

**Conseil Ouest et Centre Africain  
pour la Recherche et le  
Développement Agricoles**



**West and Central African Council for  
Agricultural Research and  
Development**

## **STAPLE CROPS PROGRAMME**

# **Analyses of the Value-Chain of Priority Staple Crops for Research and Development Interventions in West and Central Africa**

## **A REPORT**

**SUBMITTED TO THE CORAF/WECARD SECRETARIAT  
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## ABBREVIATIONS

AfDB	African Development Bank
AFSTA	African Seed Trade Association
AGRA	Alliance for Green Revolution in Africa
ARCN	Agricultural Research Council of Nigeria
ASN	African Seed Network
AU	African Union
CAADP	Comprehensive Africa Agriculture Development Programme
CAAPP	Central Africa Agricultural Productivity Programme
CARBAP	Centre Africain de Recherches sur Bananiers et Plantains
CEEAC	Communauté Économique des Etats de l'Afrique Centrale
CEMAC	Communauté Économique et Monétaire de l'Afrique Centrale
CERAAS	Centre D'Etude Régional pour l'Amélioration de l'Adaptation à la Sécheresse
CGIAR	Consultative Group on International Agricultural Research
CGS	Competitive Grant Scheme
CILSS	Comite Permanent Inter-états de Lute Contre la Sécheresse au Sahel
CORAF/WECARD	Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles/ West and Central African Council for Agricultural Research and Development
CMA/OAC	Conférence des Ministres de l'Agriculture de l'Afrique de l'Ouest et du Centre
CSIR-CRI	Council for Scientific and Industrial Research
EC	European Commission
ECOWAS	Economic Community of West African States
ES	Excecutive Secretary
FAAP	Framework for African Agricultural Productivity
FARA	Forum for Agricultural Research in Africa
FBOs	Farmer Based Organization
GA	General Assembly
GAPs	Good Agricultural Practices
HIPC	Highly Indebted Poor Country
IARCs	International Agricultural Research Centres
IAR4D	Integrated Agricultural Research for Development
ICRISAT	International Crops Research Institute for Semi Arid Tropics
ICT	Information and Communication Technology
IFDC	International Center for Soil Fertility and Agricultural Development
IFPRI	International Food Policy Research Institute
IFS	International Funds for Science
IFPRI	International Food Policy Research Institute
INTSORMIL	International Sorghum, Millet and Other Grains CRISP

IRAD	<i>Institute de Recherche Agricole pour le Developpement</i>
ISFM	Integrated Soil Fertility Management
IITA	International Institute of Tropical Agriculture
MDG	Millennium Development Goals
M & E	Monitoring and Evaluation
MOFA	Ministry of Food and Agriculture
MOU	Memorandum of Understanding
NRM	Natural Resource Management
NARIs	National Agricultural Research Institutes
NARS	National Agricultural Research System or Systems
NEPAD	New Partnership for Africa's Development
NGO	Non-government Organization
OP	Operational Plan
PARAO	Programme d'appui a la Recherche Agricole en Afrique de l'Ouest
PNDRT	<i>Programme National de Developpement des Racines et Tubercules</i>
PROPAC	<i>Programme Sous – Regionale des Organisations Paysannes d'Afrique Centrale</i>
RECs	Regional Economic Community or Communities
ROCAFREMI	<i>Reseau Ouest et Centre Africain de Recherche sur le Mil</i>
ROCARIZ	<i>Reseau Ouest et Centre Africain du Riz</i>
ROCARS	<i>Reseau Ouest et Centre Africain de Recherche sur le Sorgho</i>
ROPFA	<i>Reseau des Organisation Paysannes et de l'Afrique de l'Ouest</i>
RTIMP	Root and Tuber Improvement and Marketing Programme
SADC	Southern Africa Development Cooperation
SG2000	Sasakawa Global 2000.
SRO	Sub-regional Organization
STC	Scientific and Technical Committee
SWOT	Strength, Weakness, Opportunity and Threat
TIPCEE	Trade and Investment Program for a Competitive Export Economy
UEMOA	Union Economique et Monétaire Ouest Africaine
USAID	United States Agency for International Development
WA	West Africa
WAAPP	West Africa Agricultural Productivity Programme
WARDA	African Rice Centre (West African Rice Development Association)
WASA	West African Seed Alliance
WCA	West and Central Africa
WECAMAN	West and Central African Collaborative Maize Research Network

## EXECUTIVE SUMMARY

In the process of implementing its Strategic and Operational Plans to achieve the objectives of CAADP *Pillar IV (Improving agriculture research, technology dissemination and adoption)* within the framework of FAAP and to respond to the objectives of the RECs (ECOWAS, and UEAMO, CEMAC), the CORAF/WECARD Staple Crops Programme's conducted a consultative survey to identify key constraints and needs of end-users of agricultural technologies. By addressing the constraining elements in the staple crops value-chains, it is anticipated that improvements in food security and increases in incomes of smallholder farmers and agro-based enterprises will be realized. Thus, a significant proportion of the potential in the staple crop sub-sector, estimated to be over \$ 20 billion will be harnessed to contribute to the achievement of the 6% target growth in agricultural productivity by 2016. Priority staple crops to drive economic growth in the WCA sub-region have been identified as roots and tubers, rice, the traditional grains (maize, sorghum and millet), plantain/banana and the pulses and oil crops (including cowpea and groundnut). Cross-cutting priorities to create the necessary enabling environment for growth have also been identified as market, trade, policy, institutions and harmonization.

The study therefore aimed to: (i) consult key partners: private sector (industry, enterprises, processors, marketing groups, FBOs,), public sector (CG and Base centres, NARS, Extension) and NGOs to identify possible constraints and needs of end-users, as well as existing opportunities in improving the staple crop value-chain continuums; this was expected to form the basis for determining priority investments for the next five years, (2) prioritize sub-regional research for development opportunities that would add value to national programs, based on the results of the IFPRI study and (3) identify possible partnership arrangement for the implementation of the different activities and propose operational mechanisms to link the different actors for effective collaboration in the implementation of activities. Thus, in addition to producer, processor and marketing organizations, the study covered service providers (agri-inputs organizations, NGOs and extension service). Further to these, six research institutions from the six countries, as well as the CGIAR and base centres in the sub-region (ICRISAT, WARDA, IITA and CARBAP) were covered. The outcomes of this study, are serving as inputs to develop a 5-year Action Plan (Roadmap) that will help direct research and development investments in the staple crops sub-sector.

The study which took 30 working days, consulted seventy-two partners represented by 217 people, identified the most important technological and cross cutting constraints and needs of value chain actors. Thus, the most constraining technological factors of producers in a decreasing order of importance are insufficient access to seed and planting material, inadequate production technology and machinery, insufficient access to fertilizer and the effect of climate change. In addition, poor storage systems, insufficient germplasm, poor soil fertility and low access to irrigation facilities are constraining. The most important cross cutting constraints include inadequate access to credit, insufficient access to the output market, weak producer capacity, weak technology transfer system and poor group animation. In mitigating the effect of climate change, improvements of inventory

credit, multiple-stress tolerance varieties, seed conservation and grain storage systems to prolong food security, as well as improvements in soil water management technologies and irrigation facilities are considered very desirable to producers.

Both large scale and women-group processors are constrained by inadequate supply of quality raw material, which constitutes their most important worry. Additionally, inadequate access to improved processing equipment and low access to credit facilities, marketing limitations and insufficient processing technologies are important constraints, particularly in the case of women groups. Processing entrepreneurs see their capacity as low and their storage systems as unsatisfactory. Insufficient suitable germplasm to meet the growing consumer needs, weak technology transfer system, the poor state of group and association coherence and low access to market information are also constraining.

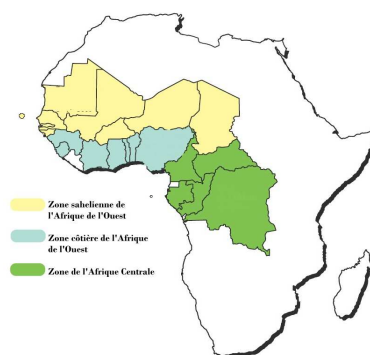
With regards to cross-border and export trades, constraints include harassments on the borders, differences in trade rules and regulations among countries, insufficient market information and linkages, currency exchange problems, linguistic limitations and difficulty in bank transactions. One major constraint of the trade and export entrepreneurs stem from their low capacity in adopting good agricultural practices (GAPs) and low knowledge in the rules and standards of the target markets. The needs of large markets of sub-regional importance include enhanced capacity to manage statistics and records of produce entering and leaving the markets, coordinate various commodity groups and the associations, as well as to manage communication and information, and large scale storage systems.

The most important constraints to the growth of the agri-inputs businesses are insufficient access to credit to expand businesses, low markets access, weak human, institutional and logistic capacity, unfavorable policy and insufficient breeder and foundation seeds. Other constraints are insufficient or dilapidated state of processing equipment, inadequate seed production technology and machinery, insufficient germplasm weakness in the technology transfer process and insufficient storage facilities. Marketing constraints are related to farmers' perception of certified seeds being expensive, poor certification systems, farmers' reluctance to invest in improved seeds due to poor performance from previous purchases, insufficient promotion, demonstration, long distances to input supply centres and inappropriateness of available inputs, particularly fertilizer.

The outcomes of the study is a draft report containing a five-year activity plan and budgets to address constraints and weaknesses under the four result areas - development of appropriate technologies and innovations; decision-making options for policy, institutions and markets; strengthening and coordinating sub-regional agricultural research system and meeting demands for agricultural knowledge from clients facilitated. In addition, an implementing mechanisms and partnership arrangements have been proposed. The enormous opportunities offered by both the private and public sector actors, present valuable means for achieving objectives of the Staple Crops Programme. The effective implementation of the anticipated action plan emerging from the survey and the workshop should lead to the realization of substantial kick-off growth indications by 2013, which should be evidence of an optimism to achieve a significant contribution to the 6% productivity growth by 2016.

## CORAF/WECARD PROFILE

The *Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles*/West and Central African Council for Agricultural Research and Development [CORAF/WECARD] was established in 1987 as conference for African and French Agronomic Research Directors. In 1995 it widened its coverage to include English and Portuguese speaking countries of West and Central Africa. It comprises 21 member states<sup>1</sup> including Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Cote D'Ivoire, Democratic Republic of Congo, Gabon, The Gambia, Ghana, Guinea, Guinea Bissau, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo. The land area is 11.5 millions km<sup>2</sup> and the population is 318 millions out of which 65% are engaged in agriculture.



### **CORAF/WECARD VISION**

*"...A sustainable reduction in poverty and food insecurity in WCA through an increase in agricultural-led economic growth and sustainable improvement of key aspects of the agricultural research system..."*

### **CORAF/WECARD MISSION**

*"...Sustainable improvements to the productivity competitiveness, and markets of the agricultural system in West and Central Africa by meeting the key demands of the sub-regional research system as expressed by target groups..."*

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<sup>1</sup> Liberia, Equatorial Guinea and Sao Tome are also likely to become members within the medium-term.

## 1. INTRODUCTION

CORAF/WECARD is constituted of 21 member countries in West and Central Africa with a total population of over 318 million people, most of who (60-70%) depend on agriculture as a source of livelihood. Despite a rich agricultural base of the sub-region, majority of the inhabitants, classified as small-holders, still live below the poverty line as defined by the United Nations (Figure 1). This is because, agricultural productivity growth in the sub-region, which is the key determinant of economic growth has not performed to the expectations of the people who depend on the sector. Indeed, the agricultural productivity growth in the sub-region has been as slow as 2.5% over the past 35 years, which has consequently affected the livelihoods of the fast growing population (at 3.1%). The large gap that exist between potential yields and the current yield, as well as the growing demands from the increasing urban population, growing industrialization, regional integration and globalization of markets present an opportunity for raising outputs of most small farmers and thereby increasing rural family incomes and improving food security.

In this vein, the African Union – NEPAD’s continental initiative on agriculture, the Comprehensive Africa Agriculture Development Program (CAADP), endorsed by the African heads of State and Governments<sup>2</sup>, is being implemented to achieve significant economic growth. The primary goal of this initiative is *... agriculture-led development that eliminates hunger, reduces poverty and food insecurity, opening the way for export expansion.*

The CAADP **targets** serve to reinforce this primary objective as follows: (1) Improve the productivity of agriculture to attain an average annual growth rate of 6 percent, with particular attention to small-scale farmers, especially focusing on women; (2) Have dynamic agricultural markets within countries and between regions; (3) Have integrated farmers into the market economy and have improved access to markets to become a net exporter of agriculture products; (4) Achieve a more equitable distribution of wealth; (5) Be a strategic player in agricultural science and technology development; and (6) Practice environmentally sound production methods and have a culture of sustainable management of the natural resource base.

The four main **Pillars** which support the entire Programme are: Pillar I - Extending the area under sustainable land management and reliable water control systems; Pillar II - Improving rural infrastructure and trade related capacities for market accesses; Pillar III- Increasing food supply, reduce hunger, and improve responses to food emergency crises; and *Pillar IV - Improving agriculture research, technology dissemination and adoption* [NEPAD, 2003]

CORAF/WECARD has been formally mandated to lead the implementation of the **Pillar IV** of CAADP on agricultural research, technology dissemination and adoption by the Regional Economic Communities (RECs). These are the Economic Community of West African States (ECOWAS), the Economic and Monetary Union of West Africa (*Union Economique et Monétaire Ouest Africaine* - UEMOA) and the Central African Economic

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<sup>2</sup> NEPAD: Comprehensive Africa Agriculture Development Programme. Midrand, South Africa. August 2002. 142pp

and Monetary Community (*Communauté Economique et Monétaire de l'Afrique Centrale* -CEMAC).

Its Strategic Plan (2007-2016) and Operational Plan (2007-2011) therefore responds to the objectives of CAADP and the Framework for African Agricultural Productivity (FAAP) in contributing to achieve the 6% annual growth in agricultural productivity by 2016. The specific objective of the strategic plan is ....***broad-based agricultural productivity, competitiveness and markets sustainably improved.***

Through the implementation of a 10-year strategy and five-year operational plans the following four results will be achieved at the end of five years: (i) appropriate technologies and innovations developed; (ii) strategic decision-making options for policy, institutions and markets developed; (iii) sub-regional agricultural research system strengthened and coordinated; and (iv) demand for agricultural knowledge from clients facilitated and met.

The basis of these plans stemmed from an IFPRI commissioned study, which revealed significant potentials of priority agricultural commodities within the sub-region to achieve the desired targets. This was followed by series of stakeholders' consultations which resulted in prioritization of interventions to achieve the specific objective. In view of this, the operational plan rationalizes the sub-regional agricultural system into 8 programs to address technical and cross-cutting constraints that will stimulate growth as follows: (1) Livestock, aquaculture and fisheries, (2) Staple crops, (3) Non-staple crops, (4) Natural resource management, (5) Biotechnology and bio-safety, (6) Policy, markets and trade, (7) Knowledge management and (8) Capacity strengthening and coordination. The central theme of the plans is ***Producers and users of technology at the center of research.*** The eight programs directly contribute to the CAADP Pillar 4 as well as to the RECs' productivity programs - the West Africa Agricultural Productivity Program (WAAPP; ECOWAP, 2002), and the Central Africa Agricultural Productivity Program (CAAPP; CEMAC, 2002).

Priority staple crops have been identified as roots and tubers, rice, the traditional grains (maize, sorghum and millet), plantain/banana the pulses and oil crops (including cowpea and groundnut; Table 1). The economic contributions of these within the next 10 year have been determined to be: cassava - US\$ 4.7 billion; yam - US\$1.8 billion; Rice – US\$ 6.8 billion; Maize - US\$ 2.5 billion; Sorghum - US\$ 2.4 billion; Millet - US\$ 1.6; Cowpea - US\$ 380 million, and groundnuts - US\$ 3.4 billion. Cross-cutting priorities to create the necessary environment for growth are market, trade, policy, institutions and harmonization. Generally, roots and tubers would contribute 17% to the projected WCA total agricultural growth where it ranks 1<sup>st</sup> among the eight most important commodities. Specifically this would contribute 17 and 20% to the projected growth of the Coastal and Central zones where it ranks 1<sup>st</sup> and 2<sup>nd</sup> respectively.

