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STDF PROJECT GRANT

Application form

SUMMARY

Project title	**A Regional Approach to Contain Banana Bunchy Top Disease in Africa**
Applicant	**BENIN: Direction de la Production Végétale, Ministère de l'Agriculture, de l'Elevage et de la Pêche, Service de la Protection des Végétaux et du Contrôle Phytosanitaire** 01 BP 58, Porto-Novo/ République du Bénin Contact : M. Eric ADOSSOU, Chef Service Protection des Végétaux et du Contrôle Phytosanitaire/ IPPC Official Contact Point Phone: +229 2021 3290 /Mobile: +229 9703 7283 Email: eadossou@gouv.bj **BURUNDI: Direction de la Protection des Végétaux** 114 Gitega, Burundi Contact: Ms. Itangishaka Goreth, Directrice de la Protection des Végétaux/ IPPC Official Contact Point Phone: (+257) 22 40 20 36 / Mobile: +257 79 765516/61582585 Email: gorethitangishaka5@gmail.com; dpvbdi@yahoo.fr **CAMEROON: Direction de la Réglementation et du Contrôle de Qualité des Intrants et des Produits Agricoles DRCQ** Ministère de l'Agriculture et du Développement Rural BP 2082 Messa-Yaoundé, Cameroun Contact: Mr. Charles Nying Shey; Directeur de la DRCQ/ IPPC Official Contact Point Phone:+237 222 31 67 71; Mobile:+237 675 66 70 00/ 697 34 11 38 E-mail: nyingcha@yahoo.com; nyingsheyc@gmail.com **DRC: Division de la Protection des Végétaux** **Ministère de l'Agriculture** Croisement Boulevard du 30 juin et Avenue Batetela Commune de la Gombe, Kinshasa, The Democratic Republic of the Congo Contact: Damas Mamba Mamba; Chef de Division de la Protection des Végétaux, IPPC Official Contact Point, Phone:+243 81 29 59 330 / Mobile:+243 9 90 97 98 61 Email: damasmamba@yahoo.fr; damasmmb5@gmail.com **KENYA: KENYA PLANT HEALTH INSPECTORATE SERVICE (KEPHIS)** P.O. BOX 49592, 00100 NAIROBI, Kenya Contact: Prof Theophilus Mwendwa Mutui Managing Director, IPPC Official Contact Point, Phone:+254 20 6618000 / Mobile:+254 0709891000 Email: tmutui@kephis.org **MALAWI**: **Department of Agricultural Research Services** P.O. Box 30779, Lilongwe 3, Off Mchinji Road, within Chitedze Agricultural Research Station, Malawi Contact : Mr. David KAMANGIRA: Senior Deputy Director for Regulatory and Advisory Services & National Contact Person for IPPC Mobile:+265 999 122 199/+265 888 342 712 E-mail: davidkamangira1@gmail.com **NIGERIA: Nigeria Agricultural Quarantine Service (NAQS)**

	81, Ralph Shodeinde Street, CBD Abuja Nigeria Contact: Mr. Akindele Ogunfunmilayo, Commandant, NAQS POST-ENTRY Quarantine Diagnostics & Surveillance Station IPPC Official Contact Point, Phone:+2348056219200 /Mobile: +2347089310378 Email: delefunmilayo@gmail.com; akindele.ogunfunmilayo@naqs.gov.ng **RWANDA: Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA)** P.O. Box 375 Kigali Rwanda Contact: Mrs. Antoinette MBABAZI, Acting Director General, IPPC Official Contact Point, Phone: +250788646292 /Mobile: +250788646292 Email: ambabazi@rica.gov.rw; jantombabazi@gmail.com **TANZANIA**: **Tanzania Plant Health and Pesticide Authority (TPHPA)** P.O. Box 3024, Arusha - Tanzania Street: Nairobi Rd, Ngaramtoni Area Region: Arusha Contact: Mr. Mdili Sambayi Katemani Officer in Charge Plant Quarantine and Phytosanitary Services, IPPC Official Contact Point, **Phone:** +255 272970467 **Email:** katemani.sambayi@tphpa.go.tz ; phs.kilimo@gmail.com **UGANDA: Department of Crop Inspection and Certification** Ministry of Agriculture Animal Industry and Fisheries P.O. Box 102 ENTEBBE UGANDA Contact: Mr. Paul MWAMBU, Commissioner, IPPC Official Contact Point, Phone:+256 (774) 013363/ Mobile:+256 (702) 001007 Email: pmwambu3@gmail.com; paul.mwambu@agriculture.go.ug
Country/region	Sub-Saharan Africa: Benin, Burundi, Cameroon, DRC, Kenya, Malawi, Nigeria, Rwanda, Tanzania, and Uganda (West, Central Africa, East and Southern Africa)
Implementing organizations	**African Union Inter-African Phytosanitary Council (AU-IAPSC)** P.O Box 4170, Yaoundé, Cameroon Contact: Dr. Saliou Niassy, Coordinator AU-IAPSC Mobile: (+237) 670 59 38 96; Fax: (+237) 222 21 19 67 Email: NiassyS@africa-union.org
Main Technical Partner	**International Institute of Tropical Agriculture (IITA)** Head Quarters, Oyo Road, PMB 5320, Ibadan, Nigeria Contact: Dr. Lava Kumar, Plant Health Program Leader Tel: +2347032565130 E-mail: L.kumar@cgiar.org
Budget	*Requested from the STDF: US$* ***995,738*** *Beneficiary's own contribution: US$202,200* *Other sources (if any): US$128,100* *Total project value:* ***US$ 1,326,038***
Contact	Mr. Kayode Awobajo Head, Project Development & Administration Unit International Institute of Tropical Agriculture (IITA) Headquarters, PMB 5320, Oyo Road, Ibadan, Nigeria Tel: +234 7008004482 or 12016336094 ext. 2890 Fax: +44 208 7113786, Mobile: +234 8039784284 Email: k.awobajo@cgiar.org

List of Acronyms and Abbreviations

Abbreviation	Description
AfCFTA	African Continental Free Trade Agreement
ASARECA	Association for Strengthening Agricultural Research in East and Central Africa
AU-IAPSC	African Union Inter-African Phytosanitary Council
BBTD	Banana bunchy top disease
BBTV	Banana bunchy top virus
BMGF	Bill & Melinda Gates Foundation
CAADP	Comprehensive African Agricultural Development Programme
CGIAR	Consultative Group on International Agricultural Research
COMESA	The Common Market for Eastern and Southern Africa
DARS	Department of Agricultural Research Services
DRC	Democratic Republic of Congo
EWARS	Early Warning and Response System
FAO	Food and Agriculture Organization
ICT	Information and communication technologies
IITA	International Institute of Tropical Agriculture
ISABU	Institut des Sciences Agronomiques du Burundi
ISPM	International Standard Phytosanitary Measure
KEPHIS	Kenya Plant Health Inspectorate Services
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MoA	Ministry of Food and Agriculture
MoFA	Ministry of Food and Agriculture
NAQS	Nigerian Agricultural Quarantine Services
NPPO	National Plant Protection Organization
PHSA	Plant Health Strategy for Africa
PFARPN	Pest-Free Areas
PSC	Project Steering Committee
PRA	Pest Risk Analysis
RPN	Royal Plants & Nurseries
SDG	Sustainable Development Goals
SPS	Sanitary and Phytosanitary Standards
SSA	Sub-Saharan Africa
STDF	Standards and Trade Development Facility
TAHA	Tanzanian Horticultural Association
TCP	Technical Cooperation Program
TPHPA	Tanzanian Plant Health and Pesticide Authority
USAID	The United States Agency for International Development
USDA	United States Department of Agriculture

1. What specific SPS problem(s) will this project address?

Bananas (including plantains, *Musa* spp.) are vital crops for food, trade, and income security in Africa, which accounts for nearly 50% of the global banana production area[1]. Fruit, planting materials and processed products are used for trade and income generation. African countries collectively export between 650,000 and 700,000 tons of bananas each year, mainly to European countries[2]. The bulk of production is used in domestic and regional markets for direct consumption and processing.

The Africa-Bananas-Market Analysis predicts a steady increase in consumption over the next decade, with a forecasted compound annual growth rate of 1.6% in volume and 2.6% in value from 2024 to 2035[3]. Projections estimate that by 2035, the production volume could reach 36 million tons, with a market value of US$32.4 billion[3]. Among the countries with significant banana surpluses are Cameroon, which generated $249.4 million, and Cote d'Ivoire, with $203 million occupy leading positions in Africa[4]. They are followed by Kenya, Nigeria, Uganda, Burundi, and Angola, among others. Banana production is mainly managed by smallholder and medium-scale farmers. While informal trade is common, there are limited economic estimations available, and such transactions are often not well documented.

