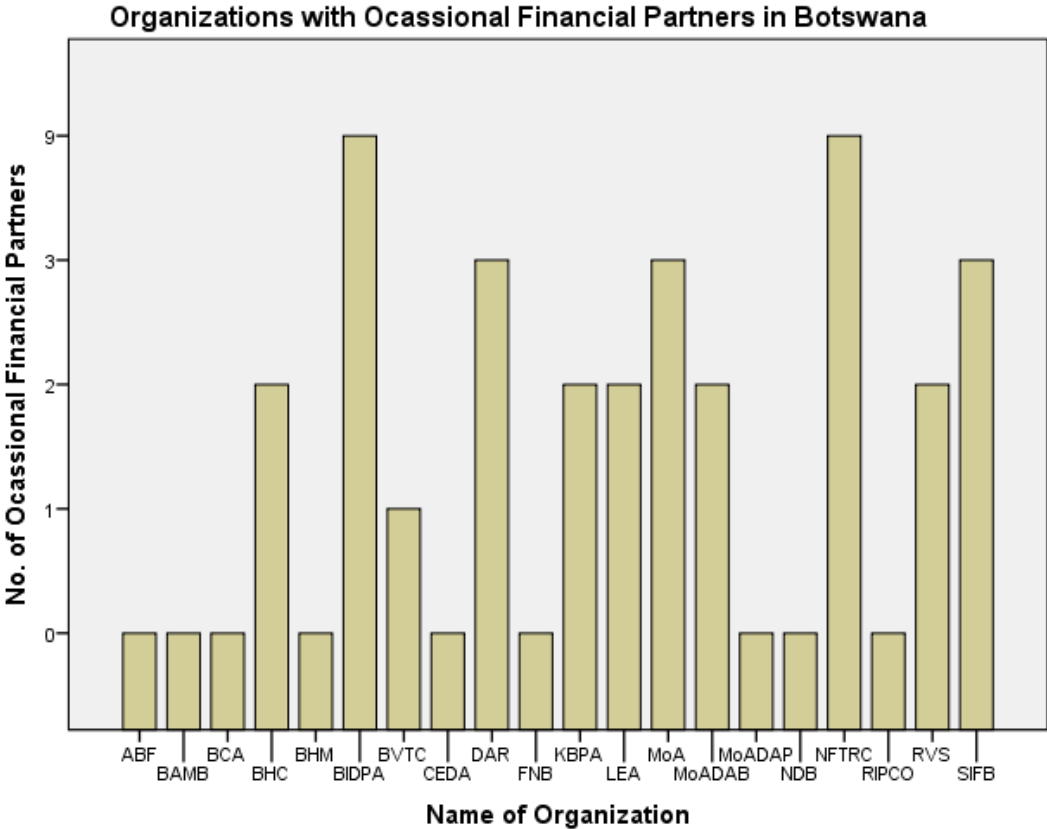


Chart 3:

