CGIAR | Plant Health Initiative

Healthy Plants for a Healthy Planet

Plant Health and Rapid Response to Protect Food Security and Livelihoods

Effective plant health management requires holistic approaches that focus on preventing entry (to the extent possible), establishment and spread of invasive pests, and mitigating the impacts of the outbreaks through eco-friendly, socially inclusive and sustainable management approaches.

The **CGIAR Plant Health Initiative** will work together with national and international partners to implement a holistic multi-institutional strategy. The Initiative will also emphasize empowering local communities in pest surveillance to inform national and regional networks.

AIM

Protecting agriculture-based economies of low and middle-income countries in Africa, Asia and Latin America from devastating pest incursions and disease outbreaks, by leveraging and building viable networksacross an array of national, regional and global institutions.

FOCUS

High-impact and/or high-risk pests and diseases causing major food security shocks and severe economic impacts in the low- and middle-income countries.

IN CONTEXT

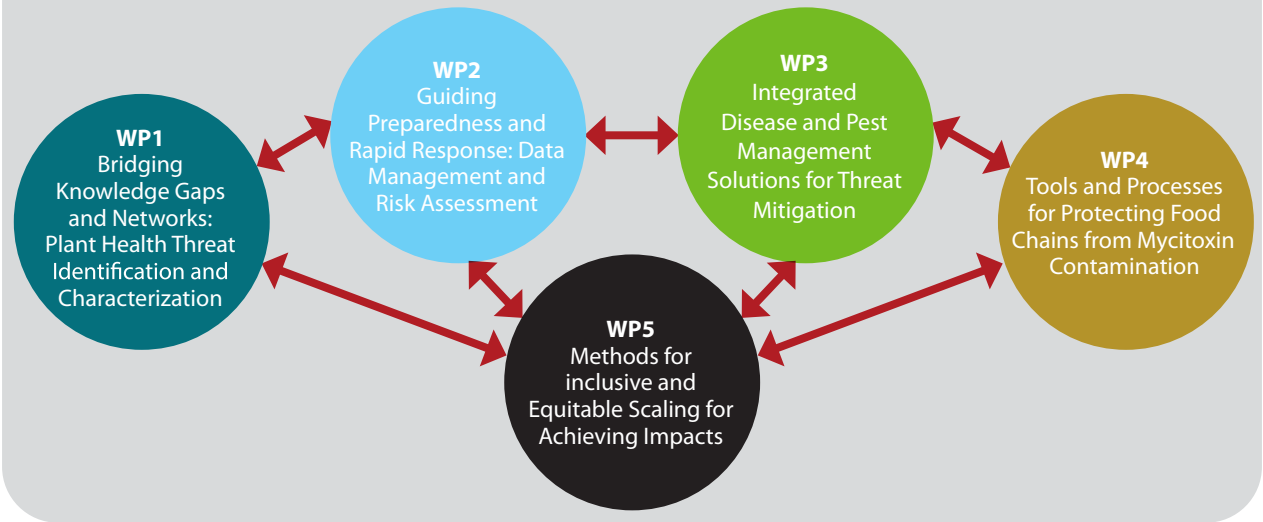
The CGIAR 2030 Research and Innovation Strategy

The mission is to deliver science and innovation that advance transformation of food, land, and water systems in a climate crisis.

The Plant Health Initiative is under the Resilient Agrifood Systems Action Area with strong linkages to relevant global and regionally integrated initiatives.

PHI builds on a track record of over five decades of research and collaboration to accelerate innovative solutions to achieve impact aligned with the Sustainable Development Goals.

Plant Health Initiative Work Packages



PHI's aim will be achieved by:

- **Bridging knowledge gaps and networks for plant health threat identification and characterization,** focusing on strengthening the diagnostic and surveillance capacity of national plant protection organizations and national agricultural research and extension systems, and facilitating knowledge exchange on pests and diseases.
- **Risk assessment, data management and guiding preparedness for rapid response,** focusing on controlling the introduction and spread of pests and diseases by developing and enhancing tools and standards.
- **Integrated pest and disease management,** focusing on designing and deploying approaches against prioritized plant health threats in targeted crops and cropping systems.
- **Tools and processes for protecting food chains from mycotoxin contamination:** designing and deploying two innovations for reducing mycotoxin contamination to protect health, increase food/feed safety, enhance trade, diversify end-use and boost income.
- **Equitable and inclusive scaling of plant health innovations to achieve impacts,** through multistakeholder partnerships, inter-disciplinary research and effective communications.