The contribution of rice to the total agricultural growth in the sub-region is 15.2%. Rice ranks 3<sup>rd</sup> in its contribution to the total agricultural growth in WCA and 2<sup>nd</sup> in the Sahelian and the Coastal zones. The contribution of rice to the total agricultural growth in the Sahelian zone is 16.3% (US\$ 1.2 billion economic benefit) and 17% (with US\$ 5.3 billion economic benefit) in the Coastal zone. In WCA, maize, sorghum and millet contribute 5.8% to the total agricultural growth, ranking 6<sup>th</sup> among the major

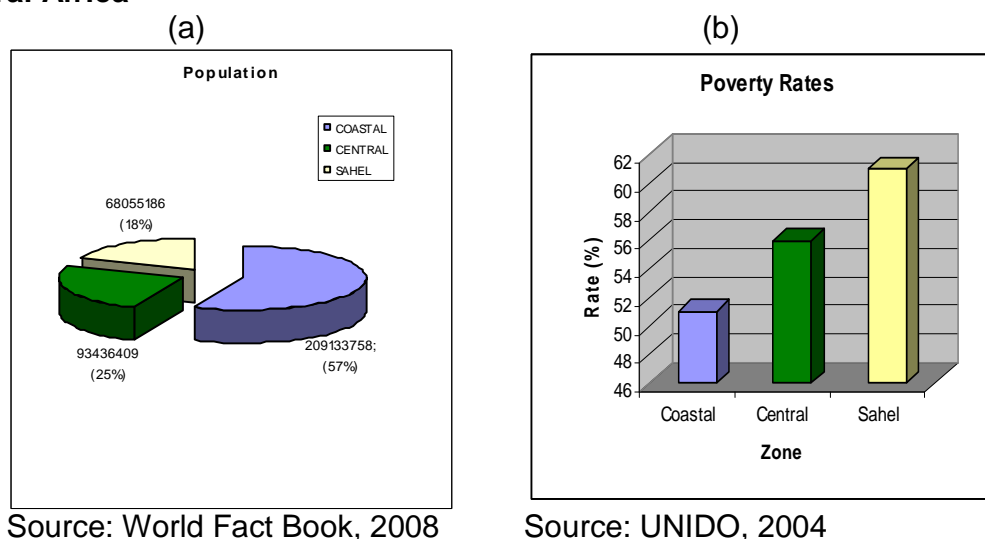
commodities in this regard. In the Central Africa zone, producer benefit of maize stands at US\$ 730 million, ranking 2<sup>nd</sup> among the important commodities. The pulses and oil seeds would contribute 8.7% of the projected WCA total agricultural growth and ranks 5 among the important commodities. They would contribute 11.6% of the projected Sahelian total growth, where they rank 4<sup>th</sup> among the important commodities. In addition, plantain/banana will also contribute significantly to the Coastal and Central African economies.

Thus, a potential of at least \$20 billion exists in the staple crops sub-sector within West and Central Africa to support economic growth within the next 10 years. Contributions of some key staple crops to the economies in the sub-region are presented in Table 1. It would however, need innovative approaches and strategies to harness this to achieve targets.

Therefore, through a sector approach and matrix process, the Staple Crops Program aims to create conducive environment for cooperation between all the stakeholders working on the major staple crops in view of: (a) capitalizing on these potentials to increase sustainable food production and income generation in West and Central Africa, (b) facilitating access to agricultural inputs (particularly, seed and fertilizer) by producers and (c) modernizing the sector through the promotion of the development and dissemination of appropriate technologies and innovations adapted to the needs of target groups. The next critical and perhaps the most important task which followed the development of the strategic and operational plans, was that of identifying key research and development constraints and priorities, which if addressed could significantly harness the potential of staple crops to significantly contribute to the achievement of the 6% growth target.

The study was planned to identify areas of priority investments which will contribute the highest towards the achievement of this target, through a consultative process with key relevant organizations and stakeholders (CG Centers, NARS, Agricultural Extension Agents, NGOs producer and trader organizations, agricultural input dealers and agro-processors).

**Figure 1 Population and poverty rates in the three agro-ecological zones of West and Central Africa**



**Objectives of the survey:** The general objective of the study was to identify in a consultative process the most constraining elements in the staple crops value-chains, which if adequately addressed during the next five years will significantly improve the food security situation and incomes of smallholder farmers and agro-based industries. The outcomes of this study serves as vital inputs for a 5-year (2007-2011) Action Plan (Roadmap) that will help direct research and development investments in the staple crops sub-sector.

Specifically, the field study aimed to:

(i) consult key partners: private sector (industry, enterprises, processors, marketing groups, FBOs,), public sector (CG centres, NARS, Extension) and NGOs to identify possible constraints and needs of end-users, as well as existing opportunities, research gaps in improving the staple crop value-chain continuums, which will form the basis for determining priority investments for the next five years,

(2) prioritize sub-regional research for development opportunities that would add value to national programs, based on the results of the IFPRI study and

(3) identify possible partnership arrangement for the implementation of the different activities and propose networking mechanisms to link the different actors for effective collaboration in the implementation of activities.

**Table 1: Contributions (%) of some staple crops to total agricultural growth in West and Central Africa**

Country	Roots & Tubers	Rice	Other Cereals			Legumes
			Maize	Sorghum	Millet	
<b>The Coastal zone</b>						
1. Benin	28.1					
2. C. D'Ivoire		9.9				
3. Ghana	22.1					
4. Nigeria	21.2	12.8	7.1			9.5
5. S. Leone		35.5				9.6
6. Togo	34.1		5.4			
7. Guinea		32.9				13.0
<b>The Central zone</b>						
8. Cameroon	9.7					
9. CAR	16.7					9.6
10. Congo	27.0					9.4
11 DR Congo	30.4					9.3
12. Gabon	17.9					
<b>The Sahelian zone</b>						
13. B. Faso			17.8			13.6
14. Chad			7.3			14.0
15. Gambia			19.2			37.3
16. G. Bissau		19.5				
17. Mali		21.8	11.7			
18. Mauritania		18.6				
19. Niger			11.3			16.4
20. Senegal		12.0	11.7			14.7

Source: IFPRI 2006

### Tasks accomplished

- ❖ The value chain continuum of priority staple crops in the three zones (Costal, Central and the Shahelian) for effective research for development interventions in the light of climate change identified and analyzed;
- ❖ Key areas (technological, climate change, policy, markets, capacity, institutional, etc) for support under a competitive grant schemes outlined;
- ❖ A mechanism to operate each activity in the context of IAR4D in holistic and integrated manner proposed;
- ❖ Organizational and institutional arrangements for key partners (in technology generation, production, markets, inputs, processing, etc) in the Staple Crops Program and roles proposed;
- ❖ Opportunities in the existing CORAF/WECARD projects and networks for the Staple Crops Program proposed;
- ❖ A detailed operational mechanism (a 5-year action plan) with a monitoring and evaluation system, a full budget on set of activities and partnership arrangements for the implementation of the Staple Crops Program for the period 2007-2011 prepared.
- ❖ The outcome of the study in a consultative workshop involving key stakeholders in Staple Crops is to be validated.

**Output of the Survey:** The output of these processes is a detailed validated action plan, highlighting the key constraints of producers and the private sector operators. It contains activity work-plans, partnership arrangements, capacity strengthening needs, existing opportunities, budgets and other relevant information for the implementation of the Staple Crops Program in West and Central Africa during the next five years. This forms the basis of developing Competitive and Commissioned Research Grant Projects which will be launched to enable Research Teams compete for funds to address constraints to the growth of the staple crops sub-sector.

## 2. THE SURVEY METHODOLOGY AND PROCESS

The survey provided an opportunity to visit value-chain actors' communities, centres or locations to learn of their priority constraints and needs, which when addressed could significantly improve productivity and market competitiveness. Thus in addition to producer, processor and marketing organizations, the study covered service providers (agri-inputs organizations, NGOs and extension service). In addition, six research institutions from the six countries, as well as the CGIAR and base centres in the sub-region (ICRISAT, WARDA, IITA and CARBAP) were covered. This offered another opportunity to learn of the opportunities the research organizations offer and their needs to improve performance in addressing anticipated constraints of producers, processors and marketers. Before the field visits, a concept note was developed (Appendix 1), which provided the background, objectives and expected outcomes of the study and firstly forwarded to partner CG Centres, NARIs and NGOs (IFDC and SG2000) in the six countries. The NARIs and the NGOs identified one National Focal Person who in turn helped identify groups and organizations which accurately represented the actors in the value-chain continuum for the interactive interviews. Objectives of the study were explained to the actors and appointments confirmed with them based on a tentative itinerary.

To ensure uniformity in responses by stakeholders, an open-ended questionnaire was designed (Appendix 2) at the CORAF/WECARD Secretariat and firstly tested in Ghana. This was administered to two research programs (yam and plantain) of the CSIR – Crops Research Institute (CSIR-CRI), one extension project on roots and tubers, (Roots and Tuber Improvement and Marketing Programme - RTIMP) of the Ministry of Food and Agriculture (MOFA), one public sector Foundation Seed Organization (Grains and Legumes Development Board) and one private sector Agri-inputs Enterprise, OBEK Agro-Services Ltd.

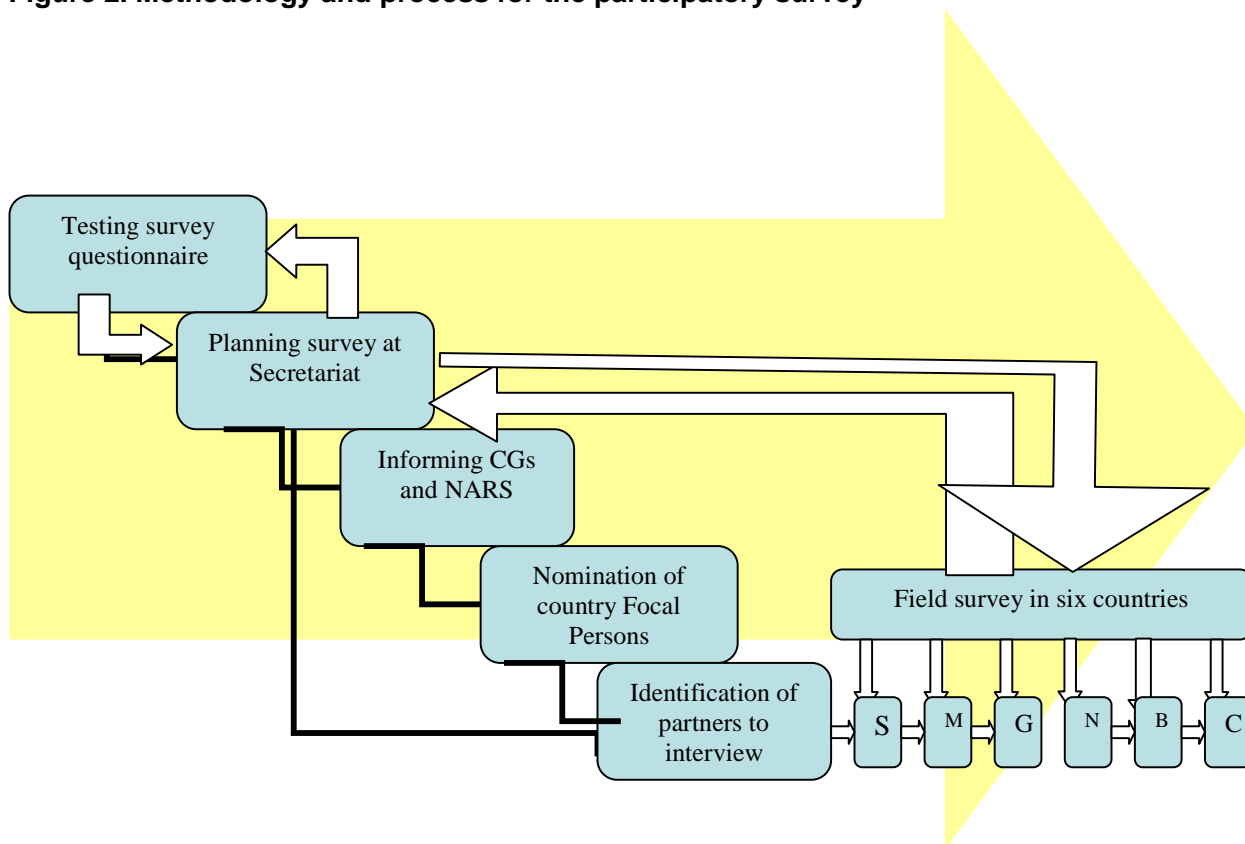
First set of questionnaires were administered in Senegal and the outcomes discussed at the Secretariat; further inputs were given before continuing in the remaining five countries. The study took place from 15<sup>th</sup> January to 29<sup>th</sup> February (Appendix 3). This covered two countries in the Sahelian zone (Senegal and Mali), three countries in the Coastal zone (Ghana, Benin and Nigeria) and one country in the Central African zone (Cameroon); five days were spent in each country. Between 10 and 16 value-chain actors were visited in each country and in all, 72 partners represented by 217 persons were met (Table 2). Twenty-two programmes were contacted within the six NARIs and nine within the CG and the base centres. Contacts of the Leaders of the organizations and departments are presented in Appendix 4. Due to civil unrest that occurred in Cameroon at the time of the study, less than a half of the target partners could be contacted. The focal person was thus, requested to administer the remaining questionnaires.

Responses of partner organizations were given by focal groups who numbered between 5 and 20 members per organization. Although memberships of some producer and processor groups were as high as 10 - 85 village communities and in some cases over 3000 membership, the study was limited to their representatives. The open-ended nature of the questionnaire allowed actors to freely provide as much information as

possible without restrictions. Key questions asked included their focal area and activities in the value-chain continuum, major constraints, opportunities they offer, partners involved in their activities, clients of their products or services and needs to improve upon performance. Responses received from actors, service providers and research organizations covered broad issues on germplasm, soil fertility, production technology and transfer, processing technology and transfer, input supply, climate change, irrigation, credit delivery, supply of raw material, trade and marketing, policy, communication and information, capacity strengthening and land tenure systems.

Information collected from the field, were collated at the CORAF/WECARD secretariat. For each factor, the frequency of occurrence of response to a particular factor (or variable) in each country, zone and the sub-region was calculated and converted into percentages for statistical analyses to detect differences. In addition, a SWOT analyses was carried out to determine the strengths, weaknesses, opportunities and threats of each actor in the value chain continuum, including NGOs, Extension and Research. Follow-up communications were carried out to receive extra information and to further clarify issues. The survey methodology and process are demonstrated in Figure 2.

**Figure 2. Methodology and process for the participatory survey**



**Table 2. Countries, kind of actors met and their representation at the survey**

	Countries						No. of Partners	No. of Respondents
	Senegal	Mali	Ghana	Benin	Nigeria	Cameroon		
1. CG Centres/Base Centres		√		√	√	√	4 (6%)	15 (7%)
2. NARIs	√	√	√	√	√	√	6 (8%)	34 (16%)
3. Extension Service/Projects	√	√	√	√	√	√	6 (8%)	8 (4%)
4. NGOs Production/Marketing	√	√	√	√	√		8 (11%)	25 (12%)
5. Agri-Input Organizations	√	√	√	√	√	√	9 (13%)	20 (9%)
6. Producer Groups/Organizations	√	√	√	√	√	√	19 (26%)	70 (32%)
7. Marketing Groups	√	√	√	√	√		6 (8%)	17 (8%)
8. Agro-Processing Groups	√	√	√	√	√	√	14 (19%)	28 (13%)
Total							72(100%)	217 (100%)

### 3. OBSERVATIONS AND FINDINGS

In general, the objectives of the field study were successfully achieved in five countries. In Cameroon, however, about half of the target partners were contacted; the shortfall was due to a nation-wide unrest at the time of the visit, which made it impossible to travel to partners' locations. It is however expected that partners there will administer the remaining questionnaires through the Focal Person and forward them to the CORAF/WECARD secretariat to provide additional information on roots and tubers and plantain. Partners identified in the remaining five countries were met; at institutions where the heads were not available, representatives were informed of the appointments, which were honoured. Receptions were cordial, enthusiasm was high and information required was willingly given.

