



The Plantain ASTI Case Study – Lessons from Ghana



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Outline

1. Ghana's economy goal
2. Place of plantain
3. Relevance of ASTI analysis
4. Methodology
5. Findings
6. Lessons learnt

1. Ghana's economy goal

- o Ghana anticipates a 6%-8% growth rate ~~which would propel it to a middle income country by the year 2015.~~
- o The economic and structural transformation is to be propelled by the agricultural sector (Ghana, 2005).
- o This is because agriculture is the highest contributor to GDP (35%+);

Ghana's economy cont.

- the bulk of the poor are engaged in various aspects of it;
- its increased productivity ensures food security;
- its modernization ensures links with industry;
- it can absorb a maximum number of the youth who seek higher income from agriculture.

2. Place of plantain in Ghana's economy

- Apart from cassava, maize and rice, plantain is the food commodity to see in most households in Ghana.
- In most Southern households it is combined with cassava to prepare fufu.
- Otherwise it is eaten as green/ ripe boiled with stews or roasted/baked, fried as chips or transformed into paste and added to other flours (maize, wheat or cassava) and consumed as snack or main meal.

Place of plantain cont.

- In six out of 10 regions where cocoa is also cultivated it is considered as food as well as cash crop.
- About 90% of produce are consumed locally in various forms.

3. Relevance of ASTI analysis

- It appears that plantain is not considered as a priority crop during food security discussions probably as a result of its low storability status.
- Yet, there is the need to enhance returns from crops and improve delivery of business and technical services to support the expansion of production, processing and marketing.
- "...without the development of science and technology, improvements in crop (including plantain) yields, processing and marketing would be slow...." (Ghana, 2005)

Relevance...

- A systems approach to analyzing the agricultural science, technology and innovations in any sub-sector would identify strengths and weaknesses within the system and opportunities and threats in the external environment.
- Lessons learnt would lead to suggestions for further biological, chemical and social science research, infrastructure development and policy formulation and implementation.

Expected outputs of Ghana's case study

- The nature of the plantain ASTI system identified
- Alternative approaches to complementary policies and programmes identified.
- Alternative approaches to complementary support organisations identified
- Inputs into future policies governing agriculture, science and innovations identified.
- Agricultural trade in plantain, competitiveness, and food security within the context of broader development goals determined.

4. Methodology

Steps undertaken:

- Theoretical basis
- Method of data analysis
- Secondary data collection
- Primary data collection
- Computer-based SPSS data processing and analysis
- Report writing based on outline suggested by CTA

Theoretical basis

The argument was that technical change is guided along an efficient path by:

- price signals in the market, provided that the prices efficiently reflect changes in the demand and supply of products and factors and
- that there exist effective interaction among farmers, public research institutions and private agricultural supply and marketing firms (Ruttan and Hayami, 1990).

Hypotheses – ASTI system

Based on the arguments we hypothesised that:

1. Policy makers in Ghana formulate and implement policies that would maintain the country's competitive position in world markets or to improve the economic viability of the agricultural sector producing import substitutes and staples.
2. The plantain actors include firms that demand, invest, research, diffuse information and develop infrastructure.
3. The actors are strongly linked both horizontally and vertically

Hypotheses cont'd

4. The actors learn and invest in/ or generate innovations.
5. The actors have adequate technical and managerial competencies.
6. The actors understand their basic and support functions
7. The actors adequately undertake their basic and support functions
8. The performance of the plantain ASTI system is high.

Identification of Actors

- CTA categorisation was adopted; i.e., sort actors according to business and non-business actions concerning:
 - demand/market,
 - enterprise operation,
 - diffusion,
 - research and training and
 - infrastructure development.

Assessment of habits, competencies and practice

- Habits are formed from association with relatives, friends and colleagues – what is learned? Is it relevant for new actions?
- Competencies are gained formally – what formal schooling and training is invested in? is it adequate to induce new actions?
- Practices are what work to the advantage (economic, social, ecological) of actors –
What is being done? Does it encourage innovation?