PHI Focus Areas 2022-2024

The Plant Health Initiative will be implemented in two phases: Phase 1 (2022-2024) and Phase 2 (2025-2030)

Work Packages	Focus Area	Target Crops & Priorities	Regions & Focus Countries	ESA	WCA	CWANA	S Asia	SE Asia	LatAm
WP1	**Global diagnostic network leveraging existing CGIAR-GHU laboratories in key regions to strengthen partners' capacity on cost-effective P&D detection and surveillance**	A broad range of P&D for Food legumes (Beans, Faba bean, Chickpea, Lentil, Grass pea, Soybean, Cowpea), Cereals (Wheat, Barley, Rice, Maize), Cassava, Yam, Plantain/Banana, Potato, Sweetpotato, Groundnut, Pearl millet, Pigeonpea, Sorghum, Finger millet, Forages, etc.	**ESA:** Ethiopia **WCA:** Nigeria, Ivory Coast **CWANA:** Lebanon **SE Asia:** Philippines **LatAm:** Colombia, Peru, Mexico						
	Global Surveillance Network	**Rice:** Bacterial leaf blight; Rice blast	**ESA:** Uganda **WCA:** Senegal, Ivory Coast **S Asia:** Bangladesh, India, SE Asia: Vietnam, Philippines						
		Wheat: Wheat rust; Wheat blast	**ESA:** Ethiopia, Kenya, Uganda (Rust) **CWANA:** Morroco, Egypt, Lebanon (Rust) **S Asia:** Bangladesh (Blast) **LatAm:** Mexico (Rust)						
		Maize: Maize lethal necrosis (MLN)	**ESA:** Ethiopia, Kenya, Uganda, Tanzania, Rwanda, Zimbabwe, Zambia, Malawi **WCA:** Nigeria						
		Maize, Sorghum: Fall Armyworm (FAW)	**ESA:** Ethiopia, Kenya, Malawi, Tanzania, Rwanda, Uganda, Zambia **WCA:** Ghana, Nigeria **S Asia:** Bangladesh, India, Nepal, **SE Asia:** Philippines, Vietnam						
		Banana: Fusarium wilt TR4; Banana bunchy top disease	**ESA:** Malawi,Tanzania, Uganda **WCA:** Ghana, Nigeria **SE Asia:** Vietnam **LatAm:** Colombia, Peru, Ecuador						
		Potato: Late blight; Potato purple top disease	**ESA:** Kenya, Uganda, Rwanda **WCA:** Nigeria **S Asia:** India **LatAm:** Bolivia, Colombia, Ecuador, Peru						
		Cassava: Cassava mosaic disease; Cassava brown streak disease	**ESA:** Tanzania, Zambia **SE Asia:** Vietnam						
WP2	Risk assessment, prediction & preparedness	Cross-cutting, covering the target P&Ds listed under WP1, WP3 & WP4 + prediction and preparedness for other potential invasive risks (e.g., Tar spot complex in maize; post-flowering stalk rots in maize; Witches broom of cassava, etc.)	Global, with specific focus on PHI priority countries listed especially under WP1, WP3 & WP4.						