#### **3.1. Identification and Analyses of the Value-Chain Continuum**

Ranking of constraints of producer groups, processors/marketing and agri-inputs organizations from these analyses have been summarized in Table 3a, 3b and 3c respectively. Also, prioritized constraining factors to the growth of the staple crops sub-sector as perceived by value-chain actors in the Sahelian, Coastal and Central Zones have also been summarized in Table 4. In addition, strengths, weaknesses, opportunities and threats (SWOT) analyses of all value chain actors have been presented in Tables 5a – 5f. The needs and expectations of value-chain actors in cereals, legumes and roots and tubers are given in Table 6. Work plans and budgets for each of the 4 result areas are presented in Annex 1a to 1d and the CORAF/WECARD Competitive Fund Manual presented in Annex 2. Statistically analyzed information from the responses of all the value-chain organizations on constraints and needs of value chain actors in the six countries are presented in Annex 3a to 3d.

##### **3.1.1. Constraints and needs of producers**

This section will analytically discuss the constraints and needs of producers, processors, agri-input dealers and marketers, which will give an input for the development of themes for the competitive grant and commissioned research projects.

**3.1.1.1. The West and Central African Sub-region:** The sub-region, which comprises three main zones, namely the Sahelian, the Coastal and the Central zones is constituted of 8 countries each in the Sahelian and the Coastal zones and 5 countries in the Central zone. Whilst the Sahelian countries predominantly produce and market cereals and legumes (rice, maize, sorghum and millet, cowpea, groundnuts, soybean, etc.), the Coastal and the Central zones produce and market mostly roots and tubers, plantain, maize and rice and to a relatively lesser extent sorghum, millet, cowpea, groundnuts and soybean.

Out of 18 constraining factors of producer organizations, the five most important ones are considered to be inadequate access to credit (which constitutes 12.7% of the total responses given), insufficient access to seed and planting material (11.5), insufficient access to the output market (9.8%), production technology and machinery (9.4) as well as weak producer capacity (8.4; Tables 3a and 4). Next to these are insufficient access to fertilizer (7.2), weak extension services (7.0%) poor animation of groups (6.4), the effect of climate change (5.0%)

and poor storage technologies (4.7%). Other important constraints are low access to irrigation and processing equipment and poor soil fertility.

Producers' constraints grouped into technological and enabling environment (Box 1; Figure 3), act in various combinations in their contributions to the decline in agricultural productivity. Seven most important technological constraints are considered to be insufficient access to seed and planting material (11.5%), inadequate production technology and machinery (9.4%), insufficient access to fertilizer (7.2%) and the effect of climate change (5.0%). In addition, poor storage systems (4.7%) poor soil fertility (3.9) and low access to irrigation facilities (3.4%) are seen as constraining. Although farmers' responses show such a decreasing order in terms of needs, they see all these technological constraints as very important, which need to be addressed systematically.

**Table 3a. Responses (%) of Producer Organizations to Constraining Factors to Growth of the Cereals & Legumes and Roots & Tubers in Six Countries in WCA**

Rank	Constraining Factors	Sahelian Zone - WA		Coastal Zone - WA		Cameroon	Mean
		Cereals	Legumes	Cereals	R&T	CA R & T	
1	Credit Management	8.3	17.4	10.5	14.7	12.5	12.7
2	Seed Supply	11.1	13.0	10.5	14.7	8.3	11.5
3	Marketing	11.1	13.0	7.9	5.9	12.5	9.8
4	Prod 'n Tech/Machinery	5.5	13.0	5.3	14.7	8.3	9.4
5	Capacity strengthening	8.3	8.7	7.9	8.8	8.3	8.4
6	Fertilizer Supply	13.9	4.3	7.9	5.9	4.2	7.2
7	Technology Transfer	2.7	13.0	5.3	5.9	8.3	7.0
8	Group Animation	5.5	4.3	7.9	5.9	8.3	6.4
9	Climate Change/Drought	2.7	8.7	7.9	5.9	0.0	5.0
10	Storage	2.7	4.3	5.3	2.9	8.3	4.7
11	Processing/Utilization Equip't	8.3	0.0	5.3	0.0	8.3	4.4
12	Soil Fertility	2.7	4.3	5.3	2.9	4.2	3.9
13	Irrigation	5.6	0.0	5.3	5.9	0.0	3.4
14	Communication/Info	2.7	4.3	2.6	0.0	0.0	1.9
15	Processing Technology	0.0	4.3	0.0	0.0	4.2	1.7
16	Germplasm	2.7	0.0	2.6	2.9	0.0	1.6
17	Policy	2.7	0.0	2.6	0.0	0.0	1.1
18	Land Tenure	2.7	0.0	0.0	2.9	0.0	1.1
19	Raw material	0.0	0.0	0.0	0.0	0.0	0.0
20	Cross-Border Trade	0.0	0.0	0.0	0.0	0.0	0.0
<b>ST. DEV</b>		<b>2.3</b>	<b>2.2</b>	<b>2.1</b>	<b>2.1</b>	<b>2.0</b>	<b>1.9</b>

Among the enabling environment issues, eight most important constraints include inadequate access to credit (12.7% of total responses), insufficient access to the output market (9.8%), weak producer capacity (8.4%), weak technology transfer system (7.0%) and poor group animation (6.4%). Other constraints are insufficient access to communication and information facilities, as well as unfavorable policies and land tenure systems (Figure 3).

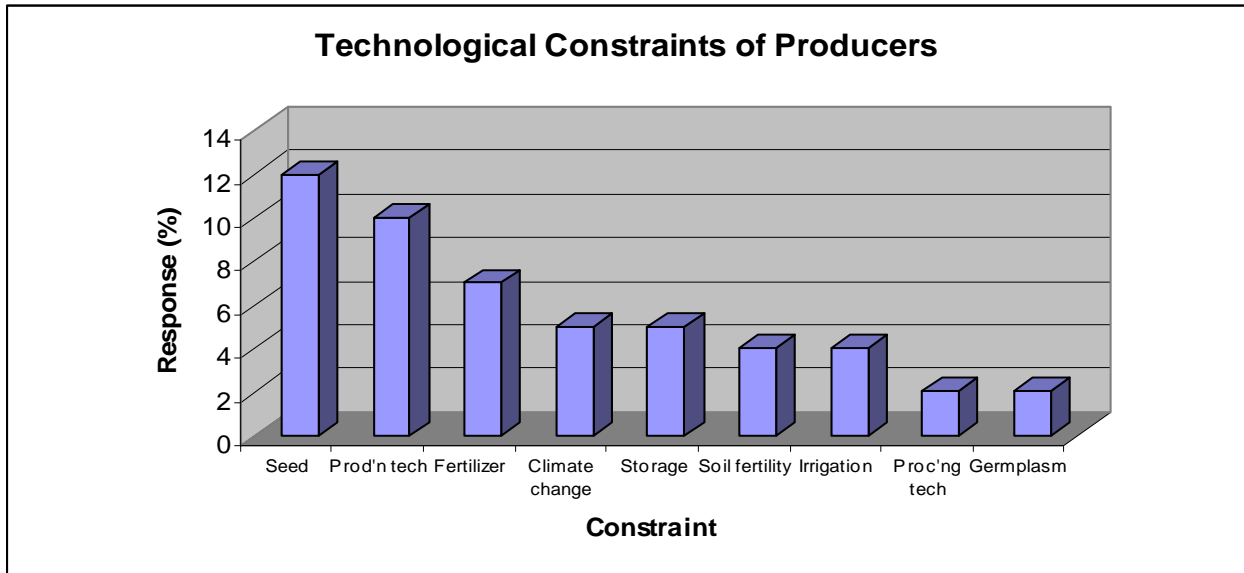
The constraint relating to seed and planting material, which stems from the low levels of certified seeds produced, poor quality of available seeds, perception of high prices and long distances of getting to supply centres is further worsened by the difficulty in acquiring credit to

purchase them. In the case of fertilizer, the problem may be compounded by its inappropriateness in type, since in some cases fertilizers used might have been imported for industrial crops, particularly cotton.

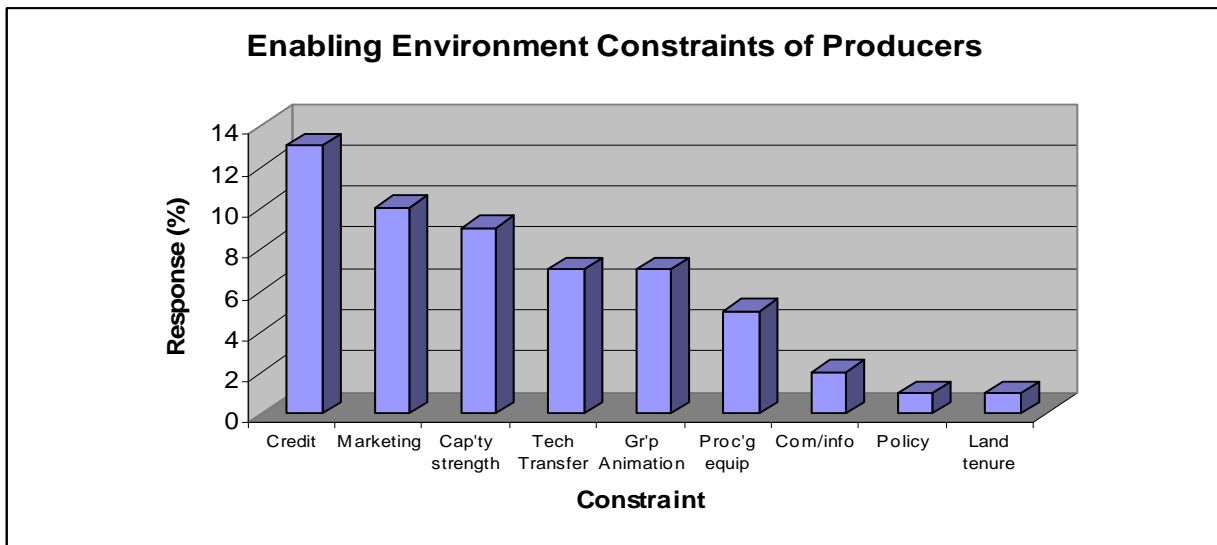
In the light of climate change, Improvement of storage systems to prolong household food reserves, soil water management technologies and irrigation facilities to support dry season cropping are considered desirable to producers. The low access to irrigation frustrates women's quest to cultivate vegetables during the long dry season and therefore deny them extra incomes. Where irrigation facilities are available to some extent, as in the cases of Mali and Senegal, cereals are also produced in the dry season to improve the food security situation. Thus, in the light of the worsening climate change, increasing development of innovative irrigation and water harvesting technologies, alongside improved storage systems and inventory credit, will further enhance agricultural productivity and improve the food security situation, particularly in the Sahelian zone. The problem of credit acquisition relates to several complications, which may include non-availability, insufficiency, high interest rates, late approvals, demand for non-affordable collaterals, short payback periods, etc. which significantly affect production efficiency. Producers in the sub-region also recognize low access to markets as a serious constraint to increased earnings and therefore rank it third to credit and seed among all constraints. They attribute this to short payback period of credit, which compels them to sell their produce at the time of glut (soon after harvest) when prices are very low. Lack of basic equipment to clean harvested produce, which is also considered a constraint, renders their outputs unattractive and non-competitive; consequently this result in low pricing at the market, leaving them very little to live on and to re-invest in production. Producers see their low capacity, insufficient access to technology and poor animation of their groups as constraints to technology adoption whose solution must be addressed holistically. Farmers, particularly in the Sahelian and the Coastal countries see climate change as increasingly becoming a major threat to food security. Sometimes, this necessitates re-sowing, which put extra stress on the worsened seed situation or may even result in crop failure.

**Figure 3 General constraints of producer groups in West and Central Africa**

(a) Technological constraints



(b) Cross-cutting constraints



**3.1.1.2. The Sahelian Zone (Senegal and Mali):** With the declining prices in cotton on the international market, and with the emergence of Presidential Initiatives in the zone, increasing attention is being given to the cereals and legumes as both food security and income earning commodities. The ten most constraining factors that hamper growth in cereal productivity include inadequate use of fertilizer (13.9%), insufficient access to improved seeds (11.1%) and markets (11.1%), whereas inadequate credit (8.3%), low capacity and lack of processing/utilization equipment followed and rank equal 8.3%. Others are the needs

for irrigation facilities, as well as production technology and group animation which received similar responses (Table 3a).

The most important technological constraints to cereal productivity are inadequate use of fertilizer (receiving 13.9% of total responses), insufficient access to improved seeds (11.1%) and insufficient access to irrigation (5.6%). Others are effect of climate change, poor storage systems and low soil fertility, which received responses of 2.7% each (Box 1; Figure 4). Thus, inadequate technologies as expressed by producers, in the light of the weak extension system, deny them of good technologies available. Inadequate access to credit to purchase inputs, low quality and insufficient supply of inputs, perception of high prices and long distances to input centres are seen to be constraining to the adoption of improved technologies.

With regards to enabling environment, constraints are related to low access to market (11.1), credit (8.3%) and processing equipment (8.3%). Additionally, insufficient group animation (5.5%), as well as weak technology transfer system, low access to communication and information systems, unfavorable policy and land tenure systems constitute important constraints, each receiving 2.7% of the total responses. Whilst the situation in grain legumes may be similar to that of cereals, inadequate access to seed supply, production technologies and machinery rank high (with each receiving 13.0% response; Table 3a), followed by fertilizer, storage and soil fertility, which all rank third (4.3%). Among enabling environment constraints for grain legume, insufficient access to credit facility ranks highest (17.4%), followed by inadequate access to markets (13.0) and poor group animation (4.3%).

Thus producers in the Sahelian zone recognize access to quality agricultural inputs as a prerequisite and crucial to the attainment of increased agricultural productivity. Improvements in input supply, soil fertility, stresses (biotic and abiotic) tolerances and innovations to mitigate the effects of climate change are considered vital in their quest to improve crop productivity. However, low access to technology, which stems from the weak technology transfer system, makes it difficult to gain access to new varieties and integrated crop management technologies.

In their quest to bridge the hunger gap which originates from the long dry season, producers see access to irrigation as an opportunity for off-season production to bridge this gap and to produce vegetables for supplementary incomes, particularly women. In addition to irrigation, improved storage systems in their view will help prolong house-hold food security and help them hold stocks for better prices. The declining productivity is being aggravated by climate change which may be manifested in erratic or insufficient rains. This sometimes calls for re-seeding in the light of scarcity of seeds or may result in crop failure. They see climate change to be gaining increasingly importance, which necessitates their quest for irrigation facilities to avoid crop losses. The recognition of low soil fertility is a manifestation that apart from gaining access to fertilizer, producers are also mindful of natural resource degradation, which calls for innovative interventions to upscale exiting technologies in integrated soil fertility and natural resource management systems to enhance crop productivity.

Cereal producers feel that germplasm available to them presently do not meet the expectation of their clients, particularly processors. For example the processor clients of a farmer group in Mali, *Cooperative Dianton Yerela* look for millet and sorghum varieties that yield higher flour upon processing. The processors believe that longer duration varieties could have given the farmers the desired qualities they look for. Unfortunately the producers are located in a zone with a very short rainfall season, and can only grow cereals of shorter durations. Irrespective

of these arguments, the bases of it all, is that they need appropriate varieties to address their constraints. In addition to variety, these producers have additional constraint by being disenfranchised from getting credit. The credit institutions feel that the low rainfall being received by these communities put them at risk for credit payment. Thus, in addition to other needs, access to adapted varieties, addressing climate change constraints and linkages to credit sources are expressed as major needs to improve crop productivity.