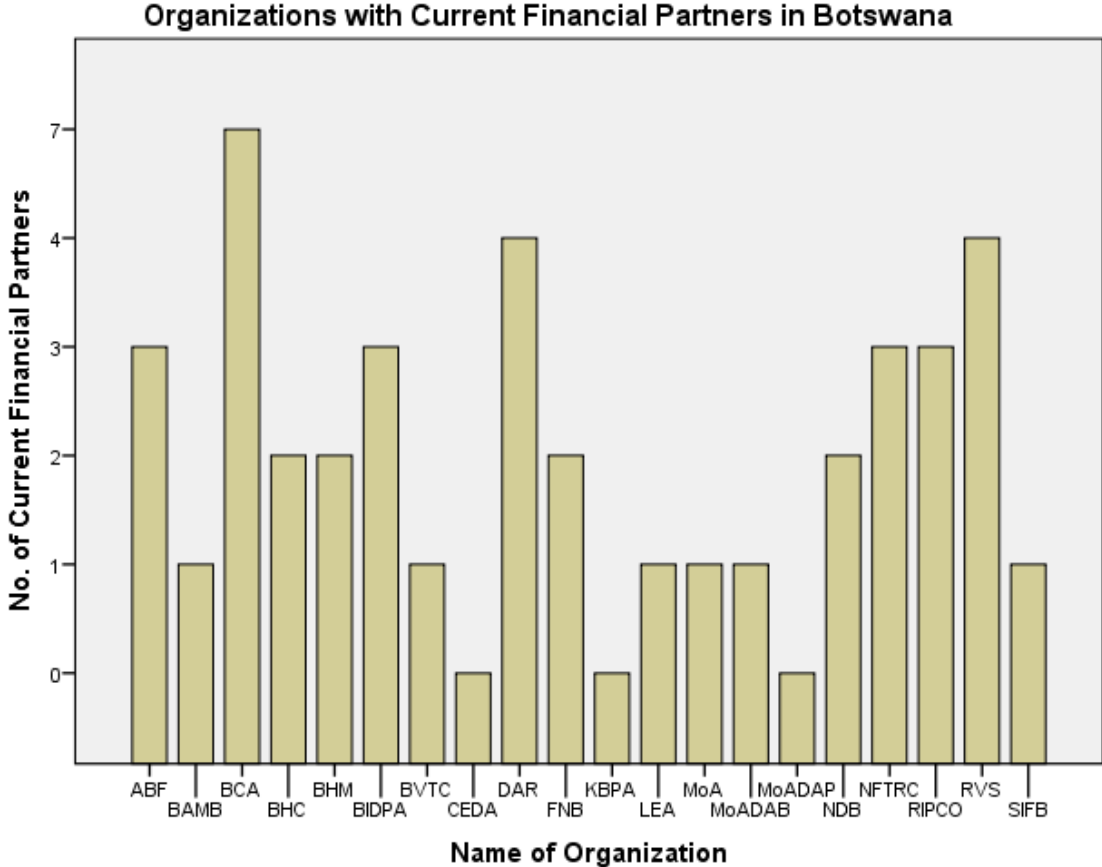


Chart 4:

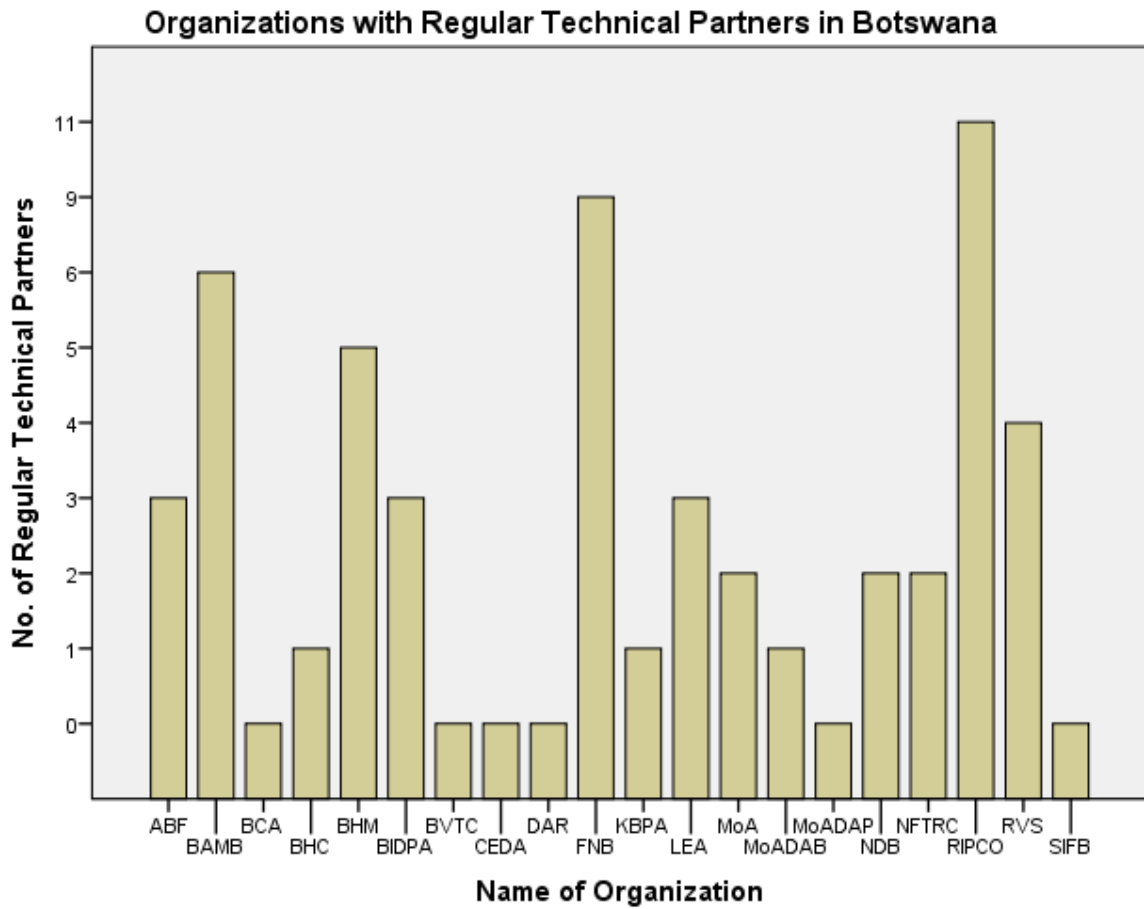


Chart 5:

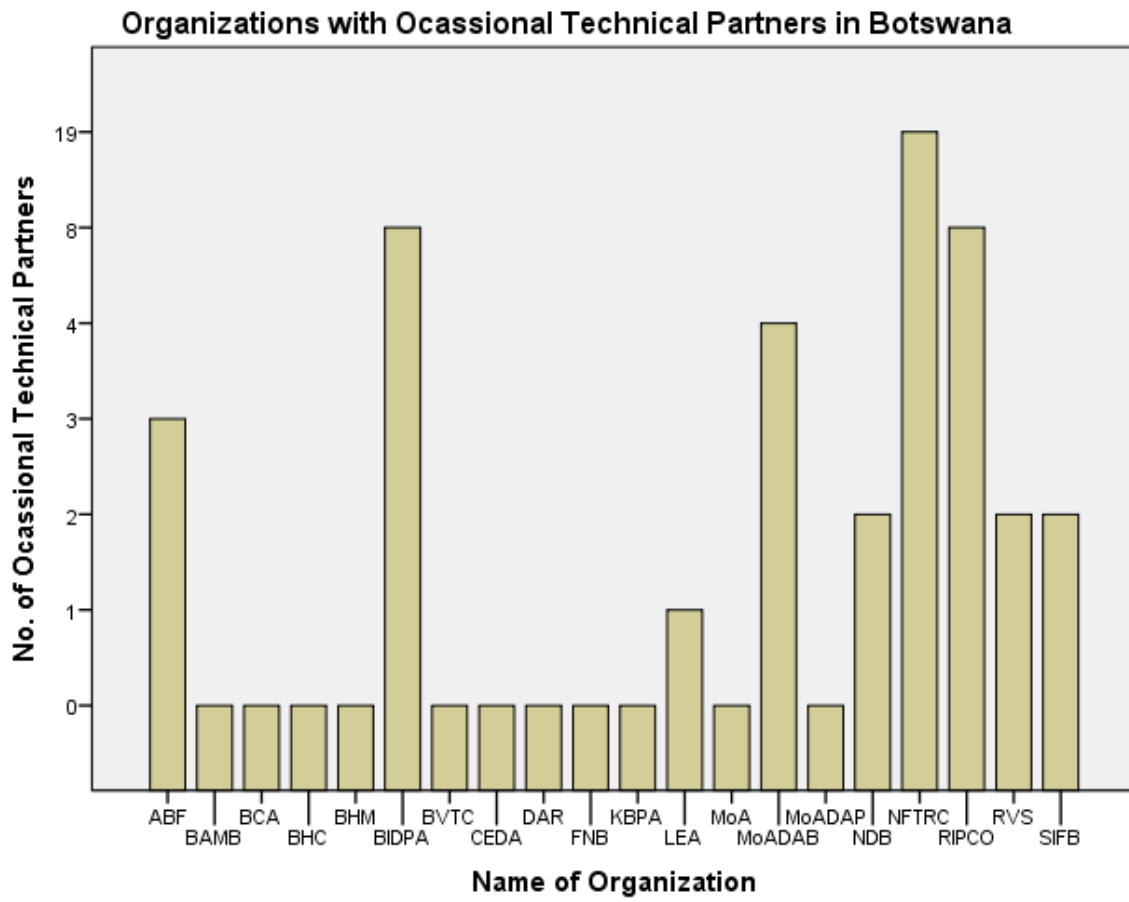
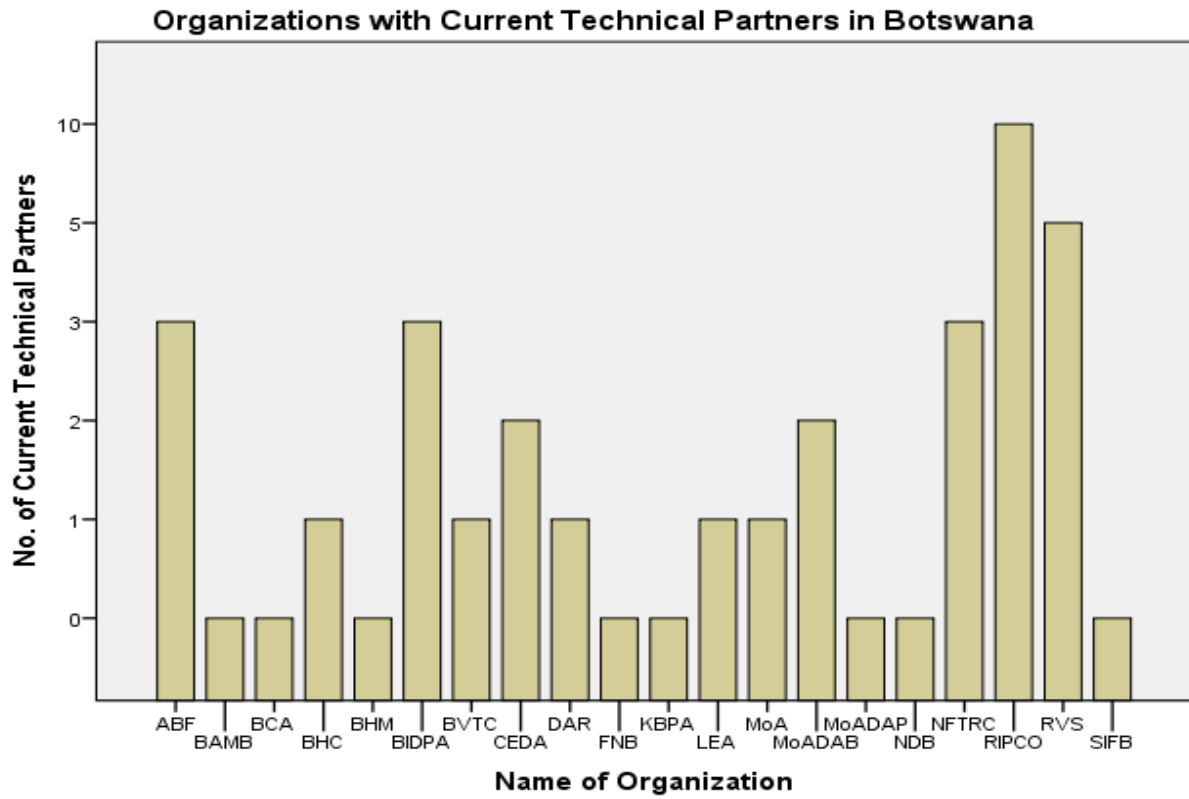
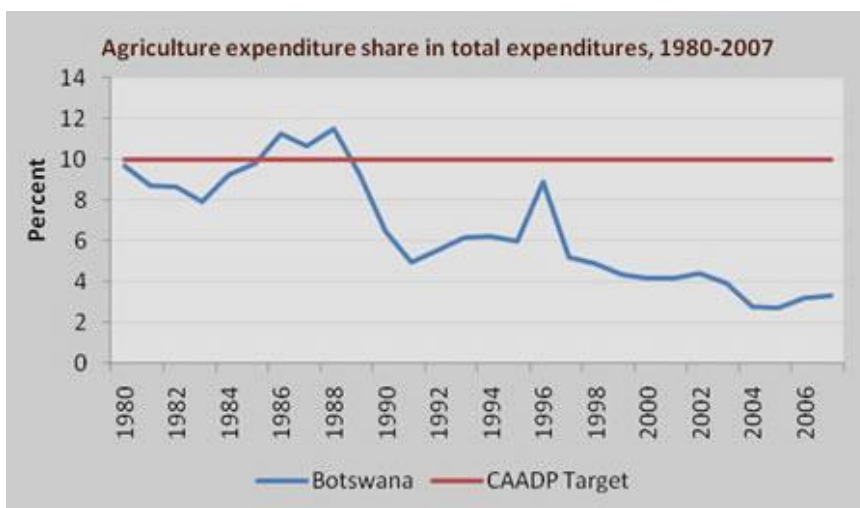


