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# Biosecurity for small growers of local and organic export banana in Peru: Seeking synergies with food safety and ecological intensification

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## Emerging diseases – challenges to small grower biosecurity

Fusarium Wilt Race 1 (FWR1) disrupted export banana supply chains 50-70 years ago, but even today continues to spread among smallholders forcing a change in cultivar or crop. Fusarium Wilt Tropical Race 4 (FWTR4) has spread in export Cavendish plantations from Asia to Africa and most recently Latin America and threatens many cultivars. Agricultural biosecurity measures (Waage & Mumford 2008) have increased to protect society from the negative impacts of pest and disease spread - measures to minimize the risk of introduction from outside the country, usually a public responsibility, and to reduce the risk of spread internally once the pest or disease is present, a farm-level issue. Smallholders with limited capital, labor and access to new information may not prioritize biosecurity designed for large farms (Kukulis & Velvers 2018).

**Study objective** – document smallholder biosecurity risk and implementation of measures at the farm level and by local plant health agencies and opportunities for complementarity with measures for ecological intensification and food security in 2 banana producing zones.

**Our hypothesis** - among resource-scarce banana growers, biosecurity measures which contribute to productivity and food safety requirements will be more readily put into practice



(Central Selva – local cultivars)



(North Coast organic export Cavendish)

## Interviews, farm mapping FW presence/risk, drone images



7 farms in Central Selva (CS); 5 banana marketing associations on North Coast (NC)



(CS)



(NC)



(CS)



(CS)



(NC)



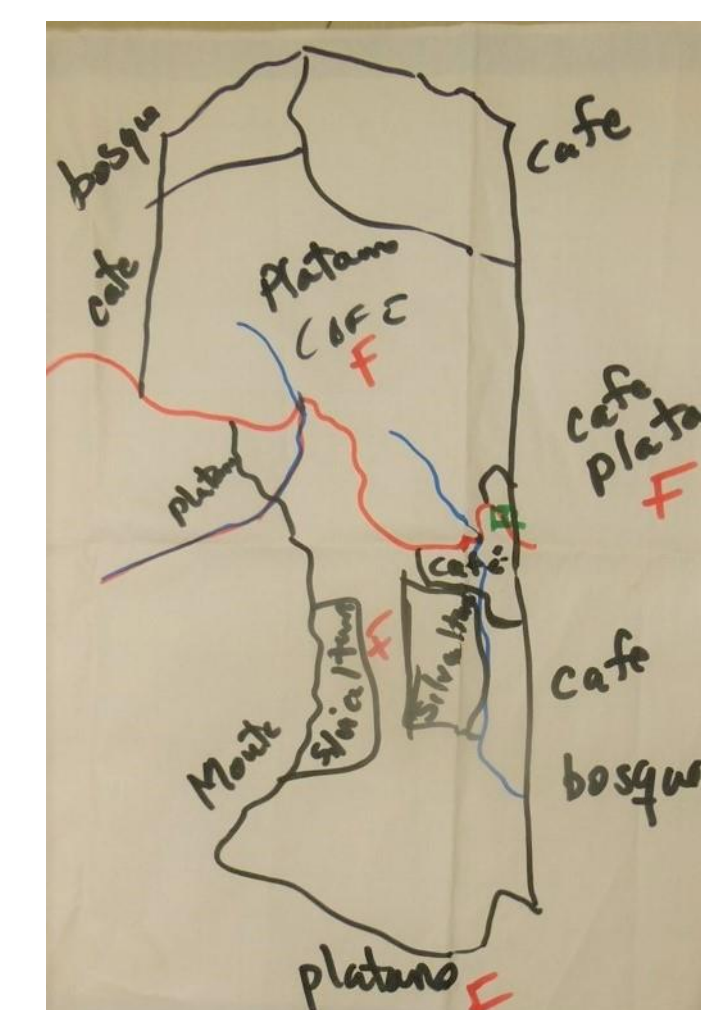
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Biosecurity measure in office



Food safety measure with biosecurity overlap



Farm map with FW and banana

## Results: Minimal biosecurity practices = high long term risk FWR1/TR4

CENTRAL SELVA Current biosecurity status		Major risks
Theme	# farms	
Farmer training knowledge FW	3/7	- Incomplete knowledge
Worker knowledge FW	0/7	FW and banana diseases
Training FW traders	0/7	/risk mapping;
Practices planting material	4/7	- uncertain planting
Controlled access fields	0/7	material;
Controlled access post-harvest	0/7	- free access and
Sanitation footwear tool field	2/7	circulation on-farm;
Sanitation harvest/post-harvest	2/7	- no measures for
Nursery stock/fertilizers	0/7	outside visitors;
Control vehicles	0/7	- uncertain nursery
Protocol visitors, auditors, sales	0/7	stock;
Protocol travel household	0/7	

## Results: Biosecurity X EI X FS

Priority biosecurity actions for FW banana with contribution to Ecological Intensification (EI) (Turmel et al 2018) and Food Safety (FS)

(<https://www.fao.org/food-safety/food-control-systems/en/>)

Action areas	Biosec	EI	FS
Banana disease training/risk mapping	X	X	
Low risk healthy planting material	X	X	
Living hedges to manage access	X	X	X
Sanitation footwear, tools, materials	X	X	X
Protocols – off-site visitors and visits	X		X
Water access, disposal and movement	X	X	X

NORTH COAST Biosecurity risk (H, M and L for high, medium and low risk)				Major risks
Theme	Risk level			
	H	M	L	
Knowledge Foc Farm	5			- Incomplete knowledge FW
Knowledge Foc Association	5			and banana diseases/ risk
Knowledge Foc mobile packing	5			mapping;
Banana planting material			5	- mobile packing station
Mgmt workers in field		2	3	routine;
Banana harvest routine	2	3		- Free access and
Vehicles movement			5	circulation on-farm;
Local organic fertilizers			5	- No measures for outside
Outside visitors	5			visitors;
Water – banana post-harvest			5	- Contiguous fields with
Water irrigation		1	4	common
Animals, runoff/drainage		2	3	irrigation/drainage
Surrounding fields FW	5			

## Conclusions and perspectives

- contrasting zones: dispersed, isolated fields in Central Selva contiguous fields/common irrigation system on North Coast
- semi-autonomous farms with low immediate risk, but high medium and long term risk
- highest priority: action-oriented, participatory training in banana diseases and risk mapping
- living hedges as barriers to control and direct access
- sanitation protocols footwear, tools, people
- high potential to address biosecurity with EI and FS
- incipient efforts in biosecurity with high need to build ties with EI and FS, but integrated research and outreach across themes largely absent

**References:** Waage, J. K., & Mumford, J. D. (2008). Agricultural biosecurity. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1492), 863-876.  
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