Comprehensive data on the banana planting materials traded within Africa is limited due to the domination of informal trade, often occurring directly between farmers or through community-based organizations[5]. The informal trade of planting material has been attributed to the transboundary and within-country spread of an invasive banana bunchy top virus (BBTV)[6], which has emerged as a major constraint to the production and trade of planting materials (vegetative propagules) and fruit. Informal seed exchange also makes BBTV a serious threat to farmer cultivars of banana, eroding sources of genetic resilience against emerging challenges.

BBTV has spread aggressively over the past 15 years to eight African countries, including Mozambique, South Africa, Benin, Cameroon, Nigeria, Togo, Tanzania, and Uganda. Its rapid spread is driven by limited awareness, weak surveillance, and inadequate diagnostic capacity. The virus severely stunts plants, leading to 100% yield loss within three years, and annual economic losses of $200–600 million in sub-Sahara Africa (SSA)[7]. BBTV is classified as an A1 quarantine pathogen and one of the world's top 100 worst invasive species[8].

BBTV was first reported in Fiji in 1889, and in Africa, it was first reported in 1901 in Egypt. In SSA, BBTV was first reported in 1958 in DRC. By 1981, it was observed in adjoining countries, including Burundi, Central African Republic (CAR), Gabon, and Rwanda. There was also a report of BBTV in Eritrea, but there was no further update. The virus spread to Malawi in the late 1980s, resulting in a devastating outbreak that destroyed Cavendish banana production in the lowlands along Lake Malawi[9]. Since 2005, the virus spread was reported in Angola, Cameroon, and Zambia, and since 2010, in Nigeria, Benin, and Togo in West Africa; in the 2020s, the virus outbreak was reported in Tanzania and Uganda (Table 1; Figure 1A). The recent outbreak of BBTV in East Africa[10] is expected to reduce overall output, disrupt trade, and negatively affect livelihoods in the most important banana production region, responsible for 45% of continental banana production.

As of 2024, BBTD occurrence had been reported in 18 out of 42 countries known for banana production as per the FAO production data[1]. Notably, these 18 countries account for 80% of the total area and 75% of the total production. The 7 of the top 10 banana producers are affected by BBTD (Figure1; Table1). The virus is endemic in Burundi, Congo Republic, DRC, Gabon, Malawi, and Rwanda. In other countries, the virus distribution is currently limited, but it poses a significant threat of expansion throughout all production areas due to the lack of domestic quarantine measures to contain the movement of infected planting materials. Additionally, three major banana-producing

[1] https://www.fao.org/faostat/en/#data/QCL
[2] https://www.foodbusinessafrica.com/fao-cote-divoire-banana-exports-up-4-to-340000-tons-in-2023/
[3] https://www.indexbox.io/blog/banana-africa-market-overview-2024-2/
[4] https://www.worldstopexports.com/bananas-exports-country/
[5] https://www.mdpi.com/2071-1050/13/6/3310
[6] https://pubmed.ncbi.nlm.nih.gov/25591881/
[7] https://cabiagbio.biomedcentral.com/articles/10.1186/s43170-021-00052-9/tables/2
[8] https://www.iucngisd.org/gisd/100_worst.php
[9] https://doi.org/10.1016/j.virusres.2011.04.021
[10] https://bit.ly/4ij1TDc

countries—Côte d'Ivoire, Ghana, and Kenya—are at high risk of exposure to BBTV because of regional trade and proximity to the affected countries (Figure 1B).

Year of first observation	Country	References
1900	Egypt	Magee (1927)
1958	Democratic Republic of Congo	Wardlaw (1961)
1981	Equatorial Guinea, Eritrea, Gabon	Manser (1982), Saverio (1964)
1987	Congo-Brazzaville, Burundi, Rwanda	Sebasigari and Stover (1988)
1994	Central African Republic, Malawi	Diekmann and Putter (1996), Kenyon et al. (1997)
2007	Mozambique, Zambia	Gondwe et al. (2007), International Plant Protection Convention (2016)
2008	Angola, Cameroon	Oben et al. (2009), Pillay et al. (2005)
2011	Benin	Lokossou et al. (2012)
2012	Nigeria	Adegbola et al. (2013)
2015	South Africa	Jooste et al. (2016)
2017	Togo	Kolombia et al. (2021)
2020	Tanzania, Uganda	Ocimati et al. (2021), Shimwela et al. (2022)

Figure 1: Timeline of establishment of banana bunchy top disease in Africa[11].

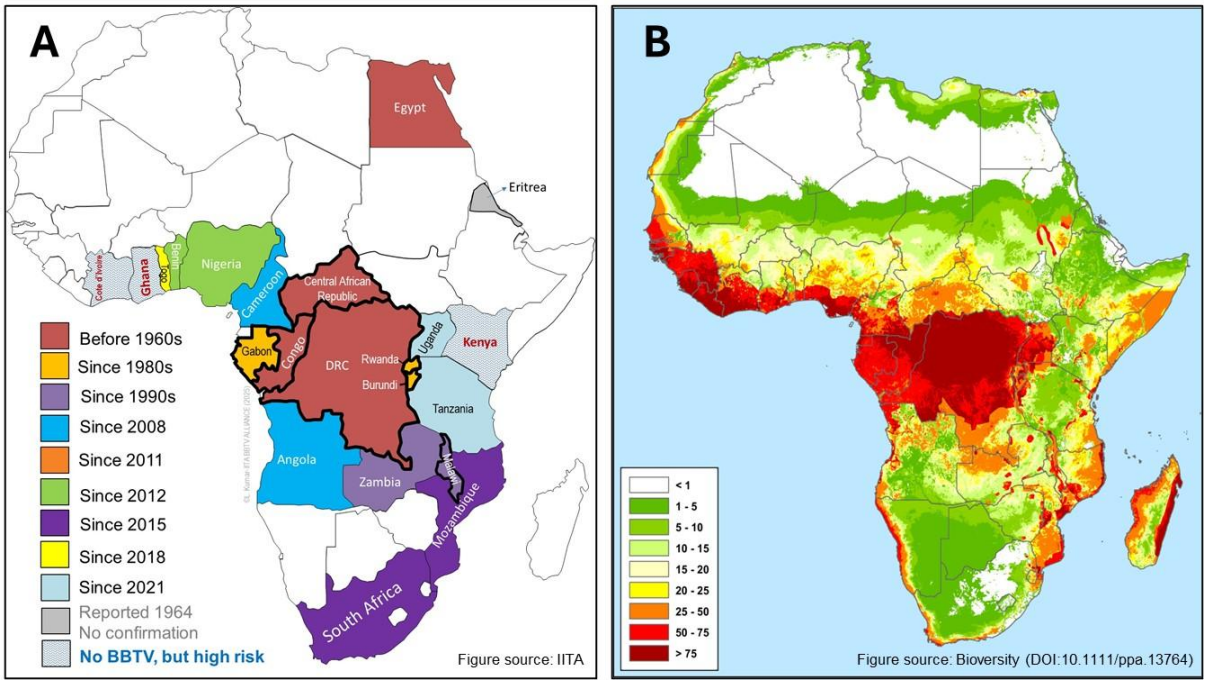

Figure 2: (A)The map of BBTD distribution along with the years of its first reports. BBTD is endemic in all production areas of Burundi, Congo Republic, Democratic Republic of Congo (DRC), Gabon, Malawi, and Rwanda. In other countries, the distribution of BBTD is limited to specific production regions. There is no BBTD in Côte d'Ivoire, Ghana, or Kenya; however, these countries are at high risk of invasion. (B) Map of the predicted environmental suitability for possible wider spread of BBTD in Africa. Areas indicated in deep red are conducive for BBTD.

[11] DOI: 10.1111/ppa.13764

Table 1 Top 10 banana/ plantain production countries in Africa*

	Country**	Area (ha)	Production
1	Uganda	2,482,097	11,090,316
2	Nigeria	566,568	7,308,103
3	Democratic Republic of the Congo	1,304,159	5,707,633
4	Cameroon	588,548	5,473,387
5	Angola	177,979	4,893,686
6	Ghana	413,316	4,552,950
7	United Republic of Tanzania	668,038	4,254,324
8	Rwanda	263,292	3,358,630
9	Kenya	82,093	2,941,412
10	Côte d'Ivoire	570,498	2,663,867
	Top 10 countries total	**7,116,588**	**52,244,309**
	Total Africa production	8,118,771	61,951,834
	% contribution of the top 10 countries	88	84
	% contribution of BBTV-affected countries	74.5	67.9
*Data source: FAO Production Status for the year 2023 (accessed on 9 April 2025) **Countries with BBTD occurrence indicated in red font			

Effective quarantine measures are essential to sustain banana production and market access. The phytosanitary measures in line with ISPMs will ensure (i) infected farms are mapped and virus spread is contained, (ii) enforce the use of BBTV-free planting materials, (iii) provide documentation and proof of quarantine inspection procedures, enhancing the confidence in materials for export, thereby boosting reputation and credibility of the country, and (iv) promote safe trade and regional market integration in accordance with the Africa Plant Health Strategy (APHS) and the Africa Continental Freed-trade Agreement (AfCFTA). BBTD is reported in 18 African countries, representing a serious threat to production and will reduce foreign export earnings. The regional market for banana in Africa is estimated at 32.4 US$ billion, and BBTD economic damage in Africa is estimated at US$ 200-600 million, representing a significant economic loss. In East Africa, bananas are seen as the "new gold[12]," increasing demand for planting materials.