Chart 6:



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



Source: ReSAKSS 2010.

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.¹

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.²

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.

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

¹ 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>);

² 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>)

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”.³ 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 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”⁴).

³ President Seretse Khama Ian Khama, in a State-of-the-Nation address, 5 November, 2012.

⁴Morula Morula, Sunday Standard online Edition (20 September, 2012), quoting Barutwa Thebenala, MoA official

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.

4. Analysis of Responses

As expected, agricultural innovation was defined differently by different organizations depending on their mandated functions and corporate priorities. For example, the Ministry of Agriculture (MoA) viewed agricultural innovation, from the perspective of policy, as involving new approaches which emphasise value chain linkages in synch with other sectors of the economy in an integrated way. Other respondents, such as the Kgatleng Beef Producers Association (KBPA) and the National Development Bank (NDBank), focusing more on practical application, saw agricultural innovation in terms of productivity-enhancing inputs, methods and technologies; effective response to climatic challenges, and appropriate business practices. The Botswana College of Agriculture (BCA) viewed innovation in terms of new knowledge as well as commercially viable technologies and management practices.

The strategies recommended by Botswana respondents to accelerate agricultural innovation included (i) privatization of agricultural research; (ii) policy focus on research that addresses value chain approaches; (iii) robust public and private investment in the commercialization of smallstock industry; (iv) legal guarantees to incentivize private sector investment in targeted subsectors in line with national priorities on agriculture (see summary of respondents' views).

FARA-sponsored SCARDA activities were implemented in Botswana, leading to an initiative which sought to build a multi-stakeholder alliance to address innovation challenges in the smallstock subsector. However, the momentum of this initiative was not sustained, perhaps due to the lack of a local champion and counterpart local resources. Hence, the legacy of SCARDA in kindling national interest and commitment to the pursuit of targeted innovation objectives in agriculture was not evident in the country during the study.

5. Recommendation: It is recommended that:

- 5.1. 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.
- 5.2. 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 development have a reasonable share, instead of just servicing the recurrent expenditure. So

**SUMMARY VIEWS OF PARTICIPATING ORGANIZATIONS
NAIS 2012 STUDY – BOTSWANA**

	NDBank	MoA
Agricultural Innovation Defined	New and greater productive farming methods; Use of new technologies which enhance productivity in farming operations; hybrid inputs (i.e. seeds) that result in greater yields & grow in challenging climatic environments	Rethinking agriculture through new approaches to agricultural development by taking cognizance of the value chain linkages with other sectors of the economy
Indicators of Agricultural Innovation	Practice of non-conventional farming methods which yield greater results & are able to be productive in challenging climatic conditions; Adoption of renewable energy e.g. solar or wind in agricultural operations	Agro-processing industries & agricultural production base
How to achieve envisaged Agric Innovation	Enhance R&D initiatives to encourage use of new technologies & assess overall implication on adoption of such technologies; Provision of subsidies be availed to assist farmers on provision of technologies, where farmers require assistance	Identify bankable projects; Develop country investment plans; Increase budgetary allocation to agriculture; Facilitate the PPP in agricultural projects such as agro-processing industries; Privatize extension services
Core vision of Organization		Attain national food security & global competitiveness
Core Mission		To improve agric productivity through technology development & transfer, diversification & commercialization, in order to promote food security in partnership with our stakeholders
Primary clients		Taxpaying citizens, Farmers
Primarily accountable to		Central government
Achievement extent		Decentralization & aligning resources according to agro-ecological zones
How to achieve Private sector strong participation	Provision of incentives, such as subsidies in accordance with the World Trade Organization (WTO) regulations; Establish Special Economic Zones (SEZ) for agricultural operations, where investors can operate in economically competitive ways	Privatization of extension service; Provide incentives for companies to set up agro-processing industries e.g. Tax rebate, low interest loans