Work Packages	Focus Area	Target Crops & Priorities	Regions & Focus Countries	ESA	WCA	CWANA	S Asia	SE Asia	LatAm
WP3	Agroecological protection of rice and rice-based cropping systems from pests and diseases	**Rice:** Brown plant hoppers, stemborers, thrips	**ESA:** Kenya; **WCA:** Nigeria, Benin, Ghana, Cote d'Ivoire, Senegal, Burkina Faso, Mali **S Asia:** Bangladesh **SE Asia:** Cambidia, Vietnam	■	■		■	■	
	A toolbox for integrated disease management of necrotrophic and hemi-biotrophic pathogens of wheat	**Wheat:** Fusarium head blight	**ESA:** Ethiopia, Zambia **LatAm:** Mexico	■					■
		Wheat: Wheat Blast	**ESA:** Zambia **S Asia:** Bangladesh	■			■		
	Integrated disease management of maize lethal necrosis (MLN) in sub-Saharan Africa	**Maize:** Maize lethal necrosis (MLN)	**ESA:** Uganda, Kenya, Ethiopia, Rwanda	■					
	Integrated pest management (IPM) of Fall Armyworm in Africa and Asia	**Maize, Sorghum & Millets:** Fall Armyworm	**ESA:** Kenya, Uganda, Ethiopia, Tanzania, Zambia, **WCA:** Nigeria, Ghana, Benin, Burundi, Cameroon, DRC, Ghana, Mali, Nigeria, Niger; **S Asia:** Bangladesh, India, Nepal **SE Asia:** Philippines	■	■		■	■	
	Integrated management of parasitic weeds of cereals and food legumes	**Maize & Food Legumes (Cowpea, Fababean, Lentil):** Parasitic weeds of maize (*Striga* spp.) and food legumes (*Alectra vogelii, Orobanche* spp.)	**ESA:** Kenya, Uganda, Tanzania, Mozambique, Ethiopia; **WCA:** Nigeria, Niger, Ghana **CWANA:** Sudan, Egypt, Morocco, Tunisia	■	■	■			
	Integrated management of banana diseases	**Banana:** Fusarium wilt TR4	**ESA:** Tanzania, Uganda, Malawi, Mozambique **S Asia:** India; **SE Asia:** Vietnam; **LatAm:** Peru	■			■	■	■
		Banana: Banana Bunchy Top Disease	**ESA:** Malawi, Uganda, Rwanda, Burundi, Tanzania **WCA:** Nigeria, Benin, Cameroon, DRC **SE Asia:** Vietnam	■	■			■	
		Banana: Xanthomonas Wilt and other Wilts of Banana	**ESA:** Uganda, Rwanda, Burundi **WCA:** DR Congo	■	■				
	Integrated management of potato diseases	**Potato:** Late Blight	**ESA:** Kenya, Uganda; **S Asia:** India **LatAm:** Peru	■			■		■
		Potato: Potato purple top disease	**LatAm:** Ecuador, Colombia, Peru						■
		Potato: Soil-borne diseases, including nematodes (Root knot nematodes/Cyst nematodes)	**ESA:** Kenya, Uganda, Tanzania, Rwanda	■					
	Integrated management of whiteflies in Sweetpotato and Cassava	**Sweet Potato, Cassava:** Whitefy *Bemicia tabacci* (vector for begomoviruses, Ipomoviruses and criniviruses)	**ESA:** Tanzania **LatAm:** Peru	■					■
	Disease management in Cassava	**Cassava:** Cassava Brown Streak Disease (CBSD)	**ESA:** Kenya, Tanzania, Uganda, Burundi, Rwanda, Zambia; **WCA:** DR Congo	■					
	Disease management in Yam	**Yam:** Yam mosaic virus (YMV)	**WCA:** Nigeria, Benin, Ghana		■				
	IPM for controlling pests and diseases of global and traditional vegetables	**Food legumes (Cowpea, Chickpea, Lentil):** Pod borers (*Maruca vitrata, Helicoverpa armigera*)	**ESA:** Ethiopia; **WCA:** Benin, Ghana, Mali, Nigeria, Niger, Burkina Faso; **CWANA:** Morocco, Sudan, Tunisia; **S Asia:** India; **SE Asia:** Philippines	■	■	■	■	■	
		Vegetables (Green beans, Yard-long bean, French bean, Cowpea, Onion, Cucurbits): Aphids, Thrips and Fruit flies	**ESA:** Kenya, Uganda, Tanzania, **WCA:** Benin, Ghana, Mali, Nigeria, Niger, Burkina Faso; **S Asia:** India; **SE Asia:** Philippines	■	■		■	■	
		Tomato: South American tomato pinworm (*Tuta absoluta*) & Fruit worm (*Helicoverpa armigera*)	**ESA:** Kenya, Uganda; Tanzania **S Asia:** India **SE Asia:** Philippines	■			■	■	
WP4	Integrated mycotoxin management (e.g., resistant germplasm, biocontrol, post-harvest processing)	Maize, Wheat & Rice	**ESA:** Kenya, Zambia, Tanzania, Mozambique **WCA:** Ghana, Cote d'Ivoire, Nigeria, Burkina Faso, Mali; **LatAm:** Mexico	■	■				■
	Aflasafe as a bioprotectant to mitigate mycotoxin contamination	Maize, Groundnut	**ESA:** Kenya, Uganda, Tanzania, Mozambique, Malawi; **WCA:** Nigeria, Senegal, Mali, Burkina Faso, **CWANA:** Sudan; **LatAm:** Mexico	■	■	■			■
WP5	Qualitative impact assesment (WP1 & WP2)	All stakeholders	**Global:** Online survey **ESA:** Kenya (interviews) **SE Asia:** Philippines (interviews)	■				■	
	Knowledge gaps in P&D diagnostic & surveillance	**Rice:** Bacterial leaf blight; Rice blast **Cassava:** Cassava mosaic disease; Cassava brown streak disease **Banana:** Fusarium wilt TR4; Banana bunchy top disease **Maize:** Maize lethal necrosis (MLN) **Wheat:** Wheat rust; Wheat blast	**Global:** Online survey **ESA:** Kenya **S Asia:** India **SE Asia:** Philippines **LatAm:** Colombia	■			■	■	■
	Promoting gender-smart IPDM innovations with women and youth consultation (qualitative case studies)	**Banana:** Xanthomonas wilt and other wilts of Banana **Maize & Sorghum:** Fall Armyworm **Sweet Potato, Cassava:** Whitefy	**ESA:** Tanzania (Sweetpotato, Cassava) **WCA:** DR Congo (Banana) **Asia:** To be decided (FAW)	■	■				
	Quantitative Impact Assessment (WP3 & WP4)	**Maize, Groundnut:** Aflasafe **Rice:** Brown plant hopper, Stemborers **Maize:** Maize lethal necrosis (MLN); Fall Armyworm	**WCA:** Nigeria (Aflasafe) **Asia:** To be decided (Rice) **ESA:** Uganda, Kenya (MLN) **ESA:** To be decided (FAW)	■	■				
	Digital platform and communications	All stakeholders	**Global**	■	■	■	■	■	■

