



Food and Agriculture  
Organization of the  
United Nations

**Regional strategy and action plan  
for the prevention, preparedness,  
response and recovery  
of Latin America and the Caribbean  
to Fusarium wilt of Musaceae  
tropical race 4**









# **Regional strategy and action plan**

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Latin America and the Caribbean  
to Fusarium wilt of Musaceae,  
tropical race 4

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# Abbreviations and acronyms

ALPP	Area of low pest prevalence
PFA	Pest-free area
PRA	Pest risk analysis
CAHFSA	Caribbean Agricultural Health and Food Safety Agency
CAN	Andean Community of Nations
CELAC	Community of Latin American and Caribbean States
CIAT	International Centre for Tropical Agriculture
IPPC	International Plant Protection Convention
CIRAD	International Cooperation in Agronomic Research for Development
COSAVE	Southern Cone Plant Health Committee
COVID-19	Coronavirus disease 2019
SSC	South-South cooperation
TSSC	Triangular South-South Cooperation
RS-TR4	Regional Strategy for the prevention, preparedness, response and recovery of Latin America and the Caribbean to Fusarium wilt of Musaceae, Tropical Race 4
FAO	Food and Agriculture Organization of the United Nations
FONTAGRO	Regional Fund for Agricultural Technology
Foc TR4	<i>Fusarium oxysporum</i> f.s. <i>cubense</i> tropical race 4, causative agent of Musaceae Fusarium wilt tropical race 4.
GICSV	Inter-American Coordinating Group for Plant Health
IICA	Inter-American Institute for Cooperation on Agriculture
PFPP	Pest-free place of production
FW	Fusarium wilt of Musaceae. Other common names: Fusarium wilt of banana (FWB) or Fusarium wilt. Many texts erroneously refer to it as Panama disease
FW-TR4	Fusarium wilt tropical race 4 (used in document to refer to disease as such)
ISPM	International Standards for Phytosanitary Measures
OIRSA	International Regional Organization for Agricultural Health
NPPO	National Plant Protection Organization
RPPO	Regional Plant Protection Organization
RAP- TR4	Regional Action Plan for Latin America and the Caribbean to address Fusarium wilt of Musaceae Tropical Race 4
TCP	FAO Technical Cooperation Programme
PFPS	Pest-free production site





# Foreword

Hundreds of thousands of families in Latin America and the Caribbean depend on the banana and plantain agribusiness for their livelihood and an important part of their food security. These crops are also relevant to the economies of many countries in the region, where 25 percent of the world's bananas and plantains are produced and 60 percent of banana shipments to world markets are generated.

Fusarium wilt tropical race 4 (Foc TR4) is one of the most devastating pests of Musaceae. Since its detection in the Republic of Colombia in mid-2019, and later in the Republic of Peru in 2021, the chances of its introduction in other countries in the region have increased. In this context, FAO and the National and Regional Plant Protection Organizations of the region have identified the need to strengthen the capacity of the countries to face this serious threat. The regional strategy and action plan presented in this document aim to contribute to the achievement of that purpose.

Both the strategy and the action plan on Foc TR4 were developed with the collaboration and coordination of FAO, together with experts and technicians from 23 countries in the region. They are aligned with the FAO Strategic Framework for 2022–2030; the priorities of the Sendai Framework and the Regional Strategy for Disaster Risk Management in the Agricultural Sector and Food and Nutrition Security in Latin America and the Caribbean. They also consider the International Standards on Plant Protection and introduce innovative elements for the management of phytosanitary emergencies.

The countries of Latin America and the Caribbean are immersed in the difficult task of recovering our agri-food systems hit by the COVID-19 pandemic. In this complex situation, tropical race 4 of the Fusarium wilt (FW-TR4) is undoubtedly the greatest challenge facing the banana and plantain agribusiness in our region. However, this context also constitutes an opportunity to encourage the development and introduction of innovations that strengthen biosecurity at different levels, the best crop and soil management practices and alternatives for the recovery of the affected countries. It is also necessary to comprehensively address the strengthening of the institutional framework related to pest management, the co-responsibility of the private sector, public-private collaboration and the involvement of society as a whole.

With this document, FAO strengthens its commitment to continue supporting governments and contributing to agricultural sustainability, while increasing the resilience of the sector and livelihoods in the region.



Julio A. Berdegué  
Assistant Director-General  
and FAO Regional Representative  
for Latin America and the Caribbean





AREA DE PRODUCCION



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# Summary

This document presents the Regional Strategy for the prevention, preparedness, response and recovery of Latin America and the Caribbean to *Fusarium* wilt of Musaceae, tropical race 4 (RS-TR4) and the corresponding Regional Action Plan (RAP-TR4). The document is the product of a regional consultation and validation process supported by: the FAO Regional Technical Cooperation Programme (TCP) “Strengthening regional capacities for surveillance, prevention, and management against the eventual spread of *Fusarium* wilt tropical race 4 *Fusarium oxysporum* f. sp. *cubense* (Foc TR4)”; the Regional Plant Protection Organizations (RPPO) of Latin America and the Caribbean; the National Plant Protection Organizations (NPPO) of the countries that grow Musaceae in the region, and the Inter-American Coordinating Group for Plant Protection (GICSV by its Spanish acronym).

The RS-TR4 is conceived as a regional instrument to contribute to the efforts and initiatives carried out in sub-regional spaces through different integration and phytosanitary protection organizations. In this regard, it is intended to strengthen coordination and focus efforts, actions and good practices to support the understanding and reduction of risk, while also strengthening the management of phytosanitary emergencies in Latin America and the Caribbean, as well as improving the resilience of the banana and agricultural sector and reducing the damages and losses related to the introduction and spread of this important pest.

The RS-TR4 covers the countries of Latin America and the Caribbean, with an emphasis on those that produce and export Musaceae. It is designed for a period of nine years (2021–2030) and will be implemented mainly through the existing structures of the RPPOs and NPPOs.

The RS-TR4 has taken into account the FAO Strategic Framework for 2022–2030 (FAO, 2021), the four priorities of the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR, 2015) and the Regional Strategy for Disaster Risk Management in the Agricultural Sector and Food and Nutrition Security in Latin America and the Caribbean (2018–2030) approved by the Community of Latin American and Caribbean States (CELAC) (CELAC, 2018), in addition to the International Plant Protection Standards (ISPM) of the International Plant Protection Convention (IPPC) (IPPC, 2021).

Its cross-cutting areas provide guidelines to reduce and manage the risk in the face of the threat of *Fusarium oxysporum* f. sp. *cubense*, tropical race 4 (Foc TR4), and are as follows:

- a. *Strengthening coordination at the regional level to improve prevention, preparedness, and response to *Fusarium* wilt of Musaceae, tropical race 4 (FW-TR4), and ensuring the necessary technical support and compliance with the Regional Action Plan (RAP-TR4).*
- b. *Strengthening of human resources training with the support of South-South and triangular cooperation (SSTC).*

c. *Synergistic and complementary approach to regional actions related to disaster risk reduction in agriculture and food and nutritional security, with emphasis on those related to the threat of *Fusarium oxysporum* f.sp. *cubense*, tropical race 4.*

d. *Strengthening alliances between the public sector, the private sector, civil society, and the academic, scientific, and technological fields to improve the prevention, preparedness, response, and recovery of *Fusarium oxysporum* f.sp. *cubense*, tropical race 4 and other phytosanitary threats.*

The RAP-TR4, as a product of the TCP regional emergency programme on Foc TR4, is designed for a period of three years (2021–2024). An annual review of the results is suggested, as well as the adjustment of activities based on the evolution of pest situation in Latin American and Caribbean and the regional context in the post-COVID-19 recovery phase.

It is aimed at achieving the following objectives:

- 1 Strengthen regional and inter-institutional coordination to improve preparedness plans for the threat of *Fusarium oxysporum* f.sp. *cubense*, tropical race 4; the management of phytosanitary emergencies; technical support and compliance with RAP-TR4 through the use and strengthening of existing regional structures; public-private partnerships; technical cooperation and support for research-development platforms in the region.
- 2 Strengthen the capacity of the countries, their institutions and human resources in order to improve the training of technicians and guarantee the effectiveness and efficiency of emergency management, with emphasis on preparing countries to face FW-TR4, response planning, the exchange and harmonization of operating procedures and good practices, the sharing of information and the training of technicians and instructors.
- 3 Increased level of biosecurity on farms, helping to reduce the dispersal speed of Foc TR4 in Latin America and the Caribbean

The components of RAP-TR4 are:

• **Component 1** – *Regional and institutional coordination*, with three lines of action: i) Strengthening of regional coordination through GICSV and its Foc TR4 working group; ii) Strengthening of public-private alliances to promote activities to reduce risk in Musaceae, and improve the management of phytosanitary emergencies and the sharing of information, and iii) Strengthening of technical cooperation, support for regional research-development platforms and global networks and integration with related international thematic networks.

• **Component 2** – *Training*, with the following lines of action: i) Development of targeted training actions and training of instructors on FW-TR4 and its causal agent; ii) Dissemination of good practices in banana cultivation and information about FW-TR4, and iii) Generation of training resources.

• **Component 3** – *Capacity to manage the phytosanitary emergency in the countries and the region*, with the following lines of action: i) Legal frameworks and legal provisions on specific phytosanitary measures for Foc TR4 and related phytosanitary threats; ii) Contingency plans and operational procedures: evaluation of their effectiveness through simulations, and iii) Strengthening and evaluation of regional capacity to manage the Foc TR4 emergency.

The RAP-TR4 was approved by the four RPPOs and 23 NPPOs in Latin America and the Caribbean during the regional validation and approval process. The specific decisions for the joint execution of the activities will be taken by the GICSV and the RPPOs.







# Introduction and Background

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# Introduction

The Regional Strategy for the prevention, preparedness, response and recovery of Latin America and the Caribbean to *Fusarium* wilt of Musaceae, tropical race 4 (RS-TR4) was developed under the leadership of FAO, which identified the need to generate a common instrument for collaboration and coordination of the countries of Latin America and the Caribbean on risk reduction and emergency management due to the detection of *Fusarium oxysporum* f.sp. *cubense*, tropical race 4 (Foc TR4)<sup>1</sup> in our continent.

The vision, mission and general objective that preceded the planning of the strategy were the following:

- **Vision:** Latin America and the Caribbean prepared to face the threat of *Fusarium oxysporum* f.sp. *cubense*, tropical race 4 and to produce Musaceae in a sustainable and resilient way.
- **Mission:** Develop the necessary capacities in the region through collaborative planning, the strengthening of regulatory frameworks and the development of actions to reduce the risk and adequately manage the phytosanitary threat of Foc TR4, strengthening the prevention, preparedness, response, and recovery of the *Fusarium* wilt of Musaceae, tropical race 4 (FW-TR4).
- **General objective:** Develop coordinated actions that increase the region's capacity to prepare for and respond to Foc TR4; strengthen the use of good practices in the management of phytosanitary emergencies; complement other risk management initiatives in agriculture and involve various actors from Latin American and Caribbean society.

The RS-TR4 is aligned with the FAO Strategic Framework for 2022–2030 (FAO, 2021), the priorities of the “Sendai Framework for Disaster Risk Reduction 2015–2030” (UNISDR, 2015), the “Strategy Regional for Disaster Risk Management in the Agricultural Sector and Food and Nutrition Security in Latin America and the Caribbean (2018–2030)” (CELAC, 2018), ISPM of the IPPC and the recommendations and considerations issued by the Ministers of Agriculture of different countries of the continent and authorities of international organizations in the high-level meetings of Quito (MAG, 2019), and Lima (Andean Community, 2021).

Both the Strategy and the Plan of Action for Latin America and the Caribbean contribute to FAO's Strategic Objectives “Promote inclusive and efficient agricultural and food systems” (SO4) and “Increase the resilience of livelihoods to disasters” (SO5). In addition, they contribute to the reduction of the risk of introduction and spread of FW-TR4 in Latin America and the Caribbean and help to avoid the worsening of the conditions of the food chain, markets and the economic recovery of our countries due to the current situation of the pandemic.

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<sup>1</sup> It has been proposed to reclassify the causative agent of FW-TR4 as *Fusarium odoratissimum* (Maryani *et al.*, 2019), however, there are divergent opinions (Bedoya, Bebbler & Studholme, 2021). Although this paper uses Foc TR4 to refer to the causative agent of FW-TR4, clarification has been deemed necessary.



This document is the product of a regional consultation and validation process supported by the FAO Regional Technical Cooperation Programme (TCP) “Strengthening regional capacities for surveillance, prevention, and management against the eventual spread of wilt by *Fusarium*, caused by Tropical race 4 of the fungus *Fusarium oxysporum* f.sp. *cubense* (Foc TR4); the Regional and National Plant Protection Organizations of the continent and the countries that grow Musaceae in the region, as well as the Inter-American Coordinating Group for Plant Protection (GICSV).

Based on the first analysis carried out collectively during the regional TCP workshop, the preliminary document was submitted for peer review and sub-regional review sessions were held. The results of the analysis made it possible to modify and develop the structure and text of the strategy and plan of action for Latin America and the Caribbean. Both documents were validated during a virtual regional workshop held at the end of 2020.

Representatives of the NPPOs of 23 Musaceae producing countries in the region, the four RPPOs of the continent (OIRSA, CAN, COSAVE and CAHFSA), the Foc working group of the GICSV; five regional institutions and development agencies; six producer associations and nine scientific and academic institutions participated in the consultation. A special effort was made to obtain input from the national authorities of all TCP beneficiary governments.





## Background

### Musaceae production and its importance for Latin America and the Caribbean

Musaceae represent an important source of exports and play an important role in food security and the livelihoods of small-scale farmers and the rural sector in Latin America and the Caribbean, where it is estimated that more than 808 000 families depend directly on the banana industry (APIB, 2021). As in many producing regions, the per capita consumption of all types of bananas exceeds 100 kg per year and provides up to 25 percent of the daily caloric intake in rural areas of some of the producing countries (OECD-FAO, 2020).

In 2019, the world production of these crops reached 158 361 680 metric tonnes, of which 73 percent (116 781 658 tonnes) corresponds to bananas and the remainder to plantains for cooking and other Musaceae (FAOSTAT, 2021). In Latin America and the Caribbean, this proportion shows the same trend: 75.41 percent, equivalent to 29 734 892 tonnes, corresponds to banana production (and represents 25.46 percent of world production), while that of plantains for cooking and other Musaceae amounts to 9 694 703 tonnes (24.59 percent) (FAOSTAT, 2021). Musaceae are produced in 31 countries in Latin America and the Caribbean (see Figure 1).

