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**INTER-AFRICAN PHYTOSANITARY COUNCIL**

**CONSEIL PHYTOSANITAIRE INTERAFRICAIN**

## **Report of the workshop on cassava production and protection, Hotel Source du Nil-Bujumbura-Burundi, November 16-17, 2009**



**November, 2009**

## **INTRODUCTION**

The Inter-African Phytosanitary Council has organized a regional workshop on cassava production and protection in Bujumbura – Burundi; after a survey that was previously conducted in some specific African countries. This survey aimed at assessing cassava germplasm and planting material exchange; cassava crop pests and diseases monitoring and diagnostics, stakeholders' linkages. The workshop was held within the framework of the 2009 budget programme activities aiming at strengthening the capacity of some National Plant Protection Organization officers. Another focus was to set up networks for cassava pest reporting and information sharing. A total of twenty participants (20) from Angola, Burundi, Cameroon, Cote d'Ivoire, Liberia, Mozambique, Nigeria and Uganda were present at the workshop. Resource persons came from IITA, FAO, IAPSC, National Agricultural Research Organizations and Universities.

### **1. OPENING CEREMONIES**

During the opening ceremony, the Director of the Inter-African Phytosanitary Council of African Union (AU-IAPSC) and the Director General for Agriculture who represented the Burundian Minister of Agriculture and Livestock have, one after another underscored the importance of cassava in achieving food security.

IAPSC's Director in his key notes address emphasized on the coordination role its institution plays in the area of crop protection; standards and SPS issues in Africa. He thanked all participants for their massive turn out and urged them to seize the opportunity to present the specific situation of cassava production and protection in their specific countries while preparing to learn more from various invited resources persons. He also underlined that ensuring food security in the continent is one of the office concerns and the project was effectively designed to address the issue in Sub-Sahara Africa by putting emphasis on pests and diseases identification, diagnostic and control that affect such a staple food. This workshop was an opportunity for all participants to deeply reflect on the impact of these diseases on rural households.

The Director General of Agriculture who was representing the Minister of Agriculture and Livestock highlighted the role of cassava in the sectorial policy of the Ministry. He underlined that cassava production is hampered by several diseases and actions needed to be taken to assist vulnerable population. He thanked IAPSC for having organized this meeting to address these threats for food security in Burundi and then opened the workshop.

### **2. PRESENTATIONS**

The training workshop comprised four modules among which were:

- cassava importance and the presentation of the survey's results;
- cassava production constraints;
- cassava germplasm and planting material exchange;
- Cassava pests' diagnostics and control technique methods.

## **2.1 Cassava Importance And The Presentation of The Surveys' Results**

### **2.1.1. Importance of cassava in Africa ( Prof. Bahama, IAPSC),**

Cassava (*Manihot esculenta*) is an important and popular staple food in Africa. It is cultivated in the tropic mainly for its carbohydrate roots. The largest cultivation occurs in Africa with an estimated annual production of 102, 6 million tons in the continent. Apart from the roots, the leaves are eaten as vegetable. Cassava's combined abilities to produce high yields under poor conditions and store its harvestable portion underground until needed make it a classic "food security crop". In addition, once established, cassava is relatively drought tolerant. However, cassava is faced to many constraints. The biggest biological constraints to cassava production and productivities in Africa are the pressure of pests and diseases which need to be addressed.

### **2.1.2. Results of the Survey for strengthening continental wide - cassava protection initiatives against major diseases (Nana, IAPSC)**

To fulfill one of the Recommendations of the IAPSC's group of experts, Steering Committee and General Assembly meetings of march 2008, a study was conducted in Angola, Burundi, Cameroon, Cote d'Ivoire, Mozambique, Liberia and Uganda. Funded by the AUC, the study aimed at: increasing food security and nutrition for rural and urban poor through boosting cassava production with the involvement of all stakeholders. Mr. Nana highlighted on the objectives of the study which were to understand cassava germplasm spread and planting material multiplication and distribution as well as linkages in Africa; to establish list of main pests affecting cassava production, stakes and germplasm transfer; to do, where possible, an inventory and assessment of laboratories involved in cassava diseases diagnostics. Activities carried out during this survey were numerous. Besides gathering secondary data, a survey to specific countries enables the team to not only sensitize member countries producing cassava on the risk involved in germplasm and planting material exchange; enhance cassava diseases monitoring and diagnostics; examine stakeholders linkages.