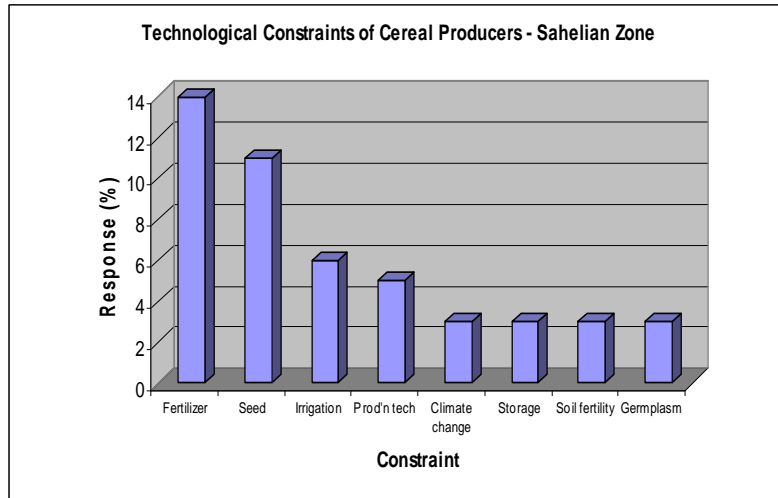
Therefore access to good markets and acquisition of credit are important in ensuring farmers liquidity to invest in agricultural productivity technologies. Innovative systems to improve producer access to credit will need pursuance. Any innovation to address this, may take into consideration women farmers, who may be disenfranchised due to demand for valuable properties as collaterals and the situation of *Cooperative Dianton Yerela*. These instances, among others, give good insight and understanding of producers' concerns and provide clues in finding solutions to constraints relating to credit acquisition.

In addressing marketing constraints, producers see their access to affordable farmer-friendly processing (cleaning) equipment as crucial for improving market quality of their produce for increased earnings. Their enhanced ability to store produce and wait for better prices will help increase their incomes in addition to improving food security; however this depends largely on access to improved storage systems and inventory credit. The concerns expressed by producers for improvement in market information systems is to enable them identify markets of good prices. Producers' concern of unfavorable policies, particularly in the light of cereal imports to the detriment of local efforts as well as insufficient support for groundnut marketing systems, further calls for innovative solutions to marketing bottlenecks.

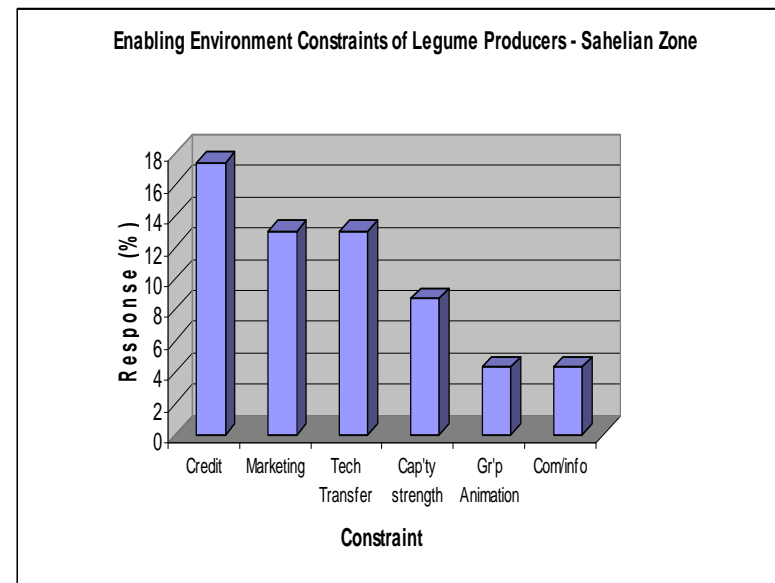
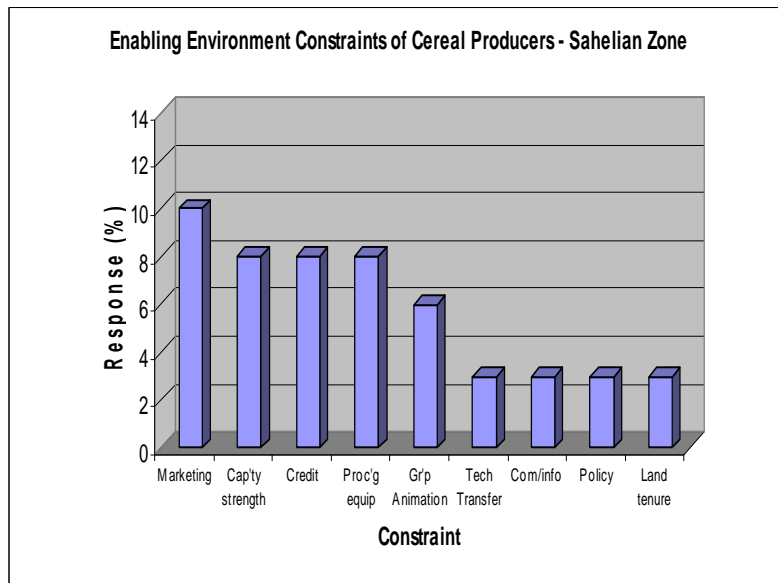
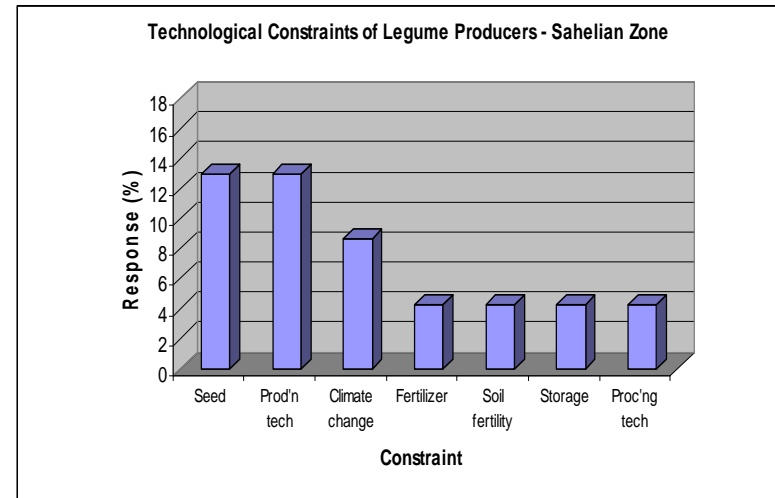
Producers' recognition of weak access to technology calls for innovative strategies to address the technology transfer system. In fact their quest for capacity strengthening is related to the need for the enhancements of their abilities to adopt new technologies and share information among group members. Judging from the potentials of members of producer groups and organizations, some of who hold degrees and diplomas, the possibility exists for empowering them to carry out intra-group technology transfer to augment the efforts to the national extension systems. In this regard, producers see the need for group and association animation as additional means to enhance their capacities to share technological information and foster linkages.

**Figure 4 Constraints of cereal and legume producer groups in the Sahelian zone showing order of responses**

**(a) Constraints of Cereal Producer Groups**



**(b) Constraints of Legume Producer Groups**



**3.1.1.3. The Coastal Zone (Ghana, Benin and Nigeria):** The most constraining factors to cereal production in the Coastal zone include insufficient access to seed and credit with both ranking first and each scoring 10.5% of the total responses of producer groups (Table 3a and 4). Next to these are low access to fertilizer and markets, as well as low capacity, insufficient group animation and climate change, each scoring 7.9% of total responses. In addition, insufficient production technology and farm machinery, processing equipment and irrigation facility are constraints which need interventions.

Technological constraints include insufficient access to seed, which ranks first and received 10.5% of the total responses, low access to fertilizer (7.9%) and climate change (7.7%; Box 2). In addition, insufficient production technology and farm machinery, irrigation facility and poor soil fertility which all received 5.3% of total responses are further constraints which requiring various interventions to address them.

In relation to inputs, the situation is similar to the general trends in the sub-region. Thus, the inputs may not be available, accessible or affordable as perceived by many producers. The formulation of fertilizers imported, at times may not be desirable for staple crop production. In this regard, fertilizers formulated for cotton production are seen to be used on staple crops which are inappropriate in achieving the expected crop performance. Nevertheless, the well organized input supply system for cotton in Benin is worthy of emulation. In this vein, an organization, *Cooperative D'approvisionnement de Gestion des Intrants Agricole du Benin* links producer groups to fertilizer importing companies and credit organizations in an effort to optimize the yield of cotton. The needs of producers are collated and forwarded to the fertilizer companies for supply. The enhanced animation of this association, with well organized credit management systems from the village to the national level, facilitates producers' access to credit and inputs. Although this facility is extended to staple crops, such as maize to a limited extent to ensure that cotton farmers meet their food requirements, the cooperative coordinator sees the staple crop sub-sector in general as poorly organized to benefit from such an arrangement.

With high recognition of climate change, producers feel that access to irrigation facilities, particularly during the minor and the dry seasons is necessary in improving food security. Production technology and simple farm machinery for land preparation and harvesting are considered important. Although farmers have high priority constraints, which they consider critical, they feel other factors with lower rankings are also important in creating the necessary physical and policy environments for increased crop productivity.

Enabling environment constraints are related to low access to credit (10.5) and markets (7.9%) which rank highest among others such as low capacity and poor group animation (7.9%). Credit again constitutes an important factor for enhancing producers' liquidity to invest in agri-inputs and farm operations. Producers see their capacity to adopt technologies and innovation as low; furthermore, they feel that group coherence which provides opportunities for sharing technical information and fostering linkages to markets and credit sources are weak and therefore need strengthening. In fact, intra-group technology transfer is gaining importance among producers, which calls for the need to strengthen group capacity to transfer technology among members. This could augment the effort of the agricultural extension system, which is now seen by producers as weak. In this vein, whilst farmer-extension ratio stands at 1:900 in Nigeria it stands at 1:1800 in Ghana, which demonstrates

the weakness in the technology transfer system. Again, processing equipment to improve the market value of produce, and linkages to markets are seen to be vital.

<b>Box 1 Responses (%) to Constraints of Producer Groups in the Coastal Zone</b>					
<b>Technological Constraints</b>			<b>Enabling Environment Constraints</b>		
<b>Factor</b>	<b>Cereals (%)</b>	<b>Roots &amp; Tubers (%)</b>	<b>Factor</b>	<b>Cereals (%)</b>	<b>Roots &amp; Tuber (%)</b>
Seed and planting material	10.5 a	14.7 a	Credit	10.5 a	14.7 a
Fertilizer	7.9 b	5.9 b	Marketing	7.9 b	5.9 c
Climate change	7.7 b	5.9 b	Capacity strengthening	7.9 b	8.8 b
Production technology and machinery	5.3 c	14.7 a	Group animation	7.9 b	5.9 c
Storage	5.3 c	2.9 c	Technology transfer	5.3 c	5.9 c
Soil fertility	5.3 c	2.9 c	Processing equipment	5.3 c	0.0
Irrigation	5.3 c	5.9 b	Communication/ information	2.6 d	0.0
Germplasm	2.6 d	2.9 c	Policy	2.6 d	0.0

Numbers in the same column followed by similar letters are not significantly different at 0.05 level of personality – DMRT

With regards to roots and tubers (cassava, yam, sweet potato and cocoyam), access to planting material (14.7), production technology and farm machinery (5.9) are critical to cropping success. Whilst formal multiplication systems for root and tuber planting materials are apparently non-existing, farmers continue to spend considerable proportion of their budgets and efforts in acquiring this vital input from informal sources, which most often are unhealthy and less productive. The drudgery and high cost of labour in farm operations are detrimental to the productivity improvements in roots and tuber. This therefore requires innovative approaches to develop appropriate technologies for land preparation, mound-making, staking (in the case of yam) and harvesting. Root and tuber producers also recognize climate change as a problem, which needs interventions and the need for fertilizer as important in the light declining soil fertility which presents another constraint to them.

Thus, the need for credit in the present circumstances, as expressed by producers, is to enable them meet the high cost associated with root and tuber production, particularly yam. In addition, producers also see their capacity to adopt technologies and innovations as low and again link this to poor technology transfer system (5.3) and group incoherence (scoring 8.8%) to facilitate information sharing among themselves. Inadequate access to market, which received 5.9% of the total responses, is related to the production of varieties whose

use may be restricted to industry, giving them little market options and uses when the industry fails them.

Available information on plantains received from Ghana, reveals producers' constraints, which are quite similar to that of roots and tubers. Technologically, lack of facilities for rapid multiplication of planting material, poor handling of harvested bunches and high levels of post-harvest spoilage, particularly during transportation stand out clear as producers' major constraints. In addition to this, lack of irrigation facilities for use in the dry season, which leads to dehydration of plantain stems, rendering them vulnerable to lodging by winds that come at the onset of the rainy season presents a further constraint. The major constraints relating to enabling environment are credit, which stands out once again, as well as high transport charges, low profit margins and poor group coherence to facilitate technology transfer and other linkages. Thus, technological and enabling environment interventions to address these constraints constitute the key needs of plantain producers in the Coastal zone.

**3.1.1.4: The Central zone (Cameroon):** The major staple crops produced in Cameroon include roots and tubers (cassava, yam, cocoyam and sweet potato), plantain and banana, cereals (predominantly maize) and legumes (groundnut and soybean). Most producer groups in the forest areas cultivate mainly roots and tubers and plantain and to some extent, maize.

Insufficient access to seed and planting material supply (8.3%), inadequate production technology and farm-adapted machinery (8.3%) and poor storage systems (8.3%) present key technological constraints to producer groups. Inadequate supply of fertilizer, declining soil fertility and low access to processing technology, which received 4.2% each of the total responses, are further constraints that need interventions (Tables 3a and 4; Figure 5). Thus, similar to other zones, producers in Cameroon see access to planting material and seed as an initial and vital requirement for improving farm level productivity. Being in the humid forest zone, they are beginning to realize the importance of fertilizer, which they now see as a constraint. The need for fertilizer in growing maize in intercrops is therefore increasingly gaining importance in the light of declining soil fertility. Thus, producers, who hitherto did not complain of poor soil fertility, are now seeing it as also a constraint. Again, lack of access to new technologies and farm-adapted equipment to address the existing and emerging constraints have denied them the opportunities of maximizing their potential for enhanced crop productivity. Certain farmer groups in Cameroon which may comprise both men and women, go beyond production to process some farm produce for the community markets; these groups feel the need for new processing technologies that will help them expand such enterprises.

In line with the trends in the Sahelian and the Coastal zones, producer groups see their key constraints in agricultural enabling environment as low access to credit and markets, which rank so high (receiving 12.5 each of the total responses). Access to credit as a constraint is related to acquisition of financial resources to engage labour and acquire basic inputs, particularly seed and planting material. Producers also admit their inability to pay back their loans, bridges their loan contracts, which makes it difficult for acquiring new loans. Their inability to pay back credit may stem from the low income earned from marketing their produce as a result of poor marketing systems and short terms for credit payments.

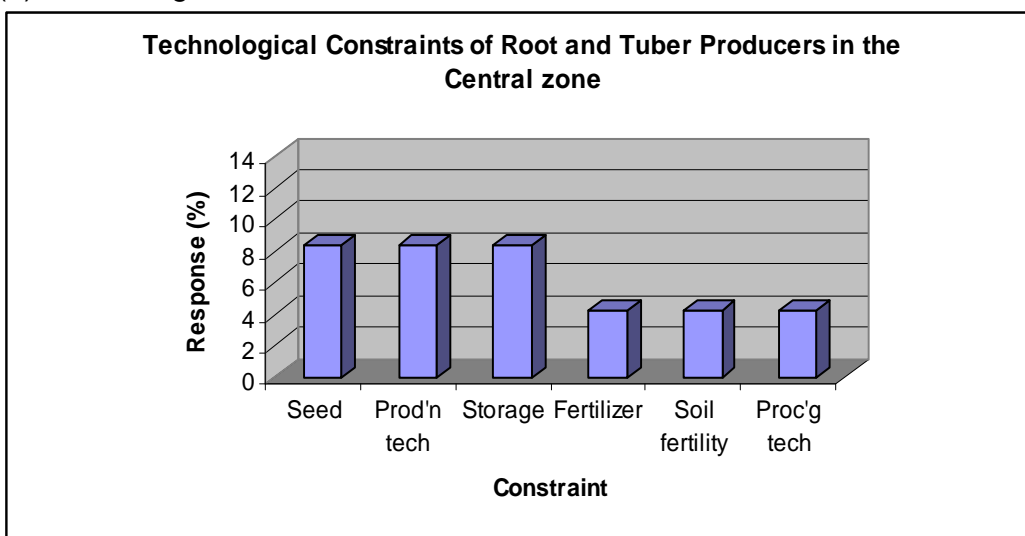
Further to this, poor access to market, which is attributable to the weaknesses in the cohesion of producer groups, breaks their front in bargaining with marketing entrepreneurs. These entrepreneurs therefore take advantage of this to offer low prices, which often, are not paid promptly. Additionally, lack of basic equipment to clean harvested cereals, result in the

reduction of their market value and earnings. In the view of producers, low financial standings of the marketing entrepreneurs, coupled with difficulty in accessing credit, renders these entrepreneurs, either incapable of paying producers or not paying regularly. The poor marketing system is also linked to the poor road networks, which makes it difficult for vehicles to come to the villages. The poor state of vehicles used for carting, which break down very often, also cause severe damages to farm produce and therefore result in significant losses and depreciation in market value.