Latin America and the Caribbean is the world's leading supplier of bananas. During the 2016–2018 period, total exports reached an annual average of 13 million metric tonnes, which represents 80 percent of banana shipments in the world (Alterndorf, 2019).



**Figure 1.** Countries that produce Musaceae in Latin America and the Caribbean



### The production of Musaceae in Latin America and the Caribbean

Ecuador is the world's leading exporter of bananas; Colombia, Costa Rica and Guatemala are in the top five exporters in the world, while the Dominican Republic, Panama, Honduras, and Mexico are also important exporters (Workman, 2020). Brazil, Ecuador, and Colombia are among the top 10 producers of bananas globally (Jegade, 2019).

In 2018, income from banana exports represented 30% of Ecuador's agriculture exports and 15% in Guatemala, while in 2019, Ecuador's greater supply contributed to the increase in banana exports worldwide (OCDEC-FAO, 2020).

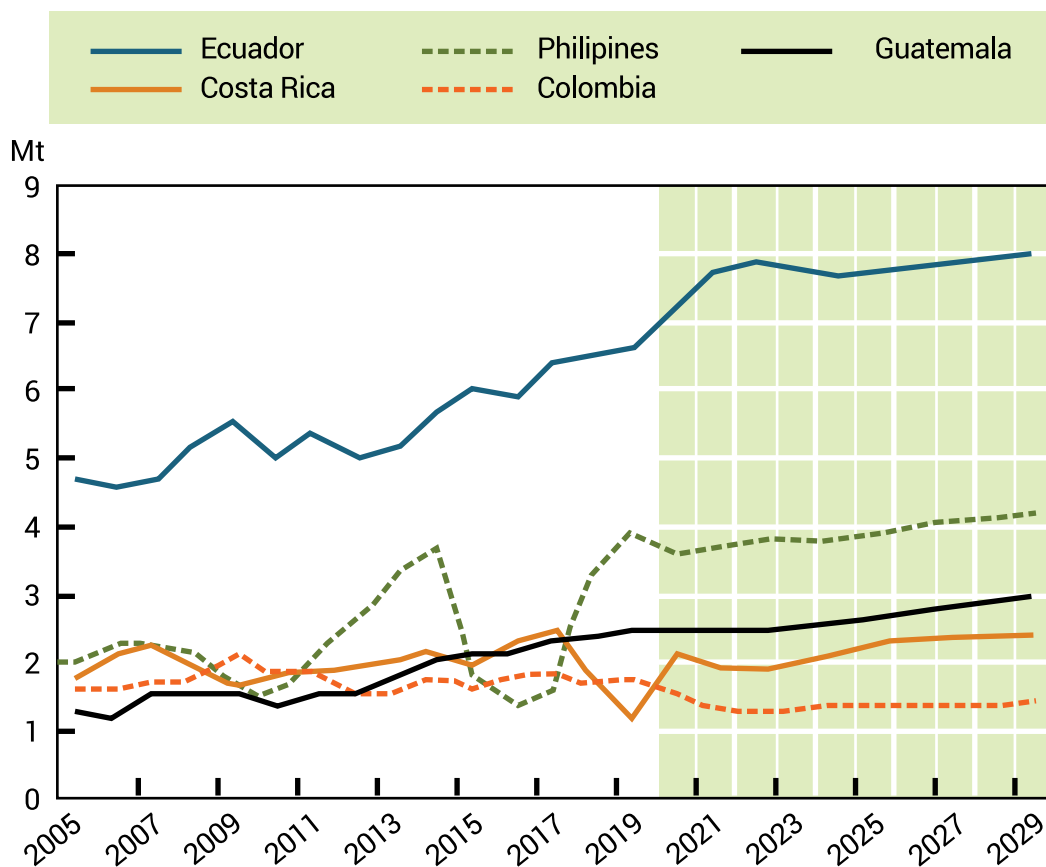
Countries that produce musaceae in LAC  
 Largest exporters and producers



Source: Figure made from the countries that register production of bananas, cooking plantains and other musaceae (FAOSTAT, 2021). A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

Projections for the world banana market, assuming average weather conditions and no other spread of banana pests, estimate that world banana production will grow 1.5 percent annually until 2029, thereby also benefitting our region, which could increase production up to 34.8 million tonnes (OECD/FAO, 2020). The same source considers that the increase in demand for the fruit worldwide will be driven by population growth and changing perceptions of health and nutrition, which will favour the world's largest exporters, including four of them in Latin America (see Figure 2).

**Figure 2.** Banana industry outlook - Banana exports by the world's top five exporters



Source: OCDEC/FAO (2020) (StatLink 2 <https://doi.org/10.1787/888934143147>)

## Fusarium wilt tropical race 4 (TR4) and its impact

Fusarium wilt (FW) caused by *Fusarium oxysporum* f.sp. *cubense* (Foc), is one of the most destructive pests of Musaceae crops. In the middle of the last century, race 1 of this fungus caused the disappearance of most of the commercial Gros Michel banana plantations in Latin America and the Caribbean, with estimated export losses of USD 2.3 billion (Ploetz, 2005). Today, it continues to limit production, especially for small-scale farmers growing susceptible varieties.

In the late 1960s, FW emerged in bananas from the Cavendish subgroup in the Taiwan Province of China (Pegg, Moore & Sorensen, 1993; Ploetz, 1994; Buddenhagen, 2009), but tropical race 4 was

not identified until 1994 as a new breed of Foc. Surprisingly, that outbreak did not alert the banana industry despite the susceptibility of several local banana cultivars and the lack of clones to replace the Cavendish demand (Ordóñez, et al., 2015).

FW is a typical vascular disease, in which the conductive plant tissues are invaded by the fungus through the roots, causing vascular necrosis, wilting and plant death (Figure 3). The symptoms of tropical race 4 do not differ from those caused by races 1 and 2 of Foc (Figure 4). However, Foc TR4 is capable of infecting not only the bananas of the Cavendish subgroup, but also other clones susceptible to races 1 and 2, such as Gros Michel and those of the Bluggoe subgroup. The presence of characteristic symptoms in clones of the Cavendish subgroup (Figure 5) constitutes a strong criterion for suspicion about the incursion of Foc TR4 in an area. However, other pests of Musaceae can produce similar symptoms or appear in the form of complex infections with symptoms variations that lead to frequent confusion, adding greater difficulty to their recognition in the field. As a result, the confirmation of Foc TR4 must be carried out by laboratory diagnosis, for which various variants of molecular techniques have been described and used with satisfactory results (García-Bastidas, et al., 2020).

**Figure 3.** Typical symptoms of Musaceae Fusarium wilt

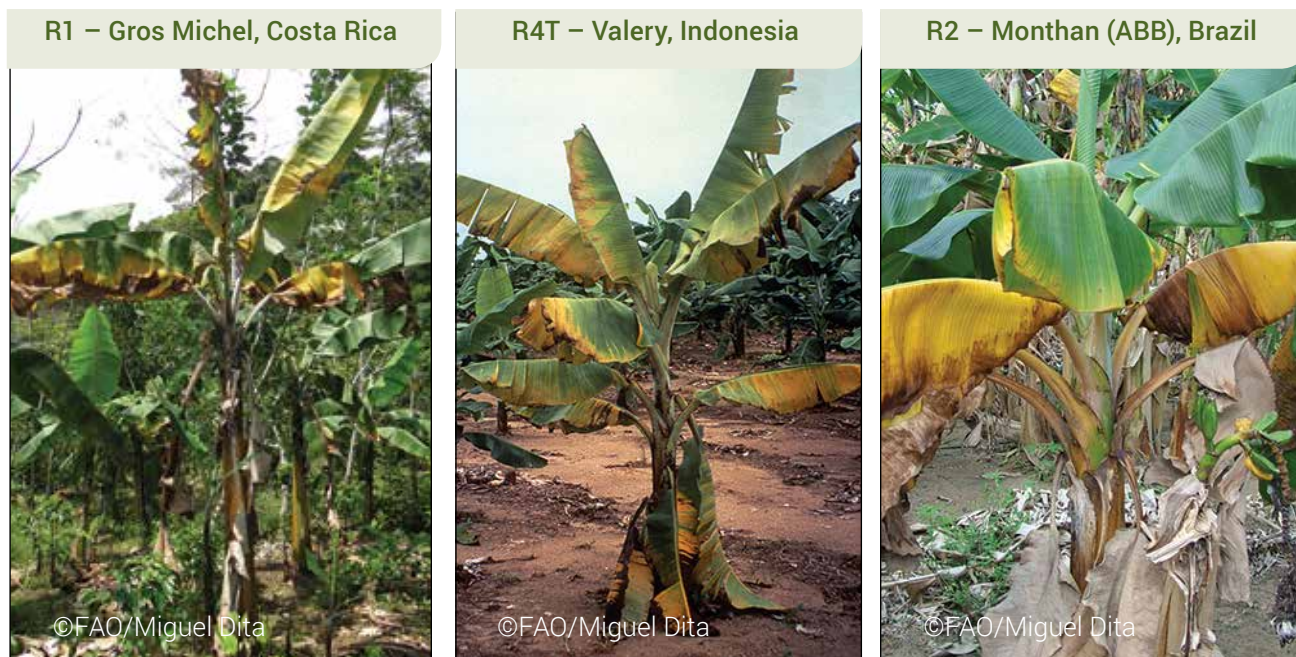




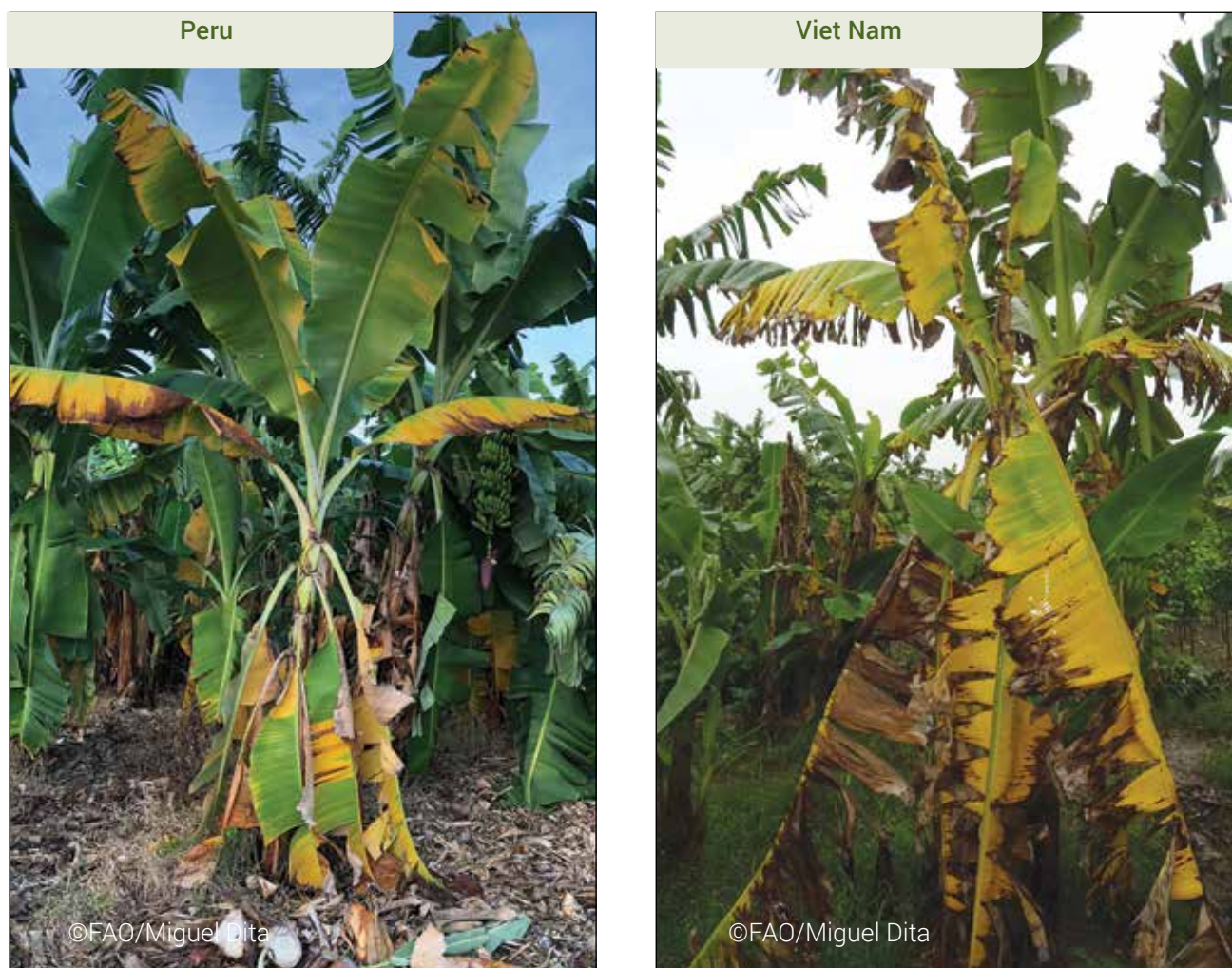




**Figure 4.** Similarity of symptoms caused by tropical race 4 and races 1 and 2 of *Fusarium oxysporum* f.sp. *cubense*



**Figure 5.** Symptoms of tropical race 4 of *Fusarium oxysporum* f.sp. *cubense* in clones of the Cavendish subgroup





The fungus is commonly spread through infected planting material, infested soil present in vehicles, containers, tools, footwear, and animals, as well as through surface runoff water and contaminated irrigation reservoirs. The transfer of infected plant material is probably one of the most important causes in the local, national and international spread of this pest (ProMusa, 2021a).

FW-TR4 has devastated commercial Cavendish banana plantations in the Chinese province of Taiwan, the Republic of Indonesia, the Republic of the Philippines, Malaysia and the Northern Territory of Australia. In 2015, the area affected by the pest was estimated at 100 000 ha (Ordonez, et al., 2015), while the reported losses amounted to USD 121 million in the Republic of Indonesia; USD 253 million in Malaysia and USD 14.1 million in the Taiwan Province of China.

Recent reports consider the devastation caused by TR4 to be far greater. In the People's Republic of China, for example, it has been estimated that by 2017, more than 100 000 ha of Cavendish bananas had been destroyed by Foc TR4, representing losses of USD 1.4 billion at current market prices. Only in the Chinese province of Guangxi, 80 000 ha of bananas were lost between 2015 and 2018. Much of the affected area has had to be used for the planting of citrus and dragon fruit. No less important is the effect of FW-TR4 on the livelihoods of small-scale producers and the loss of tens of thousands of jobs in all affected areas (ProMusa, 2021b). Figures 6 and 7 show the effects on banana crops in La Guajira (the Republic of Colombia).

