

## MusAfrica CATCH-UP MEETING WITH COUNTRY REPRESENTATIVES

**Date:** 25<sup>th</sup> March 2021

**Time:** 2.30pm-5.50pm (East African Time)

**Venue:** Virtual on Microsoft Teams

**Present:**

	<b>Country</b>	<b>Representative</b>	<b>Institute</b>
1	Burundi	Niyongere Celestin	ISABU
2	Cameroon	Gerald Ngoh Newilah	CARBAP
3	Côte d'Ivoire	Traore Siaka	CNRA
4	Ethiopia	Alemayehu Chala	Hawassa University
5	Ghana	Beloved Mensah Dzomeku	CSIR
6	Kenya	Nasambu Okoko	KALRO
7	Mauritius	Babita Dosouruth	FAREI
8	Mozambique	Cecilia Ruth Bila	IIAM
9	Malawi	Misheck Soko	ARC Bvunbwe
10	Rwanda	Gaidashova Svetlana	RAB
11	Tanzania	Mpoki Shimwela	TARI
12	Nigeria	Akiyemi Sunday	NIHORT
13	South Africa	Mieke Daneel	Agricultural Research Council
14	Burkina Faso	Drissa Sereme	INERA
<b>Alliance of Bioversity-CIAT participants</b>			
15	Uganda	Priscilla Marimo	Alliance Bioversity-CIAT
16	Uganda	William Tinzaara	Alliance Bioversity-CIAT
17	Uganda	Lewis Machida	Alliance Bioversity-CIAT
18	Benin	Aman Bonaventure	Alliance Bioversity-CIAT (MUSAfrica-Co-Coordinator) co-convenor
19	Uganda	Beatrice Ekesa-Onyango	Alliance Bioversity-CIAT (MUSAfrica Coordinator) Chair/ Convenor

**Absent with Apology:**

	<b>Country</b>	<b>Representative</b>	<b>Institution</b>
1.	Congo	Nganga Nzomono Anselme	IRA

**Absent:**

	<b>Country</b>	<b>Representative</b>	<b>Institution</b>
1	Benin	Capo Chichi Elodie Béatrice	INIRAB
2	Uganda	Priver Namanya	NARO
3	Gabon	Myrienne Andeime	IRAF

## Agenda:

- Self-introduction through chat immediately after logging in (type Name, position, Institution and Country representing)-10minutes
- Meeting introduction (Beatrice welcomes the participants and goes through the agenda and other requirements)-5minutes
- Country updates (each country representative based on alphabetic order, gives country update (i.e. new/emerging findings with regards to banana production techniques, disease occurrence and management, postharvest handling, value addition etc.) 5minutes/country (1hr 15minutes in total)
- Discussion and Q&A following the updates (30minutes)
- Updates from Coordinators (Aman and Beatrice): Open R4D proposal calls, training and scholarship opportunities, conferences, new publications (20minutes)
- AOB and closure (10minutes)

## Introduction:

Following self-introductions through the Microsoft teams' chat area, The presence of all the Country Representatives and colleagues from the Alliance of Bioversity-CIAT was acknowledged by the chairperson of the meeting (Beatrice) and she welcomed all the participants to the meeting. It was indicated that the main purpose was to get an idea of what was going on with regards to banana R4D in the different countries and establish ways of sharing knowledge, skills and enhancing cross-country and cross-institution collaboration. With that, the country representatives were able to move forward with the country highlights.

## Country Updates:

**Cameroon:** There are several government-supported projects being implemented to boost banana production mainly through the Ministry of agriculture. Regarding disease about 3 years ago a collective action between CARBAP, IITA and FAO carried out a review to establish presence of banana disease, no BBTv was reported but Banana streak virus (BSV) was reported especially in South Region of Cameroon. When it comes to postharvest handling and value chains in Cameroon, CARBAP is involved in the RTBFoods project which has three main work packages the first one on surveys to understand consumer preference when it comes to banana and by-products; second work package is on laboratory analysis to translate criteria that helps understand consumer preference into laboratory parameters; the third is on participatory evaluation of hybrids and landraces where this focuses on two breeding programs one led by IITA (4 hybrids) and another led by CARBAP (4 hybrids). The objective is to come up with hybrids that suite consumer preference.

**Cote d'Ivoire:** There banana work in Cote d'Ivoire is mainly on plantain, there are also effort on off-season production involving mixing legumes and plantains this is being carried out in between 2-20ha. Governments is working on helping them to increase production. With regards to pest management the main challenges are nematodes, weevils, and black sigatoka. To address black sigatoka there is promotion of hybrids from FHIA and IITA which are resistant to Sigatoka. For weevils we have fungal application to fight weevils, for Nematodes the use of plants that are nematicides are being used to fight nematodes. Regarding value addition, RTBFoods project is present are 11 varieties

tested in 2020 and this year the testing is of an additional 9 varieties being tested This is being carried out in collaboration with CIRAD.

