

Plantain Production Practices in the Ashanti, Brong-Ahafo and Eastern Regions of Ghana

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Abstract: A study was conducted in three of the six plantain growing regions-(Eastern, Ashanti and Brong-Ahafo) of Ghana to elucidate the plantain production practices and constraints. A total of 259 plantain farmers from 24 villages were selected randomly and interviewed using prepared questionnaires. Frequency distribution, percentage and mean score were used in the analysis of the data. The findings revealed that the mean age of the plantain farmers was 47 years. A greater percentage (84%) of the respondents had formal education, with only 16% without any formal education. The mean plantain farm of the respondent was two acres (0.8Ha). Majority (84%) of the farmers slashed and burned their fields during land preparation. Only 22% of the farmers practice row planting. All the farmers practice inter-cropping plantain with other crops and 96% without any soil amendments application. Only 25% of the farmers had heard of the release of improved cultivars by research. Less than 15% of the farmers have had some training in techniques of plantain production. Radio publicity seems to be among the highest of the extension methods farmers would prefer. Bud manipulation technique was highly adopted than the split-corm technique. Land tenure was of much problem to male plantain farmers than to the females. Plantain production contributed more income to female farmers than the male farmers. The four main constraints to plantain production identified by the farmers were credit weed, labour, disease in that order. The major marketing problem was low price for the produce.

Key words: Plantain, production practices, survey, land tenure, technology transfer

INTRODUCTION

As starchy foods, plantains and bananas (*Musa* sp.) are important sources of high-calorie energy in the entire West African sub-region (Stover and Simmonds, 1987). They are also of great socio-economic importance in the producing countries. Nearly 90% of the total plantain and banana produced worldwide (63 million tonnes) are consumed locally in the producing countries leaving only 10% for export (CGIAR, 1992, 1993). Plantain and banana are also very important sources of rural income (Ortiz and Vuylsteke, 1996).

They are also very important sources of rural income (Ortiz and Vuylsteke, 1996). They are attractive to farmers due to their low labour requirement for production compared to cassava, maize, rice and yam (Marriott and Lancaster, 1983).

In Ghana, plantain is ranked third after yam and cassava in the food crop sector (FAO, 2006) and contributes about 13.1% of the Agricultural Gross Domestic Product (AGDP) and its per capita annual consumption of 101.8 kg per head (FAO, 2006) is higher than other starchy staples except

cassava. It belongs to the non-traditional sector of the rural economy, where it is used mainly to shade cocoa and is an essential component of the diet and generates considerable employment. As regards job creation, mechanized, traditional or inter-crop cultivation of one hectare of plantain generates 1.68, 0.39 and 0.19 permanent direct jobs per ha per year. In the light of this, it is estimated that one hectare of plantain generates an average of 0.75 permanent jobs (Rodriguez Martinez and Rodriguez Saavedra, 2001). When set against the national cultivated area, this gives approximately 265,785 permanent jobs. This is equivalent of 53,157 families of five persons devoted to plantain.

Plantain is grown across all the humid agro-ecological zones and forms an integral component in most of the complex farming systems (Swennen and Vuylsteke, 1991). Annual production in the country is about 2.0 million metric tonnes for plantain (AAB subgroup) (FAO, 2006) of which only 0.5 tonnes is exported (Lescot, 1999) and 7.9 metric tonnes for banana of which 3.4 metric tonnes is exported (Lescot, 2000).

Despite the high value of plantain and banana, growing pest and disease pressures have affected production, the most notable being the fungal disease Black Sigatoka (*Mycosphaerella fijiensis*) (IITA, 1992; Stover and Simmonds, 1987; Swennen, 1990). Over the years farmers have been producing plantain in the traditional way using low-yielding poor quality cultivars and unhealthy planting materials, soil, disease and pest management practices. Yields have thus remained low and not sustainable (Hemeng, 1991).

Yield losses due to the disease are highly significant ranging from 20-50%. Under very severe conditions yield losses may be as high as 80% (Hemeng and Banful, 1994). Unfortunately all the landraces in Ghana are susceptible to the Black Sigatoka disease. In view of this, new hybrids were introduced in 1994 to supplement the landraces. The tetraploid hybrids are high yielding and disease tolerant and had been released to farmers (Dzomeku *et al.*, 2004). This study was to provide some information on the production practices and constraints farmers are confronted with as regards plantain production in Ghana.

MATERIALS AND METHODS

The baseline survey involved three districts in Ashanti, two in Brong-Ahafo and two in the Eastern regions of Ghana. In all, 24 villages were randomly selected from all the plantain growing villages in the selected districts. From these randomly selected villages, 11 farmers were further randomly picked from all plantain farmers in each village. Thus the expected total sample size was 264 farmers but the actual total sample size became 259 after 5 of the questionnaires were found missing during data entry. Information obtained included household characteristics, household access to resources (land, labour and capital), household objectives, production constraints, problems or constraints limiting production practices and access to cost effective new technologies. Data from the baseline survey was analysed using descriptive statistics.