**Figure 6.** Damages caused by Foc TR4 in banana production areas in La Guajira, Colombia





**Figure 7.** Aerial view of an area in La Guajira (Colombia) before and after the Foc TR4 incursion



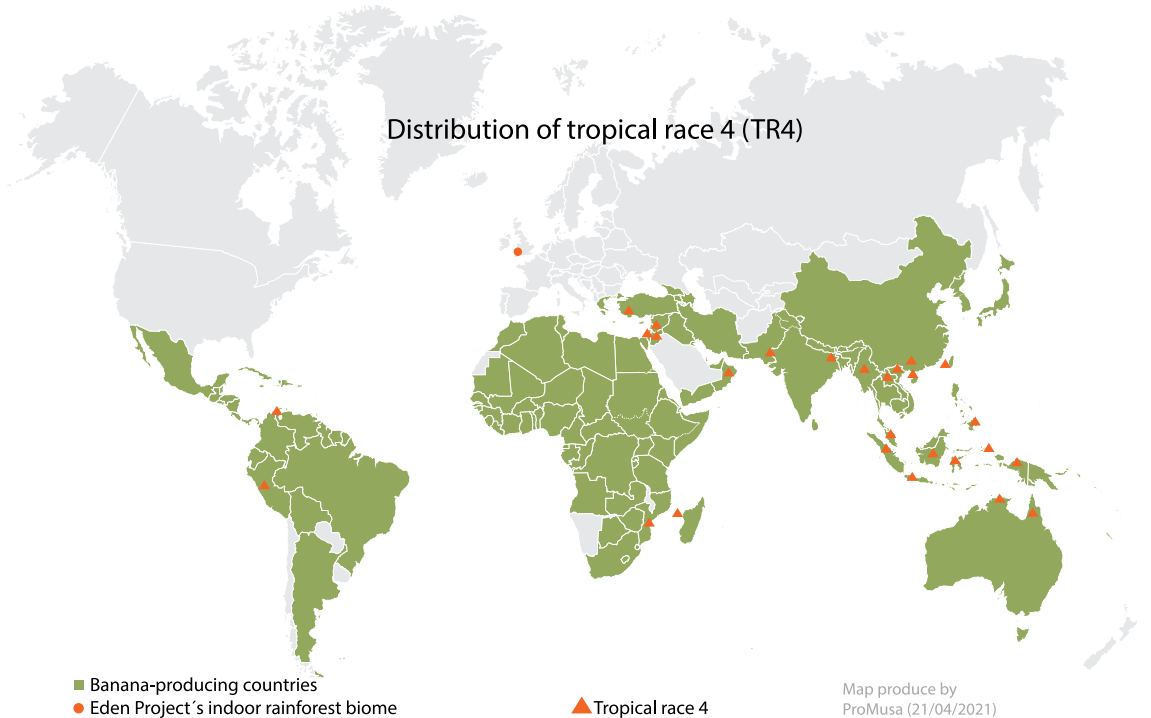
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At present, Foc TR4 is present in various countries in Asia, Africa, America, Oceania and Europe (Figure 6), which is why it has been considered a pandemic (Kema, 2020).

The Republic of India, the People’s Republic of China, the Republic of the Philippines, the Republic of Indonesia and the Republic of Colombia, five of the world’s largest banana producers (Jegade, 2019) are among the affected countries.

**Figure 8.** World map of Fusarium wilt tropical race 4 (FW-TR4) distribution



Source: Map modified from [https://www.promusa.org/Tropical+race+4+-+TR4#Origin\\_and\\_distribution](https://www.promusa.org/Tropical+race+4+-+TR4#Origin_and_distribution)

The Figure shows the presence of Foc TR4 in countries in Asia, Africa, America, Oceania, and even in Europe (Cornwall, England: Eden project on rainforest biome). Some of the Indonesian islands, such as Java, Sumatra, Borneo and the province of Papua, are singled out separately, while in Australia the two affected areas are highlighted. The presence of the FW-TR4 was confirmed in August 2019 in the La Guajira area in Colombia, and in April 2021 in a small area of Querecotillo, Department of Piura, in Peru. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

The banana clones of the Cavendish subgroup are the most commercialized, representing about 40–50 percent of world production and practically all international trade. These clones have the ability to achieve high yields per hectare and to recover quickly from disasters caused by hydroclimatological hazards (OECD/FAO, 2020). However, they are susceptible to FW-TR4.

## Current situation and challenges

The characteristics of the industrialized banana production systems and the deficient biosecurity on the farms pose great limitations to this agricultural sector due to the growing presence and spread of pests at a global level and particularly of tropical race 4 of the *Fusarium* wilt of the Musaceae.

The current emergency produced by the COVID-19 pandemic is impacting agriculture, rural areas and food systems. Its differentiated effects and the alternatives for the recovery of the agricultural sector are being studied by various international organizations, while governments seek solutions to guarantee the production of safe food and the protection of workers linked to the different sectors of food systems. This leads to food production becoming one of the greatest challenges in this complex situation.

A few months before the declaration of the COVID-19 pandemic, in August 2019, the first case of FW-TR4 in banana plantations in Latin America and the Caribbean was recorded in the department of La Guajira in the Republic of Colombia (ICA, 2019). The phytosanitary measures applied to contain the outbreak by the NPPO – the Colombian Agricultural Institute (ICA) – and its coordinated work with producer associations, the private sector, research centres and international organizations, have prevented the dissemination of the pest to other production areas of the country and facilitated the declaration of pest-free areas in territories such as Urabá (ICA, 2021).

Just under two years after that first case of the pest in Latin America and the Caribbean and facing a challenging situation due to the consequences of the COVID-19 pandemic in our continent, on 12 April 2021, the Ministry of Agriculture (MIDAGRI) and the National Agrarian Health Service (SENASA) of the Republic of Peru declared a phytosanitary emergency throughout the national territory due to the detection of the pest *Fusarium oxysporum* f. sp. *cubense* tropical race 4 (El Peruano, 2021).

The pest was detected in 0.5 hectares of organic bananas in the district of Querecotillo (Sullana province, Piura department), a border area with the Republic of Ecuador. The proximity to important banana areas of the Ecuadorian province of El Oro immediately led to the declaration of a phytosanitary alert in the world's top exporter.

Several highly relevant elements justify the implementation of immediate actions in the countries of the continent that grow Musaceae. These include: i) the importance of cultivation for the food and socio-economic security of several countries in the region, including the livelihoods of thousands of small-scale farmers and their families; ii) the complexity of the causal agent and its ability to remain in the soil for more than 30 years; iii) the various forms of dissemination, the control of which requires strict regulations, resources and discipline; iv) the lack of clones or resistant varieties to substitute in the short-term those of the Cavendish subgroup, which constitute 57 percent of those cultivated on a commercial scale at present (Lescot, 2020); and, v) the high losses caused in the affected countries, which are being forced to modify the cultivation technology thereby increasing production costs or to convert banana areas to other crops.

The consequences of the COVID-19 pandemic on the food chain, markets and the economic recovery of our countries may be aggravated if the measures for preparing and responding to Foc TR4 are not strengthened. Therefore, now more than ever it is essential to strengthen national capacities to minimize the possibilities of introduction and spread of the pest and to mitigate its effects.

## Good practices for the management of phytosanitary emergencies

The phytosanitary emergency due to the incursion of a pest such as *Fusarium oxysporum* f.sp. *cubense* tropical race 4 is one of the most difficult situations for plant health services, especially in countries where the cultivation of Musaceae is widely distributed and constitutes an important socio-economic pillar of great national interest. Recent experience in the Republic of Colombia shows that the focused and coordinated work and capacity of the NPPO, the private sector, research centres, technicians and producers, as well as the different sectors of civil society is essential to achieve good results in the detection, containment and management of this pest.

Some of the most important elements of good phytosanitary emergency management practices are summarized below, as the basis for the strategy and actions presented in this document. They are based on internationally established basic concepts and procedures for health emergencies in agriculture (Gary et al., 2021), adapted and with specifications for FW-TR4; International Plant Protection Standards (ISPMs) and guidelines for monitoring (FAO, 2016), pest risk communication (FAO, 2019) and pest status (IPPC Secretariat, 2021) developed by the IPPC.

### The management of plant health emergencies – a necessary review to face the threat of Foc TR4 in Latin America and the Caribbean

According to the United Nations, the term “emergency management” is sometimes used interchangeably with that of disaster management, particularly in the context of biological and technological threats and in relation to “health” (and phytosanitary) emergencies. Despite the high degree of overlap between both concepts, an emergency can also be associated with dangerous phenomena that do not seriously disrupt the functioning of a community or society (UN, 2016).

The phytosanitary emergency management system should be coordinated with the national disaster plan to optimize potential synergies (mobilization of resources, mobilization of other authorities).

For an efficient management of plant health emergencies, such as that caused by FW-TR4, some prerequisites are needed such as the proper functioning of plant health services, updating the legal framework with specific phytosanitary regulations, monitoring and analysis the capacities, and appropriate coordination with other sectors and interested parties. Countries with good phytosanitary capacity are better prepared to face plant health emergencies.

The basic pillars for good emergency management are the following:

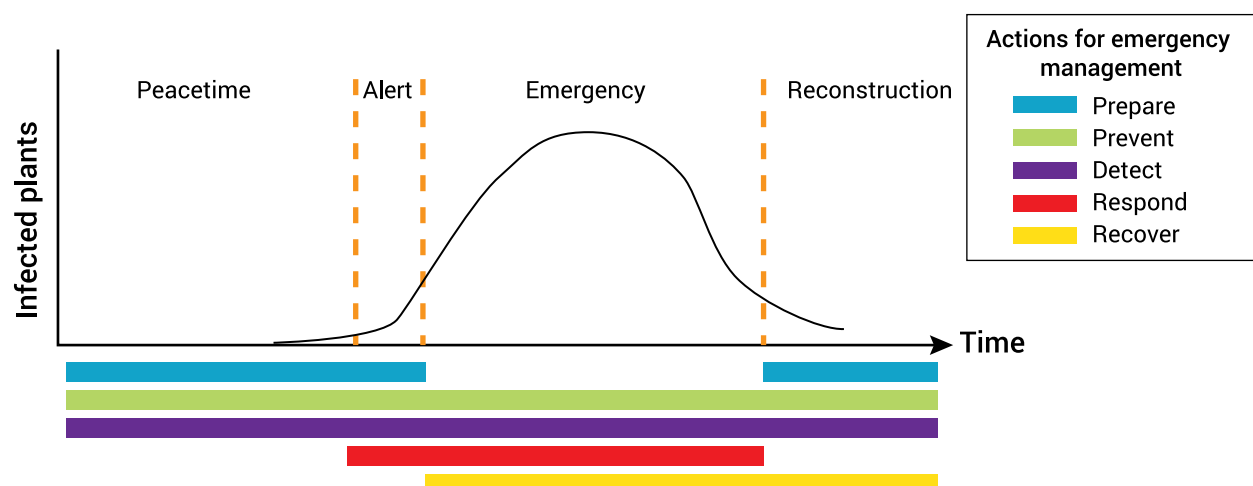
- 1 **Command and control**, through structures in charge of decision-making, evaluation of the situation, implementation of the decisions taken and control of the effects.
- 2 **Cooperation**, defined as a joint action process to guarantee common interests and values based on agreements.



- 3 | **Operational information**, based on information that has been contextualized and analysed to provide a good understanding of the situation and its evolution.
- 4 | **Coordination**, between the public and private sectors and different parts of the organizations and sectors involved in the country, in order to ensure the achievement of common objectives.
- 5 | **Clear and high-impact messages** that focus on the importance of actions to preserve livelihoods and food security.

Emergency management systems, including phytosanitary ones, are processes in which four phases are distinguished: “peacetime”, “alert”, “emergency” and “reconstruction”, along with five specific actions that are implemented according to their relevance for each phase of the emergency. These actions are: “prepare”, “prevent”, “detect”, “respond” and “recover”. Figure 9 shows the phases and actions of phytosanitary emergency management, locating them in a hypothetical epidemiological curve of a pest.

**Figure 9.** Phases of a phytosanitary emergency and actions to be taken in each phase



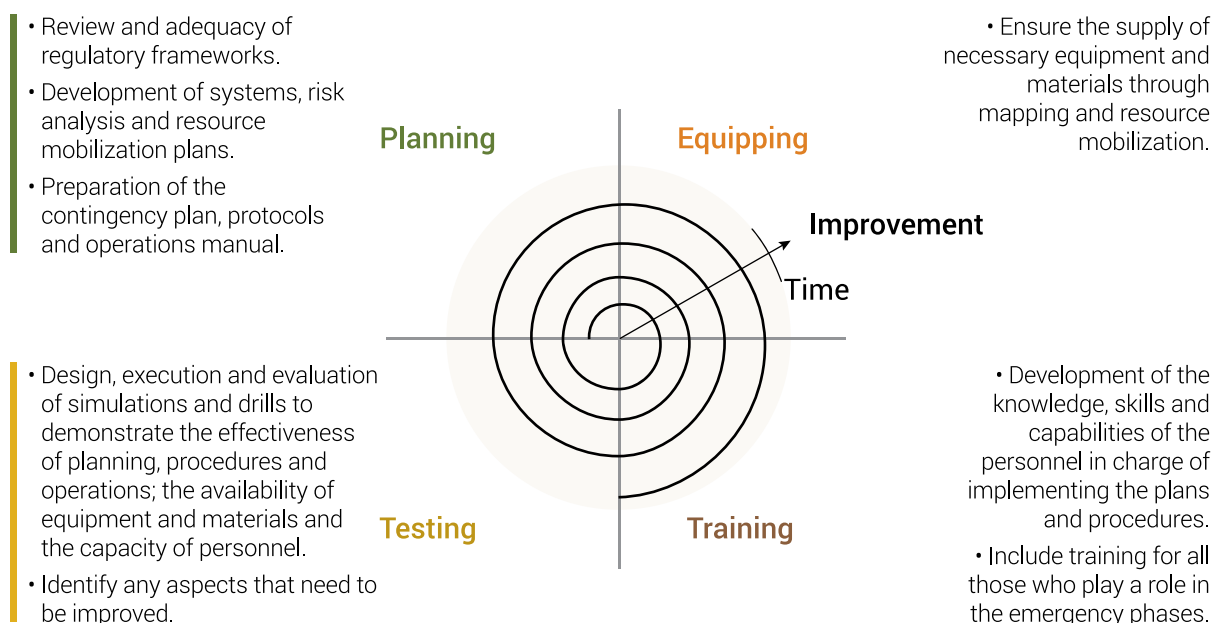
Source: adapted from Gary *et al*, (2021).