**Ethiopia:** Banana research in Ethiopia is not very active despite increasing banana production. The number of farmers initially producing banana was low, there has been reported increase in banana farmers and the land being allocated to banana (2018-2.8m households 2020-3.4 million households; uptake in terms of area of production 2018-59,000, 2020-67,000, yield 2018-8.3 tones/ha 2020-8.0tonnes/ha). The focus for Ethiopia has also been Ensette. The main diseases include Sigatoka becoming more prevalent, BXW which is affecting mainly Ensette. There has been a suspected BBTD case in the Arba Minch region, and this needs to be further followed up for verification/confirmation. COVID had great influence on banana marketing especially transportation but this is getting better as the restrictions are being relaxed.

More research in Ethiopia focuses on Ensette where there is work on disease survey, clonal diversity characterization, resistant screening for disease and testing the tools to extract the juice for ensette. Currently there is also been great focus on production of fibre from different clones of ensette in Ethiopia and interest in this seems to be building up, there is need to see whether this is an avenue to further pursue.

**Ghana:** No major active banana project at the moment but normal research being carried out through engagement of interns/students One of the main research highlights has been the move towards use of botanicals (pheromones; clove, Neem) to control weevils. A publication on this is already out and will be shared with the team after the meeting. There is also on-going work on how climate change is affecting carotenoids in plantain pulp considering the ultraviolet rays, a publication is already out and this will be shared with the team

**Kenya:** In Kenya banana is one of the main flagships within KALRO. Currently there are projects being funded by the government; examples include The Kenya Agriculture Climate Smart Project' Agricultural Inclusive project where we have 2 technical documents currently in use 1. An inventory of climate smart banana technology and management practices; 2 TOT manual for banana. stakeholders in 4 counties have already received training, 82 extension lead farmers and service providers trained on banana value chains. The objective is to take banana to commercial level so that it supports both food security and livelihoods (commercial enterprises). The project on Natural Agriculture Inclusive Project, under these 10 more countries will be trained and banana production will be promoted in these additional counties.

Currently there is a banana germplasm collection in Kisii that holds the largest banana collection in Kenya more than 100 accessions.

Although great effort has gone into collecting EAH Bananas and dessert banana varieties, production of plantain hasn't been easy as multiplication especially in-vitro (TC) would be happy if information can be shared to improve plantain materials multiplication. Sunday Akiyemi of Nigeria indicated they would be happy to provide the support and information needed in enhancing plantain production in Kenya especially the use of TC material.

Following the earlier presentation from Burundi, Kenya indicated the need to also assess and introduce the provitamin A rich bananas in Kenya, it was indicated that this attempt had been initiated

earlier but stopped on the way, therefore Nasambu would follow up with Beatrice Ekesa on this to have the moved forward.

Regarding diseases it was indicated that in Kenya black sigatoka is a challenge especially during heavy rains. Also, cigar end rot accelerated by warm, wet and humid climate.

When looking at postharvest handling and value chain addition, Kenya is working closely with a private company 'Twiga Foods' to enhance banana value addition and bananas are now being transported in better packages (plastic crates) and they are reaching various parts of Kenya. For value addition most communities have embraced the use of ripening chambers and there are various private partners interested in processing especially banana flour and wine and crisps especially in Kisii county. Forums to enhance timely and location specific advisory for project beneficiaries is being reinforced and this will target various crops including banana (Nasambu will be sharing more information as the NETWORK continues)

There is a shortage in staff in banana research for Development as there aren't many professionals in banana value chains-it was agreed that these gaps would be identified and linkages to existing expertise either at the Alliance of Bioversity-CIAT or enhance cross-country collaboration would be necessary to help fill some of these gaps -*Beatrice will follow up on this.*