Mapping of actor linkages

- First, actors at community, district, regional, national or international levels were identified;
- Next, intensity of vertical and horizontal linkages were drawn,
- The intensity was based on respondents' perceptions scored as: 1=very strong, 2=strong, 3=fairly strong, 4=fairly weak and 5=weak.
- It was expected that linkages would be strong at most levels.

Functional analysis

- Are functions basic or supportive (or statutory or non-statutory). Statutory functions are basic and have legislative backing and are mandatory. Do they concern:
 - research/extension?
 - education/technical assistance?
 - credit provision?
 - market development and
 - market facilitation?

Based on perception of respondents (% reporting) the effectiveness of functions were scored. Functions were categorised as effective (if 50 percent or more of the respondents indicated so).

Assessing performance of ASTI system

High performance ASTI system is one with :

- specific and well targeted policy,
- competent actors who are a learning organization,
- Actors who are strongly linked to each other and perform both basic and support functions effectively.

Sources and Method of Data Collection

- Both primary and secondary data were used.
- First, was the review of literature for policy and policy effects.
- Official documents reviewed included :
 - development plan documents of various regimes,
 - development policy documents of various sectors and
 - time series data on selected variables – acreage, output, yield, etc.
- Secondly, there were stakeholder consultations through four workshops in four out of six major plantain growing regions in Ghana. These involved group and plenary discussions before synthesis of findings.

Sources and method of data collection cont...

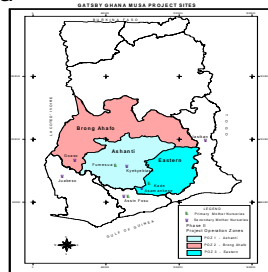
- There was the sample survey of 135 females and 73 males (farmers, traders, processors and consumers); and key informant interviews of transporters, input dealers and MoFA personnel.
- Finally, an ASTI Validation Workshop for stakeholders.

Table 1. Location of plantain ASTI survey areas in Ghana

Region	District	Study Area
Ashanti	Ashanti-Akim North	Konongo
Brong- Ahafo	Asutufi	Kenyase
Eastern	New Juabeng	Koforidua
Western	Sefwhi-Wiawso	Sefwhi-Wiawso

Location of plantain production areas in Ghana

- Map of Ghana



5. Findings

5.1. Adequacy of policy framework

- Policy makers in Ghana formulate and implement policies specific to agriculture and related fields (education, health, trade and industry, lands and forestry, science and technology).
- The policies have fairly improved the economic viability of the agricultural sector producing import substitutes and staples– Ghana is self-sufficient in plantain.
- However, plantain has not been targeted adequately;
- specific budgets to the sector have not been clearly demarcated;

Although, some research projects have been implemented.

Table 2: Plantain projects implemented by Crops Research Institute of CSIR since 1991

Period	Project	Donor
1991 – 1993 and 1995 - 1999	Plantain Improvement Project	International Development and Research Centre (IDRC)
1992 – 1994 and 1996 - 1999	National Agricultural Research Project (NARP) Plantain Project	World Bank
1997 – 2000 and 2003 - 2007	Establishment of a delivery system for healthy Improved <i>Musa</i> germplasm with field tolerance to banana streak virus (BSV) in Ghana	GATSBY Charitable Foundation
2000 – 2002	Production of bananas and plantains in the peri-urban zones of Ghana	Bio-diversity International (formerly INIBAP-IPGRI)

Projects of CSIR cont.

