



Innovating the Nigerian Agricultural Seeds Sector

A Proposed Action Plan for WAAPP-Nigeria

**Jointly developed by
Nigerian Agricultural Seeds System Stakeholders
Through the
WAAPP-Nigeria Task Force on Agricultural Seeds**

May 2013

Members of WAAPP-Nigeria Task Force on Agricultural Seeds

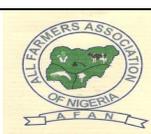
S/N	Organization Represented	Name	Remark
1.	 WAAPP / PPAO WEST AFRICA AGRICULTURAL PRODUCTIVITY PROGRAMME PROGRAMME DE PRODUCTIVITE AGRICOLE EN AFRIQUE DE L'OUEST Nigeria	Dr. Utiang P. Ugbe	Chairman
2.	 WASP Nigeria	Mr. Ebenezer Aje	Secretary
3.	 ARC	Prof. Mohammed D. Magaji Mr. Arabo A Mustafa	Member
4.	 IITA Research to Nourish Africa	Dr. Gbassay Tarawali Mr. Adunoye Francis	Member
5.	 ICRISAT Science with a human face	Dr. Hakeem Ajeigbe	Member
6.	 AfricaRice Rice science at the service of Africa La science rizicole au service de l'Afrique	Dr. Akinwale Gbenga	Member
7.	 National Agricultural Seeds Council Home of Quality Seeds	Dr. Sunday E. Abimiku Mr. Ishiak Khalid	Member
8.	 ALL FARMERS ASSOCIATION OF NIGERIA AFAN	Prince Ike E. Ubaka	Member
9.	 AHMADU BELLO UNIVERSITY ZARIA, NIGERIA	IAR	Member
10.	Premier Seed Nig. Ltd	Prof. Abraham Ogungbile	Member
11.	Savannah Seed Ltd		Member
12.	SEED Association of Nigeria	Mr. Richard O. Olafare	Member
13.	NCRI	Dr. A. T. Maji	Member
14.	 Institute of Agricultural Research & Training Obafemi Awolowo University, Ibadan, Nigeria	Dr. Adetumbi J. Adedayo	Member

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ACRONYMS

ADPs	Agricultural Development Programmes
AFAN	All Farmers Association of Nigeria
AfricaRice	Africa Rice Center
AGRA	Alliance for a Green Revolution in Africa
AIDA	Agricultural Input Dealers Association
ARCN	Agricultural Research Council of Nigeria
ATA	Agricultural Transformation Agenda
BOA	Bank of Agriculture
CGIAR	Consultative Group on International Agricultural Research
CMD-resistant	Cassava Mosaic Disease
CORAF/WECARD	West and Central African Council for Agricultural Research and Development
CSOs	Civil Society Organizations
DFID	UK-Department for International Development
DFID-funded PrOpCOM II	Promoting Pro-Poor Opportunities through Commodity and Service Markets II
ECOWAP	ECOWAS Agricultural Plan
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization
FMA&RD	Federal Ministry of Agriculture & Rural Development
GES	Growth Enhancement Support
IAR	Institute for Agricultural Research
IAR&T	Institute for Agricultural Research and Training
IAR4D	Integrated Agricultural Research for Development
ICRISAT	International Crops Research Institute for the Semi-Arid-Tropics
IFDC	International Fertilizer Development Center
IITA	International Institute of Tropical Agriculture
IPR	Intellectual Property Rights
LCRI	Lake Chad Research Institute
MARKETS	Maximizing Agricultural Revenue and Key Enterprises in Targeted Sites

MoU	Memorandum of Understanding
NACGRAB	National Centre for Genetic Resources and Biotechnology
NAIDA	Nigerian Agricultural Input Dealers Association
NARIs	National Agricultural Research Institutes
NASC	National Agricultural Seed Council
NCRI	National Cereals Research Institute
NCVLBRRC	National Crops Varieties Livestock Breeds Registration & Release Committee
NFRA	National Food Reserve Agency
NGO	Non Governmental Organization
NIRSAL	Nigerian Incentive-based Risk-Sharing for Agricultural Lending
NRCRI	National Root Crops Research Institute
NSQP	National Seed and Quarantine Project
NSS	National Seed Service
NSTA	National Seed Trade Associations
OPV	Open Pollinated Variety
R & D	Research & Development
RIUP	Research Into Use Programme
USAID	United States Agency for International Development
WAAPP	West Africa Agricultural Productivity Programme
WASA	West African Seed Alliance
WASP	West Africa Seed Programme

EXECUTIVE SUMMARY

This report presents the synthesis of the work carried out by the Nigerian Agricultural Seeds Task Force formed by WAAPP-Nigeria in May 2013 to study and propose effective ways of increasing the availability of good quality agricultural seed in the country under WAAPP-Nigeria. The terms of reference of the task force, were as follows:

- i. Take stock of available seeds and national requirements for priority commodities;
- ii. Document and evaluate constraints to the development of the Nigerian agricultural seed sector, and proffer solutions;
- iii. Recommend strategies for agricultural seeds multiplication under WAAPP-Nigeria;
- iv. Develop action plans and road map for sustainable production of agricultural seeds;
- v. Indicate contribution of WAAPP-Nigeria and WASP to the road map;
- vi. Recommend distribution and pricing of the current seed inventory so far produced by NARIs under WAAPP-Nigeria.

The task force membership comprised of ARCN, NASC, IITA, AfricaRice, ICRISAT, IAR, IAR&T, NCRI, AFAN, Premier Seed Ltd, Savannah Seeds & Livestock Ltd, SEEDAN, and WASP Nigeria. After one week of deliberations and thematic group work, the members developed the format and contents of this report.

Analyses of national seed requirement for each priority commodity and the current seed inventory, revealed severe deficits in supply of seeds for each of the crops (Section 3). Section 4 deals with identified constraints and suggested solutions for innovating the Nigerian agricultural seed sector. Suggested strategies for seed multiplication under WAAPP-Nigeria are in Section 5, while proposed action plans and road map for sustainable seed production are in Section 6. Recommendations for the sale of the breeder and foundation seed inventories produced by NARIs under WAAPP-Nigeria are presented in Section 7, and the key conclusions of the report are in Section 8.

1. INTRODUCTION

1.1. State of Agriculture in Nigeria

Nigeria has very rich ecosystem, biodiversity and human energy suitable for massive agricultural production. Despite having about 30 million hectares or 33.49% of the country's land area under cultivation the national agricultural productivity is still very low and inefficient, when compared to countries with similar resources. The country's share of the global market for cocoa, cowpea, cotton, palm oil and groundnuts has also not matched the nation's great potentials.