**Mauritius:** In Mauritius banana is the most consumed and second most produced fruit in Mauritius after pineapple. The main variety grown is the Cavendish banana (90%) which is mostly eaten ripe. It is also the preferred variety for cooking of dishes and processing into crisps. There is no plantain cultivation. The other dessert-type banana varieties fall into the ABB (Pisang awak subgroup) and AAB (Silk) which are grown as mainly as backyard or field border crop. Banana is not the staple food of Mauritius. The overall yield of the island is currently low, 20-22t/ha, mainly because most of the production is carried are located on marginal (sub-optimal) conditions. Following the lapse of preferential trade for export of sugar to Europe, there has been for a major change in the non-sugar sector in the past decades. There is also move towards extensive banana production using recommended practices (including quality planting materials) and improved yield of 30 to 50 t/ha have been obtained. The most challenging diseases are Eumusae leaf spot and the quite recent one (as from 2014), the banana freckle' which affects mostly the common Cavendish variety. Some varieties have been found tolerant especially the FHIA17, FHIA25, FHIA23, FHIA02 and FHIA01 hybrids and because of this, people are now beginning to appreciate the FHIA hybrids. Proactive measures to avoid TR4 are already in place. Currently mutation breeding to improve local varieties against FoC is ongoing in collaboration with the IAEA. Putative mutants of Cavendish banana have been sent to South Africa at Stellenbosch University to be able to test their response to TR4. This is in preparation incase TR4 gets to Mauritius. Formosana (TR4 tolerant Cavendish banana GCTCV-218') was introduced in 2016 from Bioversity International and it has adapted well to the local conditions and in event that TR4 reaches the shores of Mauritius, this variety will serve as backup to local Cavendish banana. Babita also agreed that as in other countries, weevils are also a problem in Mauritius and there is need for a good package for control of weevils, as currently Mauritius has banned the use of insecticides for its control. Babita wished to have support from other countries to help look into any botanicals that is showing effective results. To a concern of Nasambu (Kenya) regarding poor response of plantain under TC conditions, Babita, agreed that also faced challenges in multiplying plantain (recalcitrant nature).

Considering value addition, green banana is sold as crisps/chips, ripe banana is used as an ingredient for pastry making. FAREI has developed a protocol (Australia funded project) for reducing waste of overripe banana by making bulk banana puree and storing it for later use in pastry. Babita also indicated the ongoing research interest is also on banana fibre, which has potential to be developed into biodegradable materials to reduce use of plastics, (as mentioned by the Ethiopian representative).

**Mozambique:** In Mozambique, the main banana variety is the cavendish banana produced by small-holder farmers and the private sector. In addition to the 10 local banana varieties, 14 varieties have been introduced into Mozambique through collaboration with Bioversity International. The banana diseases of concern include Panama disease which affects most regions especially in the North and it greatly affected banana production leading to bankrupt of a former banana company, now a new company is using Formosana GCTCV-218 banana variety which is tolerant (not really resistant) to panama disease instead of using William variety. BBTd which was first reported in south of Mozambique in 2016 but has now spread to Maputo. MOA is leading several institutions working in order to mitigate the disease. Banana seedling production at TC laboratory is happening and being distributed free of charge to small farmers affected by BBTd. Experiment to evaluate drought tolerance of 3 banana variety, plantain 17, William and banana red variety. There are also some local cooking bananas 'apple banana' 'monkey banana' but at a very small scale. In the borders surveys to establish presence of TR4 are being done and disease was found, where the disease was identified the plants were injected with a herbicide to kill them and the plants are buried-There are also studies going on to assess whether fumigation of the soil or flooding of soils works and which of the two is better. In the farms there are baths at the entrance to ensure the boots/vehicle tires are disinfected when getting into the farms and companies-These are the management practices going on. NB: TR4 was spotted on a private firm.

**Burundi:** In Burundi there is banana production across the country. There are the EAH Bananas, dessert bananas, beer bananas (65% of all bananas grown in Burundi) and plantains in lowlands. There is also the FHIA varieties and FHIA 17 and FHIA 25 which are liked by community. Here is government support to maintain banana germplasm collection in Mosso 250 cultivars. Through IFAD funding we have a project called PRODEFI project has 2 components (seed systems and good cropping practices-rehabilitation of banana). EU has also developed a banana strategy that is being used to see on how to put together a banana platform for stakeholders where actors can come together and discuss and see how to work together along the banana value chain (Some members-especially Kenya requested that the strategy be shared, this is to be followed up by Beatrice)

Burundi also reported having officially released 5 provitamin A rich banana varieties originally from outside Burundi, this was done in close collaboration in the variety release body in Burundi ONCCS and Bioversity International, so now the provitamin A rich bananas are within the national germplasm collections and are also open to multiplication and sharing with farmers.

The main disease challenges in Burundi are: Fusarium wilt, BBTd, nematodes and weevils, BXW was there and destroyed a lot of plantations and farms but great effort towards its management and control is going on. The technology developed on BXW to be shared between Nasambu and Celestin.