As results for Cassava germplasm, in all countries visited, cassava land races from different regions and countries were being collected to select the ones with better performance, higher quality and better yield in each production region. However, only IITA-Ibadan had in vitro and in the field cassava germplasm banks. National germplasm bank with the selection and improvement of local cassava cultivars through a National Program of Cassava Improvement exist in a few countries. Furthermore cassava breeding programs for identification of high yield cultivars showing resistance to pests and diseases, and a good adaptation to different regions with specific environmental conditions was found in IITA-Nigeria.

Concerning the planting material multiplication and distribution for cassava growers, there were Primary (Agencies), Secondary (Growers), Tertiary (farmer groups) that develop a multiplication and distribution system for improved root and tuber planting materials in order to increase their availability to smallholder farmers. The three planting material systems of production, notably traditional system, semi-traditional system and complete seed system were investigated. The latest seed system was absent in all countries visited while the traditional seed system was more practiced.

With regard to cassava diseases monitoring and diagnostics a list of diseases was established and their severity and incidence described. Main diseases affecting cassava production and productivities in countries surveyed included African Cassava Mosaic Virus, Cassava Vein Mosaic Virus, Cassava Brown Streak Disease, Cassava Bacterial Blight, Anthracnose, Fusarium, Cassava Green Mite, Cassava Mealy Bug, White flies and grasshoppers. Controls of these diseases require the integrated pest and disease Management approach which unfortunately was not being appropriately done.

Focusing on the stakeholders linkages in cassava production and diseases control, it was pointed out the Insufficient Implementation mechanism(s) for effective linkage/integration into commodity chain (researchers-universities-extension staff-farmers, traders-consumers), the development mechanisms for “backward” linkages, the insufficient support to producers and advocated to restore confidence of farmers in cassava production. The SPS Capacity Evaluation of specific African countries with regards to pest diagnostic capacity, pest risk analysis, pests surveillance, exotic pest response, inspection system and pest reporting, and export certification was identified to be poor and needed to be addressed. The workshop helped to member countries of AU to adopt proper management strategies to address legal, political and technical constraints of cassava production and protection so as to increase trade and reduce poverty in the continent.

## **2.2. Cassava production constraints**

Presentations from countries like Angola, Burundi, Cameroon, Liberia, Ivory Coast, Mozambique, Nigeria and Uganda focused on reviewing cassava production and uses in their countries, germplasm maintenance and diversification, available planting materials and distribution, monitoring and diagnostic of diseases and pest, stakeholder linkages and major constraints of cassava production. Cassava being presently grown throughout the Sub-Sahara Africa; increasing and improving cassava production can certainly accelerate the achievement of food security and enhance the alleviation of poverty in Africa. But major constraints of cassava production is the use of low yielding varieties, pests and diseases and poor methods of utilization. This confirmed the results of the survey.

## **2.3. Cassava germplasm and planting material exchange**

### **2.3.1. Cassava germplasm conservation, improvement and safe movement in Africa (L. Kumar, IITA),**

IITA besides cassava does carry research on crops like yam, *Musa* spp; Maize, Cowpe and Soybean. It is implanted in African countries like Nigeria, Benin, Cameroon, Ghana, Malawi, Mozambique, The total germplasm of these crops is 28,000 accessions among which are 4,200 cassava clones. IITA possesses field bank and in-vitro gene bank which represents about 56% of the total collection. The major party of this collection is mainly acquired from Africa. However some accessions came from Brazil, and Australia. These collections are done per countries and 40% of accessions are geo-referenced. The sustainable conservation of cassava germplasm is done by field bank, in vitro banking which reduces risk of loss and facilitates exchange and cryopreservation. The author illustrated the cassava in vitro banking which start from field bank, thermotherapy, sterilization, and meristeming or indexing and distribution. More than 10% of improved cassava germplasm has been

distributed during the past 10 years. The DNA markers for identification of duplicates is ongoing at IITA. From 2000-2007 a total of 5389 accessions have been distributed to NARs and Universities. Twenty seven (27) African countries besides Japan, USA, Denmark and Australia were recipients of the germplasm.

For safe distribution, IITA does ensure germplasm health control, viability, regeneration and pathogen identification and control. Diseases management options which involved exclusion, prevention, reduce spread and impact, avoidance by cultural methods and reduce sources of Inoculums. Compliance with regulations is essential for international and regional distribution of cassava germplasm which is an essential component of crop improvement. The author also recalled that ensuring germplasm health is an expensive business that requires infrastructure, diagnostic tools, contained screen houses, well trained staff, knowledge on pathogens, understanding regulations and funds. .

The production of pest and pathogen free germplasm is achieved through treatment which can eliminate fungal, bacteria, insects and other pests but not viruses. He said that in vitro propagation (tissue Culture) does not eliminate viruses. However tissue culture material must be cleaned (thermotherapy, meristeming, indexing, selection) and certified.