RESULTS AND DISCUSSION

Personal Characteristics of the Respondents

A total of 259 plantain farmers from 24 communities participated in the study (Table 1). At least 75 farmers were interviewed from each of the three regions.

Characteristics of the Sample

Male and female farmers were about equally represented in the sample and most farmers interviewed were natives of the villages. Most farmers have had some formal education and just 16% had no formal education. Majority of the farmers fell between 31 and 60 years with 34% were over 40 years old. The study showed that only few young people (7%) (below 30 years old) were into plantain production (Table 2).

Table 1: Sample distribution among districts and villages

Region and district	No. of villages	Sample size
Ashanti Region:		
Asante Akim South	4	44
Ejisu-juaben	2	22
Asante Akim North	3	33
Sub-total	9	99
Brong Ahafo Region:		
Asunafo South	3	33
Asunafo North	4	44
Sub-total	7	77
Eastern Region:		
West Akim	5	50
Suhum-kraboa-coaltar	3	33
Sub-total	8	83
Overall Total	24	259

Table 2: Characteristics of the sample

Characteristic	(%)
Sex:	
Male	52
Female	48
Residential status:	
Native	75
Settler	25
Formal education (years):	
0	16
1-5	6
6-10	63
Over 10	15

Descriptive Characteristics

The mean age of the farmers was about 47 years suggesting that much older people were in the production of plantain (Table 3). All the farmers have had longer experience in cultivating plantain as the mean number of years they have been growing plantain was 14.7 years. The total number of plantain field farmers had ranged between 1 and 10 and averaging 2.7. In 2005, farmers had an average of 1.5 fields. This suggests that farmers maintained previous plantain farmlands in addition to their new fields. The mean size of largest plantain field was 0.8 ha (2 acres) suggesting that most farmers were small-scale producers (Table 3).

Farm Characteristics

Majority (84%) of the farmers slashed and burned their fields during land preparation with intercropping of plantain as the dominant practice of the farmers. Majority (63%) of the farmers planted plantain at random (Table 4). Nevertheless, 22% of the farmers practice row planting of plantain. Most of the farmers did not practice any soil fertility maintenance on their plantain farms (Table 4).

Extension and Technology Transfer Activities

In the survey, it became necessary to ask farmers whether they have heard of any release of improved varieties of plantain or bananas since this was related to awareness creation. Twenty-five percent of the farmers said they have heard of release of improved cultivars (Table 5). The year these farmers claimed to have heard of the releases of improved cultivars are summarized in Table 5. It was observed that farmers heard of improved cultivars recently though the hybrids were released in 1999. About 69% of respondents heard of the improved cultivars released between 2003 and 2005 (Table 5). Knowing where to obtain improved planting material by farmers is a good indicator of an

Table 3: Descriptive characteristics of the sample

Characteristics	Minimum	Maximum	Mean
Age of farmer	22	100	47.1
Years of education	0	21	8.4
Years of growing plantain in village	1	75	14.7
Total number of plantain fields	1	10	2.7
No. of fields planted in 2005	0	6	1.5
Size of largest field in 2005 (ha)	0	10	0.8

Table 4: Farm characteristics in 2005 (N = 259)

Type	(%)
Land preparation:	
Slash and burn	84
Slash and no burn	16
Cropping system:	
Monocropping	7
Intercropping	93
Planting pattern:	
Rows	22
Random	63
Mixture of rows and random	15
Fertility maintenance:	
None	96
Fertilizer	2
Poultry/Animal/green manure	2

Table 5: Year farmers heard of release of improved plantain cultivars (N = 65)

Year	(%)
1999	2
2001	6
2002	6
2003	17
2004	18
2005	34
Can't remember	17

extension message and might help drive an adoption process. In the study, just 7% (18/259) of the farmers indicated knowing where they could get improved plantain planting material. Some of the possible sources of getting planting materials of the improved cultivars as indicated by respondents included Ministry Of Food and Agriculture (MOFA), dealers and research stations. This revelation suggests that more efforts need to be put in the extension services to improve upon the lot of farmers.

Training

Less than 15% of the farmers have had some training in techniques of plantain production (Table 6). Although, extension agents are assigned to all the operational zones where this study was conducted, it was observed that transfer of plantain production technologies was low. The results had revealed that there was a limitation to information flow as regards the transfer of technologies developed by research and their dissemination by extension agents. It is therefore important to resource the frontline staff of the Ministry of Food and Agriculture to emphasize training of farmers so as to improve their production practices for increased yields.

