

From technology adoption to understanding innovation: Lessons from plantain innovation systems in four countries

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Introduction

Plantains are an important staple food and cash crop in Latin America and West Africa with growing market demand. In recent decades, new production technologies and varieties have become available and are being tested in major producing countries. However, uptake has been uneven among countries and by segments of growers within countries.

As a basis for improving productivity and profitability among smallholder plantain growers, we studied plantain farmers' use of new technologies and the accompanying context of innovation for the plantain sectors in Nicaragua, Panama, Dominican Republic and Ghana.

Research questions - Latin America & West Africa:

- What new technologies are being used by different groups of plantain growers?
- Who are main actors in plantain sectors and which factors stimulate or block innovation?
- What are entry points to accelerate technological and organizational change to improve viability of small-scale plantain producers?

Methodology

Production technology by grower segment:

Structured interviews with plantain growers

Nicaragua (n=100)	Panama (n=150)	Dom. Republic (n=101)	Ghana (n= 250)
Rivas	Chiriquí	Cibao Valley	Central Region
Ometepe	Bocas del Toro		Brong Ahafo

Strategy and alliances of plantain sector actors:

Semi-structured interviews were carried out with actors of the plantain sector to map the innovation systems: public institutions and research, extension services, farmer organizations, financing institutes, input dealers, plantain buyers and intermediaries.

Stakeholder perspectives on innovation system

In each country, stakeholder workshops using the methodology from Rapid Appraisal of Agricultural Knowledge Systems were held to:

- Discuss the maps of the innovation system
- Characterize the roles of actors
- Identify drivers and constraints of innovation
- Define options for stimulating innovation

Farmers and new technologies

Nicaragua: traditional production to intensive technology use

Farm level factor: Access to irrigation

- Higher yielding dwarf varieties, planting densities, replanting frequency, off season planting

Market factors: decline of profits in sugar cane and others, increasing demand on domestic and Central American markets



Panama: independent and associated farmers

Chiriquí: Technology influenced by banana industry

- Use of fertilizers and pest control measures

Bocas del Toro: Organic practices, farmer organization

- Mixed cropping systems , replanting

Market factors: profitability of oil palm versus plantain



Dominican Republic: technological change in large scale-farmers

FHIA-21 hybrid plantain had important influence for technology change

- Planting material availability and treatment, frequent replant and planting densities
- Productivity increasing practices also used for traditional varieties.

Market factors: high domestic demand – major staple food



Ghana: traditional farmers with varying access to information and markets

Major differences in access to extension and training between regions.

- Mixed cropping systems, phytosanitary treatment of planting material
- Slow diffusion of new varieties

Market factors: Glut periods with low prices discourage increase of productivity



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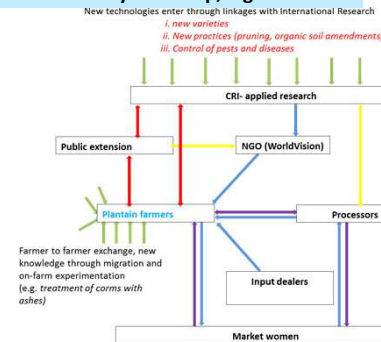
Characterization of innovation systems and prime movers

Country	Role of grower organization	Source of new production technology	Market factors
Nicaragua	33-80% organized Partner in projects for technology dissemination and marketing	Projects with grower organization and NGOs, Informal: large growers, export banana	Supermarket suppliers, Regional fresh and processing markets
Panama	40-60% organized Access to government grants and inputs	Public research (IDIAP) and extension, Informal: large growers, export banana	Lack of marketing infrastructure
Dominican Republic	30% organized Access to training	IDIAF/Ministry Agriculture/public projects, Informal: large growers, export banana	Supermarket suppliers, Processing contracts
Ghana	14% organized Links with extension and NGOs	Public research (CRI), foreign donor financed projects, NGOs, e.g. World Vision	None

Innovation system bottlenecks

Country	Bottlenecks
Nicaragua	Dependence on projects; Limited national production research capacity for plantain; Limited links among NGOs/projects, input providers and credit; Weakness of financing sector
Dominican Republic	Dominance of traders and markets; Incomplete technologies for rain-fed plantain intensification; Limited reach of extension to small-scale growers; Incipient grower organizations;
Panama	Poorly coordinated public programs on production and marketing; Smallholder enterprise skills limited; Available production technologies inadequate for smallholder limiting factors;
Ghana	Seasonal production glut, low prices; Technology for off-season production expensive and untested; Limited reach of research and extension, NGOs, projects and input suppliers;

Innovation system map, e.g. Ghana



Entry points - Conclusions

All countries:

- Use cluster focus to increase linkages among core stakeholders and develop models for market-driven, step-wise production intensification;
- Strengthen entrepreneurial capacity of grower organization (e.g. through civil society initiatives);
- Strengthen knowledge exchange mechanisms across countries on plantain technology and marketing;
- Synergize linkages with export banana sector;

Nicaragua: Build plantain research capacity

Ghana: Pilot off-season production in peri-urban zones