EXPECTED OUTCOMES BY 2024

1. National plant protection organizations in at least 10 target countries participate in a global plant diagnostic and surveillance network, exchanging data and knowledge.
2. At least 25 national partners in 10 target countries use the novel diagnostic and surveillance tools to effectively counter existing or emerging plant health threats.
3. At least 10 target national plant protection organizations increase their capacity to use epidemiological modeling data and decision support tools for pest risk assessment and preparedness to counter prioritized pests and diseases.
4. A global plant health consortium comprising 60–70 institutions is operational, codeveloping and deploying integrated pest and disease management innovation packages and educational curriculum for effective plant health management.
5. Adoption of eco-friendly and climate-smart integrated pest and disease management innovations by at least 4 million smallholders in 15 countries results in reduction in crop losses of at least 5% and use of toxic pesticides of at least 10%.
6. At least 10 private sector partners in four focal countries in Africa commercialize Aflasafe to 200,000 farmers (400,000 ha of maize), resulting in enhanced availability of safe and nutritious food and feed.
7. At least 300,000 smallholder households across five countries use affordable and easy-to-use pre- and post-harvest integrated mycotoxin management innovations for mitigating contamination of the food chain.
8. Plant health research communities in at least 12 targeted countries use needs assessment evidence and data to develop demand-driven, equitable and scalable innovations.
9. National and regional partners use validated scaling approaches for detection, surveillance and management of pests, diseases and mycotoxin.
10. Based on science-based plant health policy briefs, investors and decision makers in targeted regions create an enabling environment for research for development and scaling of plant health innovations.

PROJECTED IMPACT BY 2030

Projected impacts and benefits include:

	**POVERTY REDUCTION, LIVELIHOODS & JOBS** Livelihoods of more than 27 million people (more than 6 million households) across 13 target countries are improved due to increased yield stability and containment of pest- and disease-induced crop and food losses at the field- and landscape-levels through development and delivery of eco-friendly innovations to detect and control pests and diseases.
	**NUTRITION, HEALTH & FOOD SECURITY** More than 110 million people (more than 16 million households) benefit from better resilience of crops and cropping systems, better preparedness to counter biotic threats exacerbated by climate variability and changing farming practices, further increasing food security and farm profitability, and reducing food prices. Losses in yield and quality of major food crops due to pests and diseases are reduced through integrated pest and disease management innovations. Food and feed are made safer for consumption by reducing pesticide and mycotoxin contamination in targeted crops, improving human and animal health.
	**GENDER EQUALITY, YOUTH & SOCIAL INCLUSION** Around 8 million women have increased access to and benefit from plant health innovations through prioritization and implementation of approaches for gender-equitable and socially inclusive design and scaling of plant health innovations. These are supported by multi-stakeholder partnerships and new opportunities for women and youth.
	**CLIMATE ADAPTATION & MITIGATION** More than 8 million people (more than 1.27 million households) benefit from reduced impact of climate-induced changes in pests and diseases on crops, food security, and livelihoods through better preparedness and adaptation of plant health innovations based on improved forecasting of threats and modeling of impacts.
	**ENVIRONMENTAL HEALTH & BIODIVERSITY** Reduction in use of toxic pesticides and associated safety hazards, including pesticide residues in the environment, due to integrated disease and pest management and prioritization of nature-based solutions are applied on more than 9 million hectares of maize crops, benefiting more than 24 million people (more than 5 million households). Natural biodiversity and ecologies are protected from devastating invasive pests and pathogens and toxic pesticides.

PARTNERS

Partnerships are essential to the success of the Plant Health Initiative. The Initiative will engage a wide range of partners supporting demand, innovation, and scaling, including: academic, training and research partners; private sector partners; government and other public sector partners; multilateral organizations; foundations; international, regional, national and local NGOs; and public-private partnerships.

The Plant Health Initiative is implemented by several CGIAR Centers together with national, regional and international partners.

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International Center for Tropical Agriculture
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IITA
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ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

IRRI International Rice Research Institute

CABI

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World Vegetable Center

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