Several studies have shown that among leading developing nations, such as Malaysia, Thailand and Brazil, Nigeria has the lowest agricultural growth indices¹. Various factors, including limited use of farm inputs, low adoption rates for innovations, inadequate public investment in agriculture and undeveloped commodity value chains, have been adduced for this low growth. For example, average fertilizer use in Nigeria is about 13kg/ha, compared to a world average of 100kg/ha or 150kg/ha for Asia.

Furthermore, the percentage of farmers with access to improved seeds in the country is about 5%, compared to 25% for East Africa and 60% for Asia (ATA, 2012). Agricultural mechanization intensity is about 10 tractors/1000ha compared to 241/1000ha in Indonesia. Less than 1% of the country's arable land is irrigated, compared to 28% in Thailand (Government of Nigeria 2012)².

Low agricultural productivity is responsible for inadequate domestic food production, thereby necessitating over-reliance on food imports which have been growing at about 11% per annum since the 1980s. In 2010, the nation spent about N635 billion on wheat, N356 billion on rice, N217 on sugar and N97 billion on fish (Thisday Newspaper August 2011). Nigeria is importing what it can produce in abundance, and import dependency is hurting Nigerian farmers, displacing local production, and undermining rural livelihoods and local economic development.

1.2. Agricultural Transformation Agenda (Goals & Objectives)

The vision of ATA is to achieve a hunger-free Nigeria through an agricultural sector that drives income growth, accelerates achievement of food and nutritional security, generates employment, and transforms Nigeria into a leading player in global food markets to grow wealth for millions of farmers. To achieve this vision, ATA aims to improve processes for agricultural input procurement,

¹ Federal Government of Nigeria: Agricultural Transformation Agenda

² Reported by Crusoe Osagie, quoting the Hon. Minister of Agriculture, Dr. Akinwunmi Adesina - ThisDay Newspaper 15 August, 2011. <http://www.thisdaylive.com/articles/nigeria-spends-n991bn-on-rice-wheat-importation/96476/>

distribution, marketing, and financing with a private sector led framework. Mechanisms for this include the Nigerian Incentive-based Risk-Sharing for Agricultural Lending (NIRSAL) facilitated by the Central Bank of Nigeria and agricultural commercialization drive through the Growth Enhancement Support (GES).

ATA's action plan focuses on the following priority agricultural commodities within the six geopolitical zones: rice, cassava, sorghum, cocoa, cotton, maize, groundnut, wheat dairy, beef, leather, poultry, oil palm, and fisheries, as well as agricultural extension. This is carried out through the value chains of each of the commodities while recognizing the roles of the economic actors/stakeholders. The main target is to grow the agricultural sector through the various commodities and generate employment opportunities. The rice transformation plan, for example, would involve widespread local production of milled rice, so that high-quality, low cost local parboiled rice would be produced as a strategy for reducing rice import from 1.9 million tons in 2011 to 1.3 million tons in 2015 (ATA strategic plan). The crucial inputs for this include land, improved seeds, fertilizer use, better agronomic practices, and postharvest value addition.

1.3.WAAPP-Nigeria (Goals & Objectives)

WAAPP is a sub-regional programme of ECOWAS and is funded by the World Bank. Its main objectives are to promote agricultural productivity and regional integration (in West Africa) as part of a broad strategy for shared growth and poverty reduction across the sub-region.

WAAPP is currently being implemented by 13 out of the 15 ECOWAS countries. At the sub-regional level, the programme is coordinated by the West and Central African Council for Agricultural Research for Development (CORAF/WECARD). In Nigeria, it is implemented by the Agricultural Research Council of Nigeria (ARCN) through a WAAPP-Nigeria Project Coordination Office. WAAPP-Nigeria is currently in the first of a planned two-phase programme of five years each.

A key developmental objective of WAAPP-Nigeria is to promote national agricultural innovation by strengthening the capacity of the national agricultural research system, and promoting an integrated agricultural research for development (IAR4D) approach. The approach involves synergy among all stakeholders in each of the priority commodity value chains under WAAPP-Nigeria.

The Nigerian agricultural seed system has formal responsibility for all agricultural commodity sub-sectors. Hence, another key objective of WAAPP-Nigeria is to:

- (i) Develop partnerships with selected partner-organizations to achieve adequate production of improved agricultural seeds of priority commodities;
- (ii) Promote private sector participation in the national agricultural seed industry;
- (iii) Provide capacity development assistance to key stakeholders, including the National Agricultural Seed Council (NASC), the NARIs, the All Farmers Association of Nigeria (AFAN) and its nationwide affiliated community-based farmer organizations, and the formal seed companies;

- (iv) Support the objectives of the Agricultural Transformation Agenda (ATA) by contributing toward a sustainable availability of quality seed for the priority commodities, including fingerlings for aquaculture;
- (v) Provide administrative hosting support to the USAID-funded West Africa Seed Program (WASP) to achieve its stated objectives, particularly capacity development for harmonization of ECOWAS regional protocol on agricultural seed trade, and support to national seed trade associations (NSTAs) in Nigeria.

1.4. West Africa Seed Program (WASP) (Goals & Objectives)

The goal of WASP is to expand the production and supply of good quality certified seeds of both improved OPVs and hybrids, from approximately 12% to 25% over five years in West Africa. The broad objective is to improve sustainable agricultural productivity in West Africa, while the specific objective is to increase sustainable production and use of good quality seeds of selected crop varieties in the region.

2. SEED SUB-SECTOR IN NIGERIA

Science has made considerable impact in every sphere of human endeavour including agriculture. We now have crop varieties that are higher yielding, early maturing, more resistant to diseases and pests, and better adapted to different ecologies.

The means of transferring these benefits from scientific improvements to farmers is the seed. Seeds are therefore a means of technology transfer to farmers. However, it is a known fact, that many factors affect the output from crop production. But the seed, by its genetic constitution, sets the limit of the potential of crop productivity. Whether this potential is fully realized depends on the optimum application of these other factors of production.

Farmers have certain expectations from new crop varieties as promised by the breeders. To realize these expectations, seeds of new varieties must be made available to the farmers in adequate quantity and quality and at affordable prices. Unfortunately, the Nigerian seed industry has not fully developed the capacity to perform this role very well. For example, the current national seed uptake is less than 10%, while the regulatory and enforcement capacity in the industry has been weak.