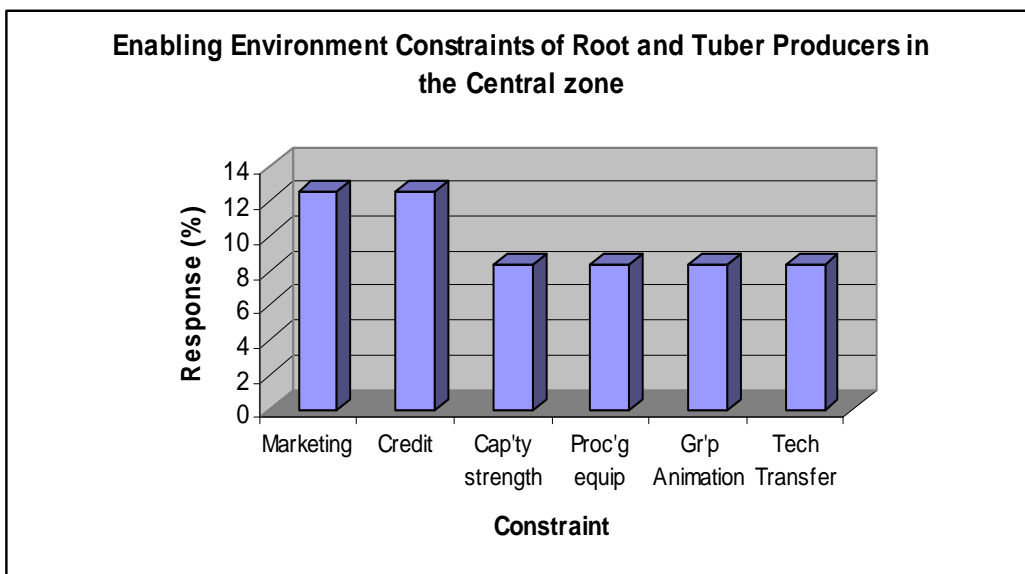
Thus, capacity strengthening, accesses to equipment, technology transfer, credit and market improvements are seen as important incentives for improving crop productivity in the Central zone.

Figure 5 Constraints of producer groups in the Central zone showing order of responses

(a) Technological constraints



(b) Enabling environment constraints



### 3.1.2. Constraints and needs of processing entrepreneurs

**3.1.2.1. The West and Central Africa sub-region:** In the sub-region in general, the processing industry is dominated by two main groups of agri-business entrepreneurs. These are the large scale companies who process farm produce into industrial feed and beverages, and the small-scale women processor groups who process farm produce into house-hold foods (such as couscous, gari, grits, flour, etc.), snacks and pastries. The most constraining factor of both groups are related to inadequate supply of quality raw material (14.4%; Table 3b), which is fast crippling the industry and consequently, the private sector's role as engine of economic growth. Additionally, inadequate access to improved processing equipment (13.9) and low access to credit facilities (12.6%), marketing limitations (12.1%) and insufficient processing technologies (8.5%) are viewed as important constraint that reduces the efficiency of the private sector, particularly women groups. Entrepreneurs see their capacity as low (8.3%) and their storage systems as unsatisfactory (6.0%). Insufficient suitable germplasm to meet the growing consumer needs are also considered a constraint (5.1). Furthermore, these entrepreneurs feel that the technology transfer system has not met their expectation (4.3). In addition, groups and associations see themselves as poorly animated (4.3) with low access to information (3.3).

**Table 3b. Responses (%) of Processing Organizations to Constraining Factors to Growth of Cereal Crops in Six Countries in WCA**

Rank	Constraining Factors	Sahelian Zone - WA		Coastal Zone - WA		Cameroon	Mean
		Cereals	Legumes	Cereals	R&T	CA R&T	
1	Raw Material	14.8	25.0	12.5	7.4	12.5	14.4
3	Processing/utilization Equip't	14.8	18.8	4.2	13.0	18.8	13.9
2	Credit Management	11.1	6.1	16.7	16.7	12.5	12.6
4	Marketing	7.4	12.5	12.5	9.3	18.8	12.1
5	Processing Technology	7.4	18.8	4.2	5.6	6.3	8.5
6	Capacity Strengthening	7.4	6.1	4.2	11.1	12.5	8.3
7	Storage	3.7	6.1	8.3	5.6	6.3	6.0
8	Germplasm	7.4	0.0	4.2	7.4	6.3	5.1
9	Technology Transfer	7.4	6.1	4.2	3.7	0.0	4.3
10	Group Animation	7.4	0.0	4.2	3.7	6.3	4.3
11	Communication/Info	3.7	0.0	8.3	5.6	0.0	3.5
13	Cross-Border Trade	3.7	0.0	12.5	0.0	0.0	3.2
12	Policy	3.7	0.0	4.2	5.6	0.0	2.7
14	Production Tech/Machinery	0.0	0.0	0.0	1.9	0.0	0.4
15	Land Tenure	0.0	0.0	0.0	0.0	0.0	0.0
16	Clim. Change/Drought	0.0	0.0	0.0	0.0	0.0	0.0
17	Soil Fertility	0.0	0.0	0.0	0.0	0.0	0.0
18	Irrigation	0.0	0.0	0.0	0.0	0.0	0.0
19	Seed Supply	0.0	0.0	0.0	0.0	0.0	0.0
20	Fertilizer Supply	0.0	0.0	0.0	0.0	0.0	0.0
<b>ST. DEV</b>		<b>2.1</b>	<b>2.4</b>	<b>2.5</b>	<b>2.6</b>	<b>2.1</b>	<b>2.1</b>

Whereas the constraints with credit are related to both groups, women processing groups are further disenfranchised by demand for valuable forms of collaterals such as ownership of houses and farm lands, which they may lack. Poor quality raw material due to high inert matter content, mycotoxin infections and insect infestation discourages large scale processing agri-businesses such as SEDIMA in Senegal, (whose turnover is 20,000 to

60,000 tons per week) from using local produce whilst opting for imports. Additionally, insufficient supplies due to the long dry season, worsening droughts and floods as a result of climate change, drudgery in harvesting roots and tubers during the dry season, result in interrupted supply and escalated prices during the lean season, which further compel industries to opt for alternative markets outside the region. In the absence of imports, they either produce below capacity or close down their businesses. In view of this, a feed manufacturer in Senegal (*Complexe Avicole de Mbao*), feels that blending cassava flour from the Coastal zone with maize for the formulation of feed will help sustain agri-businesses and also reduce costs and imports. In a similar vein, poultry farmers in Ghana had consulted the CSIR-Crops Research Institute to develop suitable cream-coloured cassava varieties for such a purpose. However, further studies to determine appropriate combinations, the nutritional value of the blend and effect on the performance of poultry may be required. It is worth noting that one women group in Mali (*Coordination de Femmes Transformatrices de Sikasso/Wayerma 1*) do blend 50:50 proportions of sweet potato flour and wheat flour in making pastries without any detectable differences. In Nigeria, a policy to blend 10% cassava flour with wheat flour is fast growing and creating demand for cassava flour, alongside yam flour. Equipment and technology for these emerging industries may however need significant improvements.

Insufficient supply of quality raw material, which directly reflects on the marketing constraints of processors in their inability to meet market demands, therefore underscores the need to improve critical value chain linkages. Undoubtedly, the quality of farm outputs, inventory credit, storage systems, dry season irrigation, farm equipment to reduce drudgery, as well as market linkages would need significant improvements. In addition, lack of basic equipment such as commercial deep fryers, dryers, packaging and labeling facilities, which compels women processors to use poor household equipment, pose a challenge to agricultural engineering. Innovative technologies and appropriate strategies would need to be developed to encourage women processors get access to modern prototypes. Low entrepreneurship capacity, insufficiency of suitable germplasm for processing, as well as inadequate access to processing and preservation technologies, communication and market information systems are major gaps that require various research and development innovations.

**3.1.2.2. The Sahelian zone (Senegal and Mali):** In conformity with the general trend in the sub-region, processing in the Sahelian zone is dominated by large scale feed processors and small-scale snack and pastry enterprises, mostly by women groups. Most of these enterprises market their products within the sub-region, with some reaching out to about three countries. Key constraints are related to the quality and quantity of raw material and inadequate access to processing equipment, which all ranked high at 14.8% (Tables 3b and 4). Low access to credit (11.1) is also considered a very important constraint. With respect to credit, women in both Senegal and Mali see themselves as disenfranchised due to extra conditionality of providing proofs of ownership of valuable collaterals such as houses and lands, which most often they do not have. Thus, access to good quality raw material at all times and improved processing facilities and credit, are the most critical needs to improve performance. Following these is low access to markets, sometimes due to their inability to supply the needs of their costumers as a result of low supply of raw materials and insufficient access to market information. In a case of some women groups, a typical example being the *Federation des Groupement de Feminine de Mboro* which has a membership of over 3000, lack of access to market information and communication hinders their efficiency in coordinating the group and linking it to markets. In contrast, where a women group *Coordination des Femmes Transformatrices de Sikasso/Wayerma 1* has been supported with an ICT facility, marketing have been expanded to supper-markets in Mali, Bourkina Faso and

Cote D'Ivoire. This underscores the need for improved market information systems to upscale such experiences for market expansion. Access to germplasm to offer new opportunities for diversification, access to processing technology, as well as facilitation for group animation and management are some of the key needs of these entrepreneurs. Further to these are capacity strengthening to adopt technologies and innovations and to also improve their lobbying/advocacy skills. Among processors of grain legumes, insufficient supply of quality raw material is again the most important constraint.

**3.1.2.3. The Costal Zone (Ghana, Benin and Nigeria):** Similar to the Sahilian zone, processing and marketing enterprises in the Costal zone may be classified as large scale companies and small-scale enterprises (also dominated by women groups). The major constraints of cereal processing and marketing enterprises include inadequate access to credit (constituting 16.7% of total responses) to expand and improve upon their operations (Tables 3b and 4). In addition, inadequate accesses to quality raw material and markets, as well as cross-border restrictions constitute a second group of constraints with each scoring 12.5%. Inability to manage storage systems efficiently and inadequate access to communication and information systems are 3<sup>rd</sup> level constraints, with each scoring 8.3%.

Among the large food processing companies, low supply of good quality raw material of cereals at all times, particularly during the lean season (June to September) was a worry to them. This together with frequent power and water outages significantly reduce efficiency of their enterprises. Cross-border hindrances due to un-harmonized regulations continue to hamper efficient marketing of both grain and finished products in the sub-region. Other constraints considered important are inadequate access to improved processing equipment and processing technology, which compels women groups to adopt sub-standards methods in their operations. Furthermore, insufficiency of suitable germplasm for certain products limits their scope of operations and sometimes makes them rely on local germplasm, which may not be very productive. Processors also see the policy environment as unfavorable in supporting private sector development. Their low capacity and weak group cohesion are both considered equally important for interventions, which need to be addressed holistically.

With reference to roots and tubers, major constraints of processing and marketing entrepreneurs are related to insufficient access to credit (17.5%), improved processing equipment (12.5%) and markets (11.1%). Further to these are low capacity (11.1%) and insufficient germplasm (7.8%). In addition, inadequate processing technology, weak technology transfer system, poor storage and communication and information systems are constraining. Also, the policy environments are considered unfavorable. The need for credit is related to improving liquidity to purchase raw material when prices go up in the dry season and also to expand and improve operations. It is worth noting that outputs of women cassava dough processing group in Ghana (*Mampong Nkwanta Women Processing Association*), is reduced by 40% during the dry season as a result of drudgery vis-a-vis high labour cost in harvesting the roots. In the case of gari women processors in Ghana an additional constraint is related to the inability to stay in business whilst awaiting payments from clients, which include academic institutions, the military, the prison camps and exporting enterprises.

Access to improved processing equipment was also expressed by small scale entrepreneurs as a need. For example gari processors see their present equipment as outdated and user-unfriendly, since apart from low efficiency, these equipment also generate excessive heat to the detriment of their health. The need for appropriate cassava peeling and grating equipment was also expressed by gari and dough processors. In Nigeria, lack of appropriate drying equipment and preservation technology, which leads to colour and quality deterioration

of yam and cassava flour was a major concern. The fast growing industry for blending cassava flour with wheat flour for baking supported by policy, and the need expressed by feed manufacturers in blending cassava with maize, poses a challenge for improvements in this emerging industry through improved technologies and innovations.

The need for capacity strengthening is related to the ability of entrepreneurs, particularly the women groups to access improved technologies to enhance their performance. The supply of appropriate germplasm to meet the fast-growing demands of the private sector is among their expectations.

**3.1.2.4. The Central zone (Cameroon):** In Cameroon, cassava, yam, plantain and maize are processed into several products, with cassava alone being processed into 42 products. Similar to the other zones, processing is done primarily by large companies and women groups. The most important constraints of these groups are low accesses to processing equipment and markets, with each receiving 18.8% of responses (Tables 3b and 4). Similar to the other zones, equipment used by women groups are often of low standards and marketing skills and linkages are considered inadequate. Insufficient supply of raw material (12.5) particularly during the lean season is a major constraining factor which compels many enterprises to close down during this season. Judging from the point of view of the lengthening dry season in the sub-region in general, vis-a-vis the menace of climate change, the problem of inadequate supplies of raw material and food seem to be worsening. This calls for pragmatic and innovative measures in finding integrated solutions, which may include release of stress tolerance varieties, improving soil water management systems, expansion of irrigation facilities and improving storage systems for both farm produce and seeds, among several others.

Inadequate credit facilities (12.5%) to offset cash-traps and to facilitate investment in improved equipment and expanded businesses are also seen to be constraining, which needs significant improvements. Processing entrepreneurs also see their low level of capacity and insufficient access to processing technologies (both 6.3% responses) as limitations that seriously affect their efficiencies. Poor storage/preservation systems (6.3%) render them incapable of storing raw material against the lean season and preserving their products. In addition, they feel that the poor states of groups and associations (6.3% responses) deny them the benefits of linkages to market and credit. Inadequate germplasm to offer wider range of consumer preferred products is also seen as a major constraint (6.3%) which needs interventions.

### *3.1.3. Constraints and needs of traders*

**3.1.3.1. The West and Central African sub-region:** Marketing of produce and products cut across producers, processors and professional marketers. Producers' marketing constraints are related to insufficient market information to enable them make informed choices as to where to find better prices for their produce. Producers see lack of basic equipment to clean their produce before marketing as constraining, since unclean grain fetches lower prices; the need for simple farmer-friendly equipment is seen to be vital for increased incomes. They find the credit delivery system as unsuitable to them, particularly since conditionality may not be favorable, which sometimes necessitates loan payback soon after harvest at the time of glut. This erodes their profits and undermines their quest to improve their livelihoods. A more prolonged payback period or expansion of the inventory

credit system, as well as moderating conditionality, in their opinion will enable them spread the sales through the lean season for better prices; this presents a challenge for improving the grain storage systems for long term storage alongside innovative ways for credit management. Improvements in irrigation systems to enable them bridge the market supply gap in the lean season and further increase their earnings is expressed as a additional need.

Since processors offer enormous marketing opportunity, improved linkages with producer, marketer and processor organizations are crucial in realizing marketing efficiency. The scarcity of raw material and shortage of food during certain times of the year is an indication that the widespread gluts that occur in the sub-region after harvest are apparent, which need innovations in managing it to suffice the entire year. With regards to cross-border and export trade, constraints include charges of unofficial tariffs, harassments on the borders, differences in trade rules and regulations, insufficient market information and linkages, currency exchanges problems and linguistic barriers. One major constraint of the trade and export entrepreneurs stem from their low capacity in adopting good agricultural practices (GAPs). These entrepreneurs are therefore not very knowledgeable in the rules and standards of the target markets and therefore operate at losses due to rejections or underpricing of their products. In addition, they might not clearly know the importing entrepreneurs, who often play truancy with them. Capacity building and linkages to markets and market information are therefore vital to the success of such agri-businesses.