Several research initiatives, such as the Learning Alliance for BBTV Control in Africa[13], have been undertaken by international research organizations such as IITA and Alliance of Biodiversity and CIAT. If these efforts are not sustained, BBTV will continue to spread, worsening food security and trade, with further consequences on the rising costs of bananas and new phytosanitary challenges in the context of a looming disease such as Fusarium TR4. Effective quarantine measures support market access for banana and raising awareness and strengthening the capacity of producers and NPPOs is crucial for safe trade. To facilitate trade in certified banana fruit and planting materials, this proposal aims to develop and scale certification procedures for BBTV-free production sites per ISPM No.8 (determining pest status in the area), ISPM No.10 (establishing pest-free sites), ISPM No.36 (integrated methods for plants for planting), and other related ISPMs. It focuses on strengthening NPPOs, improving BBTV diagnostics, raising awareness, enhancing national surveillance, and promoting certified planting materials. These efforts will improve market access, minimize losses, and protect banana-dependent livelihoods.

2. How will addressing this problem(s) increase SPS capacity and facilitate safe trade?

BBTV is an emerging threat to banana production in SSA. The virus has a status of endemic (Burundi, Congo Republic, Gabon, DRC, Malawi, and Rwanda), emerging (Angola, Benin, CAR, Cameroon, Nigeria, Mozambique, South Africa, Tanzania, Togo, Uganda, and Zambia) and invasive risk (Cote d'Ivoire, Ghana, Kenya and others) (Figure 1). Previous initiatives have attempted to contain the

[12] https://bit.ly/4cBgHfi
[13] https://bit.ly/42s2FI9

disease with limited success (case of Cameroon, Nigeria, and Togo, where the virus spread was contained but not eradicated). The most recent case of BBTV in Uganda and Tanzania in 2020 indicates that countries like Kenya, Ethiopia, Zimbabwe, and northern Africa are at high risk of invasion. The banana aphid (*Pentalonia nigronervosa*) that vectors the BBTV is ubiquitous in distribution, associated with bananas and plantains in all production zones. The introduction of the virus, either through planting materials or viruliferous aphids, will contribute to the further spread of the disease by aphids in the location. There is a need for a coordinated initiative at the Africa level to spearhead the management of BBTD on the continent.

The SPS capacity development will be adopted to the banana value chain needs. For instance, the crop is predominantly managed through traditional farming methods, with a few large-scale mono-crop establishments of the multinational private sector primarily for fruit export to the European region. The bulk of the banana production is destined to domestic and regional trade, the value chains of which are fragmented and informal. Awareness about BBTV and its vector is low among the value chain actors, including regulatory agencies. The regional and domestic trade in the banana value chains (from production to marketing, including producers, aggregators, and traders) is hampered by weak SPS capacity, including limited surveillance and diagnostic abilities to determine the pest status (ISPM-8), low awareness, and weak adherence to phytosanitary measures necessary to generate plants for planting (ISPM-36) and schemes for certification of pest-free production areas (ISPM-10).

This project aims to tackle these issues by developing fit-for-purpose procedures for phytosanitary risk mitigation to banana fruit and planting material production per ISPMs, particularly 8, 10, and 36. Through coordinated action in ten countries (Benin, Burundi, Cameroon, DRC, Kenya, Malawi, Nigeria, Rwanda, Tanzania, and Uganda) that are major banana producers, the project aims to enhance stakeholder knowledge and skills in surveillance, diagnosis, risk management, and safe production practices. Considering the transboundary nature of the disease, a coordinated approach is required to building technical expertise on BBTV and vector management among growers, marketers, and regulatory agencies. This includes strengthening landscape-scale management, surveillance, diagnostics capacity, production, clean planting materials, and eco-friendly IPM to control aphid-mediated virus spread. Vector management in terms of aphid management will be part of the wholistic BBTD management plan. The project will develop an IPM package including the use of good agricultural practices, the use of botanical or soft pesticides, and the use of biopesticides. These will be included in training materials and SOPs. These efforts will improve regional biosecurity and certification of planting materials and farms for BBTV-free status. Working as an alliance will enhance regional cooperation and foster information and capacity sharing. Addressing BBTV can significantly enhance SPS capacity, also benefit countries in tackling other invasive diseases such as Fusarium wilt Tropical Race 4 and facilitate safe trade.

Raising awareness about BBTV, its vector and its epidemiology among **plant health inspectors and border agents** will promote the adoption of measures to curb disease spread and recover banana production in affected areas. Using standardized protocols at planting material production sites and border points will ensure the safe movement of banana planting materials and reduce the transboundary spread of pests. Results from risk assessments of BBTV and other emerging diseases will be used to develop guidelines that enhance countries' phytosanitary compliance and regulatory protocols. These protocols will serve as resources for detecting and managing emerging banana pests, contributing to risk mitigation by identifying pest-free production sites. This information will inform the seed industry in selecting suitable production areas and moving towards a harmonized certification and quality assurance system that meets phytosanitary requirements for regulated non-quarantine pests across SSA. The project will also build capacity among banana value chain actors in determining disease status.

A regionally coordinated approach to addressing emerging banana disease risks will strengthen SPS's capacity to counter BBTV and reduce its impact on the banana value chain at national and regional levels. It will also curtail the unregulated movement of banana planting materials, facilitate trade, and improve food security.

3. What specific deliverables are envisaged to address the SPS problem(s)?

The project goal is to improve safe trade of banana planting materials in Sub-Saharan Africa through effective containment of BBTV. To achieve this, the project targets to achieve the following outputs and outcomes:

Outcome 1. Strengthened national capacity for effective BBTV diagnostic, surveillance and management in beneficiary countries

- **Output 1.1. Knowledge and skills of different stakeholders on diagnostic and surveillance increased:** The project will implement a comprehensive program to strengthen the phytosanitary capacity of NPPOs in the 10 target countries to support the banana value chain. This includes assessing existing capacities and identifying gaps, followed by developing tailored capacity-building plans. Training will be conducted for NPPO staff, border agents, extension officers, and farmers, focusing on ISPMs, BBTV and aphid diagnosis and control, clean plant material production in risk-free sites, and using ICT tools for pest data collection and management. Supporting materials such as training guides, e-learning modules, and field manuals will be developed. Furthermore, linkages will be established between NPPOs, seed producers, value chain actors, diagnostic laboratories, and diagnostic kits suppliers. Awareness creation campaigns will also be carried out through various media platforms (and online events such as webinars and electronic training content), agricultural fairs, and extension programs to engage stakeholders, including the broader public, farmers, and travellers, on BBTV and other emerging banana diseases.

- **Output 1.2 Knowledge and skills of national stakeholders on SPS compliance for banana planting material production and trade enhanced**: A comprehensive set of activities will be implemented to strengthen the banana value chain by enhancing pest-free production and trade compliance. These include developing Standard Operating Procedures (SOPs) based on ISPMs for identifying pest-free production sites; mapping high- and low-risk areas for BBTV and selecting appropriate sites for clean planting material production. The program also involves extensive capacity building through training stakeholders, including producers, exporters, and NPPOs, on BBTV-safe production practices, eco-friendly IPM for aphid control, SPS compliance, quality assessment, and export/import certification. Additionally, standardized procedures for NPPOs will be developed for field certification, followed by inspection and accreditation of banana farms to ensure safe planting and fruit production for trade across the 10 target countries.