**Malawi:** Malawi is a banana region; thus Banana is a very important part of the farming and diet system. Although there are a few local varieties, most banana mats are mainly ABB. Cavendish

were the main commercial crop grown by local farmers but due to BBTB most plantations were lost. Commercial growers were there but this has significantly reduced due to BBTB's effect on Cavendish. There are however a lot of interventions with significant support and designed strategic initiatives from Bioversity International most interest farmers are coming back to their main crop – banana. The diseases however, seems to be coming back, thus the needs to reinforce measures. Although BBTB is the main disease, other diseases present include Fusarium wilt (Panama), Black sigatoka. The local varieties that were previously not valued are now gaining value and becoming a very important part of the farmers' farming and diet system. Seed from TC lab comes from University, Vitropic in France and Du Roi in South Africa. There is one local investor who has established a tissue culture lab, which has just started operating and we are yet to witness its production. In addition, through macro propagation and splitting of corms, farmers produce low cost seed and share.

Through EU and World Bank funded project, there is collaborative initiatives to bring back the banana through the clean seed systems and removal of old banana plantations and intensive surveillance and logging of infected plants.

Through the collaborative research with Queensland University of Technology and IITA-Kenya which was funded by the Bill and Melinda Gates Foundation Malawi has been evaluation GMO Cavendish and plantains for resistant to BBTB in the field and the Glasshouse respectively. Some lines are already showing promising results with regards to tolerance to BBTB. The project however has stalled because of funding, but it's very worthwhile continuing.

Through working together with IITA other hybrids such as NARITAs and PITA have been introduced in Malawi.

**Rwanda:** Banana was noted to be a very important crop form Rwanda and the two main categories include the cooking banana and the beer banana having equal proportions of production and utilization, with dessert banana filling up a small portion. Regarding disease there is BBTB that was initially localized in small areas but currently in Kigali and other higher altitude areas. As for BXW better ways of managing and controlling it are being utilized especially the single-disease stem removal technique (developed by scientists from the Alliance of Bioversity International-CIAT). This technique has proved to be very efficacious and cost effective and there are plans to scale it further within Rwanda. Digital tools to monitor, identify, report and provide information to control and manage BXW have also been developed. This BXW app is freely available for download on Google store. Farmers have suggested the use of this in other disease management too-need to follow up with Svetlana to establish the similarities and differences between this tool and other tools that have been developed by scientists within CG centers.

With regards to seed production there is a private sector who has just began doing that in Rwanda and more details on this will be shared in subsequent meetings.

**Nigeria:** For Nigeria regarding banana pests, weevils seem to still be persistent with little difference being observed. Black sigatoka still a challenge although the prevalence is low compared to previous years. BBTB has entered Nigeria.

Regarding seed systems, acceptability of different banana varieties is different for different communities, so these evaluations are carried out for different communities. For value addition, in

addition to producing food items, there has been advances in use of the waste from banana, there has been production of soap from banana/ plantain peel ash and the idea of banana fiber would also be very good for Nigeria.

The Nigeria team was requested to check with IITA team in Nigeria in order to gain more support when it comes to banana disease management and other banana value chain techniques and expertise that could be available within IITA-Nigeria.

**Tanzania:** In Tanzania banana is one of the main food crops and production is mainly in north west and north east regions of Tanzania where there is mainly coming banana production (EAH Banana). Cavendish banana is also grown in most parts of Tanzania. The RTBFoods project is also being implemented in Tanzania in collaboration with Bioversity International, IITA and NARO-Uganda, there has been introduction of NARITAS, NARO BAN. Additional collaboration with Bioversity International has also seen the introduction of provitamin A rich banana varieties in Tanzania, efforts are currently underway to move forward with official release of preferred varieties of the PVACs-rich bananas. TARI has also partnered with IITA and University of Queensland on efforts to counter Foc TR4.

**South Africa:** In South Africa, cropping systems are largely based on Cavendish banana and mainly commercial scale. Tissue culture laboratories are well established and are a key source of seed. Efforts to plant plantains have been made but this hasn't taken off yet. The control of nematodes (trapping), yellow sigatoka and panama disease is well managed, and the diseases seem to be under control. The south Africa team was also involved in testing the varieties from Mozambique including Formosana GCTCV-218'. BBTD outbreak on one corner of the country was worrying but this is being handled through complete uprooting and replacement with TC materials. The current challenges include cold, frost, drought and hailstorms. On post-harvest and value addition, most of the fruit is sold as fresh fruit, there is also production of banana flour/powder from green banana which is used as an ingredient combined with wheat and use in confectionaries.