**Peacetime** is the best period to define the emergency preparedness plan and contingency or response plans for specific phytosanitary threats. If done later, it will be more difficult to mobilize the necessary resources, train the personnel who manage the response, and evaluate the effectiveness of the plans and procedures through simulation exercises and drills.

Preparing and preventing are the key actions in peacetime to achieve successful management of phytosanitary emergencies. Exclusion is the phytosanitary measure of choice to prevent incursions of quarantine pests and includes different activities. Likewise, the formulation of the preparedness plan through a planning and coordination process is essential during the peacetime phase. According to the United Nations definition, the preparedness plan establishes provisions in advance that allow timely, effective, and appropriate responses to the possible manifestation of a threat (or dangerous event) in a specific place during a specific period, or to emerging disaster situations that may pose a threat to society or the environment (UN, 2016).

The preparation that takes place in peacetime is defined as a spiral cycle of activities that are perfected over time (Figure 10), which has a positive impact not only on the management of emergencies, but also on the capacity of the NPPOs and the countries in general.

**Figure 10.** Phytosanitary emergency preparedness cycle in peacetime



Source: Graphic modified and adapted from Gary *et.al.*, 2021.

The effectiveness of the successive phases of emergency management in the event of a pest incursion depends largely on the execution of the preparedness cycle. The results of this process should lead to:

- The establishment of a national command and control committee, or single command post, from the national level down to the local level.
- The determination of the roles and responsibilities and the training of all those involved in emergency management.
- The formation of the necessary legal competencies.
- Identification of national, regional and international sources of financing, if necessary.
- The preparation, updating or adaptation of a national contingency plan or response plan for a specific phytosanitary threat, and of the manuals of operating procedures or operating protocols.
- The assurance of essential materials and equipment for the activation of the contingency plan.
- Evaluation of the national capacity to properly implement the contingency plan.

National contingency plans should be developed, regularly updated, and evaluated in peacetime through simulation exercises and drills, as part of the preparedness effort.

The content of these plans may vary, but usually they must contain the specific criteria for the declaration of the emergency, the response plan (objectives and scope; strategy, measures and options; specifications on the chain of command and the coordination of actions); phytosanitary regulations that will be put into effect; standard operating procedures (SOPs) required for the recognition of outbreaks, critical response actions (such as border measures, adapted biosecurity, specific surveillance, collection, shipment and custody of samples, rapid risk assessment to adapt the actions of response and other phytosanitary measures) and indicators for the supervision and monitoring of the response (including eradication) and the protection and biosecurity of the personnel in charge of the field work.

The **alert phase** refers to the period where the level of risk requires careful observation; the rapid transmission, exchange and evaluation of relevant information and the assurance of urgent precautionary measures to address the impending emergency. The alert phase is the period when the phytosanitary threat approaches (occurrence of outbreaks in the vicinity of the country or in trading partner countries), or suspicious cases have been detected in the national territory that must be confirmed or denied as soon as possible. During this phase it would be convenient to use the Early Warning Systems (EWS).

In the **emergency phase**<sup>2</sup>, immediate actions planned to avoid or mitigate direct and indirect losses caused by an emerging phytosanitary situation are carried out: the contingency or response plan is activated and the phytosanitary measures and regulations to control the pest are put into practice, along with the previously established response plan.

The **reconstruction phase** takes place after the emergency phase and includes the reestablishment of the affected production areas; the recovery of the phytosanitary conditions of the crops when possible; relaunching plant production systems, value chains and trade, as well as restoring livelihoods and supporting other affected socio-economic aspects. It should be characterized as “building back better”, seeking to increase the resilience of the affected sector and reduce risk factors. The after-action review is an important element that allows to reflect on the lessons learned, identify the strengths to be maintained and the deficiencies in need of improvement, as well as incorporating changes and practices that improve the management process and operational readiness status for future emergencies.

Given that the eradication of Foc TR4 has not been possible, the analysis after the experience and the lessons learned in countries such as the Republic of Colombia are of great value to improve operational and technical aspects in the other producing nations of the continent. For example, the importance of public-private partnerships and co-responsibility of the private sector for training, epidemiological surveillance and biosecurity on farms, containment measures and the maintenance of pest-free areas (PFAs) and areas of low pest prevalence (ALPPs).

All the actions carried out during the emergency management process have their specific characteristics at each phase, but it is essential that the countries can identify and implement their main activities.

**Prevent** is essential for all countries and pest-free areas. When exclusion measures are well designed and based on national pest risk analysis (PRA), they can help reduce the chances of introduction and mitigate the effects of the pest. Prevention activities include:

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<sup>2</sup> Although this is the only phase designated as an “emergency”, emergency management includes all four phases initially mentioned in this document

- Security measures at points of entry (ports, airports and land borders).
- Measures related to imports, including those related to the illegal entry of products, by-products and other regulated items.
- Constant updating of information on the pest (changes in distribution, hosts or epidemiology in affected countries and trading partners).
- Actions aimed at establishing and strengthening contacts and agreements with neighbouring countries and, if possible, harmonizing security measures at common borders.
- Promotion, implementation and/or reinforcement of biosecurity on farms, with emphasis on those of small-scale farmers.
- Awareness of all stakeholders and the public about the pest and prevention and exclusion measures. Risk communication is essential.

Early **detection** of suspected cases and a possible incursion of the pest is essential to avoid, as far as possible, its rapid spread. This action includes the implementation of activities, programmes and systems to recognize suspicious cases, define the presence or absence of the phytosanitary threat and verify the spread of the pest. Detection is especially important during the alert and emergency phases to know where to respond. In peacetime it is valuable in terms of preparation and in the reconstruction phase to help verify phytosanitary status. Components that must be available and active for effective detection include:

- Epidemiological surveillance system (general and specific), capable of early detection of suspected cases (or symptoms compatible with FW).
- Operating procedures for action in the case of suspicious cases, including their clear identification, taking and sending samples, and immediate measures in accordance with the national contingency plan.
- Team of detection specialists available for mobilization.
- Capacity for laboratory testing and necessary procedures, with the guarantee of the biosecurity of facilities and processes.
- Criteria for confirming the presence of the pest and official notification.
- System or flow of information on the data generated during surveillance and analysis.

Once suspicious cases of special interest have been detected, such as the presence of typical FW symptoms in bananas from the Cavendish subgroup, or positive results in specific PCR tests for Foc TR4, it is essential to act as quickly as possible.

**Responding** is the key action of the emergency phase and involves the implementation of activities, programmes and systems aimed at rapid containment, the eventual eradication of the pest when possible and the mitigation of its negative consequences. It is also possible to respond preventively during the alert phase. The most important activities to ensure an effective and efficient response include:



- Activation of command and control structures at all levels.
- Immediate activation of the contingency plan and the protocols established in the operation manuals, including eradication and internal quarantine.
- Systematic evaluation of the fulfilment of the contingency plan, the application of the protocols and the pest situation, including any necessary adjustments according to the current conditions.
- Establishment of new regulations and agreements depending on the situation.
- Maintenance of specific surveillance, the information system, and data management.
- Development of the communications plan, ensuring the reliability, transparency and timeliness of the information provided, as well as adequate awareness among different target audiences about the measures being taken and other pertinent messages given the phytosanitary emergency situation.
- Exchanges of information with advisory or expert groups.
- Management of additional technical and financial support, if required.

**Recover** is the main action of the reconstruction phase and is related to the implementation of activities and programmes to restore phytosanitary conditions prior to the emergency (when possible); relaunch affected production systems, value chains and trade and rehabilitate livelihoods. Recovery can also be activated before the end of the emergency in the national territory, particularly if it affects large areas of the country or is of long duration as in the case of the FW-TR4 emergency.

As the eradication of FW-TR4 has not been possible so far, a return to the previous pest status in the country is unlikely to be achieved, at least in the short-term. However, recovery from an emergency caused by FW-TR4 can include specific production, phytosanitary, commercial and rehabilitation strategies and support for affected communities. Some possible activities of the production and phytosanitary strategies are:

#### A ■ Use of affected areas that have remained unproductive

- Planting tolerant or resistant clones, or somaclones, after carrying out the pertinent evaluations to ensure that they are free of other pests and to confirm their behaviour under the environmental conditions of the specific location.
- Modification of crop systems, technologies or cycles (higher planting density; more frequent replanting) and strengthening or adaptation of good production practices.
- Reconversion of areas (change of crop), including the possibilities of providing quality seeds and credits or subsidies.
- Support the evaluation of new clones with tolerance or resistance to the pest for their later use in production.

## B ■ Pest free areas (PFA), areas with low pest prevalence and integrated management alternatives:

Depending on the situation of the areas affected by the FW-TR4, the country must decide on the phytosanitary strategies, their usefulness and the actions and activities that must accompany them, for example:

- Establishment of pest-free areas (PFA), pest-free places of production (PFPP), pest-free production sites (PFPS) and/or areas of low pest prevalence (ALPP).
- Phytosanitary measures to maintain and verify PFA, PFPP, PFPS and ALPP, such as inspections, verification surveys and movement restrictions of certain products and plant materials, including security zones, as well as extension advice to producers.
- Surveillance and pest management programmes in accordance with phytosanitary conditions after the emergency.
- Strengthening the production and certification of healthy planting material.
- Improvement of biosecurity standards in production areas, including support for small-scale producers.
- Identification of elements that require support from research, innovation and technology transfer (soil health, biological controllers, bio-inputs, mobile applications).

Other recovery-related activities include:

- Identify the priorities on trade flows, both for domestic consumption and for exports, and their adaptation if necessary.
- Negotiations with trading partners to reopen international markets, with new or updated agreements and risk-based phytosanitary requirements and in accordance with the standards of the IPPC and the Agreement on the Application of Sanitary and Phytosanitary Measures (SPM) of the World Trade Organization (WTO).
- Creation of formal and informal support networks for the good recovery of the affected places and communities, with adequate communication strategies.



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## Regional Strategy

for the prevention,  
preparedness, response and  
recovery of Latin America  
and the Caribbean to  
Fusarium wilt of Musaceae,  
tropical race 4 (RS-TR4)







## Action area

The Regional Strategy is conceived as an instrument to contribute to the efforts and initiatives that are carried out in the sub-regional spaces of Central American Integration System (SICA), Caribbean Community (CARICOM), CAN, Union of South American Nations (UNASUR) and Southern Common Market (MERCOSUR), and in particular those that are developed by the Regional Plant Protection Organizations (RPPOs) of the continent – OIRSA, CAN, COSAVE and CAHFSA – and its member National Plant Protection Organizations (NPPOs).

In addition, from a perspective of the area of plant health, it seeks to support regional actions linked to the CELAC Plan for Food and Nutritional Security (CELAC, 2014), the reduction of risks in agriculture and the strengthening of the capacities of Latin America and the Caribbean to prepare for and respond to disasters and crises, including transboundary, migratory or invasive pests.

The RS-TR4 aims to strengthen coordination, synergies, and exchanges to contribute to the advancement of collaborative actions between sub-regions and countries of Latin America and the Caribbean and to promote, in a consistent and complementary manner, activities that strengthen the region's capacity to manage the phytosanitary emergency, with an emphasis on improving its weakest aspects.

## Focus and scope

The RS-TR4 provides regional guidelines to focus the efforts of Latin America and the Caribbean on the actions and good practices of prevention, preparedness, response, and recovery of the FW-TR4 and contribute to the understanding and reduction of risk and strengthening of emergency management in the context of biological threats of a phytosanitary nature in the continent.

The strategy aims to improve the sustainability of the cultivation of Musaceae in our countries, the resilience and development of the banana and plantain production chain, as well as the preservation of the livelihoods of small-scale producers and their contribution to food and nutrition security. In this regard, its development has taken into consideration the existing opportunities, legal frameworks, and resources, as well as the potential intervention of the various actors of the Musaceae production chain and allies who will also benefit from the work to be carried out.

The Regional Strategy seeks to strengthen the planning of collaborative actions and promote the coordination and complementarity of regional and sub-regional activities conducive to the dissemination of good practices; the harmonization of regulations and procedures that strengthen the preparedness and response to the FW-TR4 and, in general, the management of phytosanitary emergencies.

The RS-TR4 covers the countries of Latin America and the Caribbean, with an emphasis on those that produce and export Musaceae. It is conceived for a period of 10 years (2020–2030) and will mainly be implemented through the existing structures in the Regional Plant Protection Organizations (RPPOs), the National Plant Protection Organizations (NPPOs) and the Inter-American Coordinating Group for Plant Protection (GICSV).

# Alignment of the Regional Strategy on Foc R4T



The FAO Strategic Framework for 2022–2030 (FAO, 2021), calls for us to act without delay to safeguard livelihoods, prepare for the future and ensure sustainable results to achieve more efficient, inclusive, resilient, and sustainable agri-food systems. Consequently, this strategy includes considerations and cross-cutting focus areas to help countries face phytosanitary threats as challenging as that of Foc TR4, as well as contributing to “achieving better production, better nutrition, a better environment and a better life without leaving anyone behind”. The strategy also includes guidance for the incorporation of technology and innovation and improvements in governance, human capital and the institutions involved.

This regional strategy has also taken into account the four priorities of the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR, 2015) – which should be applied “the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters caused by natural or man-made hazards, as well as related environmental, technological and biological hazards and risks”(p.11) – and the Regional Strategy for Disaster Risk Management in the Agricultural Sector and Food and Nutrition Security in Latin America and the Caribbean (2018–2030), approved by the Community of Latin American and Caribbean States (CELAC) (CELAC, 2018), in addition to the ISPMs issued by the IPPC.

Based on the above, the general considerations that should guide decision-making and specific measures in the region are the following:

## 1

Policies and practices for risk management, and in particular for the management of phytosanitary emergencies, must be based on *an understanding of the components of risk*: vulnerability, capacity, degree of exposure, characteristics of the pest (threat) and the environment. Understanding risk in all its dimensions allows for prior assessments to facilitate prevention and mitigation, as well as the development of appropriate specific phytosanitary measures to deal with the presence and possible spread of FW-TR4. To achieve this it is important to:

- a  Encourage and monitor the preparation of national PRA (in countries that lack them) and the periodic update of the regional and existing national PRA, in order to facilitate decision-making and the application of phytosanitary measures derived from their comprehensive analysis and understanding by farmers and the various actors involved in the Musaceae production chain.
- b  Promote awareness and education campaigns in the region aimed at different target audiences, which include not only information on FW-TR4, its effects and the need for prevention measures, but also the importance of the cultivation of bananas, plantains and other Musaceae for the



food security and livelihoods of thousands of small-scale farmers. The need to establish biosecurity measures on farms and at points of entry should be emphasized; applying good agricultural practices that improve their resilience and generally increase the understanding of the dimensions of risk, linking all public and private actors to actively collaborate in this type of initiative at different levels.