Outcome 2. Enhanced regional coordination for BBTV surveillance, monitoring and management

- **Output 2.1. Tools and systems to support BBTV monitoring at regional level developed and operationalized**: The project will strengthen surveillance and response systems for BBTV and other emerging banana pests through desk studies, improved practices, digital innovation, and regional coordination. A baseline study will be conducted in each participating country to identify gaps in BBTV management. Data collected through ICT tools will be processed and analyzed to support the creation of a digital risk map. A regional pest alert and emergency response system, linked to AI tools (e.g., Tumaini app[14]) and remote sensing technologies (Banna mapping tool[15]), will be adopted and integrated with ICT-based alert systems, which use a conventional survey approach involving trained staff and crowdsourcing. The SeedTracker[16] platform will be adapted for mapping banana value chain and value chain actors to facilitate better integration, enhanced traceability, and connections between producers of clean planting materials and farmers, as well as to raise awareness of BBTV risks. Finally, a virtual knowledge center will be created on a partner website (AU-IAPSC, IITA, and mirrored on others such as IPPC Plant Health Campus) to serve as a centralized resource on BBTV and other banana pests.

- **Output 2.2. Regional coordination strategy to control BBTV developed and rolled out, and BBTV Alliance reinvigorated:** The project will implement a coordinated regional approach to BBTV management by adopting harmonized SOPs across countries

[14]https://www.cgiar.org/innovations/tumaini-an-ai-powered-mobile-app-for-pests-and-diseases/

[15]https://www.cgiar.org/news-events/news/remote-sensing-models-to-enhance-banana-bunchy-top-virus-bbtv-surveillance-in-africa/

[16]https://e-catalogs.taat-africa.org/com/technologies/seedtracker-digital-tool-for-strengthening-seed-governance-and-certification-systems

and strengthening the BBTV ALLIANCE network to facilitate information sharing, coordinated mitigation actions, and safe banana trade. This network will also contribute to South-South cooperation through knowledge exchange between countries with BBTV and others at risk of exposure, and help their preparedness. Regular biannual regional reviews and training workshops (virtual and in-person) will be conducted to monitor progress, gather feedback, and share lessons learned. A sustainability plan will be developed to ensure the continued use of tools, resources, and regional coordination beyond the project's lifespan.

4. Logical framework

Result	Project description	Measurable indicators	Baseline[17]	Target	Sources of verification
Goal	Improved safe trade of banana planting materials in Sub-Saharan Africa through effective containment of BBTV	• Decrease in the number of rejections of banana planting materials due to BBTV contamination • Increased volume of exports of banana planting materials from beneficiary countries • Reduced incidence of BBTV in beneficiary countries • Number of BBTV contaminated countries reporting improved status (containment of the virus) among beneficiary countries • Number of beneficiary countries with increased production areas free from BBTV	Not determine (expect to get data during baseline studies)*	• At least 50% decrease in rejections from 3rd year of the project • At least 20% increase in exports after 2nd year. • At least 10 participating reports improved situation from 3rd year	Project reports and country NPPO reports.
Outcome 1	Strengthened national capacity for effective BBTV diagnostic, surveillance and management in beneficiary countries	• Number of NPPO staff with improved capacity to implement ISPMs 8, 10 and 36[18] (disaggregated by country and gender) • Number of NPPOs and border agents with improved diagnostics and surveillance	Not determine (expect to get data during baseline studies)*	• At least 1000 personnel, 100 from each country, expected to receive direct capacity development trainings • NPPO is 10 target	• Project report • Activity reports • Organizational reports on capacity strengthening activities. • Training modules • Number of permits issued for banana

[17] A baseline study will be carried out at the project inception phase to identify the current situation and appropriate targets

[18] ISPM 8: Determination of pest free status in an areas, ISPM 10: Requirements for the establishment of pest free places of production and pest free production sites; ISPM 36: Integrated measures for plants for planting

Result	Project description	Measurable indicators	Baseline[17]	Target	Sources of verification
		capacity to reduce the spread of BBTV through informal and unregulated trade • Number of banana farms declared BBTV-free (disaggregated by country) • Number of beneficiary countries approving and domesticating the developed SOPs for the identification of banana pest-free sites, planting material and fruit • Number of banana farms accredited for the production of clean plant material		countries will have diagnostic capability by 2nd year. • Each country expects to declare at least 20 farms as BBTV-Free for export markets.	trade
Outputs	1.1 Knowledge and skills of different stakeholders on diagnostic and surveillance increased	• Number of plans developed to address NPPOs' capacity gaps in beneficiary countries • Number of training modules developed on relevant ISPMs for BBTV diagnosis and translated into English, French, and Portuguese • Number of stakeholders trained on relevant ISPMs in beneficiary countries (disaggregated by group of actors (i.e. NPPO, border agents & private sector), gender and country)	Not determine (expect to get data during baseline studies)*	One continental plan and 10 country-specific plans Three training modules, one each for ISPM adaption, BBTV diagnostics and monitoring procedures. At least 10 NPPOs in each target country receive direct training as training of trainers (TOTs). At least 10 communication	• Project report • Activity reports • Organizational reports on capacity strengthening and outreach activities. • Training modules • SOPs published

Result	Project description	Measurable indicators	Baseline[17]	Target	Sources of verification
		• Number of stakeholders trained on ICT-based tools for data collection in beneficiary countries (disaggregated by group of actors (i.e. NPPO, border agents & private sector), gender and country) • Number of actors linked with suppliers of diagnostic kits (disaggregated by group of actors (i.e. NPPO, border agents & private sector), gender and country) • Number of awareness creation tools (e.g. brochures) developed and distributed on BBTV management • Number of awareness raising events/programs organized for the general public (e.g. agricultural fairs, radio programs, etc.) • Number of gap analysis reports on BBTV and other emerging pests developed in each target country • Number of harmonized protocols for BBTV surveillance and data collection developed • Number of private sector stakeholders (exporters, plant		materials on BBTV control and safe trade for various stakeholders will be produced. -Al least 1000 value chain actors in the project lifetime for 10 countries trained in use of ICT tools, -10 NPPOs linked to dealers of diagnostic suppliers -A minimum of 5 awareness events held each year. -One gap analysis report per country. -At least 5 SOPs established for banana production recover and BBTV mitigation. -All NPPOs of the target countries will know how on export certification. -One SOP developed	

Result	Project description	Measurable indicators	Baseline[17]	Target	Sources of verification
		material producers) trained on good production practices and SPS compliance measures for clean planting material and fruit production (disaggregated by gender and country)			
	1.2 Knowledge and skills of national stakeholders on SPS compliance for banana planting material production and trade, IPM for vector management enhanced	• Number of stakeholders trained on export certification and export/import verification (disaggregated by group of actors (i.e. NPPO, border agents & private sector), gender and country) • Number of SOPs for the identification of banana pest-free sites, planting material and fruit			
Outcome 2	Enhanced regional coordination for BBTV surveillance, monitoring, and management	• Deployment of digital map across countries to produce incidence report and disease distribution maps essential for decision-support. • The ICT-based pest alert system and emergency response actions for BBTV operationalized and used by stakeholders for BBTV surveillance and monitoring • Number of NPPOs adopting the SeedTracker and exchanging relevant data	-Delimitation survey data available but not updated -Pest alert systems not available for BBTV -SeedTracker tool not used for cassava in a few countries, but not for banana. -A coordination strategy	• Delimitation survey data used for containment plans. • One ICT-based pest-alert system and banana seed tracker tool • At least 10 countries adopting new tools and best practices established in the project • All 10 NPPOs	• Project report • Activity reports • Organizational reports on capacity strengthening and outreach activities. • Training modules • Number of permits issued for banana trade

Result	Project description	Measurable indicators	Baseline[17]	Target	Sources of verification
		• Number of producers of safe banana planting materials registered and using the SeedTracker • Improved regional coordination for containing and responding to BBTV spread • Number of countries adopting and domesticating harmonized regional SOPs and protocols for BBTV and vector management	exists for BBTV control but needs updated considering the latest information and partners. -Specific SOPs not available for BBTV management	adopt SeedTracker for traceability • At least 100 farmers accredited in the project lifetime • At least 10 countries adopt SOPs for BBTV management.	
Outputs	2.1 Tools and systems to support BBTV monitoring at regional level developed and operationalized	• A report of the BBTV mapping presenting key findings and recommendations for the establishment of the digital BBTV map • "SeedTracker" digital system adapted for the banana value chain and operationalized at the regional level (hosted on the IITA website) • A regional AI-remote sensing pest-alert system, linked to the SeedTracker, developed and rolled-out in beneficiary countries • A Digital knowledge centre on BBTV and other banana pests developed and housed on IITA's and partners' websites to centralise all relevant available resources	-BBTV maps available but not updated in many counties in Africa -SeedTracker used for cassava in a few countries -Remote sensing tool available but not used regularly -BBTV information is fragmented across many web sites	• One updated map on BBTV occurrence per country. • One SeedTracker tool developed for banana value chain and used • One BBTV pest alert system established and used • One digital knowledge center	• Project report • Activity reports • Organizational reports on capacity strengthening activities. • Training modules • Number of permits issued for banana trade • Survey reports and updated BBTV status maps • A pest alert and response system for invasive banana diseases • Updated country contingency plans