**3.1.3.2. The Sahelian zone (Senegal and Mali):** Marketing of cereals and legume products is common among countries in the Sahelian zone. However, marketing in general is described as poorly organized. Producers see lack of group coherence, resulting in individualism approach to market as a weakness to their bargaining front. The complaints lodged by producers on the truancy of commercial buyers, as well as low prices offered at harvest and lack of inventory credit systems, are expressed as constraining to marketing, resulting in low income earnings. Whilst producers feel cheated by processing enterprises, large processing companies feel constrained by shortages and high prices in the supply of quality raw material which makes them operate often below capacity or purchase from import sources. The need for linkages to market information is demonstrated by women groups. Thus, whilst *Federation des Groupement de Feminine de Mboro*, in Senegal sees one of its major constraint as lack of market access due to insufficient linkage to market information system, another group in the same country, *Traiteur, Fruitiers et Maraichers Production et Distribution de Produits Cereals* has successfully linked to markets (African markets) in Italy and USA with an access to an internet facility. In a similar vein, another group in Mali, *Coordination de Femmes Transformatrices de Sikasso/Wayerma* 1 has been able to expand markets to two other countries in the sub-region due to linkage to the internet. This examples, clearly underscore the importance of market information systems in private sector development, an experience which needs emulation and up-scaling.

Despite isolated success, cross-border trade in the Sahelian zone continues to suffer significant drawbacks due to various bottlenecks that besiege it. In this vein, *Union Nationale des Commerçants et Industriels du Senegal*, with trade links to 7 other countries, (Mali, Burkina Faso, Togo, Benin, the Gambia, Guinea Conakry, Guinea Bissau, Chad and Central Africa Republic) presented their views on the sub-regional trade in general. Although they see the border restrictions as a problem, they feel the in-country barrier harassments and extortions, far outweighs the border problems. To them transactions with the banks poses another important constraint, since almost all banks in the sub-region would not accept checks from other countries. Even with the advent of ECOBANK, which operates in most countries, there are no measures in place to accept checks from similar banks in other

countries, except through the automatic teller machine (ATM), which is so insignificant. These, they feel are their concerns, which call for significant improvements to realize effective sub-regional integration. In its view, the major constraint of their clients is related to lack of information to know where to get products, which further calls for capacity strengthening to improve market linkages.

With respect to groundnuts, which constitute a significant contributor to the economy of Senegal, value chain actors see its marketing and handling as poorly organized. In their opinion marketing of the crop requires significant re-organization to sustain the interests of producers and entrepreneurs. As part of the marketing system, post-harvest handling at the on-farm, transit and storage levels, are perceived to be very poor, contributing to significant quality deterioration before reaching end-users. Undoubtedly, this adds to the menace of Aflatoxin, which is increasingly affecting marketing of groundnut.

**3.1.3.3. The Coastal Zone (Ghana, Benin and Nigeria):** In the coastal zone, grain marketing constraints as viewed by large markets such as the Daulana Kano Market in Nigeria and a marketer/transporter entrepreneur in Cotonou (*Negociant en Grain et Transporteur Routier*), include the prevalence of the un-harmonized trade policies and regulations, language differences, police barriers, problems with currency exchanges, inadequate communication and market information, insufficient storage facilities and poor quality of farm produce. The Kano market which manages warehouses with a total capacity to hold 600,000 to 1 million tons of food items (cereals, legumes, roots and tubers, vegetables, sesame, Arabic gum, etc), serves 7 countries in the sub-region, several multinational companies (Guinness, Cadbury, Nestle, etc), exporters to USA, Europe, Asia and Middle East and engages 50000 traders. Constraints of the market are related to their inability to manage and coordinate the complex marketing systems. These include managing statistics and records of produce entry and exit, coordinating various commodity groups and the association, managing communication and information and large scale storage systems. Low access of retailer partners to credit sources for purchasing produce from wholesalers in the same market is considered a bottleneck to the growth of businesses in the market.

A major marketing constraint with regards to the small-scale women groups is related to irregular and non-payments by clients who purchase on credit basis; this affects their liquidity to stay in business in the absence of credit; such situations call for the need for capacity building of such micro-enterprises management, linkages to information systems and credit sources. High cost of raw material, particularly in relation to transport cost is seen to be constraining in the marketing channel; the need for partial processing of bulky produce such as roots and tubers close to production sites seem ideal. This would however require some level of technological innovations. In the case of yam exporters, insufficient knowledge in handling, storage and quality standards constrain market growth. Weak linkages to the public sector institutions and other stakeholders, as well as lack of germplasm that meet the export requirements are seen to be the causes of their poor performance. In addition, poor linkages to the importing partners in the USA, Europe and South Africa result in truancy that leads to huge financial losses. Thus, together with other needs, the capacity of these enterprises would need to be strengthened with respect to the constraints expressed.

Producers and marketing entrepreneurs of roots and tubers in general, feel constrained by high transport charges due to the bulkiness of produce, which also reflects on the cost of raw material for processing. Vehicles that cart these produce are often in poor state and frequently breakdown on the way, resulting in rotting and losses of revenue. The importance

of the emerging international yam markets in the sub-region (particularly in Ghana, Cote D'Ivoire and Mali etc.), vis-à-vis its unique challenges, calls for strategic interventions for improvements and expansion. Addressing major constraints expressed by actors, could offer prolonged supply of food, raw material and incomes. In addition to technological interventions, initiatives of NGOs such as IFDC, SG2000 and TIPCEE and others in improving market information systems and access to markets would need to be encouraged and up-scaled for accelerated market development.

**3.1.3.4. The Central African zone (Cameroon):** In the Central African zone, a lot of trade occurs between Cameroon and the neighboring countries (Chad, Central Africa Republic, Gabon, Equatorial Guinea, and the Democratic Republic of Congo.) with most of the produce (mainly cassava, plantain and maize) coming from Cameroon. The weaknesses of producers in marketing partly due to lack of group cohesion often result in financial losses. Insufficient access to capital in turn renders marketing entrepreneurs incapable of paying farmers promptly. As discussed earlier, low financial standing of marketing entrepreneurs, coupled with difficulty in accessing credit, renders them incapable of paying the producers promptly. The poor road networks, the poor state of vehicles used for carting result in significant losses in revenue.

Within the zone, most markets of sub-regional importance are located at the borders. Harassment by the law enforcement agencies at the borders poses a hindrance and delays to movements. These delays, coupled with the poor state of the roads and vehicles, result in severe deterioration and rotting of produce on the way. Thus, similar to West Africa, cross-border trade still faces several constraints in the Central zone, which requires collective interventions.

#### **3.1.4. Constraints and needs of agri-Inputs organizations**

**3.1.4.1. The West and Central Africa sub-region:** The most important constraints to the growth of the agri-inputs businesses are considered as insufficient access to credit to expand businesses (17.4%), low markets access (12.9%), weak human, institutional and logistic capacity (12.3%), unfavorable policy (8.7%) and insufficient breeder and foundation seeds (7.5%; Tables 3c and 4). Other constraints are insufficient or dilapidated state of processing equipment (7.1%), inadequate seed production technology and machinery (6.8), insufficient germplasm (5.5%) weakness in the technology transfer process (4.9%) and insufficient storage facilities (4.2%). The need for credit is related to expansion of businesses and acquisition of input for seed production, including breeder and foundation seed. Marketing constraints are related to farmers' perception of certified seeds being expensive, insufficient supply of good quality seed, poor certification systems, farmers' reluctance to invest in improved seeds due to poor performance from previous purchases, adulteration, insufficient promotion and demonstration and long distances to input supply centres, which result in low patronage of seeds. These coupled with government interventions in producing cheaper seeds of unknown quality for supply to farmers and the sub-regional trade barriers mitigate private sector development and increased use of seeds by producers.

**Table 3c. Responses (%) of Agri-Inputs Organizations to Constraining Factors to Growth of Cereal Crops in Six Countries in WCA**

Rank	Constraining Factors	Sahelian Zone WA		Coastal Zone WA		Cameroon CA	Mean
		Cereals	Legumes	Cereals	R&T	Cereals	
1	Credit Management	25.0	33.0	13.6	15.4	14.3	17.4
2	Marketing	12.5	11.1	13.6	23.1	14.3	12.9
3	Capacity Strengthening	5.3	11.1	15.9	15.1	14.3	12.3
4	Policy	5.3	11.1	4.6	15.4	7.1	8.7
5	Breeder/Foundation Seed	5.3	11.1	6.8	0.0	14.3	7.5
6	Processing Equipment	10.5	11.1	6.8	0.0	7.1	7.1
7	Production Tech/Machinery	5.3	0.0	4.6	7.7	14.3	6.8
8	Germplasm	5.3	0.0	6.8	7.7	7.7	5.5
9	Technology Transfer	5.3	0.0	4.6	7.7	7.1	4.9
10	Storage	5.3	11.1	4.6	0.0	0.0	4.2
11	Irrigation	5.3	0.0	6.8	7.7	0.0	4.0
12	Group Animation	5.3	0.0	4.6	0.0	7.1	3.4
13	Climate Change	5.3	0.0	4.6	0.0	0.0	1.9
14	Fertilizer Supply	5.3	0.0	0.0	0.0	0.0	1.9
15	Cross-Border Trade	0.0	0.0	2.3	0.0	0.0	0.5
16	Soil Fertility	0.0	0.0	0.0	0.0	0.0	0.0
17	Processing Technology	0.0	0.0	0.0	0.0	0.0	0.0
18	Raw Material	0.0	0.0	0.0	0.0	0.0	0.0
19	Communication/Info	0.0	0.0	0.0	0.0	0.0	0.0
20	Land Tenure	0.0	0.0	0.0	0.0	0.0	0.0
<b>ST. DEV</b>		<b>3.6</b>	<b>2.6</b>	<b>2.4</b>	<b>2.5</b>	<b>2.8</b>	<b>2.1</b>

Lack of implementation mechanism for the harmonized seed regulations, are seen by seed organizations to be undermining private sector businesses in their quest to market seeds regionally. Low capacity of seed entrepreneurs to multiply new varieties of seeds, including hybrids and vegetative propagated crops (such as roots and tubers and plantain), is very constraining to the productivity enhancement efforts. Insufficient capacity to carry out quality control and certification services in many countries, and to adopt harmonized regulations, standards, a common variety catalogue and variety release system, presents a further challenge in the promotion of seeds regionally. Indeed lack of effective variety release systems and lack of breeder seed programmes have denied seed enterprises and end-users of very useful germplasm developed by the CG centres and the NARS. Other constraints are related to insufficient access to seed production technologies, field machinery and irrigation facilities. It is, however, expected that the Alliance for Green Revolution in Africa (AGRA) and the West African Seed Alliance (WASA) will work with partners to come out with innovations that would address these key constraints to improve farmers' access to quality seeds and planting material.

**3.1.4.2. The Sahelian zone (Senegal and Mali):** Producers in the Sahelian zone acknowledge the need for improved inputs in the light of the poor soil fertility and widespread biotic and abiotic stresses, particularly with the advent of climate change. With the high chances of weather failures, vis-à-vis anticipated need for re-seeding, seed security issues are becoming increasingly important to planners of food security programmes. However, the supplies of fertilizer and seeds, which constitute the two most important inputs for achieving enhanced agricultural productivity, are often insufficient in the sub-region, far from reach of rural communities and perceived to be expensive.

Agri-input enterprises and associations, some of which provide opportunities for sub-regional trade, see their constraints as low financial standing to expand businesses (25%), low access to market (12.5%), as significant proportion of farmers opt for farm-saved seeds with the perception that certified seeds are expensive. Insufficient equipment for seed processing (10.5%) within the Sahelian zone is another important constraint to the seed supply system. In relation to markets, the private sector finds government interventions that supply seeds as contradictory to policies on private sector development. In addition, they find such seeds to be poor in quality and thus undermining the objective of productivity improvement. Inadequate quality control and certification systems and low capacity to implement sub-regional harmonization initiatives are additional weaknesses, which call for strong public-private consultations in planning the inputs supply systems. Low access to germplasm which may stem from poor variety release and breeder seed supply systems, low capacity in the knowledge and skills of modern seed production and marketing practices are major bottlenecks which need to be addressed to improve widespread use of improved inputs in the Sahelian zone.

**3.1.4.3. The Coastal African zone (Ghana, Benin and Nigeria):** Among the major constraints of agri-input entrepreneurs in the Coastal zone, low human capacity to produce, market and certify quality seed is seen to be the most important constraint in the development of the seed industries (with 15.9 of total responses). Following these are the poorly developed marketing and credit systems for both entrepreneurs and clients, (each receiving 13.6), which result in stagnation of the industry. Inadequate access to seed processing equipment, as well as breeder and foundation seeds and germplasm are also considered to be constraining (with all receiving 6.8%). Entrepreneurs feel that inadequate access to seed production technologies, machinery and storage facilities, as well as poor policy support have contributed to the present poor state of the respective seed industries in the sub-region.

The planting material supply system remains grossly underdeveloped. Emerging enterprises relates this to undeveloped markets (23.0%) due to the overall poorly developed marketing system for vegetative propagated crops, farmers' over-dependency on the informal system, bulkiness and cost in transporting planting material in the context of the present supply system, etc (Table 3c and 4). Therefore capacity in terms of expertise and facilities for multiplication, marketing and quality control is seen as key needs. Low capacities of the present and prospective entrepreneurs (15.1%) to live up to the challenge remain constraining. It is evident that earlier policies in seed industry development did not pay much attention to the roots and tubers, making it lag behind the grain crops and thus raking high as a constraint (15.4%). In addition, insufficient credit to develop entrepreneurship (15.0%) is considered a constraint for the emerging enterprises. Other related priority constraints are insufficiency of suitable germplasm for clients' preference, technology and equipment for multiplication, technology transfer mechanism and irrigation facilities.

The priority needs of the planting material organizations could therefore be summarized as policy support, market development, capacity building, credit management, germplasm suitability, technology acquisition and access to irrigation facilities.

**3.1.4.4. The Central African zone (Cameroon):** Cameroon is a major supplier of staple crops germplasm, particularly cereals and legumes to the countries in the Central African zone. In the view of agri-input entrepreneurs, the seed industry in Cameroon is not as developed as expected and would therefore need significant re-organization. The present

strides in the seed industry, stems from a HIPC-support project, which seeks to make seeds and plating materials available to the rural poor through the initial supply of breeder seed produced by the Institute for Agricultural Research for Development (IRAD). In addition, four functional cold-rooms, which exist provides an opportunity for long term storage against the unpredicted climate. However, the major constraints of the industry are viewed as low capacity (both human and equipment), lack of seed production technologies and field machinery, lack of functional system for seed multiplication, as well as entrepreneurs' low access to credit facilities and markets (which were all receive 14.3 responses). In their view, these major constraints are fundamental to the operations of a seed multiplication system and would therefore need significant and holistic improvements.

The constraints in seed marketing (7.1%) is related to low capacity in that respect, since agri-input entrepreneurs view seed marketing as a complicated venture, which requires capacity strengthening to improve their skills. Similar to the other zones, quality seeds are often scarce and when available, are perceived by farmers to be expensive. This results in low patronage of quality seed even when they are available in favor of farmer-saved seeds. In addition to these, unfavorable government policy (7.1%), where the ministry responsible or agriculture produces and supply farmers with seeds of doubtful quality, seem to be counter-productive to the promotion of the private sector and improved crop productivity. The Common Initiative Groups which produce and market seeds among other things, seem to provide some solutions to the present seed supply problems; however these groups see themselves as incoherent and weak and therefore feel the need for capacity strengthening to improve efficiency. Insufficiency of germplasm among all the commodities is also seen to constraining among these entrepreneurs. With regards to plantain, producers' capacities in Cameroon and in the sub-region in general are being enhanced through the initiatives of CARBAP to train scientists, NGOs, agricultural extension agents and producer organizations in the rapid multiplication technique. Nevertheless, the vegetative planting material system in general is grossly underdeveloped in the sub-region, which poses a constraint to improved productivity of plantain and roots and tubers. Innovative solutions to upscale and promote the rapid multiplication methods will go a long way to improve farm level crop productivity in roots and tubers and plantain.