- c | Support and promote the participation of organizations, institutions, and specialists from the region in initiatives, platforms and/or regional and international research and innovation programmes on FW-TR4 and the cultivation of Musaceae, as well as in global information exchange networks relevant for the prevention, preparedness, response, and management of this phytosanitary threat.
  
- d | Propose ways, including international cooperation, to determine and apply harmonized methods for the evaluation of damages and losses caused by the introduction and establishment of the FW-TR4 in economic, social and environmental terms.
  
- e | Promote and support initiatives for the exchange of information on good practices and technologies applicable to biosecurity, epidemiological surveillance, diagnosis, crop management and risk reduction, in which multiple actors participate, such as academia, the scientific-technical community and the private sector.

## 2

*Risk governance* is directly linked to the effectiveness and efficiency of risk management. This requires clarity in the objectives, plans, competencies, guidelines and coordination (intersectoral and with the different stakeholders involved). Its strengthening is essential to prepare and properly implement the phytosanitary emergency management process and achieve a good detection, response and recovery of the FW-TR4. It also contributes to developing inter-institutional and sectoral collaboration and alliances.

Risk governance refers to the institutions, standards, agreements, processes and mechanisms by which decisions about risks are made and implemented. It is broader in scope than traditional risk analysis, as it includes the participation of various stakeholders, as well as considerations of the broader legal, political, economic and social contexts in which a given risk is assessed and managed, including underlying and aggravating factors. The main principles of good governance are: transparency, accountability, efficiency and effectiveness, participation, responsiveness, equity and inclusion.

*To help improve this important element, it is necessary for our region to strengthen:*

- a | Inter-institutional coordination at all levels in the region, sub-regions, and countries to coordinate actions that strengthen exclusion and biosecurity measures; contribute to improving the resilience of Musaceae production and livelihoods, especially of small producers, and support the implementation of sub-regional and national plans for the management of the phytosanitary emergency;
- b | The analysis and updating of the national legal frameworks for the implementation of regulations and phytosanitary measures related to the FW-TR4;
- c | The agreed or harmonized procedures for biosecurity in border areas, including the inspection and control of plant materials, products, by-products, or other regulated items that constitute routes of dissemination of Foc TR4, thus promoting cooperation between countries that share common borders;
- d | The exchange of information and results to improve the verification of biosecurity on farms, with emphasis on those of small-scale producers; the development of systems to produce healthy planting material and safe procedures for the introduction of promising clones due to their behaviour against FW-TR4;
- e | The integration of risk reduction in the planning of the development of the banana and Musaceae sector in general.

### 3

*Investing in risk prevention and reduction*, in addition to being profitable when compared to the cost of responding to the introduction of FW-TR4 and rehabilitating or converting crop areas, are essential to increase economic, social and phytosanitary resilience of the agricultural sector in the countries, and in particular of the banana sector. In this sense, it is important to consider:

- a | Promote and support the participation of the public and private sectors for investment aimed at preventing the introduction and spread of Foc TR4 and increasing the resilience of growing areas, producers and companies linked to the Musaceae production chain. In this regard, the strengthening and expansion of biosecurity measures on farms, with an emphasis on small-scale producers, is important.
- b | Strengthen the capacity to manage the Foc TR4 phytosanitary emergency through the cooperation and contribution of all stakeholders.

- c | Guarantee the systematic execution of awareness campaigns on prevention measures at all levels, with the coordinated participation of the public and private sectors.
- d | Encourage the regional generation and introduction of better technologies, procedures and products that increase the effectiveness of exclusion measures, epidemiological surveillance systems and the sustainability of Musaceae production. Also, provide support for genetic improvement programmes in the region to obtain banana and plantain clones resistant to Foc TR4 is essential.
- e | Strengthen training opportunities for all actors in the Musaceae production chain and identify ways to achieve greater access for small-scale producers.
- f | Contribute to technical cooperation on good practices and economic and financial instruments for public and private investment in aspects that reduce risk in the banana sector, including the development of insurance, compensation for producers affected by the pest, support for small producers and the transfer of sustainable technologies.
- g | Analyse and promote the existing possibilities for the mobilization of resources through development funds, climate funds and public-private partnerships at different levels in the region. The development of sub-regional and regional projects must be increased.

## 4

*Improving preparedness to ensure the effectiveness of the response to the Foc TR4 incursion* and the recovery of the banana sector are essential for food security and the economy of a large part of the countries of Latin America and the Caribbean.

The lessons learned about the spread of this pest; the limited diversity of marketable clones with tolerance or resistance to Foc TR4; the poor management of soil health and the insufficient use of sustainable agricultural practices, together with the socio-economic impact observed in the affected countries on various continents, highlight the need to continue strengthening preparedness by adopting measures in advance and ensuring sufficient technical, material and financial capacity for response and recovery at all levels.

The importance of preparing phytosanitary emergency management in advance has been shown, as well as the opportunity it provides to move towards more sustainable Musaceae production, which systematically incorporates biosecurity measures and practices to improve planting material health, soil health, integrated crop management and the genetic diversity of the clones that are produced.



This opportunity also makes it possible to integrate risk reduction into banana development, increasing resilience in the agricultural sector, the countries and the region.

In this approach, although the role of governments and NPPOs is fundamental, the interaction and participation of the private sector, the academic and scientific community and civil society of the countries is important, as is the guidance and support of the RPPOs and international cooperation.

To improve preparedness as a way to ensure effective response and recovery, the following actions should be considered:

- a | Strengthen and support the actions of preparedness and response to the phytosanitary threat of Foc TR4 through the GICSV, as a hemispheric mechanism on phytosanitary matters and in particular its working group on Foc TR4.
- b | Promote the exchange and harmonization of standard operating procedures for the response to Foc TR4 in the region, based on the preparation, adaptation and updating of the corresponding contingency plans and related actions.
- c | Support South-South, triangular and international cooperation to strengthen the training of human resources on the different phases of phytosanitary emergency management and provide technical guides that facilitate the quality of prevention, preparedness, response and recovery, incorporating risk reduction elements to achieve greater sustainability and resilience of Musaceae cultivation in the region.

## Cross-cutting areas

The cross-cutting areas of the RS-TR4 provide guidelines to reduce the risk in the face of the threat posed by Foc TR4 and manage the phytosanitary emergency. They focus on risk management as a whole, including planning the necessary actions and provisions, avoiding or delaying as much as possible the introduction of the pest in the pest-free areas of the continent, curbing its spread in infected areas and establishing the most appropriate recovery measures in affected areas. These areas are the following:

- a | *Strengthening of coordination at the regional level to improve the prevention, preparedness, and response to Foc TR4, while providing the necessary technical support and ensuring compliance with the Regional Action Plan (RAP-TR4).*

This area is focused on promoting collaborative approaches to face the threat of Foc TR4, with an emphasis on avoiding its introduction as far as possible in pest-free areas in the continent, contributing to a rapid and effective response to outbreaks and ensuring compliance with the RAP-TR4, with the leadership of the GICSV and the RPPOs. It is also linked to updating the regulatory and normative frameworks of the countries, the availability of high-level technical support for Latin America and the Caribbean, and the development of strategies for risk reduction and regional management of emerging pests that promote rural development and the sustainability of agricultural production.

- b | *Strengthening of human resources training with the support of South-South (SSC) and triangular cooperation (TSSC).*

This is an important area to face the threat of Foc TR4 and contribute to closing the gaps that still exist in skills and technical capacity. It is oriented towards the achievement of higher levels of knowledge and technical training on key aspects of the biology and epidemiology of the fungus, as well as its detection in the field, specialized and differential diagnosis, alternatives for pest and crop management and good practices for the management of phytosanitary emergencies. The development of a cascade training strategy for the preparation of trainers or instructors, as well as the strengthening of capacities in prioritized topics and under similar approaches will be important elements. The development and exchange of information on Foc TR4, good agricultural practices and integrated management will also be promoted to increase resilience. The promotion of cooperation and collaboration among Latin American and Caribbean countries is a key mechanism for knowledge management and capacity building in the region, but other possibilities for cooperation on this issue should also be harnessed.

**c** | *Promoting synergies in regional actions related to disaster risk reduction in agriculture and food and nutrition security.*

Various regional initiatives and programmes address disaster risk management (DRM), adaptation to climate change (ACC), and the application of information technologies (IT) for early warning systems (EWS) in the agricultural sector and those related to food and nutrition security (FNS), among others. There are also global platforms that promote coordinated innovations and research among various actors to address gaps and urgent topics on FW-TR4, crop genetic improvement and management. This area is aimed at promoting the use of complementarity and synergies with existing programmes, initiatives, platforms and networks to seek opportunities to strengthen the work of the continent and the availability of resources.

**d** | *Strengthening of alliances between the public sector, the private sector, civil society and the academic, scientific and technological fields to improve the prevention, preparedness, response and recovery of Foc TR4 and other phytosanitary threats.*

The greatest responsibility for risk reduction in the face of phytosanitary threats such as Foc TR4, and the adequate management of emergencies that are declared due to the incursion of pests, falls on governments and their NPPOs. However, it is currently recognized that effective and efficient preparation for these threats, as well as good practices for the management of phytosanitary emergencies, requires the involvement not only of the government and related sectors, but the whole of society, with emphasis on the actors linked to the agricultural sector and the Musaceae production chain.

This area is aimed at reinforcing the role of public-private alliances and promoting joint responsibility and active cooperation of national companies and importing countries, producer associations, scientific and academic institutions and other components of civil society in outreach and sensitization activities, training, biosecurity, epidemiological surveillance, and the search for solutions that improve the emergency management of Foc TR4 and other phytosanitary threats.



# Regional Action Plan

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# Regional Action Plan for Latin America and the Caribbean to address Fusarium wilt of Musaceae tropical race 4 (RAP-TR4)

RAP-TR4 is one of the products of the regional emergency TCP on Foc TR4.

It is designed to be executed during a three-year period (2021–2024), with a prior period for implementation arrangements. An annual review of the results is recommended, as well as the adjustment of activities based on the evolution of the pest in the continent and the Latin American and Caribbean context in the post-COVID-19 recovery phase.

This product is aimed at achieving the following objectives:

- 1 Strengthen regional and inter-institutional coordination to improve the prevention and preparedness plans for the threat of *Fusarium oxysporum* f.sp. *cubense*, tropical race 4; the management of phytosanitary emergencies; technical support and compliance with RAP-TR4 through the use and strengthening of existing regional structures; public-private partnerships; technical cooperation and support for research-development platforms in the region.
- 2 Strengthen the capacity of the countries, their institutions and human resources in order to improve the training of technicians and guarantee the effectiveness and efficiency of emergency management, with emphasis on preparing countries to face FW-TR4, response planning, the exchange and harmonization of operating procedures and good practices, the dissemination of information and the training of technicians and instructors.
- 3 Strengthen the biosecurity levels on farms, helping to reduce the dispersal speed of Foc TR4 in Latin America and the Caribbean.

The expected results after the implementation of the regional action plan are the following:

- 1 Strengthening of regional coordination and technical support for the countries of Latin America and the Caribbean, facilitating the process of preparation for the response to the FW-TR4 and the sharing of information with a greater participation of international technical cooperation and public-private partnerships, under the leadership of GICSV and collaboration with FAO.



- 2 Increased capacity of the National Plant Protection Organizations in the region and human capital to adequately manage the phytosanitary emergency, based on the preparation and execution of various training activities, the availability of trainers, the exchange of good practices and the generation of well-supported training resources.
- 3 Evaluation and strengthening of capacities in the region for the planning of the response to the incursion of Foc TR4, with the adoption of the necessary measures to address the capacity deficiencies detected.
- 4 Increased level of biosecurity on farms, helping to reduce the dispersal speed of Foc TR4 in Latin America and the Caribbean.

## General description of the Regional Action Plan (RAP-TR4)

The RAP-TR4 is made up of three components, which are briefly described below:

### Component 1 – Regional and inter-institutional coordination

This component is aimed at strengthening regional coordination and collective actions related to FW-TR4 through the Inter-American Coordinating Group for Plant Protection (GICSV) and its working group on this pest.

The strengthening of this group should ensure the sustainability of the activities carried out by the FAO Regional Technical Cooperation Programme on Foc TR4 (TCP/RLC/3724), support the implementation of the activities of this regional action plan and improve them as required, as well as facilitating their monitoring and evaluation.

With the guidance of the GICSV, this component is also aimed at the creation and promotion of public-private alliances to strengthen activities of great interest within this action plan, such as raising awareness among different target audiences, the implementation of biosecurity measures, mainly on farms, as well as epidemiological surveillance, training technicians and producers and early actions to reduce risk in the face of the threat of Foc TR4.

Due to its strategic importance for Latin America and the Caribbean, the Foc TR4 working group of the GICSV, with the support of the expert committees of the continent's RPPOs, and of South-South and triangular cooperation, will strengthen the exchange of information and experiences on Foc TR4. It will

also strengthen its coordinating role for the development and adoption of standards and guidelines on phytosanitary measures for this pest, as well as the harmonization of diagnostic procedures, disinfection and safe introduction of promising plant material of bananas and plantains, among others.

Its lines of action are as follows:

- a. Strengthening of regional coordination through GICSV and its working group on Foc TR4.
- b. Strengthening of public-private alliances in support of activities to reduce risk in Musaceae, management of the phytosanitary emergency and sharing of information.
- c. Strengthening of technical cooperation, support for regional and global research-development platforms and integration into international thematic networks.

## Component 2 – Training

Component 2 is aimed at increasing the capacity of human resources, organizations and society through the systematic encouragement and development of their capacities and the sustainability of these improvements over time. In addition to increasing knowledge through learning and the use of various types of training, it also includes raising political awareness and the promotion of sustained efforts to develop institutions, financial resources and technological systems.

The activities of this component emphasize the strengthening of the capacities of institutions and human resources based on existing knowledge, available resources and the exchange of experiences and good practices, while also contributing to the reduction of risks in agriculture and particularly in the cultivation of Musaceae.

The lines of action of this component are the following:

- a. Development of coordinated training actions and training of instructors in the countries on FW-TR4 and its causal agent.
- b. Sharing of good practices in banana cultivation and the exchange of information about FW-TR4.
- c. Generation of training resources.

