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The threat of Panama disease to the role of banana and plantain in realising food security: linking local realities to a global problem

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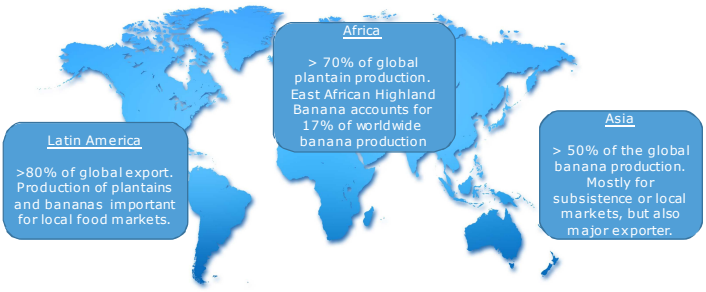
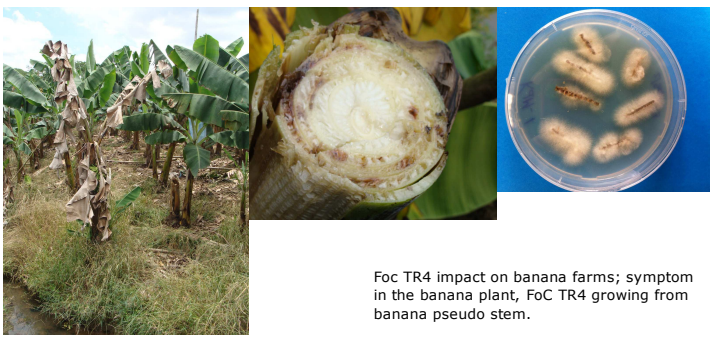
Background

- Banana and plantain are an important ingredient of local diets, as staple or fruit, and parts of it are used for various other purposes.
- Banana is the world's leading fruit crop and an important export commodity for several agriculture-based economies.
- 85% of total banana volume goes to domestic markets and only 15% enters export trade. Plantain is mainly for domestic markets.
- Banana and plantain production for domestic markets and self-consumption combines in different ways with export-oriented banana production.



Panama Disease: a global threat

- Panama disease is caused by the soil-borne wilt fungus *Fusarium oxysporum* f.sp. *cubense* (Foc).
- *Fusarium oxysporum* is a species complex with morphologically indistinguishable pathogenic and non-pathogenic strains. Different strains of Foc affect banana and plantain production world-wide.
- Panama disease led to severe losses in the export trade in Latin America prior to 1960s, which was based almost entirely on the cultivar Gros Michel , susceptible to Foc. Since the 1950s, companies converted to Cavendish cultivars, resistant to Foc Race 1.
- Current re-emergence and rapid spread of Panama disease in Southeast Asia is caused by Foc Tropical Race 4 (TR4). This race is extremely virulent, destroying banana, including Cavendish, and plantain for self-consumption, domestic and export markets.
- This global threat connects the export trade, which strongly depends on the no longer resistant Cavendish cultivars, to the diverse local realities wherein banana and plantain contribute to food security.



Foc TR4 impact on banana farms; symptom in the banana plant, FoC TR4 growing from banana pseudo stem.

Diversity in producing banana

- Banana production takes place under diverse agro-ecological and social-economic conditions and disease pressure varies significantly.
- The previous threat posed by Race 1 was countered by a shift to a resistance variety in export-oriented production. Realising such a shift was more difficult in the highly diverse production systems contributing to food security.
- Therefore, it is essential to include the resistance configured by biological diversity, agro-ecological variability and the variety in management practices and institutional arrangements.

Diversity in banana production in terms of the link between export trade and domestic food provision and of diversity of cultivars planted

Country	Average share export total national production (2007-2011)	Degree of diversity in banana / plantain cultivars grown
Colombia	35%	Low
Costa Rica	95%	Low
Ecuador	71%	Low
Philippines	23%	High
Uganda	0%	Very high

Multiple actors and uses

- Banana is produced in backyards and by smallholders, cooperatives, companies.
- Banana is used by consumers for cooking, dessert, and brewing.
- Other uses: leaves for packaging and wrapping, peelings for ketchup, fibres for handcrafts, animal feeds, dried sheaths for binding ropes and thatching materials, mulching material, medicines.
- This multiplicity enables spread of the pathogen and complicates tailoring of disease management to different circumstances

The need for an integrative research agenda

- How does Foc TR4 spread through the global food system and create impact on local production and food provision?
- How is the severity of Panama disease affected by embedded interactions between plants, agro-ecologies and human actions?
- How does genetic resistance combine with resilience grounded in agro-ecological variability and managerial variety?
- How does global regulation and trade combine with varied management practices and forms of coordinated action in local realities?

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