### ***3.2. Strengths, Weaknesses, Opportunities and Threats (SWOT) Analyses of Value-Chain Actors***

The SWOT analyses presented in Table 5a to 5f provides the strengths and opportunities of value chain actors (producers, processors, marketers), NGOs, extension service and research organizations in domains for collaboration in the implementation of programme and project activities. It also shows weaknesses that need to be strengthened in addressing constraints of end-users.

#### ***3.2.1. Producer groups and associations***

Strengths of the producer groups and associations stems from the important role they play as the production force of the bulk of food and raw material (Table 5a). The groups and associations present a unified front for lobbying and advocacy, linkages to technologies, markets and credits. Groups comprising both men and women complement each others' strengths to increase production and add value to produce before marketing. Their

weaknesses and threats highlighted in Table 5a present an opportunity for strengthening these actors to empower them to achieve the desired growth in staple crops. In the years ahead, highly animated producer groups and associations would offer opportunities for group-targeted technology transfer and linkages.

### *3.2.2. Processing and marketing entrepreneurs*

The strength of the private sector processing and marketing enterprises stems from their provision of huge markets to producers and ability to add value to produce, through transformation and improvements in nutritional status, as well as enhancing shelf life and distribution. This component of the value chain also provides employment for several people, particularly women. Although several actors are confronted with several weaknesses, including inadequate access to equipment and raw material, insufficient capacity, weak linkages, etc. (Table 5b), the improvements of these constraints will help realize their full potential as true engine of growth of the respective economies. Improving the efficiency of the private sector, will not only add value to the existing commodities, but will also expand the market and trade opportunities in the sub-region and create more jobs for the youth.

### *3.2.3. Agri-inputs organizations*

With respect to the agricultural input organization, the strength lies in the existence of input supply enterprises with capacities to expand when key constraints are addressed. The existence of functional quality control and certification system in certain countries such as Nigeria and Ghana offers resources of expertise to build other capacities. Weaknesses lie in the low capacity of the industry within several countries to produce, certify and market seeds and planting materials. This reflects on the poor quality of seed dominated by farm-saved seeds and insufficient quantities of inputs used by producers in the sub-region. The emergence of new initiatives such as WASA and AGRA and the existence of a sub-regional harmonized regulations and variety release systems offer an opportunity to strengthen the input delivery systems for accelerated growth of the staple crops sub-sector.

### *3.2.4. Non-governmental organizations*

The strength of the NGOs, such as SG2000 and IFDC, lies in their visibility in the sub-region working closely with producer, processor and marketer groups. They provide unique services which complement the efforts of the national extension systems. For example IFDC provides capacity building programmes, market linkages and information for the growth of agri-businesses, whereas TIPCEE assists market development by providing capacity strengthening support in GAPs to agri-business enterprises engaged in regional and international trades. The NGOs provide linkages for producer groups to inputs, credit, market, trade and technology by harnessing the potentials of respective stakeholders for development (Table 5d). Their weaknesses stem from their limitation in staff strength and coverage (area and commodity), insufficient lifespan of projects for long term planning. However, they offer various opportunities such as effective partnership with the private sector, provision of market linkages, capacity strengthening of producer groups and the private sector and development of database on actors. The services offered by the Songhai Centre in Benin in integrated agricultural development offer further opportunity for partnership with the centre in building the capacities of producer organizations and the private sector in general.

### *3.2.5. Agricultural extension services*

With regards to agricultural extension services, strengths lie in wider coverage, geographically and commodity wise and promotion of technologies. The knowledge of agricultural extension agents of government policies, management of agricultural statistics, high capacity to train producers in particular and the private sector to a limited extent present a great strength and an opportunity. Weaknesses include low farmer – extension ratio, inadequate capacity and resources to carry activities. Despite these weaknesses, they offer valuable opportunities through their extensive coverage, knowledge of farming systems, strong background in crop science, managing vital database on production and market trends, strong partnership with research, etc.

### *3.2.6. Agricultural research system and networks*

The strength of the agricultural research organizations stems from their valuable capacity to develop suitable germplasm for domestic, industrial and export markets, as well as technologies and innovations for integrated crop management and utilization and marketing to achieve productivity enhancement. In addition, these actors have the capacity (human and equipment) for documentation and development of extension materials, as well as to strengthen the capacity of producers and the private sector actors. Weaknesses in recent times include inadequate human resources, logistics and funding. Nevertheless, they offer tremendous opportunity to provide suitable germplasm and other crop-based technologies as well as capacity strengthening support. The strengths of the former collaborative research networks including WECAMAN, ROCARIZ, ROCARCE, ROCAFREMI, etc. lie in their strong partnership and networking experience with scientific partners, particularly in the various commodity programmes of the NARS. Over the years, these networks have developed efficient methodologies for collaborative development and testing of technologies, which need emulation and adaptation. The community seed multiplication systems initiated by these networks must not be overlooked, particularly in the context of climate change and unreliable weather, which calls for an increasing need to re-seed, in the absence of strong national seed programmes. One other opportunity that the networks offered is the monitoring system through functional steering committees, biannual workshops and joint monitoring tours, which offered scientists the opportunity to share knowledge and experiences.

## 4. CONCLUSIONS

The outcomes of the consultative survey and the follow-up validation workshop, would complement an earlier study by IFPRI; these exercises seek to reveal and prioritize end-users' constraints and needs within the value-chain continuum of priority staple crops. Within the next five years, the outcomes would guide research and development interventions in the areas of production, processing, marketing, agri-input use, policy and institutional issues, to facilitate the adoption of staple crops' technologies and innovations in West and Central Africa. The operational mechanism for implementing activities, which is nested in CORAF/WECARD Operational Plan 2007-2011 encourages effective linkages and active involvement of stakeholders in a more coherent manner in addressing constraints for improving adoption.

Opportunities offered by both the private and public sector actors, present valuable means for addressing constraints and weaknesses identified to achieve the objectives of the Staple Crops Programme. The effective implementation of the anticipated action plan emerging from the survey and the workshop, should lead to the realization of a strong kick-off growth in the staple crops sub-sector by 2013, which should be evident of an optimism to achieve CORAF/WECARD objective of significantly contributing to the 6% productivity growth target of CAADP.

**Table 4 Prioritized Constraining Factors to the Growth of the Staple Crops Sub-Sector as Perceived by Value-Chain Actors in the Sahelian, Costal and Central Zones of West and Central Africa**

Zone	Producers	Processors/Marketers	Input Organizations	All Actors in Respective Zones
<b>WCA Sub-Region</b>	<ul style="list-style-type: none"> <li>* Credit delivery</li> <li>** Seed supply</li> <li>** Marketing</li> <li>**Production tech/machine</li> <li>**Capacity strengthening</li> <li>**Fertilizer</li> <li>***. Technology transfer</li> <li>****. Group animation</li> <li>****Climate change</li> </ul>	<ul style="list-style-type: none"> <li>* Raw material</li> <li>** Processing equipment</li> <li>***Credit delivery</li> <li>****Markets</li> <li>*****Processing technology</li> <li>*****Capacity strengthening</li> <li>*****Storage (preservation)</li> <li>*****Capacity /animation</li> <li>*****Information/Communication</li> </ul>	<ul style="list-style-type: none"> <li>*. Credit delivery</li> <li>** Marketing</li> <li>***. Capacity strengthening</li> <li>****. Policy environment</li> <li>****. Breeder/Found'n seed</li> <li>****. Processing equipment</li> <li>****. Seed production tech/ machinery</li> <li>*****. Germplasm</li> </ul>	<ul style="list-style-type: none"> <li>*. Credit delivery</li> <li>** Marketing</li> <li>***. Seed supply</li> <li>****. Capacity strengthening</li> <li>*****. Processing equipment</li> <li>*****. Production tech/transfer</li> <li>*****. Policy</li> <li>*****. Germplasm, fertilizer</li> </ul>
<b>Cereals in the Sahelian zone</b>	<ul style="list-style-type: none"> <li>*Fertilizer</li> <li>**Seed supply</li> <li>**Marketing</li> <li>***Credit management</li> <li>***Processing equipment</li> <li>***Production technology</li> <li>***Capacity strengthening</li> <li>***Group animation</li> </ul>	<ul style="list-style-type: none"> <li>*Raw material</li> <li>**Credit delivery</li> <li>**Capacity strengthening</li> <li>***Processing equipment</li> <li>****Processing technology</li> <li>****Technology transfer</li> <li>****Marketing/storage</li> <li>****Policy</li> </ul>	<ul style="list-style-type: none"> <li>*Credit delivery</li> <li>**Seed supply (BS, FS)</li> <li>**Fertilizer supply</li> <li>**Marketing</li> <li>**Policy</li> </ul>	<ul style="list-style-type: none"> <li>*Capacity strengthening</li> <li>**Credit delivery</li> <li>***Seed supply</li> <li>****Fertilizer supply</li> <li>*****Production tech/transfer</li> <li>*****Marketing</li> <li>*****Processing equipment</li> <li>*****Policy/Communication</li> </ul>
<b>Cereals in the Costal zone</b>	<ul style="list-style-type: none"> <li>*Credit delivery</li> <li>*Group animation</li> <li>**Fertilizer supply</li> <li>**Seed supply</li> <li>**Marketing</li> <li>**Climate change</li> <li>***Production tech/transfer</li> <li>***Technology transfer</li> </ul>	<ul style="list-style-type: none"> <li>*Credit delivery</li> <li>**Raw material</li> <li>**Marketing</li> <li>**Cross border trade</li> <li>***Communication/info</li> <li>***Storage/preservation</li> <li>****Group anim/capacity</li> <li>****Germplasm</li> </ul>	<ul style="list-style-type: none"> <li>*Capacity strengthening</li> <li>**Credit delivery</li> <li>**Marketing</li> <li>***Irrigation facility</li> <li>***Germplasm</li> <li>***Storage</li> <li>***Group animation</li> </ul>	<ul style="list-style-type: none"> <li>*Credit delivery</li> <li>**Marketing</li> <li>***Seed supply</li> <li>****Fertilizer supply</li> <li>*****Production tech/transfer</li> <li>*****Capacity strengthening</li> <li>*****Communication/info</li> </ul>
<b>Roots &amp; Tubers – Coastal and Central zone</b>	<ul style="list-style-type: none"> <li>*Production technology</li> <li>*Seed supply</li> <li>*Credit delivery</li> <li>**Capacity strengthening</li> <li>***Marketing</li> <li>***Technology transfer</li> <li>***Climate change/irrigation</li> <li>***Group animation</li> </ul>	<ul style="list-style-type: none"> <li>*Credit delivery</li> <li>**Processing equipment</li> <li>***Raw material</li> <li>***Capacity strengthening</li> <li>****Germplasm</li> <li>*****Processing tech/transfer</li> <li>*****Storage</li> <li>*****Policy</li> </ul>	<ul style="list-style-type: none"> <li>*Credit delivery</li> <li>*Marketing</li> <li>*Capacity strengthening</li> <li>**Germplasm</li> <li>**Production technology</li> <li>**Technology transfer</li> <li>**Irrigation facility</li> </ul>	<ul style="list-style-type: none"> <li>*Credit delivery</li> <li>*Marketing</li> <li>**Capacity strengthening</li> <li>***Seed supply</li> <li>****Production technology</li> <li>****Processing technology</li> <li>*****Processing equipment</li> <li>*****Germplasm</li> </ul>

\* The more the number of asterisks the less is the priority

Table 5a Strengths, Weaknesses, Opportunities and Threats (SWOT) Analyses of **Producer Groups and Associations**

<b>Strengths</b>	<b>Weaknesses</b>	<b>Opportunities</b>	<b>Threats</b>
<p>1. Constitute the major production force for staple crops for domestic consumption, markets and industry</p> <p>2. Grouping and associations facilitate lobbying, advocacy, technology transfer and adoption, capacity strengthening and</p> <p>3. Grouping facilitates linkages to relevant public and private sector stakeholders</p> <p>4. Groups comprising men and women add value to produce with the women engaging in processing</p> <p>5. Women use long off-seasons to produce irrigated vegetable for sustainable income earnings.</p>	<p>1. Challenges in sustainable association management – lack of logistics, M&amp;E system, difficulty in coordinating constituent groups, generating internal funds, etc.</p> <p>1. Insufficiently animated groups that can stand the test of time; normally formed when an opportunity seem eminent and disintegrate after</p> <p>2. Practice low input agriculture and depends largely on local stress susceptible germplasm with low or no added fertilizer</p> <p>3. Low crop productivity, storability and market non-competitiveness rendering them poor and food insecure</p> <p>4. Inadequate access to credit, agri-input, technology, equipment, markets and information; poor storage and little value addition</p> <p>5. Poor linkage to source of technology and to other private and public sector stakeholders</p> <p>6. Low capacity to adopt improved practices and low quality consciousness and access to standards</p> <p>7. Inability to meet raw material demands of private sector in terms of quantity and quality</p>	<p>1. Producers would still provide raw material for the growing industry</p> <p>2. Existence of groups and association provides opportunity for further capacity strengthening to facilitate technology transfer and linkages</p> <p>3. Producers offer diversity of commodities and farming systems which can be improved for economic development</p> <p>4. Producer groups and associations are resources for improving crop productivity</p> <p>5. Elite members of producer groups offer opportunities for building capacity for community-based technology transfer system</p>	<p>Current farming systems are vulnerable to climate change and other stresses, which affect consistency in food and raw material supply.</p> <p>Seasonality of the farming systems leave a long lean season undermining food security and uninterrupted supply of raw material.</p>

**Table 5b** Strengths, Weaknesses, Opportunities and Threats (SWOT) of **Private Sector – Processing and Marketing Enterprises**

<b>Strengths</b>	<b>Weaknesses</b>	<b>Opportunities</b>	<b>Threats</b>
<p>1. Manufacture nutritionally enhanced human and animal feeds</p> <p>2. Creation of large market opportunities for producers.</p> <p>3. Small women enterprises organized into groups, manage revolving credit system and sensitive communities on social vices including HIV/AIDS</p> <p>4. Conduct in-service training for members and participate in fairs</p> <p>5. Educate general public in nutritional issues</p> <p>6. Constitute key players in sub-regional trade and food supply to institutions</p> <p>7. Help prolong food supply during the lean season and thereby contribute to ensured food security.</p>	<p>1. Vulnerable to market fluctuations in commodity prices and availability of raw material resulting in closure of factories during lean season.</p> <p>2. Small-scale processors and marketers lack capacity in modern processing, preservation, packaging and marketing.</p> <p>3. Drudgery in harvesting roots and tubers in the dry season results in shortage and price increases of raw material for processing.</p> <p>4. Small-scale women groups lack modern equipment and therefore use sub-standard local facilities.</p> <p>5. Factory hands have not received basic technical, professional and ethical training.</p> <p>6. Insufficient financial capital to pay farmers promptly</p> <p>7. Private sector marketers are perceived by farmers to be cheats.</p> <p>8. Weak linkage to research, particularly the small-scale processors to express technological needs, including desired quality of germplasm.</p> <p>9. Weak linkage of small scale exporters to government export initiatives and poorly organized import market resulting in financial losses to marketing groups</p> <p>10. High taxes of non-traditional export commodities, such as gari and ware yam</p>	<p>1. Provides market for producer groups</p> <p>2. Provide processed foods which support prolonged food supply and ensures food security</p> <p>3. Possess capacity for capacity strengthening and technology transfer to members in communities</p> <p>5. Serve as vehicle for sub-regional and international trade</p> <p>6. Small scale processor grouping facilitate linkages to service providers and technology transfer</p>	

**Table 5c** Strengths, Weaknesses, Opportunities and Threats (SWOT) Analyses of Service Providers - **Agri-Inputs Supply Systems**