Private sector in Agric Extension	Utilize income from customs/duties on imported agric products to finance private sector	
Organizational strengths	Extensive experience in financing agric projects; diverse & flexible financing products	Educated and skilled human resource
Organizational weakness	High interest rate; few branches	Paucity of resources e.g. funding & vehicles
Capability to deliver	Amendment of regulatory framework to allow involvement in other financial services	Increase budgetary allocation and undertake planned activities
Relevance of Organization in Agric Innovation	Provision of loans with innovative features suitable for various agric projects	Commercialization & diversification of production base for markets is the way to go
Partnering Private sector	Arranging discounted rates for customers sourcing machineries etc. with loan from National Dev Bank	The ministry take a proactive role in facilitating the PPP concept in bankable investment in agricultural projects

	BIDPA	BHM	Dept. of Agric Research	BCA	KBPA	SIFB	BCA –Dept of Animal production
Agricultural Innovation Defined in terms of			Development of drought tolerant crop varieties & animal breeds	Application of new & old scientific knowledge or technologies to solve current agricultural challenges from production to marketing & consumption of produce	Where new agric ideas & technologies are generated to solve existing problems &/or to improve agricultural productivity	New approach to agric thinking that recognizes the importance of all stakeholders in the value chain	Combining conservative agricultural practices with new technologies to enhance production
Indicators of Agricultural Innovation			Adoption of- drought tolerant varieties/breeds by farmers; high yield varieties/breed in the country	More visible linkages between research, extension agents, farmers/ agripreneurs, marketers, exporters & everyone else in the value chain.	Adoption of new agric technologies; increased yields of quality agric products; effective environmental conservation practice; increased agric -research, development & training, capacity building & strengthening	A vibrant smallstock industry federation; increased nos of smallstock population; improved quality of smallstock & it's by-products; effective & efficient marketing structures, subsectors, extension system & a win-win environment for all actors	Involvement of relevant stakeholders&/to key players in the value chain through a common platform

How to achieve envisaged Agric Innovation			Privatize agricultural research institution; Give researchers ample/flexible time to work	Deliberate policy to encourage agriculture research projects that address the whole value chains as opposed to research for the sake of journal publications	Train more agric research scientist; increase funding; conduct more of applied agricultural research; utilize more of indigenous knowledge	MoA should put up a team within the dept of animal production wholly dedicated to the smallstock industry commercialization, to assist in the development & implementation a of strategic plan	Have relevant policies in terms of production land, livestock water, credit facilities, producers representation in policy making entities
Core vision of Organization	To be a globally competitive policy research institute	Still at draft level, awaiting board's approval	Be a Centre of excellence in developing appropriate environmental friendly agric technologies; sustainable agric conservation practices; poverty alleviation & socio-economic growth in partnership with stakeholders.	To be an agricultural university of international repute	To produce high quality beef in a more environmentally friendly manner at low cost of production while maintaining best standards, specification & practices	To be a vibrant & commercialized industry by 2025	Attain national food security & global competitiveness in agric products
Core Mission	Be a centre of	Still at draft level, awaiting	To identify, promote	To produce quality	Advocacy at policy and	To organize all stakeholders in the	To improve agric productivity

