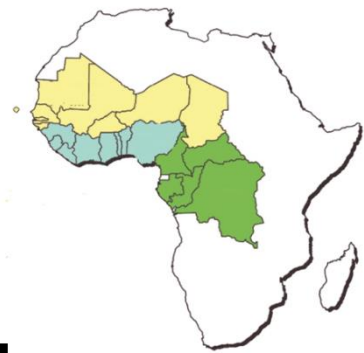


# **African Center for Research on Bananas and Plantains (CARBAP)**

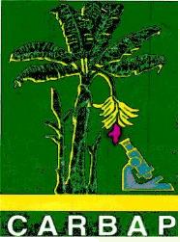


**Technical Consultation on Prevention and  
Management of Fusarium Wilt Disease of Banana  
9-10 December 2014, Rome**

## **IMPROVEMENT OF BANANA & PLANTAIN IN WEST AND CENTRAL AFRICA**

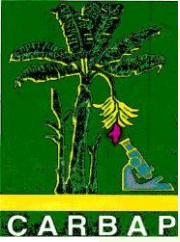
**Michel NDOUMBE, Acting Director**

Pascal NOUPADJA, Lucien IBOBONDDJI, Leopold SADOM,  
*CARBAP*



# Outline

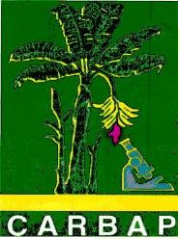
1. Strategic stakes for banana and plantain Research and Development (R&D) in West and Central Africa
2. Presentation of CARBAP
3. Improvement programme of CARBAP
4. Management and development of the Musa genetic resource collection
5. Way forward



# Strategic stakes for banana and plantain Research and Development (R&D) in West and Central Africa

- ❑ General context of the B & P sector in West and Central Africa :
  - Production: 11 Mt annually (15-20% of world production)
  - Consumption 125-130kg/hbt/year (very important crop)
  - Rich in energy and nutritional content
  - Low productivity: 4-7t/ha annually whereas a potential of 30 -35 t/ha





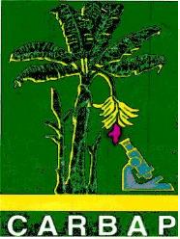
# Strategic stakes for banana and plantain Research and Development (R&D) in West and Central Africa

□ The R&D stakes involve:

- Sustaining food security by improving productivity and production
- Contributing in the development of a sustainable agriculture that is environmentally friendly
- Promoting and developing quality products and by-products, adapted to consumers' needs
- Diversifying productions and improving the income of producers (efficient farming systems)