The Nigerian Agricultural Seed Council (NASC) evolved from the National Seed Service (NSS) established with technical assistance from the Food and Agriculture Organization (FAO) in 1975. The World Bank later assisted through the National Seed and Quarantine Project (NSQP) from 1991 – 1997. The council has regulatory functions to ensure that good quality seeds are produced and made available for all crops in the country.

Previous attempts by government to increase private sector participation in the seed industry led to establishment of several limited liability companies in the 1980s. The companies included (i) Ag-Seed Nigeria Ltd; (ii) Temperance Seed Nig. Ltd; (iii) UAC Seed Nig. Ltd (An affiliate of PANNAR of South Africa); (iv) Pioneer Seed (A merger between Ag-Seed and Temperance Seed Nig. Ltd); (v) UTC Seed Ltd. However the companies liquidated due to lack of economic viability of the sector.

2.1. Seed Sector Stakeholders in Nigeria

The stakeholders recognized in the Nigerian seed development system with their mandates are as follows:

2.1.1. National Agricultural Research Institutes (NARIs)

These have mandates for crop variety development, breeder seed production and maintenance. They also collaborate with International Agricultural Centres, such as IITA, AfricaRice Center, and ICRISAT in breeder seed production and maintenance in selected crops, (rice, maize, cowpea). The NARIs and their mandate crops are shown in the table below:

Table 1: Selected NARIs and their Mandate Crops

S/N	Organization	Mandate Crops
1	Institute for Agricultural Research, IAR, Samaru	Maize, Cowpea, Sorghum, Cotton, Groundnut, Sunflower
2	National Cereals Research Institute, Badeggi	Rice, Beniseed, Castor Oil, Soybean, Sugar cane, Hungry Rice
3	Institute for Agricultural Research and Training, Ibadan	Kenaf, Maize, Cowpea
4	National Institute for Horticultural Research and Training, Ibadan	Vegetables and Crop Seedlings
5	Lake Chad Research Institute, Maiduguri	Wheat, barley, Millet
6	National Root Crops Research Institute, Umudike	Yam, Potatoes, Ginger, Cocoyam, Cassava.
7	Cocoa Research Institute of Nigeria, Ibadan	Cocoa, Cashew
8	Rubber Research Institute of Nigeria	Rubber, Gum Arabic
9	National Institute for Oil Palm Research, Benin	Oil Palm, Date Palm

Table 2: CGIAR Centres and their Mandate Crops in Nigeria

S/N	Institutes	Mandate Crops
1	IITA, Ibadan	Maize, Cassava, Soya Bean, Yam, Cowpea etc
2	AfricaRice, Ibadan	Rice
3	ICRISAT	Millet, Sorghum, Groundnut, Cowpea

2.1.2. National Agricultural Seeds Council (NASC)

The establishment of the Council was provided for in the National Agricultural Seeds Act, No. 72 of 1992 but established in 2007. It is responsible for:

- (a) Certification and quality control of seeds;
- (b) Seed industry development & technical support services;
- (c) Coordination and monitoring of Breeder, Foundation & Certified seeds production and utilization;
- (d) Information, planning and data management;
- (e) Collaboration in the registration, release and publication of new varieties approved for commercialization in Nigeria;
- (f) Assistance in the development of private sector participation in seed production;
- (g) Receipt and processing of applications for seed import and export;

- (h) Seed law enforcement; and
- (i) Capacity building and training of stakeholders in the seed industry.

2.1.3. National Variety Release and Registration Committee

The Committee is mandated to scrutinize data on nominated candidates by mandate NARIs, release and register new varieties for commercialization in Nigeria. The members include; Representatives of NARIs, NASC, ARCN, National Rice and Maize Center, and NACGRAB which houses the secretariat with a registrar.

2.1.4. Private Sector

There are over 70 registered private seed companies of which about 15 are considered active. Some civil society organizations (CSOs) such as the All Farmers Association of Nigeria (AFAN), and development assistance projects (e.g. Sasakawa Global 2000) are also involved, particularly in the production of open pollinated varieties (OPVs). The informal sector is increasingly involved in production and marketing of agricultural seeds through community based organizations and occupational associations, such as the Nigerian Agricultural Input Dealers Association (NAIDA). The NGO sector has also been effective in linking rural farmers with input suppliers and technical/extension support. For example, the development of small scale seed enterprises under the West African Seed Alliance (WASA), support for agro-dealer development by WASA, IFDC-AGRA, National Food Reserve Agency (NFRA), and value addition to grain outputs under USAID-MARKETS and DFID-funded PropCOM II.

The unique position of the informal sector in agricultural seed system is that community-based organizations (CBOs) are both producers and end users of seeds, although the produced seeds are generally outside the formal purview of the NASC certification protocol.

2.1.5. Agricultural Development Programmes (ADPs)

ADPs are responsible for provision of seed extension services in respective states.

2.2. Policy Domain

The policy objectives of the seed sector are to

- i) Support varietal development, registration, release and multiplication of released varieties;
- ii) Improve the quality of the seed sold to farmers for higher yields and better income;
- iii) Re-orientate the operations of public sector agencies along commercial lines;
- iv) Encourage private sector participation in seed operations through appropriate promotional activities and incentives;
- v) Promote innovation and global best practices in the seed industry;

- vi) Maintain genetic biodiversity of the crop ecologies.

The current trend in the seed sector is toward harmonization with the sub-regional framework of the ECOWAS agricultural plan (ECOWAP) which is been supported by USAID through WASP. This includes a planned regional seed catalogue and regional varietal release committee.

There is increasing private sector participation and leadership in some activities previously undertaken by the NASC (e.g. the production of foundation seeds). This is in line with overall policy of agricultural commercialization and the disengagement of public agencies from activities that can best be carried out by private enterprise.