**Burkina Faso:** Banana is an important crop for Burkina Faso, there is increase in production which has gone hand in hand with capacity building of actors along the value chain i.e. disease identification, control and management and macro propagation (in vitro TC is very expensive and therefore not feasible for the majority of banana growers. Banana diseases and pests are still a challenge. Banana streak virus (BSV), Black leaf streak disease (*Mycosphaerella fijiensis*) are the major constraints that affects banana production in the country. Recently (2020), severe Moko disease of Banana (*Ralstonia solanacearum*) was reported in the western region of the country. Interestingly, the prevalence of this disease is low.

Currently, there is a project being funded by the government, intitled "Participatory production and dissemination of healthy banana plants material through innovative techniques". This project aims to investigate banana diseases and pests and to produce healthy plants through "Plants derived from Stems Fragments (PIF)" and "Multiplication on Decorticated Stems (MSD)" techniques.

The main challenges in Burkina Faso include evaluation of smart agricultural production practices, pests and disease management, introduction and evaluation of hybrids, acquisition of healthy planting materials.

**Follow-up points emerging from the country highlights:**

- Management of banana related diseases and pests is still a challenge there is need to share technologies and practices that are proving to be working for specific diseases and pests.
- There is need to mobilize private sectors and bring them on board in order to move commercialize banana production both as an end product and also as a raw materials for the production of other end-products based on the fruit and also other parts of the plant
- Research on development of fiber from banana seems to be gaining momentum in several countries, need to organize we and write a project on this.
- Beloved to share with Beatrice and Aman publications on botanical control of weevils and the effect of climate change on provitamin A carotenoids in plantain pulp
- Celestin of Burundi to share with Beatrice the banana strategy developed under a project funded by EU.
- Nasambu to share with Celestin and the group (Through Beatrice) the BXW management protocol that had earlier been developed under the McKnight that is being used in Burundi.
- Nasambu to share with Beatrice a soft copy of TOT manual and the Banana Inventory Document
- Arrangements to ensure Kenya (KALRO) received the provitamin A rich bananas for evaluation and introduction to be initiated by Beatrice.
- Sunday of Nigeria to reach out to Nasambu and provide technical advice on how to enhance plantain multiplication in Kenya.
- The Alliance team to follow up on the BXW app developed by Rwanda team and review the similarities and differences when compared with other tools developed within the CGIAR.
- Nigeria team to follow up with IITA-Nigeria with regards to other technologies on disease management and control that could be emerging from IITA research.
- Alliance team to check with Nasambu-KALRO Kenya regarding gaps in banana research expertise and explore possibilities of filling the gaps through enhanced collaboration with the Alliance and other countries

**Open scholarship, training, conferences, and proposal opportunities:**

1. RUFORUM 2021

<https://www.ruforum.org/MCF/mcfruforum-scholarships-20212022>

RUFORUM in collaboration with master card foundation. Opportunities are available in a Kenyan (Egerton University) and Ugandan University (Gulu University), deadline of application is 31<sup>st</sup> March 2021.

2. AfricanFoodFellowship (starting in Kenya, then Rwanda and possibility to be scaled to other countries)

<http://africanfoodfellowship.org/application/>

10-months virtual food systems leadership course (4hrs/week)

Deadline is 15<sup>th</sup> April 2021

One should be working on Kenyan food systems

**Upcoming conferences:**



## 1. Tropentag 2021

The call for papers and preliminary conference information is now available at:

<https://www.tropentag.de>

To present your research at Tropentag 2021, you are invited to submit high quality abstracts of original research (250-350 words, English language) via the online form at: <https://www.tropentag.de/submission/index.php>

The deadline for abstract submission is May 3, 2021

### **Calls for research grants:**

#### 1. Global Innovation Fund (GIF)

Target countries: Innovations can be located in any developing country.

Eligible applicants: All types of organizations may apply, including social enterprises, for-profit companies, non-profit organizations, government agencies, international organizations, and researchers in any country.

Procedure: GIF is a very competitive programme, attracting far more applications than can be funded. Selection follows a four-staged procedure:

Stage one: concept note

Stage two: conference call with GIF investment team members, given that applicants have passed the initial stage

Stage three: full proposal, subject to GIF's positive evaluation of the concept note and conference call

Stage four: due diligence

NB: Babita from Mauritius indicated that it seems Mauritius is always left out in the categories of countries eligible to scholarships or any calls, this has already been communicated to Karen, but Beatrice could again check to see whether anything can be done about this or establish the reason behind.

### **Resent research findings/literature related to banana:**

- Need to exploit recent findings that are useful and test them in our own contexts
- Several tools (digital and AI) have been developed for eased in identification and guidance towards control options.
- Aman shared 60 papers obtained from Google Scholar search under published between 2020 and 2021 (see attached file).

**Next meeting:** The team agreed to have meetings after every 4 months meaning the next meeting will be scheduled for July 2021.