	excellence that provides policy research, analysis, advice and capacity building	board's approval	innovative & appropriate technologies that will enable customers optimize productivity via: efficient utilization of agric resources; use of improved genetic resources good agricultural management practices	graduate through innovative teaching and research	market levels	smallstock industry & advocate for relevant policy development & decision making that will further the industry.	through – technology development & transfer, diversification & commercialization
Primary clients	Government, private sector, NGO & development partners	Traders, retailers and general public	Commercial and subsistence farmers	Students & employers of the graduates	Beef producers, government officials, local & international markets, processors, input suppliers & transporters	Smallstock farmers, transporters, stock feed manufacturers & distributors, suppliers of animal drugs, researchers, butchers/abattoirs, wholesalers, shops, consumers	Smallstock producers
Primarily accountable to	Board of Trustees; Govt. of Botswana; African Capacity Building Foundation	MoA and BDC	MoA & government of Botswana	BCA governing council, MoA and Parliament	Beef producers (farmers)	Members of association; individual members of primary association	Permanent secretary & Minister of Agriculture

	(ACBF)						
Achievement extent	Developed into a reliable think-tank producing high quality policy analysis and advice; continuous staff capacity building	N/A	Wide acceptance & adoption of technologies developed by the department	Training at undergraduate & graduate levels; positive impact of graduates in the agric & related sectors; currently pursuing becoming a full-fledged University of agric.	A nascent organization but is seeking to create partnerships & write project proposals for funding to implement its strategic plan, establish a secretariat & offices	A nascent organization	Continuous training of producers
Organizational strengths	Demand-driven jobs; Direct influence on policy change	Ability to restrict importation of products locally produced in abundance	Large number of skilled personnel; Government support	Well trained academic staff; Government continued financial support for recurrent & development budgets	Beef farming & functions of its value chain knowledge; inexhaustible beef market, conducive environment, enabling legislation, genetic diversity of the beef breeds	Strong support from MoA	Longtime association with producers; availability of extension officers in districts
Organizational weakness	Concentration on demand-driven jobs to the detriment of	Ability to convince farmers to their bring produce	Brain-drain: not easy retaining qualified	Inadequate facilities to meet students space	The on and off export market for beef (EU market); weak	Lack of reliable & permanent funding source; inadequate training/exposure	Weak linkages with role players in the value chain

	supply-side of its mandate	to the market & marketing itself	researchers in the dept; Government structure	demand; reduction of funding by government	linkages btw some value chain players – researchers; traceability issues & export market esp.	of members in-leadership, advocacy, proposal writing, etc.	
Capability to deliver	Training & retooling of staff to keep abreast with contemporary policy research issues & methodologies; Impact assessment & project evaluations; Staff exchange programmes	Rebranding & liaising more with MoA & farmers for an improved horticulture industry	Increase in research budget; Motivate staff with fair allowances & infrastructural development; Should be semi-autonomous	Transform college into a full-fledged university with commensurate upgrade of resources	Be transparent, trustworthy & operate in a corporate manner, pursuing the vision, mission &, strategic plans with correct M&E mechanism in place.	Capacity building in leadership & advocacy; Sensitization of members; Initial financial support to the organization to set up appropriate, functional structures & drawing a strategic plan	Reduce bureaucratic red tapism, to allow extension officers take initiative & negotiate with private sector on the organization's behalf
Relevance of Organization in Agric Innovation	Organization deals with policy research in the country, thus play critical roles in promoting technology development, dissemination & uptake; coordinate research on social & economic issues	When there is surplus of produce it is exported to other countries	Current restructuring of the sector; recruitment & training of more personnel	BCA has the highest concentration of well trained academics in the agricultural & related sciences in Botswana who can be harnessed for maximum impact in the	As user of research information, the organization will be create more researchable platforms	Boost the potential socio-economic development of the agric sector in the neighbouring countries	Economic empowerment of different categories of people in the society

				development of innovation platforms			
Partnering Private sector	Partner with private sector to conduct specific research in areas of interest;	By encouraging private sector to invest in agriculture for an improved output of good quality where standards are followed	Demand-driven research and disseminate same for free	Through joint basic & applied research aimed at addressing the whole vale chain where the private sector also benefits	All actors in the beef value chain need to consult and work closely with one and other	Improved collaboration	PPP in: provision of smallstock AI services; extension services; farmer/producer training credit facility formation of common platforms