<b>Strengths</b>	<b>Weaknesses</b>	<b>Opportunities</b>	<b>Threats</b>
<p>1. Good large scale companies exists in Nigeria;</p> <p>2.The West Africa Seed Alliance and AGRA to promote harmonized WA seed regulations, seed catalogue, variety release system.</p> <p>3. Large market potential exist since the formal sector meets less than 10% of total demand in more advanced industries in cereals and lesser in less advanced ones and other crops.</p> <p>4. The CG centres and the NARIs provide good germplasm, breeder seeds and expertise in crop improvement.</p>	<p>1. Most countries have poorly developed seed industries to implement regional initiatives in seeds, as well as to produce and market seeds.</p> <p>2. Non-existence of seed regulations, standards and release systems in many countries and low capacity to develop and implement these.</p> <p>3. Standards of the harmonized systems for the sub-region are too high for adoption. Most stakeholders are ignorant of this information.</p> <p>4. Low capacity of seed producers and marketers to produce and market seeds effectively.</p> <p>5. Insufficient seed processing and storage facilities in the sub-region</p> <p>6. Low financial standings of many seed enterprises.</p> <p>7. Low supply of quality certified, foundation and breeder seeds.</p> <p>8. Inadequate capacity and logistics for the few seed quality control and certification agencies to effectively perform functions.</p> <p>9. Insufficient promotion of certified seeds.</p> <p>10 Inadequacy of adapted germplasm.</p> <p>11. Power outages during processing and storage.</p> <p>12. Climate change vrs insufficient irrigation facilities 13. Border restrictions in cross-border trade.</p> <p>13. Roots and tubers and plantain have not received adequate attention by seed industries.</p>	<p>1. The CG Centres and some NARS have strong programs on variety improvement and breeder seed production.</p> <p>2. Few countries have functional seed industries, For example has capacity to produce and market more than over 6000 tons of seeds yearly and has capacity to expand marketing to sub-region;</p> <p>3. Ghana has a seed industry, medium scale seed enterprises that also market breeder and foundation seeds in the sub-region. Has a capacity of marketing over 2000 tons of certified seeds</p> <p>4. Senegal, Mali, Benin and few others have smaller scale industries. Senegal has a capacity of marketing groundnut seed in the sub-region</p> <p>5.WASA and AGRA exist to promote harmonized seed regulations, seed catalogue, variety release system, foundation seed marketing, public-private sector partnership, agri-business networking.</p> <p>6. Quality control system exists in few countries. Some seed enterprises are members of AFSTA. Market for seed exist as expressed by farmers</p>	<p>(1) Climate change – unpredictable weather for the production of seed</p> <p>(2) Policy – Uncertainties in the adoption and implementation of harmonized regulation, standards and release systems as well as regional trade at both sub-regional and national levels;</p>

**Table 5d Strengths, Weaknesses, Opportunities and Threats (SWOT) Analyses - NGOs**

<b>Strengths</b>	<b>Weaknesses</b>	<b>Opportunities</b>	<b>Threats</b>
<p>1. Visible in many countries in West Africa and knowledgeable in the sub-region; have offices and staff in many WA countries</p> <p>2. Competent and experience staff to strengthen capacity of clients</p> <p>3. Promotion of produce marketing strengthening value chain in cereals and legumes, roots, etc.</p> <p>4. Strengthening linkages in the value chain in these crops.</p> <p>5. Promoting farmers access to inputs, market information systems and credit.</p> <p>6. Promotion of integrated agricultural technologies (production, post-harvest and NRM/ISFM systems) and provision of advice to clients.</p> <p>7. Strong networking approaches in linking partners and clients.</p>	<p>1. Coverage is limited to some countries and restricted area and commodities within each country.</p> <p>2. Insufficient human resource for market monitoring to conduct activities.</p> <p>3. Insufficient access to research information.</p> <p>4. Short-term funding of projects makes it difficult to retain experience staff and to develop long term plans for NRM/ISFM</p> <p>5. Difficulty in strengthening public-private sector partnerships to enable client get the desire information from the public sector.</p> <p>6. Difficulty in ensuring the enforcement o rules, regulations and decrees by national institutions.</p> <p>7. Insufficient M&amp;E systems to ensure achievement of desired impact.</p> <p>8. Lack of coordination of NGOs sometimes resulting in duplication of effort in certain domain with the negligence of others.</p>	<p>1. Innovative in building partnerships with the private sector, regional organizations and networks.</p> <p>1. Provision of market information and linkages of producer groups to input/output markets and industries and credit institutions.</p> <p>2. Capacity strengthening of input/output marketing groups and enterprises.</p> <p>3. Capacity strengthening of producers and exporters on sub-regional and international trade standards, regulations and competitiveness and GAPS.</p> <p>4. Development of database on private sector operators.</p>	<p>1. Shortness of project lifespan in most cases to ensure continuous partner during the entire operational period CORAF/WECARD.</p>

**Table 5e** Strengths, Weaknesses, Opportunities and Threats (SWOT) Analyses of Services Providers – **Extension Service**

<b>Strengths</b>	<b>Weaknesses</b>	<b>Opportunities</b>	<b>Threats</b>
<ol style="list-style-type: none"> <li>1. Extensive national geographical coverage – visible in all districts.</li> <li>2. Extensive coverage of most agricultural commodities.</li> <li>3. Promotion of improved technologies (production and post-harvest practices) to achieve policy objectives.</li> <li>4. Promotion of ISFM systems</li> <li>5. Linking farmer groups to input/output markets and credit institutions</li> <li>6. Organization and registration of farmer cooperatives.</li> <li>7. Promotion of produce marketing.</li> <li>8. Development of databases on production, market and price trends.</li> <li>9. Knowledgeable of government policies in agricultural development.</li> <li>10. Posses capacity to train farmers</li> </ol>	<ol style="list-style-type: none"> <li>1. Inadequate funding for operations and low motivation of staff.</li> <li>2. Low farmer to extension ration (1:1800 in Ghana and 1:9000 in Nigeria) and long distances in getting to farmers</li> <li>3. Poorly resourced to carry out effective extension services</li> <li>4. Weak linkages to research institutions and to producer/processor groups</li> <li>5. Low capacity and inadequate knowledge in new technologies</li> <li>6. Weak and non-formalized linkages with the private sector (processors and input/output marketers.</li> <li>7. Weak in the promotion of post-harvest technologies (processing, utilization marketing)</li> </ol>	<ol style="list-style-type: none"> <li>1. Extend improved technologies to farmers</li> <li>2. Extensive geographical coverage and knowledge of farming communities and farming systems</li> <li>3. Source of national database on extension centres, commodities under production, annual production and marketing data, stakeholders in agricultural sector.</li> <li>4. Good partnerships with research institutions, development projects, NGOs</li> <li>5. Possess capacity and expertise for capacity strengthening of farmers, processors and the private sector actors.</li> <li>6. Posses capacity for group formation and animation</li> <li>7. Provide linkages of farmers to credit sources, processors and markets.</li> </ol>	<p>Low motivation and commitment to perform</p> <p>High overhead costs</p> <p>Bureaucratic processes in performance</p>

**Table 5f** Strengths, Weaknesses, Opportunities and Threats (SWOT) Analyses of Research Organizations – **CG and Base Centres and NARIS**

<b>Strengths</b>	<b>Weaknesses</b>	<b>Opportunities</b>	<b>Threats</b>
<ol style="list-style-type: none"> <li>1. Major source of improved germplasm and technologies for cereals, roots and tubers, legumes</li> <li>2. Development of production, processing, utilization technologies, etc.</li> <li>3. Rich experience and knowledgeable in the sub-regional agricultural systems</li> <li>4. Expertise for high quality scientific research as well as for socio-economic, policy and marketing studies</li> <li>5. Experience in research-extension-farmer linkages, seed systems, rapid multiplication and technology transfer</li> <li>6. Expertise in networking and partnership development</li> <li>7. Expertise in technology transfer and capacity strengthening.</li> <li>8. Provision of laboratory services for food quality control</li> <li>9. Capacity for documentation of agricultural information.</li> <li>10. Linkages with stakeholders and development partners.</li> <li>9. Support to government initiatives in respective countries</li> </ol>	<ol style="list-style-type: none"> <li>1. Inadequate human resources due to movements to other organizations and prevalence of the non-replacement policy. Certain specialized areas such as plant breeding, aflatoxin control, soil salinity control and biometrics have acute shortages of scientists</li> <li>2. Insufficient logistics, laboratory equipment, power and water outages. Poor funding and low motivation.</li> <li>3. Poor communication networks and facilities.</li> <li>4. Challenges in addressing biotic and constraints associated with crop productivity improvement.</li> </ol>	<ol style="list-style-type: none"> <li>1. A source of germplasm and technologies for producers and private sector actors as well as policy and market studies in the sub-region.</li> <li>2. Expertise and facilities to provide capacity strengthening support in the sub-region.</li> <li>3. Support in linkages and networking with partners in production, processing, technology transfer and input delivery.</li> <li>4. Technical support to existing an prospective seed and planting material enterprises</li> <li>5. Expertise for quality control in the regional and international trade</li> </ol>	<p>Scientists' movement to other organizations and retirements without replacement is leaving vacuum for effective research support.</p>

**Table 6 The Needs and Expectations of Value-Chain Actors in Cereals, Legumes, Roots and Tubers and Plantain**

Enabling Environment	Technology	Markets	Policy	Harmonization & Trade
<p>Effective partnership at sub-regional and national levels for addressing identified constraints to achieve the desired growth in the staple crops sub-sector</p>	<p>Generation and promotion of crop productivity enhancing technologies - NRM, ISFM, control of biotic &amp; abiotic stresses in all. Soil salinity and acidity control, aflatoxin, grain quality and storage, climate change, water stresses, soil water conservation, small scale irrigation, cereal-root and tuber flour blends and quality improvement for bakery and poultry industries</p>	<p>Strong quality control and certification systems to support producers and private sector operators in adopting GAPs for marketing and exporting quality food products and seeds</p>	<p>Functional policy to support the growth of private sector seed enterprises whilst government plays its complementary and defined role without competing with the private sector</p>	<p>Innovations to soften the language barrier, currency exchanges and barrier harassments that hamper cross-border trade</p>
<p>Innovative and improved credit delivery and management systems for producer and private sector actors. (Short payback period of loans compels farmers to sell at glut period)</p>	<p>Provision of sufficient genetic materials meeting expectations of producers, private sector processors, exporters, consumers and frequently made available through functional variety release systems</p>	<p>Vigorous promotion of Improved and harmonized market information systems and data collection for the benefit of producer, processor and marketing groups in making informed choices</p>	<p>Innovations to curb unfair competition between imported and locally produced cereals whilst policies are reformed to support local initiatives</p>	<p>Active promotion of existing rules and regulations for cross border trade in grains and seed under ECOWAS treaties.</p>
<p>Expanded and empowered farmer/processor groups to enhance their knowledge and skills in group management, governance and to strengthen capacity for technology adoption</p>	<p>Widespread and cost-effective use of appropriate fertilizers for staple crops through facilitation of linkages between producer groups, agri-inputs enterprises and credit institutions.</p>	<p>Stabilized prices of produce throughout the year in favour of both producers and industry through improved storage and longer term credit management systems</p>	<p>Government offering low price for groundnut grain for export at disadvantage of producers whilst better price exist in the open market.</p>	<p>Strong Sub-regional capacity (human and logistics) to implement harmonized rules, standards and regulations to facilitate sub-regional trades in general</p>



**Table 6.....The Needs and Expectations of Value-Chain Actors in Cereals, Legumes and Roots and Tubers**

Enabling Environment	Technology	Markets	Policy	Harmonization & Trade
Support to key NGOs in acquiring long term projects and to expand scope and coverage in specialized roles; Encourage NGOs-Research-private sector linkages to support capacity strengthening of clients and access to technology, contractual market and credit	Facilitating the fabrication and acquisition of adaptive equipment for processing, utilization, preservation and packaging of grain and food products. Simple machinery and equipment for roots and tubers and cereals to reduce drudgery and high labor costs.	Improved quality of raw material and availability of year round supply to private sector and industry; improved bulk storage system and warehouse management for long term grain storage for industry and for food security	Sensitizing policy makers to curb policy on embargo on recruiting scientists to replace those who have left, retired or about to retire.	Strong producers, processors and exporters' capacity in acquiring knowledge in market and export standards and rules to facilitate sub-regional and international trade.
Capacity of extension service strengthened to improve farmer-extension ratio and research-extension-private sector/FBO linkages for effective tech. transfer	Promotion of uninterrupted supply of breeder and foundation seeds of priority varieties required by farmers and industry and support to certified seed marketing	Vibrant promotion and utilization of certified seeds and fertilizer, bringing distribution outlets closer to farming communities	Policy support to promote indigenous crops including roots and tubers for accelerated socio-economic development	Insufficient policy support and poorly organized import markets for yam in Europe, USA and South Africa, resulting in marketing groups losing money during transaction
Research capacity (human, equipment and logistics) strengthened to carry out strategic research in the identified constraints in production, post-harvest, ISFM, NRM, policy and marketing.	Functional agri-businesses in planting material multiplication and marketing systems for roots and tubers and plantain to improve farmers' access to productive genetic materials		Curbed power and water outages to enable seed and processing industries to improve efficiency and achieve the desired growth	
Sensitization and Promotion of professionalism and quality staff in the fast growing private sector led agri-industry.	Encouraging the acquisition of vital farm machinery for land preparation and for irrigation in modernizing agriculture		Tax exceptions on imported machinery and equipment as incentives for modernized agriculture	
Improved communication among value-chain actors at all levels; functional national platforms for value chain actors' consultations for planning and strategic interventions			Private sector -Policy support and linkages to public sector institutions for capacity strengthening	
Effective strategies to improve land tenure system in promoting NRM and facilitating women acquisition of farm land and for credit				

# Proposed Research and Development Themes to Address Constraints of Value Chain Actors in Staple Crops

## **Theme 1: Agricultural productivity enhancement**

### **Activities**

- 1.1. Intensify of low lands and irrigated areas
- 1.2. Develop and promote of appropriate crop varieties for various agro-ecologies
- 1.3. Manage Diseases and pests in the field and in storage (use of host plant resistance, cultural practices, biological control, chemical control, integrated crop and pest management, quarantine, trade issues etc.)
- 1.4. Strengthen institutional and human capacity for technology development and adoption
- 1.5. Promote of technological and market information systems

## **Theme 2: Agricultural input usage enhancement**

### **Activities**

- 2.1. Promote productivity enhancing technologies on-farm for adoption
- 2.2. Improve seed and inputs supply (credit, labour, mechanization, fertilizer etc) chain management
- 2.3. Adapt agricultural input and output systems to sub-regional needs
- 2.4. Promote viable seed companies and agro-input enterprises in rural areas
- 2.5. Facilitate trade in seeds and other inputs in West Africa
- 2.6. Strengthen capacities of producer organizations in the production, accessing and marketing of improved seeds, in the light of the global food crises and climate change
- 2.7. Facilitate credit and rural financing

## **Theme 3: Promotion of post harvest technologies**

### **Activities**

- 3.1. Develop and promote post harvest technologies in storage, processing, packaging and marketing for food and feed management in West and Central Africa
- 3.2. Transform raw produce into quality processed products
- 3.3. Improve packaging, labelling and product grading
- 3.4. Develop and operate effective sub regional and regional post-harvest technology data base management systems
- 3.5. Promote appropriate manual and mechanized equipment for processing

## **Theme 4: Strengthening capacities of value chain actors**

### **Activities**

- 4.1. Strengthen the capacities of policy makers to take clear decisions
- 4.2. Train and sensitize service administrators to improve the enforcements of laws, norms, etc.
- 4.3. Strengthen capacities of civil society organizations (leadership, management, marketing, organizational capacity, etc.)
- 4.4. Strengthen the capacities of researchers
- 4.5. Strengthen the capacities of private sector actors in the value chain (processors, traders, etc.)

## **Theme 5: Accelerated promotion of regional integration systems**

### **Activities**

- 5.1. Develop and harmonize sub-regional laws, rules, norms and regulations on exchanges of planting material, varieties and other inputs in order to facilitate regional trade and exchanges of genetic resources
- 5.2. Develop and harmonize laws, rules and norms on food products in order to facilitate regional trade in food products
- 5.3. Develop and harmonize laws, rules and norms on information systems for markets, credit, etc in order to facilitate regional trade.

## **Theme 6: CORAF/WECARD CORE FUNCTION: Strengthening sub-regional agricultural research systems**

### **Activities**

- 6.1. Develop a financial resource - mobilization mechanism to attract funding both internally and externally
- 6.2. Develop scientific and technical partnership mechanism among all the NARS actors at the sub-regional level (define roles of different partners)
- 6.3. Renew and harmonize research statutes in different countries of the sub-region to reduce brain-drain