Planting Material Multiplication/development

Poor and inadequate planting material has been one of the major constraints in plantain production. The split corm and bud manipulation techniques are used to raise more healthy plantain planting materials. Thirty percent of the farmers indicated that they had heard of the split corm

Table 6: Farmers who have had training in plantain production (N = 259)

Type of training	Percentage farmers
Land preparation	12
Digging of holes	12
Planting material development	13
Hot water treatment	9
Farm hygiene	10
Agronomic management	15
Bud manipulation	8
Post harvest handling	6
Processing	7

Table 7: Farmers recent year of using split-corm technique (N = 42)

Year	Percent of farmers applying technique
2000	2
2001	10
2002	0
2003	17
2004	21
2005	50

technique and 16% (42/259) had ever used it to raise suckers (Table 7). The use of the split-corm technique has been quite recent with about half of the farmers applying it in 2005 though the technique had been in the system for over ten years. Another observation was that the adoption of the split-corm technique has been growing over the years.

For bud manipulation technique, 12% of all the farmers claimed to have heard about it and 9% (23/259) had ever used the technique before. Of the farmers who had ever used it, 9% of them used the practice in 2003, 56% in 2004 and 35% in 2005. This shows that though the technique was recently released, its adoption is high compared to the split corm technique.

Farm Hygiene

Plantain farmers face problems of diseases and pests. This calls for improved farm hygiene. Farmers have been edged to treat their suckers before planting to reduce pest and disease incidence. The study indicates that 84% of all the farmers did not treat their suckers before planting. Eight percent mechanically slashed off the base of the corm, 4% used chemicals, 3% applied hot water and 1% employed other methods. As regards pruning of the dried leaves 90% of the farmers were practicing the technique. The survey found that 92% of the farmers staggered their planting days. This is to avoid the excessive lodging at the start of the major rainy season (March/April).

Farmer Participation in Plantain Cultivation Activities

As regards participation in other extension activities few farmers had participated (Table 8). There are other extension methods that can be employed to facilitate farmers' adoption of improved technologies. Nevertheless, radio publicity seems to be among the highest of the extension methods farmers would prefer.

Production Practices in New Fields

Of the total sample size of 259 farmers, 11 of them did not plant new farms in 2005. Thus 248 farmers planted new farms in 2005. The analyses in this section are based on the sample size of 248.

Plantain Cultivars

Majority of farmers (73%) grow the False Horn plantain. The plantain cultivars farmers cultivated in new fields in 2005 and the percentage of farmers growing the cultivars are presented in Table 9. It

Table 8: Farmer participation in plantain technology transfer activities

Activities	Percentage farmers
Farmer field school	7
Hosting of on-farm demonstration	7
Farmer field day	8
Visit to plantain nurseries	9
Workshops on plantain	5
Received plantain production manuals	4
Radio publicity	10
Television publicity	7
Post-harvest demonstration	3

Table 9: Plantain cultivars planted in new fields in 2005 (N = 248)

Cultivar	Type	Adoption rate (%)
Apem hema	FHIA-21, Improved	9.7
BITA-3	Improved	1.6
Kwadu bempa	Improved	0.8
PITA-4	Improved	0.8
(All improved)		(12.9)
Apantu	False Horn, Local	73.0
Apem	French plantain, Local	10.9
Asamienu	True Horn, Local	2.0
Oniaba	French plantain, Local	1.2
(All local)		(87.1)

Table 10: Adoption rates and intensities of improved production practices for new fields in 2005 (N = 248)

Improved practice	Adoption rate (%)	Adoption intensity (%)
Row planting	21.8	3.5
Fertilizer	2.4	3.3
Poultry /animal/green manure	1.2	0.3
Split-corn	8.1	3.5

must be pointed out that all the farmers planted more than one cultivar in the same fields in a season. The improved cultivar, Apem Hema, was the highest adopted cultivar by nearly 10% of the farmers. The adoption intensity of all the improved cultivars combined was 3.5%.

Other Improved Production Practices

The adoption rates for other production practices of farmers who planted new fields in 2005 and their intensity of adoption was low in relation to when the technology was released to farmers. Row planting was the more adopted practice (Table 10). In addition to the 22% of the farmers who planted in rows, 15% planted their crop in a mixture of rows and random.

Land Tenure

The tenure of land was not a problem for female farmers since 84% of them planted on their own or family land compared with 71% of the male farmers. On the other hand, more male farmers tended to rent land and sharecropped than their counterpart female farmers as shown in Table 11. A higher percentage of female farmers slashed and burned during land preparation than the male farmers. This could be that burning made it easier to plant for female farmers and underscores the access to labour and capital. Both male and female farmers intercropped their plantain fields.