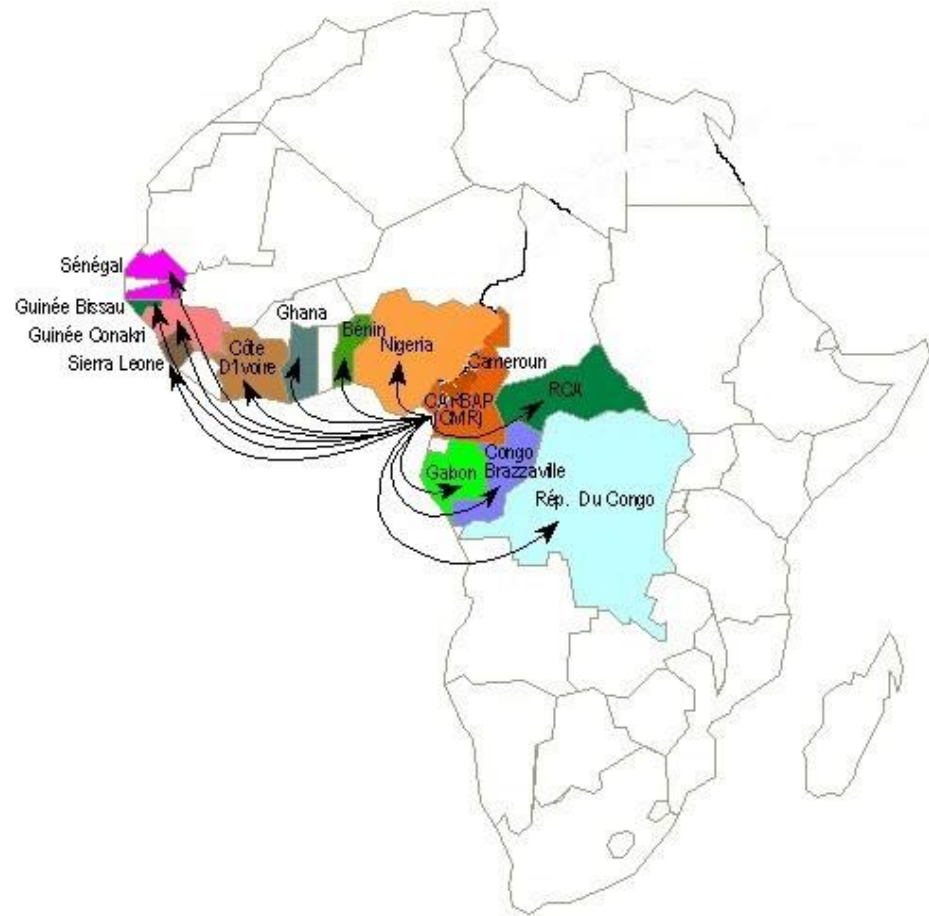




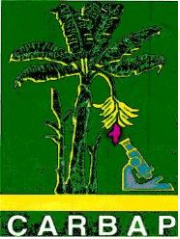


## 2. Presentation of CARBAP (1/4)

- Created in 2001 under the auspices of the Conference of the Ministers of Research and Development of West and Central Africa (COMRED/ACC);
- Inter-governmental agreement: *Cameroon, Congo, Gabon, Equatorial Guinea, Central African Republic, Democratic Republic of Congo*
- Headquarters Agreement with Cameroon (2013):  
*CARBAP is an agricultural International organization with an international legal status*



*Regional Deployment of CARBAP*

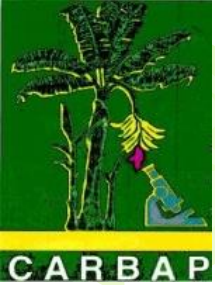


## 2. Presentation of CARBAP (2/4)

- CORAF/WECARD Base Centre (2006),  
✓ *On the process on being erected as the CORAF Regional Centre of Excellence on bananas in West and Central Africa.*
- CEMAC Centre of Excellence on bananas and plantains (2007), under the aegis of PRASAC

### **3 Research Units:**

- **Research Unit 1:** Varietal Improvement, Processing, and Valorization of the Genetic Resources
- **Research Unit 2:** Sustainable Production System
- **Research Unit 3:** Economic information system and impact measurement of the innovations



## 2. Presentation of CARBAP

### Human Resources

- About 120 staff, including:
  - 18 researchers
  - 20 research technicians
  - Researchers and executive staff/managers provided by national and international institutions
    - France : CIRAD
    - Congo: DGRST
    - Central African Republic
    - RDC
    - Cameroon: IRAD, Univ. Yaoundé 1 and Dschang
  - Admission of:
    - Trainees (Short duration)
    - Postgraduates or PhD students (Gabon, Congo, Togo, Cameroon, Benin, etc...)



## 2. Presentation of CARBAP (3/4)

**Strategic Plan (2013-2022) / Operational Plan (2013 - 2017)**

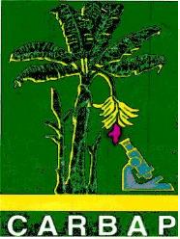
### **Overall Objective**

*Improve the living conditions of the actors of the plantain and banana sectors in West and Central Africa.*

### **Specific Objective**

*Improve the productivity and competitiveness of the plantain and banana sectors in the intervention zones of West and Central Africa.*

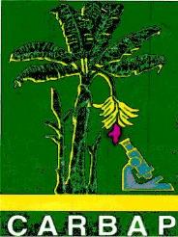




## 2. Presentation of CARBAP (4/4)

04 major outcomes to be attained

1. *The technologies and innovations on production, conservation and processing of plantains and bananas are developed.*
2. *The technologies and innovations on production, conservation and processing of plantains and bananas are valorized.*
3. *Options for decision-making on the plantain and banana sectors are developed and disseminated*
4. *The CARBAP institutional framework is reinforced.*