3. NATIONAL SEED REQUIREMENT AND SEED INVENTORY

The national agricultural seed requirement as well as the available the seed inventory and the analysis of shortage or surplus for the priority commodities under WAAPP-Nigeria and WASP are presented in the following tables:

Table 3: Breeder Seed National Requirement and Inventory

S/N.	Crop	Hectares Cultivated (National)	Seed Rate (Kg/Ha)	Seed Requirement (Kg)	Quantity of Breeder Seeds (mt)			% Available
					Required	Available	Gap	
1	RICE - lowland	1,305,386	50	65,269,300	26.11	5.84	20.27	22%
	RICE - upland	482,814	60	28,968,840	8.05	2.16	5.89	27%
2	MAIZE - OPV	2,335,102	20	46,702,040	116.76	56.87	59.89	49%
	MAIZE - Hybrid	1,000,758	15	15,011,370	66.72	24.37	42.35	37%
3	SORGHUM	4,736,730	10	47,367,300	473.67	3.35	470.32	1%
4	COTTON	374,140	20	7,482,800	18.71	4.91	13.80	26%
*5	SOYA BEAN	105,154	50	5,257,700	2.10	5.34	(3.23)	254%
6	G/NUT	2,636,310	50	131,815,500	52.73	-	52.73	0%
7	MILLET	3,749,600	5	18,748,000	749.92	1.38	748.55	0%
*8	WHEAT	19,744	20	394,880	0.99	2.50	(1.51)	253%
9	BEANS/COWPEA	2,524,580	70	176,720,600	36.07	6.00	30.07	17%
10	YAM (Seed Yam)	2,776,010	10,000 Yam mini-sett	27,760,100,000	-	-	-	
11	CASSAVA (Bundles)	3,126,510	50 (Bundles/Ha)	156,325,500	0.50	-	0.50	0%

Table 4: Foundation Seed National Requirement and Inventory

S/N	Crop	Hectares Cultivated (National)	Seed Rate (Kg/Ha)	Seed Requirement (Kg)	Quantity of Foundation Seeds (mt)			% Available
					Required	Available	Gap	
1	RICE - lowland	1,305,386	50	65,269,300	1,305	300	1,005	23%
	RICE - upland	482,814	60	28,968,840	483	111	372	23%
2	MAIZE - OPV	2,335,102	20	46,702,040	2,335	253	2,082	11%
	MAIZE - Hybrid	1,000,758	15	15,011,370	1,001	108	892	11%
3	SORGHUM	4,736,730	10	47,367,300	4,737	25	4,712	1%
4	COTTON	374,140	20	7,482,800	374	34	340	9%
*5	<i>SOYA BEAN</i>	<i>105,154</i>	50	5,257,700	105	32	73	30%
6	G/NUT	2,636,310	50	131,815,500	2,636	-	2,636	0%
7	MILLET	3,749,600	5	18,748,000	3,750	3	3,747	0%
*8	<i>WHEAT</i>	<i>19,744</i>	20	394,880	20	4	16	20%
9	BEANS/COWPEA	2,524,580	70	176,720,600	2,525	11	2,513	0%
10	YAM (Seed Yam)	2,776,010	10,000 Yam mini-sett	27,760,100,000	-	-	-	
11	CASSAVA (Bundles)	3,126,510	50 (Bundles/Ha)	156,325,500	278	-	278	0%

Table 5: Certified Seed National Requirement and Inventory

S/No.	Crop	Hectares Cultivated (National)	Seed Rate (Kg/Ha)	Seed Requirement (Kg)	Quantity of Certified Seeds (mt)			% Available
					Required	Available	Gap	
1	RICE - lowland	1,305,386	50	65,269,300	65,269	27,259	38,010	42%
	RICE - upland	482,814	60	28,968,840	28,969	10,082	18,887	35%
2	MAIZE - OPV	2,335,102	20	46,702,040	46,702	15,640	31,062	33%
	MAIZE - Hybrid	1,000,758	15	15,011,370	15,011	6,703	8,308	45%
3	SORGHUM	4,736,730	10	47,367,300	47,367	875	46,492	2%
4	COTTON	374,140	20	7,482,800	7,483	8,089	(606)	108%
*5	SOYA BEAN	105,154	50	5,257,700	5,258	1,705	3,552	32%
6	G/NUT	2,636,310	50	131,815,500	131,816	36	131,780	0%
7	MILLET	3,749,600	5	18,748,000	18,748	18	18,730	0%
*8	WHEAT	19,744	20	394,880	395	-	395	0%
9	BEANS/COWPEA	2,524,580	70	176,720,600	176,721	107	176,614	0%
10	YAM (Seed Yam)	2,776,010	10,000 Yam mini-sett	27,760,100,000	27,760,100	62,500	27,697,600	0%
11	CASSAVA (Bundles)	3,126,510	50 (Bundles/Ha)	156,325,500	156,326	135,713	20,613	87%

4. AGRICULTURAL SEED SYSTEM: CONSTRAINTS AND SUGGESTED SOLUTIONS

The Nigerian agricultural seed sector has evolved over the last 30 years in terms of seed science and commercial seed production capabilities. However, the sector is still under-performing in terms of meeting the agricultural seed needs of the country. Consequently, the government of Nigeria imported rice seeds in 2012, while vegetable seeds are still mostly imported through informal channels.

The development and performance of the seed sector is constrained by many factors which include weak technical capacity, poor market mechanisms, inefficient enforcement of seed law, information asymmetry, insufficient capital investment and low utilization of innovations. These and other constraints have been tabulated in this section and appropriate solutions recommended for each constraint (see Table 6).

In response to some of the constraints, WAAPP-Nigeria has already initiated some interventions in the seed sector. One of these involved seed multiplication contracts with selected NARIs (NRCRI, IAR, IAR&T, NCRI) in 2012 to produce breeder and foundation seeds. Under the arrangement, NRCRI was contracted to cultivate 30 hectares of improved varieties of cassava in order to produce stems for distribution to farmers in the subsequent planting season. Similarly the NRCRI is also to cultivate 20 hectares of seed yams using the yam mini-sett method. The other NARIs (IAR, NCRI & IAR&T) were contracted to produce breeder and foundation seeds for Maize, Rice and Sorghum.

WAAPP-Nigeria also commissioned the multiplication of several improved (CMD-resistant and bio-fortified) cassava varieties and seed yam production in 8 states through the Agricultural Innovation Platform (based in Abia State). The organization was inherited from the defunct DFID-funded Research Into Use Programme (RIU-Nigeria) which was hosted by the Agricultural Research Council of Nigeria (ARCN). The initiative is part of WAAPP-Nigeria's strategy of building capacity for community-based production of agricultural seeds for vegetatively propagated crops.

In order to build the seed sector policy implementation capacity, WAAPP-Nigeria signed an MOU with the National Crops Varieties Livestock Breeds Registration & Release Committee (NCVLBRRC) and funded activities to strengthen its capacity to process varietal release applications from NARIs. WAAPP-Nigeria has also provided funding to the National Centre for Genetic Resources and Biotechnology (NACGRAB) to enhance its capacity to collect catalogue and store genetic resources related to agricultural seed research and varietal development.