He concluded his presentation by saying that training and capacity building should be an ongoing process to ensure good germplasm production and distribution.

### **2.3.2. Cassava planting material multiplication and distribution (Kanju, IITA),**

The production constraints of cassava are pests and diseases, poor Agronomic practices, poor soil fertility, poor planting material and drought. It takes 7 to 8 years to develop a new variety. Consequently the variety released must be carefully multiplied and distributed to cassava growers. This vegetative multiplication has a low ratio. It is perishable, expensive and there is no incentive for private sector to produce planting material. Farmers do not care to specifically multiply stems but use the stems that come as a secondary product from a normal cassava root production field. Farmers cannot afford to buy improved planting material. IITA has put in place a rapid multiplication technique which has been developed to overcome the problem of low multiplication ratios for the benefit of Germplasm evaluation (breeding programs for multi locations), Germplasm exchange (regional or international distribution, using tissue culture techniques to clean diseased plants) and Seed multiplication (used in multiplication of improved varieties, to increase stocks for distribution to the farming communities). The author also emphasised on the assessment of seed quality and plant health within cassava multiplication schemes which have seven stages. Guidelines for the seven stages for stem multiplier include procurement of planting material, planting location, agronomic requirements, management of diseases and pests, harvest and seed specification.

### **2.3.3. Cassava planting material multiplication and distribution: Experience of FAO-Burundi,(S. Kaboneka, FAO/Burundi),**

Cassava contributes to 70% of the Burundian population food need. It is the 3<sup>rd</sup> staple food after banana and sweet potato. The yield is about 7 tons per ha. Farm size varies from ¼ to 2 ha. 83per cent of planting material is from traditional farm, 2% from selected multiplication farm by agricultural extension services and 15% from various sources. Cassava planting material production in the country has step up from 7 ha in 2005 to 100 ha by 2010. Six varieties are currently being produced. These include: Abbey-ife, MM96/0735,

MM96/0287, MM96/7633, MM96/7204, and MM96/5280. This last cited cultivar makes up 71% of production in the country.

## **2.4. Cassava stakeholders linkages**

### **2.4.1. Stakeholders linkages: Experience of Great Lakes Cassava Initiative (P. Banyankiye, CRS),**

A four years project which started in December 2007 concerned six countries of Central and East Africa: Rwanda, Burundi, Democratic Republic of Congo, Kenya, Tanzania and Uganda. The total budget of this project is estimated at US \$ 22.3 million. It was funded by Bill and Melinda Gates Foundation CRS private funds. Interesting is the collaboration of several stakeholders (IITA, NARS, Local partners and NGOs). The objectives of this project include:

- Planning and Partnership Objective: CRS and partners plan and partner effectively
- Disease Objective: Improved knowledge and disease diagnostics for sustainable management of cassava viruses and virus vectors
- Training Objective: Develop training modules and train partner trainers
- Seed Objective: Farmers access improved and preferred cassava varieties for production
- Farmer Group Objective: Cassava production scaled up through farmer groups.

The project partnership concerns farmers' groups which are the hub scalability and adoptions. Supported by partners, they provide planting material, ensure the appropriateness of technologies and form a dense network for information dissemination and disease surveillance. For local partners; Local NGOs and extension agencies are supported by CRS country program to share technologies and training materials with farmers. NARS (National Agricultural research systems) help farmers assess and adapt technologies and knowledge through collaborative research. NARS also work with CRS to develop training materials and awareness literature for use by local partners. IITA, in close partnership with selected NARS scientists and with support from International organizations, generates new technology and knowledge related to the two diseases, including detection, epidemiology, transmission and spread. Lessons learned from this partnership are that:

- Linkage between partners can make success of the targeted objectives.
- Collaborative actions are a key for success.
- Training in M&E and document all data. Assist the local partners to support farmers groups
- Farmers group to be close to their field for efficient follow-up, distribution and handling of planting materials
- Availing agronomic techniques will help the technician to address in time the invasion of diseases and pests.

### **2.4.2. Stakeholders linkages, case of Burundi, (Author, S. Ndikumagenge),**

In Burundi; there is a national committee for plant pests and diseases control. This Committee comprises about 20 representatives from ISABU, FAO, IFAD, CRS, World Bank, etc who work in 16 provinces of the country. The objective is to create a synergy among all the stakeholders and institutions involved in cassava production and protection. It ensures good Coordination and planing, monitoring and field evaluation of all activities. It

also provides recommendations in the area of the use of cassava varieties, phytosanitary, Coordination, and need requirements.