## Component 3 – Capacity to manage the phytosanitary emergency in the countries and the region

This component aims to periodically evaluate the region's capacity for pest risk analysis and its progress in establishing the necessary legal provisions for the measures to be taken, as well as the existence and updating of regional and national contingency plans in the event of outbreaks of FW-TR4, along with the required operating procedures with clear definitions of functions, responsibilities and institutional resources. It will also review the information processes and corresponding operational provisions in the event that it is necessary to activate the contingency plan by declaring an emergency.

Its lines of action are as follows:

- a. Legal frameworks and legal provisions on specific phytosanitary measures for Foc TR4 and related phytosanitary threats.
- b. Contingency plans and operating procedures, including the preparation and evaluation of their effectiveness through simulations.
- c. Strengthening and evaluation of the capacity to manage the Foc TR4 emergency.

Annex 1 presents the details of RAP-TR4.



# Implementation arrangements for the Regional Action Plan

The Regional Action Plan has been drawn up in accordance with the analysis carried out with representatives of the RPPOs, NPPOs, private sector actors, representatives of regional and international organizations and research centres, as well as the opinion of regional experts on the subject. It has been officially endorsed by the RPPOs and the NPPOs during the validation and approval process, from which the GICSV working group on Foc TR4 and the RPPOs will make specific decisions for the joint execution of activities.

With regard to the participation of international cooperation agencies and mechanisms (FAO, IICA, FONTAGRO, U.S. Agency for International Development (USAID), and others), it is suggested that different implementation arrangements should be used based on the respective agreements. Potential synergies with other regional and international bodies, processes and funds should also be identified on issues such as risk management in agriculture, climate change, family farming, compliance with the SDGs in the context of food security and poverty eradication, in order to identify opportunities to support implementation resources with mutual benefits. It is also recommended to sign agreements or memorandums of understanding to strengthen alliances, increase visibility and strengthen the execution of different actions.

The mechanisms and modalities of implementation of the regional action plan, as well as the relevant specific agreements, will be determined by the regional coordination group.

The preparation of national action plans is the responsibility of the NPPOs with the approval of the corresponding national authorities, which must also determine the appropriate implementation mechanisms.







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Annex 1

## **Regional Action Plan**

for Latin America and  
the Caribbean to address  
Fusarium wilt tropical race 4  
(RAP-TR4)

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## Regional Action Plan for Latin America and the Caribbean to address *Fusarium* wilt tropical race 4 (RAP-TR4)

### OBJECTIVES

1. Strengthen regional and inter-institutional coordination to improve preparedness plans for the threat of *Fusarium oxysporum* f.sp. *ubense*, tropical race 4; the management of phytosanitary emergencies; technical support and compliance with RAP-TR4 through the use and reinforcement of existing regional structures; public-private partnerships; technical cooperation and support for research-development platforms in the region.

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2. Strengthen the capacity of the countries, their institutions and human resources in order to improve the training of technicians and guarantee the effectiveness and efficiency of emergency management, with emphasis on preparing the countries to face FW-TR4; response planning; the exchange and harmonization of operating procedures and good practices; the sharing of information, and the training of technicians and instructors.

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3. Strengthen the biosecurity levels on farms, helping to reduce the dispersal speed of Foc TR4 in Latin America and the Caribbean.

### EXPECTED RESULTS

1. Strengthen regional coordination and technical support for the countries of Latin America and the Caribbean, facilitating the process of preparation for the response to the FW-TR4 and the sharing of information with a greater participation of international technical cooperation and public-private partnerships, under the leadership of GICSV and collaboration with FAO.

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2. Increased capacity of the National Plant Protection Organizations in the region and human capital to adequately manage the phytosanitary emergency, based on the preparation and implementation of various training activities, the availability of trainers, the exchange of good practices and the generation of well-supported training resources.

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3. Evaluation and strengthening of capacities in the region for the planning of the response to the incursion of Foc TR4, with the adoption of the necessary measures to address the capacity deficiencies detected.

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4. Increased level of biosecurity on farms, helping to reduce the spread speed of Foc TR4 in Latin America and the Caribbean.

No.	COMPONENT	LINE OF ACTION	PROPOSED ACTIVITIES	PERIOD	ENTITY IN CHARGE / PARTICIPANTS	MEANS OF VERIFICATION
1	REGIONAL AND INTER-INSTITUTIONAL COORDINATION	Strengthening of regional coordination through GICSV and its Foc TR4 working group	Develop the group's work agenda based on the action plan*	2021	GICSV and Foc TR4 working group.	Work agenda and identification of the main collective actions to be carried out.
			Determine implementation mechanisms for the action plan; prepare and sign agreements and memorandums of understanding (MoU) as appropriate*.	2021	GICSV, Foc TR4 working group, RPPO and representatives of international cooperation organizations (FAO, IICA, FONTAGRO, USAID and others as determined).	Agreement on defined implementation mechanisms; Agreements and memorandums of understanding (MoU) signed (virtually).
			Periodically evaluate compliance with the regional action plan and adjustment of activities.	Annual, according to the working group's agenda.	GICSV and Foc TR4 working group.	Compliance report. Adjustments to the plan and agreements.
		Strengthening of public-private alliances to support activities to reduce risk in Musaceae, management of the phytosanitary emergency and promote the sharing of information.	Promote the activation of public-private partnerships in risk reduction, farm biosecurity, training and surveillance tasks, as appropriate.	January-December 2022.	NPPO, RPPO, GICSV Secretariat, representatives of the private sector and FAO national offices.	Official documents for updating or establishing public-private partnerships in the countries and the region and their commitments.
			Jointly develop outreach and education campaigns to publicize the risks and existing legislation in order to raise awareness among travellers, scientists, producers, importers and all sectors of the population in general.	January-November 2022, joint agreements and internal planning.	NPPO, RPPO, GICSV Secretariat and representatives of the private sector.	Official documents of agreements for the development of campaigns; outreach and education materials.
			Systematically evaluate the results of public-private partnerships, according to internal planning.	2022 and 2023 at the GICSV analysis meeting.	NPPO, RPPO, GICSV Secretariat.	Reports and agreements of the GICSV work evaluation meeting.
			Identify South-South and triangular cooperation needs and opportunities and manage them through FAO.	July 2021-May 2022.	NPPO, RPPO, GICSV Secretariat and FAO representations in Latin America and the Caribbean.	Communication to FAO of SSC and TSSC needs in countries and sub-regions.



No.	COMPONENT	LINE OF ACTION	PROPOSED ACTIVITIES	PERIOD	ENTITY IN CHARGE / PARTICIPANTS	MEANS OF VERIFICATION
1		Strengthening of technical cooperation, support for regional and global research-development platforms and integration into international thematic networks.	Execute the agreed actions of CSS and TSSC, according to the plan.	Permanent, in accordance with the requests and the agreed dates.	NPPO, RPPO, GICSV Secretariat and FAO representations in Latin America and the Caribbean.	Documents, ToR and results reports of the CSS and TSSC.
			Promote support for identified regional and global R&D platforms.	Permanent, in accordance with the identification of the platforms and the aspects they address.	NPPO, RPPO, GICSV Secretariat and FAO representations in Latin America and the Caribbean.	Preparation and signing of memorandums of understanding as appropriate. Reports of activities carried out according to the previously agreed timeline.
			Promote the regular participation of technical representatives of RPPOs and the private sector of Latin America and the Caribbean in global networks on TR4.	Permanent, according to the identification of global networks related to TR4.	RPPO, GICSV Secretariat, FAO.	Report at the GICSV TR4 group compliance analysis meeting, according to its schedule.
2	TRAINING	Development of coordinated training actions and training of instructors in the countries on FW-TR4 and its causal agent.	Plan training actions according to the priorities of the countries and sub-regions.	As of July 2021, as agreed.	RPPO, NPPO, GICSV, FAO.	Videos, summary of participants, certificates.
			Guide and support the development of cascade training plans for the preparation of trainers in the sub-regions and countries.	October 2021-March 2021, as agreed with the NPPOs and RPPOs	RPPO, NPPO, GICSV, FAO.	Official documents on plans prepared and approved.
			Training of trainers in the countries.	November 2021-November 2022	NPPO, RPPO	Official documents on groups of trained trainers.
			Develop a webinar on Foc TR4 laboratory diagnostics.	June-August 2021 (according to the programme)	FAO, WBF with support from NPPO, RPPO and experts.	Videos, summary of participants, certificates.
			Develop a Regional Training Day on FW-TR4 (biosecurity, management alternatives, risk communication).	June-August 2021 (according to the programme).	FAO, WBF, IPPC with support from NPPO, RPPO and experts.	Videos, summary of participants, certificates.

No.	COMPONENT	LINE OF ACTION	PROPOSED ACTIVITIES	PERIOD	ENTITY IN CHARGE / PARTICIPANTS	MEANS OF VERIFICATION
2			Develop a virtual course on conducting risk analysis to prioritize endangered areas or areas of higher risk in the countries.	November 2021 - November 2022.	RPPO, NPPO, GICSV, FAO.	Course program, videos, summary of participants, certificates.
			Promote participation in a self-study course on procedures and tools for damage and loss assessment and a collective analysis workshop with participants.	August 2021-August 2022, with the support of FAO consultants.	GICSV, RPPO, FAO, NPPO.	Summary of participants in course and workshop, certificates.
			Prepare and develop a regional virtual course on the main phytosanitary threats to banana cultivation.	November 2021-August 2022 (preparation); September-October 2022 (launch); August 2024 (launch of updated version of the course if needed).	GICSV, RPPO, FAO.	Course programme, videos, summary of participants, certificates.
			Prepare and launch a self-study course on good phytosanitary emergency management practices and promote the participation of NPPOs.	2021 (preparation); March 2022 (launch of the course).	FAO, NPPO, RPPO, GICSV.	Course programme, videos, summary of participants, certificates.
			Plan activities for the socialization of good practices for epidemiological surveillance and use of support computer applications; field detection and sampling; laboratory diagnosis; biosecurity on farms; protection and hygiene of workers in the Musaceae production chain.	Permanent, according to internal planning.	GICSV, RPPO, FAO, private sector representatives.	Documents on the type of activities and technical materials on good practices developed.
			<b>Sharing of good practices in banana cultivation and information about the FW-TR4</b>	Manage the availability of adequate platforms for the development of regional, sub-regional and national virtual activities.	2021 / permanent according to internal planning.	GICSV, RPPO, NPPO, private sector representatives.

No.	COMPONENT	LINE OF ACTION	PROPOSED ACTIVITIES	PERIOD	ENTITY IN CHARGE / PARTICIPANTS	MEANS OF VERIFICATION
2		Generation of training resources	Preparation and publication of guides, protocols and/or brochures on good biosecurity practices on farms and checklists for small and medium producers; phytosanitary emergency management process; development of simulation exercises and drills; soil health improvement; surveillance systems.	Permanent, according to internal planning. (simulation exercises and drills: 2021); good practices for the management of phytosanitary emergencies: 2022).	RPPO, FAO, private sector representatives, CIGSV.	Number of published guides / brochures; physical tests.
			Preparation and publication of short videos on good biosecurity practices on farms and entry points; disinfection; detection of suspected cases of Foc TR4, collection and transfer of samples; eradication practices for infected plants; monitoring and alert procedures; awareness campaigns.	2021, according to internal planning, (biosecurity on farms and field certification: 2021).	RPPO, FAO, private sector representatives, CIGSV.	Number of short videos; physical tests.
			Prepare and publish guidance for the safe introduction of promising banana clones.	March 2022-December 2023.	RPPO, FAO, private sector representatives, GIGSV.	Physical tests.
			Promote the preparation and use of materials aimed at producers, with emphasis on small farmers, through radio spots, pamphlets and other channels according to the characteristics of the countries and sub-regions.	2021 / permanent according to national and sub-regional planning.	NPPO, RPPO, private sector representatives, GIGSV.	Availability of materials used in outreach, awareness and training campaigns for farmers in the countries of the region.
			Promote the use of informational and training materials available on the website of the World Banana Forum (WBF).	2021 / permanent depending on availability of new materials.	NPPO, RPPO, FAO, private sector representatives, CIGSV.	Availability of materials used by the countries and sub-regions in their awareness and dissemination campaigns; training activities and others.