In general the challenges facing the seed sector are complex and require comprehensive strategic solutions. The solutions should be multi-pronged to address poverty alleviation needs and private sector interests. In order to encourage private sector investment in seed research, the Intellectual Property Rights (IPR) institutions need to be well developed in Nigeria.

Table 6: Seed System Constraints and Recommended Solutions

S/N	CONSTRAINTS	RECOMMENDED SOLUTIONS	Actors	Timeline
1.	Inadequate breeder and foundation seeds	Support NARIs to build capacity;	WAAPP, WASP & NARIs	2013 onwards
2.	Inadequate technical capacity of seed producers	Train stakeholders on seed production management practices	WAAPP, WASP & Seed producers	2013 onwards
3.	Faking and adulteration of seeds and packaging	Build capacity of NASC to enforce quality assurance and deterrence	WAAPP & NASC	2013 onwards
4.	Poor access to other complementary yield enhancing inputs such as fertilizer and agro-chemicals at affordable prices	<ul style="list-style-type: none"> • Promote stronger integration of seed and other inputs • Strengthen the activities of NAIDA at all levels 	WAAPP & NAIDA	2013 onwards
5.	Most companies do not have R & D, quality control departments, seed processing facilities and adequate seed testing facilities	<ul style="list-style-type: none"> • Include seed companies in WAAPP sponsored forum of NARIs-Universities-CGIAR to build R & D capacity • Support upgrade of seed companies' processing and testing facilities • Promote use of mobile seed processing technology for informal seed sector 	WAAPP, CGIAR, NARIs, Universities & Seed producers	2013 onwards
6.	Low compliance with formal roles and activities of stakeholders in seed industry	<ul style="list-style-type: none"> • Promote awareness on legal roles and activities of stakeholders • Support robust monitoring capacity of NASC for enforcement of the rules 	WAAPP, WASP NASC, NARIs & Seed companies	2014 1 st Qtr
7.	Lack of hybrid varieties for other crops except maize	Proactive support for research initiatives on hybrid seed development	WAAPP, WASP, NARIs, ICRISAT,	2014 onwards

			AfricaRice	
8.	Seed companies are not interested in producing seeds of crops with high seed rate, but with low yield return.	<ul style="list-style-type: none"> Promote informal sector production of seed for vegetatively propagated crops and OPVs e.g. groundnuts, millet, sesame, cowpea, yam, cassava etc. 	WAAPP, WASP, AFAN & Selected innovation platforms	2014 onwards
9.	Poor seed handling	<ul style="list-style-type: none"> Support training programs on seed handling and storage for selected stakeholders e.g. agro dealers, AFAN 	WAAPP, WASP, AFAN, AIDA, Seed companies & NASC, NARIs	4 th qtr 2013
10.	Limited access to agricultural credit	<ul style="list-style-type: none"> To initiate seed multiplication contract with seed producers FMA&RD to make possible the recapitalization of the BOA with a directive to support targeted WAAPP and WASP partners FMA&RD to direct BOA to fund training activities for seed producers under WAAPP 	FMA&RD, BOA, WAAPP, WASP, Seed producers, NASC, NARIs, CGIAR & other development partners	2013 onwards
11.	Delayed availability of seed to farmers after release of new varieties	<ul style="list-style-type: none"> NASC to involve farmers and other seed system stakeholders in post-release process. 	NASC, NARIs & AFAN	2013 onwards
12.	Inadequate manpower capacity	<ul style="list-style-type: none"> Train production staff of seed producers on breeder, foundation and certified seeds Support post graduate training in plant breeding 	NARIs, Seed companies, NASC, WAAPP & WASP	2013 onwards
13.	Low level of adoption of improved seeds by farmers	<ul style="list-style-type: none"> Promote selected varieties of priority crops under WAAPP/WASP 	WAAP, WASP, Seed	2013 onwards

		<ul style="list-style-type: none"> Promote seed system innovation platform 	companies, AFAN	
14.	Non-implementation of ECOWAS seed trade protocol	Pursue national ratification of protocol	NASC, WASP & AFAN	2013 onwards
15.	Non functional nationally coordinated varietal trials	Reactivate sustainable nationally coordinated varietal trial	ARCN, NARIs, WAAPP, Universities, CGIAR, Seed companies, AFAN	2013 onwards

5. STRATEGIES FOR SEED MULTIPLICATION UNDER WAAPP-NIGERIA

WAAPP and WASP had identified different commodity crops in which they will intervene along with the Federal Government's Agricultural Transformation Agenda (ATA). The priority crops under WAAPP-Nigeria are wheat, rice, maize, sorghum, yam and cassava, while the WASP priority crops are millet, cowpea and groundnuts.

The WAAPP-Nigeria priority crops are housed in 5 NARIs (IAR, IAR&T, NCRI, LCRI and NRCRI), while the WASP priority crops are housed in 2 NARIs (IAR and LCRI).

Table 7: Priority Commodities and the Sponsors

S/N	Priority Commodities	ATA	WAAPP	WASP
1	Maize	√	√	-
2	Rice	√	√	-
3	Sorghum	√	√	-
4	Cassava	√	√	-
5	Wheat	√	√	-
6	Millet	√	-	√
7	Cocoa	√	√	-
8	Cotton	√	√	-
9	livestock	√	√	-
10	Yam	-	√	-
11	Groundnuts	-	-	√
12	Cowpea	-	-	√
13	Aquaculture	√	-	-

Table 8: NARIs for WAAPP-Nigeria and WASP Priority Commodities

S/N	NARIs	Priority Commodities
1	IAR, Zaria	Maize, Sorghum, Groundnuts, Cotton & Cowpea
2	NCRI, Badeggi,	Rice
3	LCRI, Maiduguri	Wheat and Millet
4	IAR&T, Ibadan	Cowpea & Maize
5	NRCRI, Umudike	Cassava and Yam

The strategies adopted by WAAPP-Nigeria and WASP should stem the rampant adulteration of certified seeds, poor quality of seeds produced, inadequate quantity of breeder and foundation seeds and weak capacity of NASC to perform its quality control functions. Another key issue to be addressed is the shortage of qualified breeders in the country. The strategies proposed under WAAPP-Nigeria and WASP to improve the production and availability of good quality agricultural seeds in the country are outlined in Table 9 below:

Table 9: Strategies for Breeder Seed Production

S/N	Components	Activities/Task	How	Agencies	Time Line
1	Development and strengthening of Institutional environment	Identification of NARIs that have mandate for each of the commodity priorities	See Table 1	-	Completed (May, 2013)
		Identification of acceptable varieties of the commodity crops	See Tables 3, 4 & 5	WAAPP, WASP, ATA	Completed (May 2013)
		Determine seed quantity required for each commodity	Analysis of National seed requirement (See Tables 3, 4 & 5)	WAAPP & NASC	May/June, 2013
		Evaluate resources available for Breeders seed production at each NARIs (Land, equipment etc) thereby ascertaining production capability of NARIs	Submission of available resources and inadequacies	NARIs & CGIAR	June, 2013
		Strengthening NARIs for the inadequacies that requires immediate attention	Verification of the submissions	WAAPP & NASC	June /July 2013
		Strengthening NARIs for the inadequacies that requires immediate attention	Provision of facilities	WAAPP	2013
		Commissioning NARIs to produce	Provision of funds		

		required quantity of seed and/or arrangement of institutional collaborations where possible		WAAPP, WA SP, NARIs & CGIAR	June/July 2013
		Varietal maintenance and generation of additional improved varieties	Research and crop breeding	NARIs, Universities, NACGRAB, CGIAR	2013 upward
2	Development of regulatory environment	Seed production plan Seed Administration	Development of active Seed production plan Effective monitoring to meet certification standards Report on numbers of fields certified ahead harvesting and processing Projected expected seed yield Seed testing for genetic, analytical and	NARIs NASC, WAAPP, WASP, NARIs NASC NARIs, NASC, WAAPP, WASP	June/July 2013 June to Jan. 2014 Jan 2014 Jan / Feb, 2014 Jan/ Feb 2014

			physiological quality.	NARIs, NASC, Accredited laboratories	
3	Development of enabling environment for seed uptake	Seed uptake and distribution	Provide storage facilities pending seed uptake. Ensure breeder seeds are taken up by seed companies	NARIs, NASC, WAAPP	Feb/March 2014

Table 10: Strategies for Foundation Seed Production

S/no	Components	Activities/Task	How	Actors / Organization	Time line
1	Development and strengthening of Institutional environment	Identification of Registered Seed Companies that have ability and manpower to produce each of the commodity priorities	Revalidate existing data	NASC, WAAPP, WASP	June, 2013
		Increase quantity and quality foundation seed production	Encourage specialization of seed companies to produce foundation seed of commodity crops where they have comparative advantage	NASC, Private Seed Co	Continuous
		Determine national seed requirement of foundation seed for each commodity	Submission from seed company & Analysis of National seed requirement	Seed Company & NASC	June, 2013
		Evaluate resources available for foundation seed production at each Seed Company (Land, equipment etc) thereby ascertaining production capability of Seed Companies/ producers	Submission of available resources and inadequacies Compilation of Out growers used by seed companies/ producers (use of GPS)	WAAPP, NASC & Private Seed Companies “	June, 2013
		Strengthening Seed Companies for the inadequacies that requires	Capacity enhancement or provision of facilities	WAAPP & Seed Companies/	July, 2013

		immediate attention Commissioning of Seed Company/ Producer to produce required quantity of seed and/or arrangement of organizational collaborations where possible.	Provision of funds	producers WAAPP & Seed Companies/ Producers	July 2013
2	Development of regulatory environment	Seed production plan Seed Administration	Development of active Seed production plan Effective monitoring to meet certification standard Report on numbers of fields certified ahead harvesting and processing Project expected seed yield Seed testing for genetic, analytical and physiological quality.	WAAPP, NASC Seed Companies/ Producers NASC Seed Companies/ Producers, NASC WAAPP, WASP, NASC and seed companies/ producers Seed Companies, NASC	June/July, 2013 July – Dec, 2013 Jan 2014 Jan/Feb, 2014 Jan/Feb, 2014
3	Development of enabling	Seed pricing, uptake and distribution	Fix maximum seed price	NASC, WAAPP, NARIs,	

	environment for pricing and seed uptake			WASP and seed companies	
	Regulations on Foundation seed production	<p>The production of this class of seed, progeny of breeder seed of publicly bred material has been liberalized. Under this liberalized production arrangement, the following stakeholders are involved:</p> <p>(1) The mandate Research Institutes can produce and market foundation seed of their crop varieties. The institutes are to register an independent seed unit that will operate as a commercial entity with its account and staff.</p> <p>(2) Seed companies that have the facilities and capacities can obtain breeder seed of their choice from Research Institutes and produce foundation seed for their use in the certified seed production</p> <p>(3) Seed companies that have the capacities and facilities can register a separate outfits for production and marketing of foundation seed</p> <p>Meanwhile private seed companies that have breeders and facilities to develop their varieties may do so. The developing company may produce the breeder, foundation and certified seeds of such varieties.</p>			

Table 11: Strategies for Certified Seed Production

S/no	Components	Activities/Task	How	Actors / Organization	Time line
1	Development and strengthening of Institutional environment	Identification of Registered Seed Companies that have ability and manpower to produce foundation as well as certified seeds of each of the commodity crops	Existing data	NASC	June, 2013
		Increase the quantity and quality of certified seed production	Encourage formation of efficient and responsive seed out-grower scheme to produce certified seed for seed companies. Use of yield enhancing crop management practices to increase seed yields	NASC, Private Seed Companies and seed producers	Continuous
		Determine national seed requirements of certified seed for each commodity	Submission from seed companies & Analysis of National seed requirement	Seed Company & NASC	June, 2013
		Evaluate resources available to seed companies(Land, equipment etc) for certified seed production thereby ascertaining production capability of Seed Companies	Submission of available resources and inadequacies	WAAPP, WASP, NASC & Private Seed Companies/ producers	June, 2013
				WAAPP/WASP &	

		Strengthening Seed Companies for the inadequacies that requires immediate attention	Capacity building or provision of facilities and facilitate access to credits	Seed Companies/ producers	July, 2013
		Commissioning of Seed Companies/ producers to produce required quantity of certified seed	Provision of funds	WAAPP/WASP & Seed Companies/producers	June/July 2013
2	Development of regulatory environment	Seed production plan	Development of active Seed production plan	WAAPP, WASP, NASC Seed Companies/ producers	June/July, 2013
		Seed Administration	Effective monitoring to meet certification standard	NASC, WAAPP, WASP	July – Dec, 2013
			Report on numbers of fields certified ahead harvesting and processing	Seed Companies/ Producers, NASC	Jan 2014
			Seed testing for genetic, analytical and physiological quality.	NASC and seed companies/ producers	Jan/Feb, 2014
			Submission of certified seeds	Seed Companies/ Producers	Feb/Mar.