## **2.5. Cassava pests diagnostics and control techniques/methods**

### **2.5.1. Cassava diseases and pests diagnostic (T. Alacai, NaCRRRI).**

Dr. Alacai highlighted that there are different agents single or in combination like viruses, bacteria, fungi, nematodes and phytoplasma that cause major diseases to Cassava plant and products. The process of determining the cause and nature of a disease by examination and analysis may involve:

- Careful observation of symptoms by naked eye first while noting down extent, severity and nature of symptoms;
- Examination with equipment such as hand lens & microscopes – for signs & symptoms; fresh samples may be used or after incubation, isolation samples may be cultured;
- Detection of proteins & nucleic acids (DNA & RNA) of disease causing microorganisms in plant tissue.

Diagnosis can be at the whole organism, physiological, cytological, molecular or level. The increasing threat by plant diseases due to the evolution of pathogens, the elevated vector populations; globalization and climate change; makes imperative diagnosis which should provide basis for protection of plants from diseases through prevention and management measures. A rapid and accurate diagnosis of plant pathogens is critical for safeguarding agricultural production. This requires well trained pathologists (both field and lab); other procedures can be performed at site even by a person with no special training. Basic Physical infrastructure and facilities and funding as well as materials and supplies are needed.

For effective management of plant diseases, diagnostics should be implemented alongside disease monitoring, epidemiology studies and crop improvement. The author concluded by saying that: Control measures depend on proper identification of diseases and of the causal agents. Without proper identification of the disease and the disease-causing agent, disease control measures can be a waste of time and money and can lead to further plant losses. Steps of an accurate diagnosis of cassava diseases are the identification of cassava variety, checking of the disease symptoms, identification of symptom variability, searching for signs of disease causing agent, looking out for disease patterns, assessing host specificity, taking note of cultural practices and environment. These steps aimed at recognizing a disease and precisely identify the causal agents. The common diseases symptoms on cassava include necrosis, blights, chlorosis, leaf distortion and stunting. The processes of identifying cassava diseases using biological means, protein methods, PCR were illustrated.

### **2.5.2. Integrated Pest Management (Prof. Bahama, IAPSC)**

Prof. Bahama focused his presentation on the general concepts in integrated pest and disease management, organized in three sections. Diseases infection, resurgence and replacement, plant disease epidemiology and effect of climate change in the environment made up the first part of his presentation. Part two concerned the control methods used after the development of diseases which are the suppression or limitation of inoculums, eradication of hosts, the use of resistant and /or tolerant cultivars, the application of phytosanitary inspection, and quarantine activities, the use of cultural practices, chemical control. Any

combination of at least two of the cited control methods is called IPM. An application of various methods to some cassava pests and diseases.

### **3. RECOMMENDATIONS**

Considering the importance of this workshop held in Bujumbura, Burundi on 16-18 November 2009 and knowing the difficulties faced by African countries in implementing phytosanitary measures, especially on cassava production and protection. Participants made the following recommendations:

1. IPPC should respect the promise to provide internet connectivity, electronic materials, and follow up appointments of IPP Contact Points and editors in Africa.
2. Each African country should make a report on the status of pests of different crops (Cassava pests) in their countries and deposit on the AU-IAPSC.
3. AU-IAPSC should facilitate the creation of Centres of Phytosanitary Excellence (COPE) to help other countries to cope with phytosanitary principles in order to improve control of quarantine pests and to comply with ISPMs.
4. The African Union commission (AUC) should, through IAPSC, adopt IITA as a technical partner in aspects related to germplasm conservation and distribution of cassava, yam and banana in Africa.
5. NPPOs should be encouraged to conduct PRAs in order to base their decisions on scientific evidence for ISPM issues;
6. The National Governments and IITA should continue supporting capacity building of NPPOs for cassava pest and disease diagnostics;
7. Linkages between NPPOs and NGOs should be improved or established in order to know which crops are being improved, multiplied and distributed. The NPPOs should be able to check and control pest and disease outbreaks during the multiplication process and report to AU-IAPSC.

### **4. CLOSING CEREMONIES**

The Director of National Plant protection Organization of Burundi thanks participants and IAPSC for organizing the workshop. He further declared close the meeting. Participants positively appreciated the workshop, meaning that expected results have been reached.



## 5. ANNEXES

### 5.1 Annex1: Agenda

INTER-AFRICAN PHYTOSANITARY COUNCIL CONSEIL PHYTOSANITAIRE INTERAFRICAIN

## Workshop on cassava production and Protection.

Hotel Source du Nil, Bujumbura/BURUNDI, November 16-18, 2009.