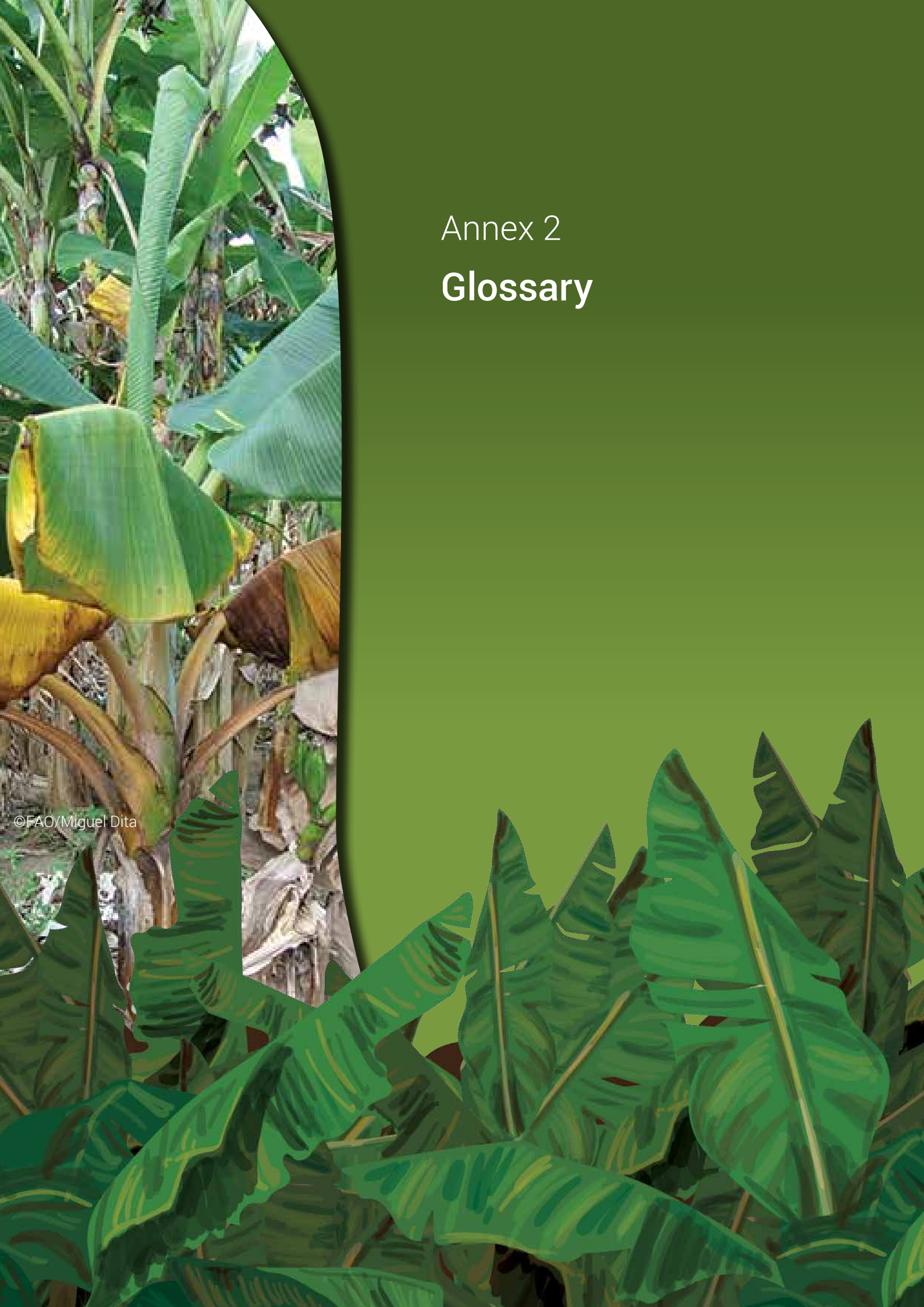
No.	COMPONENT	LINE OF ACTION	PROPOSED ACTIVITIES	PERIOD	ENTITY IN CHARGE / PARTICIPANTS	MEANS OF VERIFICATION
3	CAPACITY FOR THE MANAGEMENT OF THE PHYTOSANITARY EMERGENCY IN THE COUNTRIES AND THE REGION	Legal frameworks and legal provisions on specific phytosanitary measures for Foc TR4 and related phytosanitary threats	Promote the establishment of phytosanitary measures and harmonized regulations among banana-producing countries in the region that share land borders and suggest evaluation and improvement mechanisms, when appropriate.	October 2021-October 2022.	NPPO, RPPO, GICSV.	Meeting evidence, suggested mechanisms, agreements, and guidance materials, if applicable.
			Organize regional exchange or sub-regional meetings for the review and agreement of regulations and the corresponding procedures that strengthen the phytosanitary exclusion measures for FW-TR4 and other related phytosanitary threats to crops.	November 2021-April 2022.	RPPO, GICSV.	Videos of regional exchange or sub-regional meetings (as determined); agreements and recommendations.
			Organize sub-regional meetings to share and analyse elements of interest on updating, evaluating and improving the specific legal framework for Foc TR4 and other relevant phytosanitary threats.	2022, according to internal planning.	RPPO, GICSV.	Videos of sub-regional meetings; agreements and recommendations.
		Contingency plans and operational procedures: preparation and evaluation of their effectiveness through drills	Promote the preparation/adaptation of contingency plans in countries that do not yet have them.	2021-2022, according to planned dates.	NPPO, RPPO.	Contingency plans of the countries adapted or updated.
			Evaluate the national contingency plans, as well as the operating procedures necessary for their implementation, and provide the pertinent technical advice and suggestions on frequency of updates.	2023 (evaluation, according to internal planning); 2022 and 2024 (possible update periods, if considered).	NPPO, RPPO.	Review reports and technical suggestions, including updating of procedures according to the state of the art. Agreements on frequency of updates of contingency plans.
			Promote the collective analysis for the adoption of common criteria for the notification of FW-TR4, the introduction of	2021, according to internal planning.	GICSV, RPPO, NPPO.	Videos of virtual workshops / meetings; final documents with agreements and recommendations.

No.	COMPONENT	LINE OF ACTION	PROPOSED ACTIVITIES	PERIOD	ENTITY IN CHARGE / PARTICIPANTS	MEANS OF VERIFICATION
3			promising plant materials and alternative methods and products for disinfection.			
			Exchange of regional experiences on operating procedures for Foc TR4, with emphasis on organization and operation of command posts, roles and responsibilities; criteria for notification of pest incursion; detection in the field, collection and sending of samples; information and management systems; eradication; biosecurity on farms and entry points; disinfection; introduction of promising plant materials.	2021 to 2023, according to internal planning; 2025 to 2026, according to internal planning.	GICSV, RPPQ, NPPQ, FAO.	Videos of regional exchanges; agreements and recommendations if applicable.
			Exchange of regional experiences on emergency planning and contingency plans.	2022; 2024; according to internal planning.	GICSV, RPPQ, NPPQ, FAO.	Videos of regional exchanges; agreements and recommendations if applicable.
			Prepare the base documents for the execution of tabletops on the prevention, preparedness, detection, and response to Foc TR4 and other threats to the crop.	July 2021- July 2022.	GICSV, RPPQ, FAO.	Background documents generated.
			Develop virtual office drills on the key elements of preparedness and response (e.g., planning process; activation of the contingency plan (action against a first suspicion of TR4 and other threats to the crop); detection and sampling of suspected cases; eradication of outbreaks and biosecurity measures on farms and entry points.	From July 2022 to 2024, according to internal planning.	GICSV, RPPQ, NPPQ, FAO, private sector representatives.	Videos, number of participants, certificates.

No.	COMPONENT	LINE OF ACTION	PROPOSED ACTIVITIES	PERIOD	ENTITY IN CHARGE / PARTICIPANTS	MEANS OF VERIFICATION
3			Preparation and distribution of methodological guides for the execution of action drills; checklists; list of materials and indicative budget.	June 2021-October 2021	GCSV, RPPO.	Methodological guidelines for the execution of action drills; checklists; list of materials and preliminary budget.
			Plan, develop and evaluate action drills (face-to-face) on Foc TR4 in countries and common border areas.	2022-2023 (start date dependent on the situation).	NPPO, RPPO, GICSV, FAO.	Report on the results of the drill (evaluation and recommendations); videos.
		<b>Strengthening and evaluation of the capacity to manage the Foc TR4 emergency.</b>	Develop technical exchanges between NPPOs on operational and technical aspects of emergency management.	June-September 2021; 2022, 2023 (according to internal programming).	NPPO, with RPPO support, FAO and private sector representatives.	Report of technical exchanges; participants.
		Analyse the results of the Latin American and Caribbean baseline update survey on capacity to respond to Foc TR4 (according to the survey conducted in June-August 2020) and adjustment of measures to be adopted.	November-December 2021 (according to date agreed upon); February-April 2022 (adjustment of measures to be adopted).	NPPO, FAO, GICSV, RPPO, and private sector representatives.	Summary of the results of the survey; strengths, weaknesses and recommendations. Document on adjustment of measures to be adopted in each country.	
		Periodically evaluate the capacity of the countries and the region on the preparedness and response to Foc TR4 through surveys of NPPOs and other evaluation instruments decided by the GICSV.	2023-2024, according to internal planning dates.	RPPO, GICSV.	Developed surveys; summary of the results of the surveys; strengths, weaknesses and recommendations.	
		Prepare a plan for the improvement of the capacities of the countries according to the deficiencies detected.	2023-2024, according to dates of internal planning (following the analysis of the evaluation results).	NPPO, RPPO, GICSV.	Document on adjustment of measures to be adopted, disseminated and approved.	
		Help to develop a project to strengthen the emergency management of Foc TR4 in the countries of the Andean region.	May 2021-September 2022	FAO, CAN, Andean NPPO, IICA, Alliance of Bioersivity and CIAT, WBF, IPCC.	Approved project document (physical test) and results of negotiation with donors.	







## Annex 2

# Glossary

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# Glossary

(This annex has been included at the suggestion of the participants in the consultation processes).

### FAO definition

Source: *Biosecurity principles and components*. 2007. Available in: [BiosecurityEnPart1\\_3.pdf \(fao.org\)](#) (or <http://www.fao.org/3/a1140s/a1140s00.pdf>), p. 3

**Biosecurity:** a strategic and integrated approach that encompasses the policy and regulatory frameworks (including instruments and activities) for analyzing and managing relevant risks to human, animal and plant life and health, and associated risks to the environment. Biosecurity covers food safety, zoonoses, the introduction of animal and plant diseases and pests, the introduction and release of living modified organisms (LMOs) and their products (e.g. genetically modified organisms or GMOs), and the introduction and management of invasive alien species. Thus, biosecurity is a holistic concept of direct relevance to the sustainability of agriculture, and wide-ranging aspects of public health and protection of the environment, including biological diversity.

## Terminology related to disaster risk reduction

Source: United Nations - General Assembly. Report of the Intergovernmental Working Group on open-ended experts on indicators and terminology related to the reduction of disaster risk. Section V, pp. 11-25. 2015<sup>3</sup>. Available in: [https://www.preventionweb.net/files/50683\\_oiewgreportspanish.pdf](https://www.preventionweb.net/files/50683_oiewgreportspanish.pdf)

**Hazard:** A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption, or environmental degradation. *Annotations: Hazards may be natural, anthropogenic, or socio-natural in origin. Hazards include (as mentioned in the Sendai Framework for Disaster Risk Reduction 2015–2030, and listed in alphabetical order) biological, environmental, geological, hydrometeorological and technological processes and phenomena. **Biological hazards** are of organic origin or conveyed by biological vectors, including pathogenic microorganisms, toxins, and bioactive substances. **Hydrometeorological hazards** are of atmospheric, hydrological, or oceanographic origin. Examples are tropical cyclones (also known as typhoons and hurricanes); floods, including flash floods; drought; heatwaves and cold spells; and coastal storm surges. Hydrometeorological conditions may also be a factor in other hazards such as ... locust plagues, epidemics.*

**Capacity:** The combination of all the strengths, attributes, and resources available within an organization, community, or society to manage and reduce disaster risks and strengthen resilience. *Annotation: Capacity may include infrastructure, institutions, human knowledge and skills, and collective attributes such as social relationships, leadership, and management.*

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<sup>3</sup> The terms most closely related to the Regional Strategy and Action Plan have been included, but the order in which they appear in the above-mentioned document has been maintained.

- **Coping capacity** is the ability of people, organizations, and systems, using available skills and resources, to manage adverse conditions, risk, or disasters. The capacity to cope requires continuing awareness, resources, and good management, both in normal times as well as during disasters or adverse conditions. Coping capacities contribute to the reduction of disaster risks.
- **Capacity assessment** is the process by which the capacity of a group, organization or society is reviewed against desired goals, where existing capacities are identified for maintenance or strengthening, and capacity gaps are identified for further action.
- **Capacity development** is the process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals. It is a concept that extends the term of capacity-building to encompass all aspects of creating and sustaining capacity growth over time. It involves learning and various types of training, but also continuous efforts to develop institutions, political awareness, financial resources, technology systems and the wider enabling environment.

**Disaster:** A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability, and capacity, leading to one or more of the following: human, material, economic and environmental losses, and impacts. Emergency is sometimes used interchangeably with the term disaster, as, for example, in the context of biological and technological hazards or health emergencies, which, however, can also relate to hazardous events that do not result in the serious disruption of the functioning of a community or society.

**Disaster impact:** It is the total effect, including negative effects (e.g., economic losses) and positive effects (e.g., economic gains), of a hazardous event or a disaster. The term includes economic, human, and environmental impacts.

**Disaster risk assessment:** A qualitative or quantitative approach to determine the nature and extent of disaster risk by analyzing potential hazards and evaluating existing conditions of exposure and vulnerability that together could harm people, property, services, livelihoods, and the environment on which they depend. *Annotation: Disaster risk assessments include: the identification of hazards; a review of the technical characteristics of hazards such as their location, intensity, frequency, and probability; the analysis of exposure and vulnerability, including the physical, social, health, environmental and economic dimensions; and the evaluation of the effectiveness of prevailing and alternative coping capacities with respect to likely risk scenarios.*

**Disaster management:** The organization, planning and application of measures preparing for, responding to, and recovering from disasters. *Annotation: Disaster management may not completely avert or eliminate the threats; it focuses on creating and implementing preparedness and other plans to decrease the impact of disasters and "build back better". Failure to create and apply a plan could lead to damage to life, assets, and lost revenue. **Emergency management** is also used, sometimes interchangeably, with the term disaster management, particularly in the context of biological and technological hazards and for health emergencies. While there is a large degree of overlap, an emergency can also relate to hazardous events that do not result in the serious disruption of the functioning of a community or society.*

**Disaster risk governance:** The system of institutions, mechanisms, policy and legal frameworks and other arrangements to guide, coordinate and oversee disaster risk reduction and related areas of policy. *Annotation: Good governance needs to be transparent, inclusive, collective, and efficient to reduce existing disaster risks and avoid creating new ones.*

**Mitigation:** The lessening or minimizing of the adverse impacts of a hazardous event. *Annotation: The adverse impacts of hazards, in particular natural hazards, often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures include engineering techniques and hazard-resistant construction as well as improved environmental and social policies and public awareness. It should be noted that, in climate change policy, "mitigation" is defined differently, and is the term used for the reduction of greenhouse gas emissions that are the source of climate change.*

**Disaster risk management:** Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses. *Annotation: Disaster risk management actions can be distinguished between prospective disaster risk management, corrective disaster risk management and compensatory disaster risk management, also called residual risk management. **Disaster risk management plans** set out the goals and specific objectives for reducing disaster risks together with related actions to accomplish these objectives. They should be guided by the Sendai Framework for Disaster Risk Reduction 2015-2030 and considered and coordinated within relevant development plans, resource allocations and programme activities. National-level plans need to be specific to each level of administrative responsibility and adapted to the different social and geographical circumstances that are present. The time frame and responsibilities for implementation and the sources of funding should be specified in the plan. Linkages to sustainable development and climate change adaptation plans should be made where possible.*

**Disaster risk reduction:** Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development. *Annotation: Disaster risk reduction is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans. **Disaster risk reduction strategies and policies** define goals and objectives across different timescales and with concrete targets, indicators, and time frames. In line with the Sendai Framework for Disaster Risk Reduction 2015-2030, these should be aimed at preventing the creation of disaster risk, the reduction of existing risk and the strengthening of economic, social, health and environmental resilience.*

**Contingency planning:** A management process that analyses disaster risks and establishes arrangements in advance to enable timely, effective, and appropriate responses. *Annotation: Contingency planning results in organized and coordinated courses of action with clearly identified institutional roles and resources, information processes and operational arrangements for specific actors at times of need. Based on scenarios of possible emergency conditions or hazardous events, it allows key actors to envision, anticipate and solve problems that can arise during disasters. Contingency planning is an important part of overall preparedness. Contingency plans need to be regularly updated and exercised.*

**National Platform for disaster risk reduction:** A generic term for national mechanisms for coordination and policy guidance on disaster risk reduction that are multisectoral and interdisciplinary in nature, with public, private, and civil society participation involving all concerned entities within a country.