Result	Project description	Measurable indicators	Baseline[17]	Target	Sources of verification
	2.2 Regional coordination strategy to control BBTV and banana aphid (vector) developed and rolled out, and the BBTV Alliance reinvigorated	• Number of regional harmonized SOPs developed for improved management of BBTV and banana aphid • Number of meetings of existing task forces on BBTV control • Number of coordination meetings of the BBTV Alliance • Number of biannual progress reviews and training workshops to monitor progress • A sustainability plan to ensure the sustainable management of resources, tools and the continuation regional coordination post-project	At least one meeting held annually related to BBTV status updates and coordination issues.	• Five SOPs related to surveillance, field inspections, pest-free site selection, diagnostics testing and clean plant production. • At least 4 task force meetings per year • At least 2 project meetings, including online events to monitor project progress. • One sustainability plan	• Project report • Activity reports • Organizational reports on capacity strengthening activities. • Training modules

6. Risk Matrix

Results	External risks	Impact[19]	Mitigation measures
Goal	Political: At the political level, the project has been endorsed by all participating countries' NPPOs and AU-IAPSC, which is a testimony of their commitment to overcoming potential political and regulatory risks. However, political instability could hamper implementation in some parts of the country (e.g. Eastern DRC).	Low	The project team will monitor political challenge in each target country using local partner information before engaging any activity and concentrate in areas where there is no risk. The project team will constantly consult local NPPOs and seek their consent of local authorities. Likewise, the project team will monitor political stability and weather conditions in regions before engaging in any activity for the safety of project implementers and effectiveness.
	Environmental/ Impacts of climate change: risks of extreme weather events such as droughts, floods, etc.	Low	Environmental risks could be mitigated by observing weather pattern in target countries in partnership with NPPOs. Furthermore, focus project activities in safer areas. By enhancing the capacity of diagnostics, farmers may reduce heavy fungicide application.
Outcomes	Political and regulatory risks from national regulation and regional processes might impede project implementation, especially with change of staff. For example, the domestication of protocols and guidelines might lead to delays, considering the number of countries and the fragmented policies.	Medium	The project Principal investigator (PI) and stakeholders will establish an efficient coordination strategy with a steering committee and regular virtual meetings to discuss issues and to mitigate this risk. The project will engage new staff who comes on board for full engagement and delivery on commitments.
Outputs	Political: government support or involvement	Low	At political level, the project partners will inform local government of the importance of the project and how this requires support. Therefore, project activities and partners will be carefully selected to ensure that project deliverables are met at minimal cost and delivered efficiently to all partners using communication strategy, virtual meetings, and smart technology.
	External stakeholder groups: The project might experience challenges linked to partners who might not wish to collaborate.	Low	Thanks to long-standing partnerships and the already existing fraternity among NPPOs, the project team will use the coordinating mandate of AU-IAPSC to strengthen dialogue and participation of all partners.

[19] High: Requires immediate action; Medium: A mitigation plan should be in place; 3 Low: No specific action required but the situation should be monitored.

7. Who will benefit from the project and how?

This project will enhance stakeholders' knowledge, expertise, and skills in diagnosis, surveillance, control strategies, and risk management across ten countries: Benin, Burundi, Cameroon, DRC, Kenya, Malawi, Nigeria, Rwanda, Tanzania, and Uganda. It will also engage stakeholders from other BBTV-affected countries, such as Angola, Gabon, Ghana, Mozambique, and Zambia, to share knowledge and build capacity.

Smallholder farmers and other banana value chain actors in target countries will benefit from maintained and increased banana production and access to local, regional, and international markets. Hence, the project will contribute to improved livelihoods, food security, and income generation through trade in those countries. Enhanced BBTV awareness will allow stakeholders, particularly border agencies, and plant health inspectors, smallholder farmers, to adopt biosecurity measures to prevent the risk of BBTV spread within and beyond the borders of affected countries.

Furthermore, national regulatory, research, and extension institutions, regional research and trade organizations, and their networks will benefit from enhanced phytosanitary capacity. To that effect, the project will work with countries that have performed their Phytosanitary Capacity Evaluation (PCE), particularly Kenya, Uganda, Rwanda, Nigeria, and Cameroon. The project will build on the findings and recommendations of the PCE where possible and sensitize other countries who haven't conducted it yet through awareness raising and outreach activities.

Countries in SSA will benefit from the result of the Pest Risk Analysis (PRA) information communicated and distributed to all beneficiary countries, will increase awareness of BBTV and other emerging banana threats, and serve as a tool to prioritize and justify national interventions. The distribution maps of BBTV will improve surveillance decisions at the national and regional levels.

Tissue culture companies and banana plantlet producers will have access to improved national plant health support systems and virus indexing support, which will lead to the production and distribution of disease-free planting materials. Recovery of banana production in BBTV-affected areas will reduce the cost of bananas, which has significantly gone up due to shortage induced by BBTV, benefiting in the long-term >100 million Africans dependent on bananas for livelihoods.

8. How will the project address gender-related needs?

Both men and women are involved in nearly all nodes of the banana value chain, from production to processing and marketing. Generally, females and males are equally represented in production, while women predominantly participate in processing and marketing. Seed systems value chains are appealing to youth investors due to shorter product cycles, technology integration, and lower land requirements. The project will ensure that all gender and age groups benefit from the project activities. A gender analysis will be conducted during the project inception to better understand gender dynamics and roles within the banana value chain in alignment with the STDF Gender Action Plan.[20] This analysis will also identify potential gender-specific needs and challenges in BBTV detection, management, and provision of clean planting products. Where possible, entry points for gender mainstreaming will be identified and integrated into the project activities. Lastly, sex-disaggregated data on participation will be collected for all project activities, and gender-specific indicators will be integrated into the project logical framework to ensure proper monitoring of the project's results regarding gender mainstreaming. Furthermore, capacity-building activities in selected countries will consider gender representation. A gender-sensitive approach will be employed in the development and design of project materials, including training, communication, and awareness creation items.

9. How will the project address issues related to the environment?

Major components of this project involve capacity development in surveillance, diagnostics, and awareness creation to combat emerging banana diseases. The project also focuses on training stakeholders in integrated methods for disease control, including eradication and optional use of pesticides and herbicides. Trainers will emphasize responsible use and safe practices to ensure health and environmental protection. The destruction of banana plants by BBTV will increase the risk of erosion in affected countries. Thus, the successful management of BBTV will help mitigate the adverse effects of environmental degradation. Furthermore, the project will adopt eco-friendly methods to reduce its carbon footprint. It will minimize travel by conducting review meetings and routine consultations online, extensively using digital platforms for messaging, and reducing paper

[20] https://standardsfacility.org/sites/default/files/STDF_Gender_Action_Plan_E_final.pdf

use. The project will also promote ICT tools for surveillance to facilitate rapid communication and decrease reliance on paper-based data collection tools. Environmental issues will be incorporated into the terms of reference for the baseline survey, in accordance with the upcoming STDF guide, to ensure that primary BBTV-related concerns are captured and addressed throughout the project's duration.

10. How does this project fit into the national/regional SPS context?

The project provides a roadmap for all major stakeholders to work together to mitigate the effects of the BBTV disease and strengthen SPS systems that help combat BBTV and other pests posing as a barrier to livelihoods and trade. The project provides an opportunity to operationalize Annex 7 of the African Continental Free Trade Agreement (AfCFTA[21]) and the Plant Health Strategy for Africa (PHSA), which calls for the implementation of the provisions of the Protocol on Trade in Goods concerning SPS measures that affect trade between Member States. Trade and exchange of agricultural planting material by participating countries is envisaged to be significantly impacted. Thus, creating an environment that will enable smallholder banana farmers and agribusinesses to reach compliance with SPS standards will enhance trade opportunities and protect African banana production.

The project seeks to embrace and enhance harmonization, transparency, science-based SPS standards, streamlining border crossings with bananas, and exchange of clean planting material, a major source of the introduction of infected planting material and the spread of BBTV. There will be enhanced capacity for AU-IAPSC to coordinate the collaboration of Member States and RECs in SPS matters, including information exchange and sharing, enabling a cohesive continental system regarding banana production and trade.

The project is designed to fit seamlessly into the national/regional SPS context, aligning with the AU SPS Policy Framework (2019), the Plant Health Strategy for Africa (2022-2036)[22], and other continental strategies. These strategies are all geared towards maximizing technical capacity and strengthening overall SPS compliance. The project will utilize regional centers of excellence to provide advanced training and diagnostic capabilities to Member States. Centres of Excellence and reference laboratories for BBTV have been identified already, and they include IITA Ibadan, KEPHIS/COPE, IITA Cameroon, WAVE (Cote D'Ivoire), and IITA Uganda. We could also include Tanzania as well. These are places where hands-on work in terms of tissue culture and other banana-related issues will be conducted.

