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

<table>
<thead>
<tr>
<th>Country</th>
<th>Role of grower organization</th>
<th>Source of new production technology</th>
<th>Market factors</th>
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<tbody>
<tr>
<td>Nicaragua</td>
<td>33-80% organized Partner in projects for technology dissemination and marketing</td>
<td>Projects with grower organization and NGOs, Informal: large growers, export banana</td>
<td>Supermarket suppliers, Regional fresh and processing markets</td>
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<tr>
<td>Panama</td>
<td>40-60% organized Access to government grants and inputs</td>
<td>Public research (IDAP) and extension, Informal: large growers, export banana</td>
<td>Lack of marketing infrastructure</td>
</tr>
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<td>Dominican Republic</td>
<td>30% organized Access to training</td>
<td>IDIAF/Ministry Agriculture/public projects, Informal: large growers, export banana</td>
<td>Supermarket suppliers, Processing contracts</td>
</tr>
<tr>
<td>Ghana</td>
<td>14% organized Links with extension and NGOs</td>
<td>Public research (CRI), foreign donor financed projects, NGOs, e.g. World Vision</td>
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Characterization of innovation systems and prime movers

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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

- Chiriqui: Technology influenced by banana industry
- Use of fertilizers and pest control measures
- Boacas 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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Innovation system bottlenecks

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

Innovation system map, e.g. Ghana

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