			produced		2014
3	Development of enabling environment for pricing and seed uptake	Seed pricing, uptake and distribution	Fix maximum seed price	NASC, WAAPP, WASP, seed companies/producers and farmers	Annual

6. ACTION PLAN AND ROAD MAP FOR SUSTAINABLE SEED PRODUCTION UNDER WAAPP-NIGERIA

The table below shows proposed interventions that could be implemented under WAAPP-Nigeria and WASP as contributions toward achieving sustainable availability of good quality agricultural seeds for farmers in Nigeria (Table 12, Table 13, Table 14 and Table 15):

Table 12: Road Map to Achieve Sustainable Seed Production

Strategic Plan	Objectives	Breeder Seed	Foundation Seed	Certified Seed
Development and strengthening of Institutional environment for seed production	To bridge the gap created by seed inadequacies by increasing seed availability in the National seed system	Provision of fund for the development of more improved high yielding varieties & maintenance breeding for existing farmers preferred commodity crops that has high adaptive characteristics to several agro-ecologies of Nigeria	Research Institutions and other Private sectors with requisite abilities should be encouraged and assisted to register seed company venture to produce foundation seed	Identification of farmer preferred varieties, encouragement and institutional support to private seed producers to complement seed production processes. Promotion of improved seed through demonstration plots combined with continuing efforts to popularize new high yielding varieties
Development of regulatory environment of seed production	To sustain quality of available seed within the seed system	Follow up breeding activities to ensure that popular variety among farmers do not suffer genetic depletion and maintained its high-field performance and uniqueness Effective monitoring to meet	Empowerment of NASC to monitor seed production field through modern day IT (GPS), Google map in addition to unscheduled physical field inspection (Acquisition of technology, equipment and logistics)	Empowerment of NASC to monitor seed production field through modern day IT (GPS), Google map in addition to unscheduled physical field inspection (Acquisition of technology, equipment

		certification standard		and logistics)
Development of enabling environment for seed uptake	To encourage seed uptake and distribution	Assistance in provision of conducive storage facilities pending seed uptake	Assistance in provision of conducive storage facilities pending seed uptake	Assistance of provision of conducive storage facilities pending seed uptake

Table 13: Action Plan to Achieve Sustainable Breeder Seed Production:

Objectives	Action	Actors/Activity	Target dates	Status	
1. To increase breeder seed availability in the National seed system	Timely provision of fund for breeder seed production	WAAPP and WASP to support funding of breeder seed production.	June 2013 to 2015	On going	
	Provision of fund for the development of more improved varieties of commodity crops adapted to several agro-ecologies of Nigeria	WAAPP and WASP to support infrastructural development for off season seed production (e.g. irrigation facilities) WAAPP and WASP to fund varietal trials and release process	June 2013 to 2015	New	
	Utilization of biotechnology approach for rapid seed multiplication.	WAAPP to encourage and fund NARIs and Universities to collaborate in Markers assisted breeding	2014	New	
	Encourage existing Plant breeders, while younger ones are trained	WAAPP, NARIs, Seed Producers should facilitate the implementation of Intellectual property rights (Plant breeders' right).	2013 to 2015	On going	
	Maintenance breeding		NARIs to continue with purification and production of breeder seed of the improved varieties	2013	On going
				2013	On going

	Fixing of minimum price of breeder seeds to ensure sustainability	Prices of breeder seeds are to be fixed at prevailing production cost annually while seed companies should indent at least a year ahead of intended production season.		
2. To sustain quality of available seed within the seed system	Ascertain genetic purity of existing breeder seed	WAAPP to support NASC to conduct genetic purity analysis of parental lines of hybrids and breeder seeds (through molecular techniques)	2013	New
	Facilitate quality assurance	WAAPP to provide fund for NARIs , NASC and Seed Companies to set up seed testing laboratories and upgrade with some latest basic seed testing equipment	2013	New
	Provide linkages between Seed companies, breeders, seed producers and end users of WAAPP and WASP priority commodity.	WAAPP to facilitate formation of seed system stakeholders' platform.	2013	
3. To conserve genetic materials and increase adoption and seed uptake of developed improved varieties	Encourage farmer acceptance of variety through participatory varietal selection	WAAPP to encourage collaborative research between farmers and Scientists	2014	New
	Liberalization of registration and	WAAPP, WASP, ARCN, NARIs,	2014	New

	<p>release of crop varieties to allow other stakeholders such as Universities, Research Institutes without National mandate, International centers, Seed companies and Individuals to present developed outstanding varieties.</p> <p>Provision of conducive seed storage for NARIs</p>	<p>Universities, NASC, NAGRAB, Variety Release Committee, Seed Companies, CGIAR members,</p> <p>ADPs WAAPP to assist in provision of conducive storage facilities pending seed uptake</p>	<p>2013</p>	<p>New</p>
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Table 14: Action Plan to Achieve Sustainable Foundation Seed Production

Objectives	Action	Actors/Activity	Target dates	Status
1. To increase foundation seed availability in the National seed system	Support seed production capacity of seed companies Design sustainability of foundation seed production	WAAPP-Nigeria to organize a seminar on agricultural seed production investment	June 2013 to 2014	New
		NARIs should be encouraged and assisted to register seed ventures	June 2014	
		WAAPP to support capacity for foundation seed production	2013	New
		WAAPP to support capacity development of users of foundation seed	2013	
2. To sustain quality of available seed within the seed system	Facilitate quality assurance	WAAPP to provide assistance to NARIs, NASC, seed companies to set up seed testing laboratories and upgrade with some latest basic seed testing equipment	2014	New
		WAAPP to support training for NASC staff, Seed dealers, seed companies and state seed coordinating committee on modalities to enforce compliance to	2013 - 2015	New

		seed law. WAAPP to support capacity building in the area of quality assurance to all Seed system stakeholders	2013	
3. To conserve seeds and increase adoption and seed uptake of developed improved varieties	Provision of conducive seed storage	WAAPP to assist in provision of cold room storage facilities pending seed uptake through provision of	2014	New