Given that countries, and by extension RECs, participating in the project are at different levels in terms of capacity, strengthening national and regional reference laboratories will be essential. The establishment of a continental early warning and response system (EWARS) will assist in the prevention of BBTV introduction as well as pest and virus identification and management. The project will work with NPPOs to delimit the disease expansion using existing remote sensing and surveillance data to determine pest-free areas (PFAs). The production and distribution of tissue culture (micro) and macro propagated (healthy) plantlets will also be guided by this information, which is implicit in the activities 1.2.1, 1.2.2, and 1.2.3.

Notification on new/revised BBTV management measures and information sharing is needed within the continent to facilitate transparency, constitute training, and make management systems more efficient, e.g., by sharing PRA information, test results, pest databases, and information on existing facilities, among others. The project will establish a digital monitoring platform that will enable information exchange within the alliance. The establishment of the communication materials and BBTV knowledge databases and the offering of necessary training in these systems will facilitate greater compliance, enhance trade opportunities on the continent, and protect Africa's banana production, industry, markets, and trade.

11. How does this project complement or build on other initiatives?

IITA, with partners, has been working on BBTV since 2008 in sub-Saharan Africa as part of the CGIAR Trust Donors funded program, "ALLIANCE for Banana Bunchy Top Disease Control in Africa (www.bbtvalliance.org)," (2013-2020), and the "BBTV Mitigation: Community Management in Nigeria," funded by BMGF through the University of Queensland, Australia (2016-21) and CGIAR funded Plant Health Initiative (2022 onwards). These initiatives have led to the first detection and delimitation surveys to map virus spread in the countries where the disease was newly reported

[21] https://au.int/sites/default/files/treaties/36437-treaty-consolidated_text_on_cfta_-_en.pdf
[22] https://auiapsc.org/2023/04/10/plant-health-strategy-phsa-for-africa-2022-2036/

(Angola, Benin, Cameroon, Nigeria, Tanzania, Togo; and Uganda). The same efforts documented further spread and landscape risk in Rwanda, in addition to the first diagnostic confirmation of the virus occurrence in the Central African Republic, Malawi, and Zambia. Established tools and protocols for surveillance and point-of-care rapid diagnostics, strategies for implementing emergency response action, and development of the capacity of the national program partners.

Previous initiatives also attempted to contain BBTD spread in smallholder farms and replacing infected mats with clean planting material to recover banana production. It also includes the first detection of BBTV in Togo. The proposed project will leverage on these tools, including AI-based disease recognition apps (Selvaraj et al., 2019), remote surveillance and management tools (Alabi et al., 2022; Selvaraj et al 2020; Omondi et al., 2023) to contain and prevent further spread of BBTD in target countries and beyond.

IITA joined FAO as a technical partner in implementing the FAO-led Technical Cooperation Program (TCP) on banana bunchy top control in Cameroon, Gabon, and Equatorial Guinea, with a focus on implementing surveillance and develop national program capacity to control BBTV (FAO 2018). Through this project, IITA has built diagnostic capacity, trained national program partners in surveillance and disease containment methods, production of healthy planting material, and methods to prevent reinfection. These activities helped develop the national surveillance capacity and the comprehensive mapping of BBTV spread in the target countries, conclusively ruled out BBTV in Equatorial Guinea, and contributed to preventing BBTV spread in Cameroon (FAO 2018).

Currently, IITA is implementing a 2-year project (2024-2025) project, "Combating BBTV in East Africa (Kenya, Tanzania, and Uganda)," with funding from USDA and the USAID East Africa regional mission. The seed money was given to create BBTV awareness and conduct surveys to understand the distribution of BBTV in Tanzania and Uganda and check the status in Kenya where there is no official report of BBTV.

Previous initiatives targeted a few countries in the region, leaving other BBTV-prone countries aside. The proposed initiative is a consortium of 10 major banana-growing countries, the African Union, and CGIAR centers to combat the disease and preserve the banana sector in a coordinated manner. The proposed project builds on the momentum of past projects and synergies with ongoing activities to ensure the safe trade of bananas while establishing a watchguard for other quarantine pests such as Fusarium TR4.

AU-IAPSC is the "Plant Health Campus (PHC)" Champion at the IPPC. Hence, the project will serve as a conduit for disseminating PHC information resources to NPPOs and will tap appropriate PHC resources to build the capacity of stakeholders to combat BBTV and improve SPS capacity to enhance the safe trade of bananas and plantains. On the other hand, existing training materials and those planned for development, including a manual on BBTV identification and management, will be assembled and submitted to the PHC's knowledge system for wide usage.

12. How was this project developed?

This proposal was designed based on proposed beneficiary countries' needs. Several consultations with stakeholders in these countries highlighted the need for coordinated action to combat the emerging BBTV disease and to strengthen national and regional capacity for containing the BBTV spread, recovering banana production, and enhancing safe trade. A coordinated regional approach is essential to mitigate risks from BBTV, prevent large-scale losses, and protect banana production and regional trade.

The AU-IAPSC and Food and Agriculture Organization Regional Office Africa (FAO-RAF) organized a stakeholder consultation workshop titled "Coordinated Management of Banana Bunchy Top Disease" from 6 to 10 May 2024 in Nairobi, Kenya. Members from Benin, Burundi, Cameroon, Kenya, Nigeria, Malawi, Rwanda, Tanzania, and Uganda attended with the IITA and Alliance Biodiversity. The group assessed the latest spread of BBTV in the Eastern and Western fronts of SSA and expressed grave concern about the alarming spread of BBTV and the urgent need to strengthen SPS capacity to protect production and trade.

A second workshop was held on 9-13 December 2024 in Moshi, Tanzania on "Tools and strategies to combat banana bunchy top virus outbreak in East Africa: A review and training workshop", organized by IITA, together with FAO-RAF, AU-IAPSC, and country partners from Tanzania (The Tanzania Plant Health and Pesticides Authority (TPHPA), Tanzania Agricultural Research Institute (TARI), Ministry of Agriculture, Animal Industry and Fisheries Uganda (MAIFF), and Kenya Plant Health Inspectorate Service (KEPHIS), stakeholders identified weak SPS capacity and a lack of

harmonized Standard Operating Procedures (SOPs) as gaps to facilitate safe trade while controlling the invasive BBTV.

In 16-20 December 2024, the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), IITA, and KEPHIS convened a regional workshop on preparedness and response to new and emerging banana pest and disease threats in the East Africa community. The workshop brought together 40 participants from the 8 EAC countries (Burundi, DRC, Kenya, Rwanda, Uganda, South Sudan, Somalia, and Tanzania) to develop a joint strategy and action plan for tackling BBTV, *Fusarium oxysporum* Tropical Race 4 (Foc TR4), and banana rust thrips, major challenges to banana production in the region. The need to strengthen SPS and regional harmonization of standards was highlighted.

The government of Tanzania is seriously concerned about the devastation of banana production due to the BBTV emergency. To highlight the government's concern, the European Union (EU) funded project "Strengthening plant health services in Tanzania for enhanced food security (STREPHIT)" organized a consultation meeting with stakeholders on January 27 to 31, 2025, which identified weak SPS as the major reason for the continued spread of BBTV in the country and demanded urgent action.

13. How the project will be implemented?

The Inter-African Phytosanitary Council (IAPSC) of the African Union will lead project implementation, overseeing daily operations, coordinating activities, managing funds, and reporting to the STDF Secretariat. It will also mobilize beneficiary countries and coordinate efforts with stakeholders, including National Plant Protection Organizations (NPPOs) and private sector actors. AU-IAPSC will hire a Project Management Officer to handle the daily management of the project.

AU-IAPSC finance will serve as the formal liaison with STDF for signing agreements, submitting work plans, financial and technical reports, executing subcontracts, and ensuring legal compliance. The project will hire short-term consultants for baseline studies, gender analysis, M&E, GIS, and communications on an as-needed basis. AU-IAPSC, through its member states and Regional Economic Communities (RECs), will coordinate and oversee the delivery of project activities in partnership with IITA, NPPOs, and other relevant actors, such as, the private sector and exporting entities in the banana sector.

IITA will be the primary technical partner, responsible for providing technical expertise and coordination support under the ALLIANCE framework, leading the adaptation of digital tools for surveillance, banana seed tracker for value chain mapping, data analytics, including developing interactive maps, and models for BBTD risk assessment and clean planting sites. IITA will hire a Digital Extension Expert and a member to support technical backstopping on full time basis. IITA will work closely with the AU-IAPSC, assisting in activity coordination and collaboration with its satellite offices in the target countries and oversee implementation and delivery.