	RIPCO	MoA	CEDA	BHC	BAMB	NFTRC
Agricultural Innovation Defined in terms of	A process that transfers agricultural ideas through research & development into marketable goods, processes & services		A new idea or technology which assists to enhance agric productivity	Modern ideas/concepts meant to turnaround the agric sector for better	New methods of production resulting in higher output	Agric that integrates efficient use of resources with the capacity of the land and environment
Indicators of Agricultural Innovation	Number of - transferred innovation; agro-business startups; intellectual property registered; income generated		Adoption of new technology by small scale farmers in order to improve/enhance production	Improve crop yield and beef quality, etc.	Improved farming techniques & more food for all	Wide spread adoption of arid zone conservation agric, focusing on smallholder efficient production & processing
How to achieve envisaged Agric Innovation	Institutional framework for R&D; Social investment in R&D, Science & technology policies; connected		Subsidize inputs and end products; make policies that will facilitate growth of markets by SMMEs	Develop research capacity	Education and research& development	Finance agric innovation research sustainably, focus on areas that will ensure food sufficiency;

	national innovation system					provide technical support in formation of innovation platforms
Core vision of Organization	To deliver research & development products & services to support industrial technopreneurial development	Attain national food security & global competitiveness in agricultural processes	To be the citizen's empowerment partner choice through prod=vision of financial services		To be a world class market for agricultural products & services	To be an international centre of excellence in food science technology
Core Mission	Be the leading technopreneurship institute in Botswana	To improve productivity through technology development & transfer, diversification & commercialization in order to promote food security in partnership with stakeholders	To fund & support the development of viable & sustainable citizen businesses		Provide marketing services for growing the agricultural industry	To generate food technologies that will enhance economic diversification, food security & quality through sustained end-user-focused research & development by 2016
Primary clients	Small medium enterprises, farmers, agro-processors, central & local government	Farmers	Start-up businesses; SMMEs		Millers and farmers	Private companies, retailers, hospitality industries, & government
Primarily accountable to	Ministry of infrastructure science & technology	Central government	Government of Botswana through the ministry of Trade & Industry	Farmers & government	Botswana government	MoA
Achievement extent		Decentralization & aligning resource according to agro-ecological zones			Turnover increase in ten folds within 6years	Vision & mission achieved to a great extent

Organization's strength	Government support; R&D infrastructures; modern machineries; qualified & skilled personnel; governance & quality management systems	Educated and skilled human resource	Give opportunities to entrepreneurs with good proposals who would otherwise be denied funding from commercial banks; train & mentor promoters	Lobby government for favourable horticultural policies	Strong branch network	Team of committed scientist
Organization's weakness		Paucity of resources – funding & vehicles	Promoters view the organization as government's instrument to allocate funds/grants & view the fund as entitlement, therefore do not commit to repayment obligations	Inability to generate funds	Continuous complains by farmers over prices	Over-dependent on government for funding; high turnover of management staff; lack financial resources to strengthen assets
Capability to deliver	Conflicting mandate of commercial vs development, dependence on government funding, fragmented system of innovation	Increase budgetary allocation to increase resources & undertake planned activities	Work in partnership with stakeholders in development & establishment of markets for funded businesses as well as facilitating business linkages; develop an effective & efficient way of loan repayments as against collection via project officers	Structural review	More land availed to farmers	A long term funding plan with clear targets to facilitate as against the yearly release of fund
Relevance of Organization in	Transfer of technologies for pre &	Commercialization & diversification	CEDA is relevant because it provides	Sponsor research;	Continue to be a secure market	Advancing environmentally

Agric Innovation	post harvest processes; agro-industry development	of production base for the markets is the way to go	funding at subsidized interest rates	lobby for research funds from other organizations	for the farmers	sound practices as well as ensure relevant research; preserve indigenous
Partnering Private sector	Joint contract research with private sector; technology transfer to private sector	Encourage PPP & also take proactive role in facilitating PPP concept in bankable investment agric projects	Private sector should actively participate in educating farmers rather than just providing retail services; finance innovations that will improve agricultural productivity; CEDA engage with private sector in mapping ways of enhancing identification & adoption of innovation	Establish a forum to meet and discuss issues of agricultural interest	Sign MoU in areas of similar interest	