Table 15: Action plan to achieve sustainable certified seed production

Objectives	Action	Actors/Activity	Target dates	Status
1. To improve adoption level and utilization of certified seed in the agricultural production	Promotional activities of improved seed.	WAAPP to coordinate 2 multi-locational demonstration plots of 20m x 20m in each state using ICRISAT Model - partners include NARIs, NASC, CGIAR, Seed Companies, AFAN seed producers, AIDA, ADPs	June 2013 to 2014	New
		Field days and Seed fair	June 2014	New
		Provision of enabling seed policy that will guarantee returns on investment achievable through constant interactions between actors, to address emerging challenges	2014	New
2. To sustain quality of available seed within the seed system	Facilitate quality assurance	WAAPP to provide assistance to NASC to play their regulatory role	2013 - 2015	New
		WAAPP to enhance capacities of Seed companies for internal quality control		New
		WAAPP to support training for NASC staff, Seed dealers, seed companies and state seed coordinating committee on modalities to enforce compliance to		New

		seed law. WAAPP to support capacity building in the area of quality assurance to all Seed system stakeholders		New
3. To improve uptake of improved varieties	Provision of conducive seed storage	WAAPP to assist in provision of conducive storage facilities pending seed uptake WAAPP to promote agro input dealers to market seeds.	2014 2013	New New

7. DISTRIBUTION OF EXISTING SEED STOCK

The task force examined the existing stock of agricultural seeds produced by the NARIs under the 2012 funding agreement with WAAPP-Nigeria. The funding from WAAPP-Nigeria was for the production of breeder and foundation seeds for agreed varieties of sorghum, maize and rice, by NARIs which included the Institute for Agricultural Research (IAR), the Institute of Agricultural Research & Training (IAR&T), and the National Cereal Research Institute (NCRI), as shown in Tables 16 – 21 below.

Table 16: Sorghum Breeder Seeds Produced by IAR under WAAPP-Nigeria

S/N	Variety	Quantity Produced (kg)
1.	Samsorg 17	200
2.	Samsorg 14	100
3.	CSR 01	100
4.	CSR 02	100
	Total	500

Table 17: Sorghum Foundation Seeds Produced by IAR under WAAPP-Nigeria

S/N	Variety	Quantity Produced (kg)
1.	Samsorg 14	700
2.	Samsorg 17	2,000
3.	CSR 01	600
4.	CSR 02	600
	Total	3,900

Table 18: Maize Foundation Seeds Produced by IAR under WAAPP-Nigeria

S/N	Variety	Quantity Produced (kg)
1.	Sammaz 11	1,000
2.	Sammaz 14	2,700
3.	Sammaz 15	4,500
4.	Sammaz 16	2,000
5.	Sammaz 17	2,000
6.	Sammaz 18	1,000
7.	Sammaz 20	1,000
8.	Sammaz 27	400
9.	Sammaz 26	200
10.	Sammaz 29	500
11.	Sammaz 33	300
12.	Sammaz 34	500
14.	Sammaz 36	200
16.	Sammaz 37	500

	Total	16,800
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Table 19: Rice Breeder Seeds Produced by NCRI under WAAPP-Nigeria

S/N	Variety	Quantity Produced (kg)
1.	FARO 44	2,750
2.	FARO 52	2,400
3.	FARO 57	1,200
	Total	6,350

Table 20: Rice Foundation Seeds Produced by NCRI under WAAPP-Nigeria

S/N	Variety	Quantity Produced (kg)
1.	FARO 52	Being Processed
2.	FARO 57	Being Processed
3.	FARO 44	1,600
4.	FARO 52	1,400
	FARO 57	1,000
	Total	4,000

Table 21: Maize Breeder Seeds Produced by IAR&T under WAAPP-Nigeria

S/No	Variety	Quantity Produced (kg)
1	ART-98-SW6-OB	2500
2	BR9928DMRT	500
3	BR9943DMR	4000
4	TZBR-Eld3	4500
5	TZE Comp 5	1000
	Total	12,500

The task force recommended that the above listed inventory of breeder and foundation seeds in the custody of the NARIs should be sold to seed companies and community based organizations at 60% of the prevailing market prices. WAAPP-Nigeria is to advertise in a national newspaper for the expression of interest from prospective buyers, and to organize a competitive and transparent selection process. The selected prospective buyers will pay for the seeds directly to the NARI that produced the particular set of seeds before the seeds are handed over to the buyer. WAAPP-Nigeria is to pay the NARI the remaining 40% of the value of the seeds purchased to financially capacitate the NARIs for production in the subsequent season. From the proceeds of the seed sales, each NARI should pay 2% directly to the breeder(s) as an incentive allowance.

8. CONCLUSIONS

The WAAPP-Nigeria seed task force identified issues to be addressed by the programme in the Nigerian agricultural seed sector. They include (i) capacity for seed policy implementation; (ii) seed market development; (iii) seed production capacity for all classes of seeds by the private sector; and (iv) effective linkage to informal (community-based) groups whose members are both producers and users of agricultural seeds.

WAAPP-Nigeria has already initiated partnerships with some NARIs and an innovation platform to produce seeds for specific crops and varieties. The initiative should be extended to private seed companies through a competitive selection process.

Given the predilection of farmers to save their own seeds, WAAPP-Nigeria should expedite a partnership with NARIs to develop and produce hybrid seeds for rice and sorghum, in order to transform seed production in the country.

The task force analyzed the data supplied by the NASC on the national agricultural seed production and the national seed requirement for 2010; the analysis shows there is acute shortage of seeds for all crops except breeder seeds for soybean and certified seeds for cotton.

Nationally coordinated research trials are a major aspect in the development and release of new varieties. The task force understood that inadequate funding is hampering the efficient and effective performance of this important function by the responsible agencies. If this is, indeed, the situation, WAAPP-Nigeria should intervene either financially or by mediating the support of another resource organization.

NASC needs assistance to strengthen its capacity to enforce agricultural seed law and seed quality assurance across the country, especially in rural areas where out-growers undertake seed multiplication under arrangements with seed companies.

The informal sector has comparative advantage in the production of seeds for vegetatively propagated crops. Therefore WAAPP-Nigeria should support the informal sector to complement the seed production capacity of private seed companies in this line of seeds. Furthermore NARIs should be required to release foundation seeds for OPVs to informal sector partners in rural areas for multiplication.

As part of a value chain approach, WAAPP-Nigeria should pursue vertical and horizontal linkages in each priority commodity sector, and support market development as a strategy for building market demand for farm outputs which will invariably increase the demand for seeds.