The project will establish a Project Steering Committee (PSC), with the AU-IAPSC Coordinator serving as the PSC chair, IITA providing the secretariat, and one representative from project partners (e.g., STDF, FAO, IPPC, Alliance Biodiversity, and qualified private sector companies) joining as a member of the PSC. The PSC will invite a member from STDF and two external experts with a proven track record in BBTV and banana disease to be part of the committee to oversee and guide project implementation.

Country partners (NPPOs) in the target countries will serve as grassroots implementers. They will co-design country-level plans, co-create protocols and communication and capacity development activities, and implement them as learning on-the-job activities. The country teams will be part of the baseline studies, pest risk assessment, value chain mapping, and selection of pest-free sites for domestic and export markets. The IAPSC, IITA, and ABC will work closely with the country partners to offer implementation support, including course corrections based on the feedback lessons.

During the inception meeting, roles and responsibilities will be assigned, including the development of detailed annual workplans. An annual meeting will be organized for donors and members of the steering committee to assess project implementation. The project team will meet online each month to share updates, and there will be one in-person annual meeting. Reports from countries and M&E experts, along with digital surveillance systems and modeling efforts, will help appreciate the management of BBTD in the countries.

Additionally, ad-hoc meetings (online or in-person) will be convened in the event of emergencies or when specific decisions require immediate attention. Such meetings will be held at country, regional, or continental level, as needed.

14. How will project results be communicated?

AU-IAPSC has already initiated a Communication Plan to implement the Plant Health Strategy. In line with the STDF Communication Plan[23], the communication and knowledge/data management plan will be reviewed to cater for the project's needs during its inception phase. During working groups, the objectives of the Communication Plan will be defined, as well as the audience and communication products and channels in line with STDF guidelines. Already, AU-IAPSC has a dedicated Communication Officer who will be responsible for project activities both internally and between partners and project actors. The Communication Plan raises awareness of the project and the importance of BBTV, builds the capacity of actors, and promotes knowledge products in project target countries. In line with the STDF communication plan the project will be centred around (1) information management, (2) stakeholder engagement, (3) capacity development, and (4) dissemination and outreach. The project will engage communications specialists in respective organizations who will be responsible for increasing the visibility of the project and its results. Additionally, information will be hosted on the existing AU-IAPSC and BBTV Alliance web pages, as well as other web pages for broader outreach.

The project will produce and disseminate SOPs, training manuals, fact sheets, and progress reports on results and lessons learned. It will also hold yearly review meetings, during which participating countries and stakeholders will discuss results, lessons learned, and challenges, including mitigation approaches engaged. The project implementing partners will lead dissemination activities in their respective countries and regions and share reports with stakeholders on results and achievements for each year.

Project outputs are expected to result in publications in scientific peer-reviewed journals. Technical bulletins, websites, IPPC Plant Health Campus, guidelines, protocols, policy briefs, and videos will be used to disseminate project information. This information will be critical in replicating such a project in other parts of Africa and elsewhere where BBTV and other emerging pests are of concern to banana production.

15. What steps will be taken to ensure that the project results will be sustained in the long run?

The implementing centres, including AU-IAPSC, IITA, Alliance Biodiversity, NPPOs, and other regional research institutions, are mandated to strengthen the banana value chain and plant health capacity as part of their institutional mandates. As project implementers, they will help sustain the management of tools and resources and continue regional coordination beyond the project's lifespan. All the outputs of the STDF project will be incorporated into the operational activities for sustainability and further scaling. In addition, stakeholders and beneficiaries of the project working on banana will incorporate outputs as part of the routine to derive the positive benefits and avert the negative impact of the disease. Training and awareness materials are expected to be incorporated into web platforms and will continue to be available with updates.

The project will launch a broad-based awareness-raising campaign and develop a strong linkage with the relevant local government partners. It will also create a well-coordinated dissemination and communication strategy to improve awareness and strengthen disease management activities in accordance with the STDF guidelines.

The information will be disseminated through awareness-raising workshops and information exchange and media platforms of implementing partners (e.g., IITA, AU-IAPSC, Alliance Biodiversity and CIAT, national programs, and that of partners, including the website of the www.bbtvalliance.org). The awareness-raising workshops to be held during the life of the project will help facilitate the establishment of a communication platform and sustain interest in the outcomes of the project.

[23] https://standardsfacility.org/sites/default/files/STDF_Comms_plan_Final.pdf

Project knowledge products and awareness materials will be stored on the website of AU-IAPSC, IITA, BBTV ALLIANCE, and other partners, as part of the virtual library, to ensure accessibility. The project team will make special effort to promote relevant materials through IPPC Plant Health Campus. Project milestones will be featured in AU-IAPSC reports, newsletters, and other briefs. Before the project is completed, efforts will be made to identify local partners interested in monitoring the disease and promoting the project's findings.

The coordinated awareness-raising campaign will be supported by capacity-building activities with training on detection and diagnostics kits, which will be conducted online with hands-on training in IITA reference centres in Nigeria, Cameroon, and Tanzania. Furthermore, the project will develop tools for BBTV surveillance to reinforce border interceptions and provide clean planting materials to farmers to avoid the cross-border spread of BBTV at the regional and continental levels. AU-IAPSC will work closely with member states to ensure that BBTV management protocols are endorsed for adoption and institutionalized in countries through advocacy during statutory and internal African Union meetings. Harmonized SOPs will be developed and made available to participating countries and others concerned by the disease to enhance capacity and ensure safe trade at national, regional, and international levels. AU-IAPSC will seek endorsement by member states of project technical documents. The project will also involve private sector companies, farmers, and export companies to ensure uptake when the project phases out.

16. Why should the STDF fund this project?

By funding this project, STDF will contribute to the UN SDGs, Agenda 2063, CAADP, the Kampala Declaration of the African Union, and the recent commitment to the Plant Health Strategy for Africa (PHSA). There are several reasons to fund this project:

1. Alignment with STDF mandate and PHSA goals: The project proposal reflects our shared values and goals. The project links the continental body, AU-IAPSC, member-state NPPOs, and two technical partners, IITA and Alliance of Biodiversity International and CIAT (ABC) of CGIAR. It promotes continental coordinated action and contributes to the STDF goal of facilitating safe trade by strengthening stakeholders' capacity to meet international SPS requirements.

2. Restore economic and social impact: Bananas are a key food and income security among smallholder farmers. Support from STDF will contribute to sustainable economic growth, poverty reduction, and food security, and pave the way for positive social change. It will also increase productivity, food security, trade, and income, as well as livelihood through employment.

3. Measurable Outcomes: The project will enhance awareness and knowledge about SPS issues hindering the banana sector with diseases such as BBTV and the looming Fusarium TR4.

4. Innovation and Sustainability: No banana is resistant to BBTV; thus, the whole production system is at risk. Funding from STDF will help significantly improve awareness and provide stakeholders in the banana value chain with knowledge, information, and guidelines/protocols to facilitate the movement of planting material within the confines of sound SPS measures meant to prevent further disease spread. The project introduces innovative solutions to BBTV management by providing training on SPS issues and tools to monitor the pests and mitigate the risks of spread effectively. The country's regional and continental approach to the issue is distinctive, as information and knowledge will be equally accessible to all countries at risk. Moreover, survey data and surveillance tools will enable countries to develop tools for decision-making process.

5. Reputation and Recognition: AU-IAPSC, IITA, Alliance Biodiversity, and the NPPOs of the countries have worked together and have a long-standing tradition of supporting agriculture and trade. The African Union and banana-exporting countries will recognize this contribution and STDF's commitment to the PHSA goals.

6. The collaborative approach: The project will promote a regional and coordinated strategy to address BBTV in Africa. Additionally, public-private partnerships will be established by engaging private companies, such as QUALIPLANT-7, and participants in the banana trade. Furthermore, the project will promote South-South collaboration and the exchange of best practices between beneficiary countries. Countries with reference laboratories and centers of excellence will assist low-capacity nations in managing BBTV by providing training and sharing their experience. This will enhance scalability and replicability, enabling emerging banana-growing countries to benefit from interventions and strategies.

7. Other opportunities: The current project will strengthen AU-IAPSC and the existing alliance and create opportunities for partnerships and collaborations between organizations, exporting organization stakeholders to eradicate BBTV and foster preparedness for the advent of Fusarium TR4, which was declared in Mozambique.

ATTACHMENTS

Appendix 1: Work plan (see attached template)

Appendix 2: Project budget in Excel (see attached template)

Appendix 3: Written consent from an STDF partner that agrees to implement the project OR evidence of the technical and professional capacity of another organization proposed to implement the project

Appendix 4: Letters of support from organizations that support the project request

APPENDIX 1: Work Plan

STDF projects should have a maximum duration of three years.