### 3. IMPROVEMENT OF BANANA & PLANTAIN (1/5)

- ✓ Develop a control and certification method for plant material (*control tools to prevent the spread of diseases and ensure variety purity*)
- ✓ Manage and preserve the field collection of Banana and Plantain (*ensuring diversity in view of preventing genetic erosion*)
- ✓ Improve the knowledge of the genetic resources (*creation of new hybrids that are resistant to diseases and more efficient and that meet the requirements of users*)
- ✓ Select and disseminate elite varieties (*enable users to choose varieties of interest that meet their requirements*)

### 3. IMPROVEMENT OF BANANA & PLANTAIN (2/5)

Two strategies traditional improvement were developed CARBAP:

1. The first strategy (3x / 2x) used for the creation of tetraploid hybrids was to develop into one crossing tetraploid genotypes resistant plantains. One of the products of this traditional way is the hybrid CRBP-39 resistant to MRN and broadcast in over 50 countries by *Bioversity*.

Most of its tetraploid, although resistant and modest quality, are less sterile with seeds.

It should also be noted that almost all AAAB hybrids are likely to express the symptoms of virus streak banana (BSV) caused by the activation of viral sequences integrated into the genome 'B' of these cultivars.

### 3. IMPROVEMENT OF BANANA & PLANTAIN (3/5)

2. New medium-term strategy towards creating supposedly sterile triploid hybrids and especially not contain active BSV sequences. Triploid offspring are created by hybridization between diploid and tetraploid parents better parents obtained previously. Obtaining these triploid hybrids is facilitated by the use of *acuminata* clones building on crossing over and segregation.  
  
The establishment of this pathway has allowed CARBAP produce type triploid hybrids *acuminata* (AAA) or triploid genome with a 'B' carrying activated BSV sequences, combined with multiple resistance to fruit qualities.

### 3. IMPROVEMENT OF BANANA & PLANTAIN (4/5)

#### Crosses made in Njombe (Cameroon)

<i>Femelle parent</i>	<i>Male parent</i>
CRBP 039	A 26
CRBP 085	A14
CRBP 753	BANKSII IIC
CRBP 755	BANKSII ITC 1342
CRBP 776	Calcutta 4*
CRBP 832	CRBP 436
CRBP 838	I D N 077
CRBP 969	K.T.RUANG
CRBP 978	KHOM
D.KALAPUA	KHOM BAO
FHIA 21	KM5
I D N 077	L.VUNALIR
KALAPUA 2	LANG VUNA
KHOM BAO	M 53
KM5	PA RAYON
LANG VUN	TOMOLO
PELIPITA	YAGAMBI
TOMOLO	

#### Hybridization

Different combinations produced nearly 4,017 seeds sent to the Tissue culture laboratory for rescue zygotic embryos



CARBAP

### 3. IMPROVEMENT OF BANANA & PLANTAIN (5/5)

New hybrids of Banana and Plantain resistant to some disease developed by CARBAP



*CARBAP 969*



*F 568*



*F 709*



*CARBAP 838*





CARBAP

## 4. CARBAP *Musa* GENETIC RESOURCES (2/2)

- ❑ One of the world's **largest cultivated** field collection of banana genetic resources:
  - 596 accessions including **135 plantains**
  - 5 plants per accession

Bloc	Genomic diversity	Number of accessions
1	Triploids	210
2	Plantains	135
3	Edible diploids (PNG)	158
4	Wild diploids (inedible)	80
5	Hybrids	09
	<b>TOTAL</b>	<b>596</b>



CARBAP

## 4. CARBAP *Musa* GENETIC RESOURCES (2/2)



**Partial view of the CARBAP Field Collection of Banana Plantain**



CARBAP

# WAY FORWARD

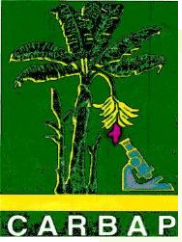
## ***Suggested area of collaboration***

Coming back to Foc TR4,

- One of the CARBAP hybrid (K74) tested at the University of Wageningen (via CIRAD)
- CARBAP has something to offer for the creation of resistant varieties as far germplasm availability is concerned







# Thanks For Your Kind Attention