Income from Plantain

Plantain contributed more income to female farmers than the male farmers as presented in Table 12. Thus female farmers depended more on plantain for income than the male farmers. This goes to emphasize the need for more extension services to female plantain farmers.

Table 11: Land tenure, land preparation and cropping system between male and female farmers in 2005

Practice	Percentage farmers	
	Male (N = 132)	Female (N = 116)
Land tenure:		
Own/family	71	84
Rent	12	8
Sharecrop	17	8
Land preparation:		
Slash and burn	77	92
Slash, no burn	23	8
Cropping system:		
Monocrop	6	7
Intercrop	94	93

Table 12: Contribution of plantain to farmers' income

	Mean percentage contribution		
	All farmers (N = 259)	Male (N = 136)	Female (N = 123)
Contribution of plantain to farmer's total annual income	48	44	53
Contribution of plantain to farmer's crops annual income (N)	(259)	(136)	(123)

Table 13: Farmers' production constraints

Problem	Percent of farmers with constraints			Overall
	1st priority (N = 259)	2nd priority (N = 259)	3rd priority (N = 259)	
Credit	34	27	26	29
Weeds	26	25	17	23
Diseases	19	6	1	9
Labour	7	15	17	13
Pests	7	7	3	5
Lack of suckers	2	3	4	3
Low yield	1	1	2	1
Theft/Others	2	5	7	5
No problem	2	11	26	13

Note: Overall total is more than 100% because of rounding ups

Production Constraints

Table 13 gives the major production constraints plantain farmers are confronted with. The overall production constraints by farmers as summarized in Table 13 were weeds, money, labour and credit in that order. These constraints are however, interrelated. It is interesting that low yield was down the farmers' ladder. This seems to suggest that the farmers were content with their yields or that they did not have other improved cultivars to compare with. If the perceived high yields of farmers' cultivars exist, it might be necessary to examine these and incorporate desirable characteristics such as disease and pest tolerance into these cultivars.

Credit

Credit an important ingredient to increased agricultural production. It is ranked the highest constraints to plantain production with weeds, diseases and labour following in that order. Only 4% of the plantain farmers in the sample had ever received credit for their plantain production. Access to credit in Ghana may sometimes be based on whether farmers belonged to farmers associations. Just 11% of the farmers were members of farmers' associations. This could explain why few farmers might have had credit.

Table 14: Access to village infrastructure

Type of infrastructure	Percentage farmers accessing infrastructure (N = 259)
Telephone	47
Mobile phone	88
Electricity	55
FM broadcast reception	85
All year accessible road	81
Good transportation	82
Market information centre	8

Table 15: Farmers' marketing constraints

Problem	Percent of farmers with constraints			Overall
	1st constraint (N = 259)	2nd constraint (N = 259)	3rd constraint (N = 259)	
Low price	62	17	2	27
Traders dictating price	17	38	17	24
Over production	4	18	9	10
Theft	2	2	9	4
Lack of buyers	1	1	11	4
Transportation	1	2	9	4
Post harvest losses	0	1	9	3
No problem	13	22	34	23

Note: Overall total is not up to 100% because of rounding up

Access to Infrastructure

Access to infrastructure can create opportunities for rapid adoption of improved agricultural technologies. As given in Table 14, most of the farmers indicated that their villages had a fairly good infrastructure such as phones, reception of FM broadcasts, accessible roads, transportation and electricity. The villages however, lacked market information centres for production information and marketing trends.

Marketing Constraints

The major marketing problem was low price for farmers produce, dictation of prices by traders and overproduction as pointed out by farmers in Table 15. All these factors are interrelated.

The month at which farmers received highest price for their produce is between April and July as 73% of the farmers indicated so. The lowest prices fell between September and December pointed out by 75% of the farmers. Seventy percent of the farmers indicated that traders visited their villages one to three times a week and 30% indicated four to seven times a week with the mean visit of 3 times a week. Thus it seems that getting traders to purchase their produce was not a problem. This could explain why transportation was not much of a problem to the farmers because traders came to their villages to purchase them quite often.

CONCLUSIONS

Plantain production is every important socioeconomic activity in Ghana. Production has been increasing over the years and farmers are aware of various production technologies however, the adoption of the technologies has not very high as expected. Slash and burn has been the major method of land preparation. Soil fertility was not a major practice; however, intercropping with other crops played a significant role in production. The main cultivar grown is the False Horn however farmers were aware of new hybrids in the country. Land tenure was not a major problem for female plantain farmers and plantain production contributes more income to them than their male counterparts. The major constraints to production of plantain were credit, weeds and diseases. In addition, low pricing with traders determining prices was a hindrance to the marketing of the produce. The plantain farmers in Ghana could benefit significantly and create employment if the industry is well organized.

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