## Agenda

### Day 1. November 16, 2009

8- 8.30. Registration of participants

Mr. Nana, IAPSC

8.30-10.00: **Session 1: OPENING CEREMONY:**

- Welcome speech: **Dr. Jean-Gérard MEZUI M'ELLA, Director of IAPSC**
- Opening speech: **Director of Agriculture, Republic of Burundi**

10.00-10.30: **COFFEE BREAK**

10.30-11.00: **Session 2:** Introduction of participants and Purpose of the workshop

**Bahama, IAPSC**

11.00-11.30: Cassava, an important crop for Africa:

**Bahama**

11.30-12.00: Survey of cassava diseases: results

**Nana, IAPSC**

12.00-13.30 **LUNCH AT VENUE**

### **Session 3: CASSAVA PRODUCTION CONSTRAINTS**

13.30-15.30 Countries` presentations  
Angola, Burundi, Cameroon, Liberia, Ivory Coast, Mozambique,  
Nigeria, Uganda

15.30-16.00 **COFFEE BREAK**

16.30-18.00 **DISCUSSION**

**Bahama**

### Day3. November 17, 2009

**Session 4: CASSAVA GERMPLASM AND PLANTING MATERIAL EXCHANGE**

8.30-9.30: Cassava germplasm conservation, improvement and safe movement in Africa  
**L. Kumar, IITA**

9.30-10.00: Cassava planting material multiplication and distribution **Kanju, IITA**

**10.00-10.30: COFFEE BREAK**

10.30- 11.00: Cassava planting material multiplication and distribution: Experience of FAO,  
**FAO/Burundi, S. Kaboneka**

11.00- 11.30: Stakeholders linkages: Experience of Great Lakes Cassava Initiative  
**P. Banyankiye, CRS (GLCI)**

11.30-12.00: Stakeholders linkages, case of Burundi **S. Ndikumagenge**

**12.00-13.30: LUNCH**

**Session 5: CASSAVA PESTS DIAGNOSTICS AND CONTROL TECHNIQUES / METHODS**

13.30 -14.30: Cassava diseases and pests diagnostics **T. Alacai, NaCRRI**

14.30-15.30: Integrated Pest Management **Bahama**

15.30-16.00: Discussion

**16.00-16.30: COFFEE BREAK**

16.30- 18.00: General Discussion and recommendations (round up and networking)  
**Nana, IAPSC**

18.00: **CLOSING REMARKS**

**Day3. November 18, 2009: Departure of participants**

## **5.2 Annex2. Brochure**

**CASSAVA PRODUCTION AND PROTECTION WORKSHOP: November 16-17, 2009; BUJUMBURA/ BURUNDI.**

**Information note for participants**

**1. Host Country**



The Republic of Burundi is a country in the Great Lakes region of East Africa bordered by Rwanda to the north, Tanzania to the east and south, and the Democratic Republic of Congo to the west. It has an area of 28,000 km<sup>2</sup> with an estimated population of about 9 million inhabitants. Although the country is landlocked, much of the southwestern border is adjacent to Lake Tanganyika. Burundi in general has a tropical highland climate, with a considerable daily temperature range in many areas. Temperature also varies considerably from one region to another. **In Bujumbura, the venue of the workshop, average temperature is now around 25°C.**

**2. Accommodation**

Hotel reservations have been made for foreign participants at 2 Hotels: Hotel le Bouquet and Hotel Amitié. Participants will be picked up at the Airport on arrival and also taken back to the airport at departure.

**3. Visa**



It is the responsibility of participants to obtain any official clearances and otherwise comply with any other relevant national legislation as may be necessary to attend the workshop. Prior to travel, please ensure that you have complied with any Burundian immigration formalities that may be applicable to you. However, for countries without Burundian diplomatic representation, visa is obtained at arrival. **The visa fee is 40 US dollars** (note that only US dollar is accepted by immigration services) and will be reimbursed upon presentation of receipt. **The visa is free of charge for those travelling on service passport with official authorization from their Government.** The **yellow fever vaccination card** is obligatory. In case of any problem, contact Prof. BAHAMA Jean-Baptiste on his mobile phone **77743000**.

**4. Presentations**

It has been requested to all participants to make a presentation. In order to ease preparation, we would appreciate receiving the text of the presentation at the latest on Thursday 12<sup>th</sup> November 2009

**5.3. Annex3: list of participants**

**WORKSHOP ON CASSAVA PRODUCTION AND PROTECTION  
BUJUMBURA - BURUNDI  
Hôtel Source du Nil, 16 – 18 November 2009**

**LIST OF PARTICIPANTS**

<b>N°</b>	<b>Country</b>	<b>Name/Designation</b>	<b>Adress</b>
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