**Preparedness:** The knowledge and capacities developed by governments, response and recovery organizations, communities, and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters. *Annotation: Preparedness action is carried out within the context of disaster risk management and aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response to sustained recovery.*

- *Preparedness is based on a sound analysis of disaster risks and good linkages with early warning systems, and includes such activities as contingency planning, the stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation and public information, and associated training and field exercises. These must be supported by formal institutional, legal, and budgetary capacities. The related term “readiness” describes the ability to quickly and appropriately respond when required.*
- *A preparedness plan establishes arrangements in advance to enable timely, effective, and appropriate responses to specific potential hazardous events or emerging disaster situations that might threaten society or the environment.*

**Prevention:** Activities and measures to avoid existing and new disaster risks. *Annotations: Prevention (i.e., disaster prevention) expresses the concept and intention to completely avoid potential adverse impacts of hazardous events. While certain disaster risks cannot be eliminated, prevention aims at reducing vulnerability and exposure in such contexts where, as a result, the risk of disaster is removed. Prevention measures can also be taken during or after a hazardous event or disaster to prevent secondary hazards or their consequences, such as measures to prevent the contamination of water.*

**Recovery:** The restoring or improving of livelihoods and health, as well as economic, physical, social, cultural, and environmental assets, systems, and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and “build back better”, to avoid or reduce future disaster risk.

**Disaster risk reduction:** Disaster risk reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development.

**Resiliency:** The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

**Response:** Actions taken directly before, during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety, and meet the basic subsistence needs of the



people affected. **Annotation:** ...Effective, efficient, and timely response relies on disaster risk-informed preparedness measures, including the development of the response capacities of individuals, communities, organizations, countries, and the international community. "Emergency services" are a critical set of specialized agencies that have specific responsibilities in serving and protecting people and property in emergency and disaster situations. The division between the response stage and the subsequent recovery stage is not clear-cut. Some response actions, such as the supply of temporary housing and water supplies, may extend well into the recovery stage.

**Hazardous event:** The manifestation of a hazard in a particular place during a particular period of time. **Annotation:** Severe hazardous events can lead to a disaster as a result of the combination of hazard occurrence and other risk factors.

**Underlying disaster risk drivers:** Processes or conditions, often development-related, that influence the level of disaster risk by increasing levels of exposure and vulnerability or reducing capacity. **Annotation:** Underlying disaster risk drivers – also referred to as underlying disaster risk factors – include poverty and inequality, climate change and variability, unplanned and rapid urbanization and the lack of disaster risk considerations in land management and environmental and natural resource management, as well as compounding factors such as demographic change, non-disaster risk-informed policies, the lack of regulations and incentives for private disaster risk reduction investment, complex supply chains, the limited availability of technology, unsustainable uses of natural resources, declining ecosystems, pandemics and epidemics.

**Vulnerability:** The conditions determined by physical, social, economic, and environmental factors or processes which increase the susceptibility of an individual, a community, assets, or systems to the impacts of hazards. **Annotation:** For positive factors which increase the ability of people to cope with hazards, see also the definitions of "Capacity" and "Coping capacity".

## Terminology related to plant protection

Source: FAO 2019. *Glossary of phytosanitary terms. International Standard for Phytosanitary Measures No. 5 (ISPM 5). Published by FAO on behalf of the Secretariat of the International Plant Protection Convention. Adopted in 2019; published in 2020. Available in: [ISPM 5. Glossary of phytosanitary terms \(fao.org\)](https://www.fao.org/3/mc891e/mc891e.pdf) (or: <https://www.fao.org/3/mc891e/mc891e.pdf>)<sup>4</sup>.*

**Area of low pest prevalence:** An **area**, whether all of a country, part of a country, or all or parts of several countries, as identified by the competent authorities, in which a specific pest is present at low levels and which is subject to effective **surveillance** or **control measures** [IPPC, 1997; revised CPM, 2015]. (ALPP).

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<sup>4</sup> The terms most closely related to the Regional Strategy and Plan of Action have been included. Concepts and definitions have also been added from Supplement 1 "Guidelines on the Interpretation and Application of the Concepts of "Official Control" and "Not Widely Distributed" and the Appendix to Supplement 2 "Guidelines on the Interpretation of "Potential Economic Importance" and other related terms including reference to environmental considerations" of the same Standard (ISPM 5).

**Area:** An **officially** defined country, part of a country or all or parts of several countries [FAO, 1990; revised ISPM 2, 1995; CEPM, 1999; based on the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (WTO, 1994)].

**Buffer zone:** An **area** surrounding or adjacent to an **area officially** delimited for phytosanitary purposes in order to minimize the probability of **spread** of the target **pest** into or out of the delimited area, and subject to phytosanitary or other control measures, if appropriate [ISPM 10, 1999; revised ISPM 22, 2005; CPM, 2007].

**Containment:** Application of **phytosanitary measures** in and around an infested **area** to prevent **spread** of a **pest** [FAO, 1995].

**Contamination:** Presence of a **contaminating pest** or unintended presence of a **regulated article** in or on a **commodity, packaging, conveyance, container, or storage place** [CEPM, 1997; revised ICPM, 1999; CPM, 2018].

**Control (of a pest):** **Suppression, containment, or eradication** of a **pest** population [FAO, 1995].

**Efficacy (of a treatment):** A defined, measurable, and reproducible effect by a prescribed treatment [ISPM 18, 2003].

**Emergency action:** A prompt **phytosanitary action** undertaken in a new or unexpected phytosanitary situation [ICPM, 2001].

**Endangered area:** An area where ecological factors favour the **establishment** of a **pest** whose presence in the **area** will result in economically important loss [ISPM 2, 1995].

**Entry (of a pest):** Movement of a **pest** into an **area** where it is not yet present, or present but not widely distributed and being **officially controlled** [ISPM 2, 1995].

**Eradication:** Application of **phytosanitary measures** to eliminate a pest from an area [FAO, 1990; revised FAO, 1995; formerly “eradicate”].

**Establishment (of a pest):** Perpetuation, for the foreseeable future, of a **pest** within an **area** after **entry** [FAO, 1990; revised ISPM 2, 1995; IPPC, 1997; formerly “established”].

**Exclusion (of a pest):** Application of **phytosanitary measures** to prevent the **entry** or **establishment** of a **pest** into an **area** [CPM, 2018].

**Harmonization:** The establishment, recognition, and application by different countries of **phytosanitary measures** based on common **standards** [FAO, 1995; revised CEPM, 1999; based on the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (WTO, 1994)].

**Harmonized phytosanitary measures:** **Phytosanitary** measures established by contracting parties to the IPPC, based on **international standards** [IPPC, 1997]

**Incursion:** An isolated population of a **pest** recently detected in an area, not known to be **established**, but expected to survive for the immediate future [ICPM, 2003].

**Inspection:** **Official visual examination of plants, plant products** or other **regulated articles** to determine if **pests** are present or to determine compliance with **phytosanitary regulations** [FAO, 1990; revised FAO, 1995; formerly “inspect”].

**Monitoring:** An **official** ongoing process to verify phytosanitary situations [CEPM, 1996].

**National plant protection organization:** **Official** service established by a government to discharge the functions specified by the **IPPC** [FAO, 1990; formerly “plant protection organization (national)”]. (Note: NPPPO)

**Official control:** The active enforcement of mandatory **phytosanitary regulations** and the application of mandatory **phytosanitary procedures** with the objective of **eradication** or **containment** of **quarantine pests** or for the management of **regulated non-quarantine pests** [ICPM, 2001]

**Official:** Established, authorized, or performed by a **national plant protection organization** [FAO, 1990].

**Outbreak:** A recently detected pest population, including an **incursion**, or a sudden significant increase of an **established pest** population in an **area** [FAO, 1995; revised ICPM, 2003].

**Pest diagnosis:** The process of detection and identification of a **pest** [ISPM 27, 2006].

**Pest free area:** An area in which a specific **pest** is absent as demonstrated by scientific evidence and in which, where appropriate, this condition is being **officially** maintained [ISPM 2, 1995; revised CPM, 2015]. (PFA).

**Pest free place of production:** **Place of production** in which a specific **pest** is absent as demonstrated by scientific evidence and in which, where appropriate, this condition is being **officially** maintained for a defined period [ISPM 10, 1999; revised CPM, 2015]. (PFPP).

**Pest free production site:** A **production site** in which a specific **pest** is absent, as demonstrated by scientific evidence, and in which, where appropriate, this condition is being **officially** maintained for a defined period [ISPM 10, 1999; revised CPM, 2015]. (PFPS).

**Pest record:** A document providing information concerning the presence or absence of a specific **pest** at a particular location at a certain time, within an **area** (usually a country) under described circumstances [CEPM, 1997].

**Pest risk (for quarantine pests):** The probability of **introduction** and **spread** of a **pest** and the magnitude of the associated potential economic consequences [ISPM 2, 2007].

**Pest risk analysis** (agreed interpretation): The process of evaluating biological or other scientific and economic evidence to determine whether an organism is a **pest**, whether it should be regulated, and the strength of any **phytosanitary measures** to be taken against it [ISPM 2, 1995; revised IPPC, 1997; ISPM 2, 2007].

**Pest risk management** (for **quarantine pests**): Evaluation and selection of options to reduce the risk of **introduction** and **spread** of a **pest** [ISPM 2, 1995; revised ISPM 11, 2001].

**Pest status** (in an **area**): Presence or absence, at the present time, of a **pest** in an **area**, including where appropriate its distribution, as **officially** determined using expert judgement on the basis of current and historical **pest records** and other information [CEPM, 1997; revised ICPM, 1998].

**Pest**: Any species, strain or biotype of plant, animal, or **pathogenic** agent injurious to **plants** or **plant products**. Note: In the IPPC, “plant pest” is sometimes used for the term “pest” [FAO, 1990; revised ISPM 2, 1995; IPPC, 1997; CPM, 2012].

**Phytosanitary action**: An **official** operation, such as **inspection, testing, surveillance, or treatment**, undertaken to implement **phytosanitary measures** [ICPM, 2001; revised ICPM, 2005].

**Phytosanitary certificate**: An **official** paper document or its **official** electronic equivalent, consistent with the model certificates of the **IPPC**, attesting that a **consignment** meets **phytosanitary import requirements** [FAO, 1990; revised CPM, 2012].

**Phytosanitary measure** (agreed interpretation): Any legislation, regulation or **official** procedure having the purpose to prevent the **introduction** or **spread** of **quarantine pests**, or to limit the economic impact of **regulated non-quarantine pests** [ISPM 4, 1995; revised IPPC, 1997; ICPM, 2002].

**Phytosanitary procedure**: Any **official** method for implementing **phytosanitary measures** including the performance of **inspections, tests, surveillance, or treatments** in connection with **regulated pests** [FAO, 1990; revised FAO, 1995; CEPM, 1999; ICPM, 2001; ICPM, 2005].

**Phytosanitary regulation**: Official rule to prevent the **introduction** or **spread** of **quarantine pests**, or to limit the economic impact of **regulated non-quarantine pests**, including establishment of procedures for phytosanitary certification [FAO, 1990; revised ISPM 4, 1995; CEPM, 1999; ICPM, 2001].

**Plant products**: Unmanufactured material of **plant** origin (including grain) and those manufactured products that, by their nature or that of their processing, may create a risk for the **introduction** and **spread** of pests [FAO, 1990; revised IPPC, 1997; formerly “plant product”].

**Plant quarantine**: All activities designed to prevent the **introduction** or **spread** of **quarantine pests** or to ensure their **official control** [FAO, 1990; revised FAO, 1995].

**Point of entry**: Airport, seaport, land border point or any other location **officially** designated for the importation of **consignments**, or the entrance of persons [FAO, 1995; revised CPM, 2015].

**Post-entry quarantine**: Quarantine applied to a **consignment** after **entry** [FAO, 1995].

**PRA**: **Pest risk analysis** [ISPM 2, 1995; revised ICPM, 2001].

**Prohibition**: A **phytosanitary regulation** forbidding the importation or movement of specified **pests or commodities** [FAO, 1990; revised FAO, 1995].



**Quarantine pest:** A pest of potential economic importance to the **area endangered** thereby and not yet present there, or present but not widely distributed and being **officially controlled** [FAO, 1990; revised FAO, 1995; IPPC, 1997].

**Regional plant protection organization:** An intergovernmental organization with the functions laid down by Article IX of the **IPPC** [FAO, 1990; revised FAO, 1995; CEPM, 1999; formerly “plant protection organization (regional)”] (Note: RPPO).

**Regulated area:** An **area** into which, within which or from which **plants, plant products** and other **regulated articles** are subjected to **phytosanitary measures** [CEPM, 1996; revised CEPM, 1999; ICPM, 2001].

**Regulated article:** Any **plant, plant product**, storage place, **packaging**, conveyance, container, soil and any other organism, object, or material capable of harboring or spreading **pests**, deemed to require **phytosanitary measures**, particularly where international transportation is involved [FAO, 1990; revised FAO, 1995; IPPC, 1997].

**Suppression:** The application of **phytosanitary measures** in an infested **area** to reduce **pest** populations [FAO, 1995; revised CEPM, 1999].

**Surveillance:** An **official** process which collects and records data on pest presence or absence by survey, monitoring or other procedures [CEPM, 1996; revised CPM, 2015].

**Survey** (of **pests**): An **official** procedure conducted over a defined period to determine the presence or absence of **pests**, or the boundaries or characteristics of a pest population, in an **area, place of production** or **production site** [FAO, 1990; revised CEPM, 1996; CPM, 2015; CPM, 2019].

**Transparency:** The principle of making available, at the international level, **phytosanitary measures**, and their rationale [FAO, 1995; revised CEPM, 1999; based on the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (WTO, 1994)].

## From Supplement 1 and Appendix to Supplement 2 of ISPM 5

**Official control:** *Official control includes:*

- Eradication and/or containment in the infested area(s)
- Surveillance in the endangered area(s)
- Restrictions related to the movement into and within the regulated area(s) including phytosanitary
- Measures applied at import

**Not widely distributed:** The concept “not widely distributed” refers to a pest’s occurrence and distribution within an area. A pest may be categorized as present and widely distributed in an area or not widely distributed, or absent. In pest risk analysis (PRA), the determination of whether a pest is not widely distributed is carried out in the pest categorization step. Transience means that a pest is not expected to establish and therefore is not relevant to the concept of “not widely distributed”.

**Mandatory nature of official control:** Official control is mandatory in the sense that all persons involved are legally bound to perform the actions required. The scope of official control programmes for quarantine pests is completely mandatory (e.g. procedures for eradication campaigns), whereas the scope for regulated non-quarantine pests is mandatory only in certain circumstances (e.g. official certification programmes).





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