Please shade or otherwise indicate when the activity will take place

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 0: Preparatory and cross-cutting activities													
0.1. Conduct questionnaire-based surveys and focus group discussions to identify, map, categorize (by role and gender) and assess the capacities of key stakeholders engaged in banana production and trade.	IITA, ABC, IAPSC, NPPOs, and Trader associations												
0.2. Utilize survey data to conduct a gender analysis to project implementation and a plan to ensure equitable participation, benefit-sharing, and empowerment across genders.	IITA, IAPSC, NPPOs, ABC, and Trader associations												
Output 1.1. Knowledge and skills of different stakeholders on diagnostic and surveillance increased													
Activity 1.1.1**.** Assess the capacity of NPPOs in each target country to identify gaps and capacity-building needs.	IITA, IAPSC, NPPOs, and Trader associations												
Activity 1.2. Develop capacity building plans to address the gaps and enhance phytosanitary capacity, focusing on personnel training for skill improvement, awareness improvement, and technology adoption.	IITA, IAPSC, NPPOs, and Trader associations												
Activity 1.3. Conduct training (online and face-to-face) on relevant to ISPMs for NPPO staff, border agents and farmers including developing training materials, e-learning modules, and field guides for BBTV diagnosis and control.	IITA, IAPSC, NPPOs, and Trader associations												
Activity 1.4. Train NPPOs' staff, border agents and farmers on data collection and use of ICT-based tool for collecting data on pests' contamination, trade of banana planting materials	IITA, IAPSC, NPPOs, ABC, and Trader associations												
Activity 1.5. Link NPPOs and seed producers with laboratories for diagnostic and private suppliers of diagnostic kits	IITA, IAPSC, NPPOs, ABC, and Traders												
Activity 1.6. Prepare and implement awareness creation events and materials (media, digital platform, agricultural fairs, national extension programs, radio and TV) on BBTV and other emerging diseases of banana targeting the consumers, the general public, the media, the travellers,	IITA and IAPSC												

and also, farmers who are not involved in banana production													
Output 1.2 Knowledge and skills of national stakeholders on SPS compliance for banana planting material production and trade, IPM for vector management enhanced													
Activity 1.2.1. Develop SOPs for identification of pest-free production sites (adapt the ISPM for the banana VC)	IAPSC, IITA, ABC, and NPPOs												
Activity 1.2.2. Map high and low-risk areas for BBTV in the countries and identify sites for production of clean planting material	IITA, ABC, IAPSC, and NPPOs												
Activity 1.2.3. Training stakeholders on establishment of BBTV safe production sites and good production practices and SPS compliance measures to produce clean planting materials and fruits for trade in the 10 target countries	IITA, IAPSC, ABC, and NPPOs												
Activity 1.2.4. Training of producers/farmers on how to produce safe planting materials and quality assessment (disease free materials, sourcing, maintaining, supplying clean material)	IITA, ABC, IAPSC, and NPPOs												
Activity 1.2.5. Organize training workshops for banana planting materials exporters and NNPOs on export certification and import verification	IITA, ABC, IAPSC, and NPPOs												
Activity 1.2.6. Develop and implement standardized procedures for NPPOs to assess for banana plant materials producers to field certification for clean seed production for planting and fruits for trade	IITA, ABC, IAPSC, and NPPOs												
Activity 1.2.7. Inspection and accreditation of banana farms for planting of safe material and fruit production for safe trade	NPPOs												
Activity 1.2.8. Promote eco-friendly aphid vector management packages	IAPSC and IITA												
Output 2.1 Tools and systems to support BBTV monitoring at regional level developed and operationalized													
Activity 2.1.1. Conduct a baseline study (desk review, focus group discussions, key informant interviews) for gap analysis for BBTV and other emerging pests for each participating country	IITA, IAPSC, ABC, and NPPOs												

Activity 2.1.2. Process and analyse the data from ICT-based data collection from participating countries to inform the digital map	IITA and IAPSC												
Activity 2.1.3. Establish a regional pest alert system, and emergency response actions for BBTV and other invasive banana pests (linked the AI-remote sensing mechanism)	IITA, IAPSC, NPPOS												
Activity 2.1.4. Link the project beneficiary countries to an ICT-based national pest alert system, and emergency response actions for BBTV and other invasive banana pests	IAPSC, IITA, ABC, growers, exporters, phytosanitary inspectors, and NPPOs												
Activity 2.1.5. Adapt the digital system (SeedTracker) for the banana value chain and database of seed producers of clean planting material and a tool for linking producers of clean planting material and farmers and for traceability and raising awareness on BBTV on risks on purchase of unsafe planting materials	IITA, IAPSC, ABC and NPPOs												
Activity 2.1.6. Create a virtual knowledge centre on BBTV and other banana pests on a partner website (AU-IAPSC or IITA)	IAPSC and IITA												
Output 2.2. Regional coordination strategy to control BBTV developed and rolled out, and BBTV Alliance reinvigorated													
Activity 2.2.1. Adopt a regional approach to BBTV management (harmonized SOPs at the regional level)	IAPSC, IITA, ABC, and NPPOs												
Activity 2.2.2. Strengthen BBTV ALLIANCE network for information sharing and coordinated management of BBTV mitigation action and enhance opportunities for safe banana trade	IITA, IAPSC, ABC, NPPOs and IAPSC												
Activity 2.2.3. Promote South-south cooperation and best practices sharing between countries who have been able to maintain BBTV and those at risk (newly affected)	IAPSC, IITA, ABC, and NPPOs												
Activity 2.2.4. Conduct regional biannual progress reviews and training workshops to monitor progress and gather feedback on lessons learned by stakeholders (Virtual and in person)	IITA, and IAPSC												
Activity 2.2.5. Develop a sustainability plan to ensure the sustainable management of resources, tools and the continuation regional coordination post-project	IAPSC and IITA												

Appendix 5: Development of a Seed Tracker for digitalization of banana value chain

With regard to Activity 2.1.5., "Adapt the digital system **(SeedTracker[24])** for the banana value chain and database of seed producers of clean planting material and a tool for linking producers of clean planting material and farmers and for traceability and raising awareness on BBTV on risks on purchase of unsafe planting materials," the project will adopt the SeedTracker tool developed by IITA for digital mapping and integration of banana value chain actors.

SeedTracker (ST) is a digital tool (web app) usable on any internet-enabled device that enables registration of producers, processors, off-takers, regulators, and extension. It seamlessly connects the functions of the value chain and enables traceability. The tool has been adopted for the cassava value chain in Nigeria and Tanzania and is being tested for adoption in other countries (e.g., Ghana, Sierra Leone, and the DRC).
Its functions support the entire crop value chain, including production planning, traceability, certification, inventory management, and real-time tracking (Fig. A1). ST offers marketing tools, geographic maps, and decision support, providing comprehensive seed production geo-referenced data by variety, region, and quantity. Its applications are customizable to fit specific crops, country regulations, and language (English, French, etc.). The data collection tool of ST works offline, i.e., usable in areas without internet. Data gets uploaded into the system when the device connects to the network.

Figure A1. Features of SeedTracker

Within the frame of the STDF project, we will develop and establish a fit-for-purpose ST to enable seamless integration of the banana value chain, including seed and fruit producers, processors, marketers, aggregators, regulators, phytosanitary inspectors, extension, etc. It offers real-time information on seed production and facilitates quality seed production and assurance (seed certification). The system will serve as a centralized digital platform for the banana value chain, enhance access to quality seeds of improved varieties, and serve as a catalyst to enhance seed system efficiency. The system is adaptable for other crop value chains.

[24] https://e-catalogs.taat-africa.org/com/technologies/seedtracker-digital-tool-for-strengthening-seed-governance-and-certification-systems

Description:

- Digitalization and data-driven solutions can increase the efficiency of the seed value chain and empower producers, regulators, traders, and farmers with knowledge and tools for a sustainable and productive seed sector.
- The Seed Tracker will be tailored to meet the functions of banana seed value chains in the target countries.
- It includes designing digital data collection forms, a database, and a dashboard (front end). The system is hosted on a cloud server and will be accessible to authorized users through a login password.
- The data collection forms are usable on mobile phones, tabs, and web forms and help capture geo-referenced information about value chain actors, banana production fields, and inspection activities.
- The project will organize key stakeholder consultations to map the banana value chain actors and their needs using Seed Tracker.
- The data captured in the Seed Tracker will be available to target countries and implementing partners and is expected to benefit from the captured data for decision support.
- The platform supports baseline studies and is a tool for M&E. It helps countries map banana fields and markets. It also enables communication and networking between value chain actors, increasing trading opportunities.
- The project team will develop this tool within the first quarter and put it to use.