2002 - 2005 Plantain Target Project USAID

2002-2007 Small scale irrigation project for farmers.
Agricultural Sub-Sector Investment project.
IDA

Performance -Low level plantain innovations

Innovations	Period + Source	Type	Focus	Key actors
IPM-Black sigatoka disease management	1990s-2000s	Bio-tech IPM	Breeding Agronomy	Researchers, Extension and Farmers
Plantain-coconut cropping system	2000s	Bio-tech ICM	Breeding Agronomy	Researchers, Extension and Farmers
Mass propagation of Planting material	2000s	Bio-tech BMT-IPM	Breeding Agronomy	Researchers, Extension and Farmers
Plantain chips Plantain flour	2000s	Processing technology	Value addition – post production	Processors
Plantain-based fufu-powder	2000s	Bio-tech	Value addition -post	Researchers and processors

Some new plantain Technologies



Mass-propagated seedlings



Seedlings of new hybrids



Shade-netnursery



Humidity chambers

Value added food products & Training



New plantain recipes



Women under training by WIAD/FRI



New plantain hybrid

Some new disease tolerant plantain and banana hybrids



Fruits of new plantain /banana hybrids

5.2. Plantain Actors and location concentration in Ghana

Component	Actors/stakeholders	Concentration
Market/Demand	<ul style="list-style-type: none"> Consumers Retailers Wholesalers Processing firms Restaurants Local eateries 	<ul style="list-style-type: none"> Community Community District capital District capital District capital Community
Enterprises	<ul style="list-style-type: none"> × Farmers • Suppliers of planting materials • Agro-input dealers 	<ul style="list-style-type: none"> Community Community District capital
Research and Training	<ul style="list-style-type: none"> × Council for Scientific and Industrial Research • University of Ghana • Kwame Nkrumah University of Science and Technology • Ghana Atomic Energy Commission • Ghana Science Association 	<ul style="list-style-type: none"> National National • National National Regional
Diffusion	<ul style="list-style-type: none"> × Ministry of Food and Agriculture • National Board for Small Scale Industries • NGOs 	<ul style="list-style-type: none"> Zonal/District District Zonal/District

Plantain actors cont.

Infrastructure	·Ministry of Education, Science and Sports	District
	·Ministry of Food and Agriculture	District
	·Ministry of Lands and Forestry	District
	·Financial institutions (including Rural and other commercial banks)	District /Sub-district
	·Transport Unions and Cooperatives	Zonal/subdistrict
	·Environmental Protection Agency	Regional
	·Ghana Standards Board	National
	·Food and Drugs Board	National

5.3. Adequacy of habits, competencies and practices

Habits:

Farmers learn 'best' practices in agronomy, post-harvest handling and marketing.

Minimum competencies are

- o gained formally from formal schooling and training organised by MOFA and other NGOs.
- o Farmers, traders and processors are fairly **aware** of improved technologies such as use of new varieties of planting materials, fertiliser, pesticides and pest management techniques, processed products, etc.

Adequacy of practices

Practices:

- o Many farmers depend on traditional technology. Very few farmers have adopted plantain high technology, i.e. use of paring and hot water method, BMT, herbicides, fertilizers and other pesticides.
- o Few processors use mechanical slicers and fryers. Some traders de-hand and package plantain for distribution; others sell on bunches.
- o Innovations attributed to farmers/traders themselves are not documented.

5.4 Effectiveness of linkages of plantain actors

1. There is an appreciable level of collaboration among plantain actors in Ghana
2. The strongest vertical linkages are:
 - Research ↔ extension (statutory)
 - Extension ↔ farmers; (statutory)
 - Farmers ↔ wholesalers; (business)
 - Wholesalers ↔ retailers; (business)
 - Retailers ↔ consumers (business)

Horizontal linkages

The strongest horizontal linkages are:

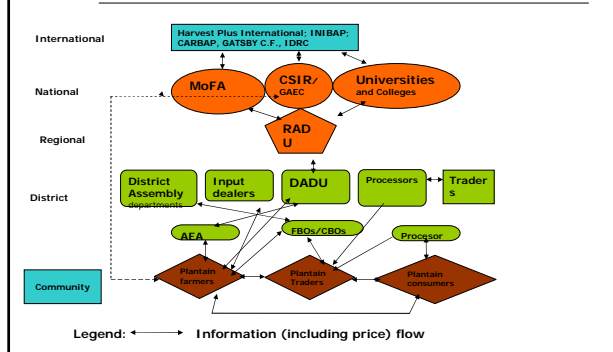
- Transporter ↔ Transporter
- Researcher ↔ Researcher

There are informal interactions with respect to:

- Farmer ↔ Farmer
- Trader ↔ Trader
- Processor ↔ Processor

Formal cooperatives or farmer-based organizations are poorly developed among plantain farmers in Ghana

Figure 5.1: Map of linkages of plantain actors in Ghana



5.5 Functions and effectiveness of functions of plantain actors

- The general indication is that all the actors understand their basic, supportive or statutory and non-statutory functions.
- 2. However, the study's respondents perceive that:
 - Apart from market facilitation, all the actors' functions are not effectively carried out.
 - The research/education functions of researchers and universities are inadequate.

Effectiveness cont'd

- The extension/technical assistance functions are not adequately being carried out by MoFA and the District Assemblies.
- Credit provision is not being carried out adequately by financial institutions and NGOs,
- Market development by District assemblies is not adequate either.
- Only market facilitation by input dealers, transporters, plantain farmers, traders, wholesalers and consumers is adequate.

5.6 Performance of ASTI system

The performance of the plantain ASTI system is fairly low. This is because :

- there is no specific and well targeted plantain policy
- the competence of various actors is mixed and some level of formal and informal learning occurs
- the actors are not strongly linked to each other and the performance of both basic and support functions are just fairly effective.

Actors' perceived major constraints limiting innovation

- i Economic
 - Low farm gate price
 - High tax rates from district Assembly
 - High cost of transportation
 - High interest rate and short moratorium period from financial institutions
 - Seasonal market price instability

Actors' perceived major constraints limiting innovation cont..

- 1. Social
 - Lack of feed back and irregular visits from researchers
 - Lack of regular visits by extension agents
 - Delays in provision of assistance by FBOs and NGOs
 - Low patronage of members of Farmer Based Organisations
 - Breaches of informal contracts between traders and farmers
- 1. Technological
 - Poor handling of produce
 - Poor state of vehicles of transporters
 - Lack of product standardisation
 - Lack of processing machines

6. Lessons learnt

The structure of the plantain ASTI system in Ghana is clear and well understood:

It is noteworthy that:

- the policy framework is just fairly adequate,
- Both public and private sector actors involved with plantain are functional,

lessons

- The statutory/basic and non-statutory/supportive functions are well understood,
- The performance of functions are generally not effective,
- Plantain actors learn and receive innovation information; they hardly innovate themselves

lessons

- The competencies and habits of plantain actors are fairly adequate
- The practices remain largely traditional – low use of high technology.
- The actors are fairly strongly linked along the supply/value chain
- The strongest linkage is among the 'business' actors

Lessons...

- The weakest linkage is between researchers and business actors
- The overall economic performance of the actors is just fair; profit levels are not stable; they were low in 2006.
- There are several political, economic, social and technological constraints
- Innovations are needed to reduce the impact of the constraints

Lessons...

- Major areas of innovation needed:

- specific policy,
- capacity building of actors,
- business finance education,
- horizontal and vertical linkage strengthening and
- market infrastructure

Recommendations

New actions are needed in:

- Forming working group on plantain to design specific policy on plantain; this is an alternative approach that will complement broad policies and programmes
- Increased capacity building of actors – institute public extension service for traders, transporters, processors and input dealers; this is an alternative approach that would complement that of private support organisations.

Recommendations

- Stepping up business finance education to improve savings culture among business actors. In this way:

- farmers credit assess would improve;

then trade in plantain, competitiveness, and food security within the context of the broader development goals can be achieved

Recommendations..

- Instituting annual fora to get all plantain actors to engage and make inputs into future policies governing agriculture, science and innovations
- Organising public-private support for FBO dynamics (norming)
- Designing market infrastructure to suit plantain distribution (particularly storage).