

## Seed yam demand and supply gap in Ghana: Implications for commercialisation of seed yam production

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### ABSTRACT

The paper examined seed yam supply and demand across four yam producing districts in Ghana. Primary data were obtained from 108 yam farmers who were selected through a multistage random sampling approach. Data collection was done through personal interviews with the use of standardised structured questionnaires. Purely descriptive statistics and pictograms were used to analyse the data. The results showed that about 40 per cent of seed yam suppliers only sold surplus seed yams after planting their own yam fields. About 52 per cent of yam producers had difficulties in obtaining seed yams for cultivation. The demand for seed yams in Ghana far exceeds supply. About 30 per cent of seed yam demand was hardly met in the past three seasons (2007 – 2009). This unfulfilled demand for seed yams in yam producing districts presents a business opportunity for private investors to produce the commodity in commercial quantities. A more commercial approach to seed yam production could bridge the demand-supply gap by linking seed yam and yam producers through urban and local markets in the producing districts.

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### Introduction

Yam provides multiple opportunities for poverty reduction and nourishment of poor people in the West African sub-region. However, its production is stagnating and, thus, threatening rural livelihoods and urban food security. Scarcity and high cost of clean planting materials (seed yams) is one of the major constraints to increasing yam production and productivity in West Africa (NRCRI, 2004; Kenyon, 2006). The yield

advantage of using good/clean seed yams over poor ones was consistently reported as being about three times greater in parts of Nigeria (Ekiti and Kogi) in a survey in 2003 (Kenyon, 2006).

The three major inputs in yam production are seed yams, labour, and staking materials. These inputs account for 45, 21, and 16 per cent of yam production costs, respectively (Ugwu, 1990; Nweke, Ugwu & Asadu, 1991; Ezeh, 1991). The minisett technique

(involving the use of about 25 g cut setts to produce whole tubers which serve as “seed” of yam) was developed to address the problem of high cost of seed yam (Okoli & Akoroda, 1995). Three types of seed yams are used in yam growing areas. These include milked seed yam, cut setts (minisetts) and small whole tubers (Asumugha *et al.*, 2007). Farmers may produce seed yams for sale, for own production or both. Most farmers sell seed yams only after meeting their own production needs, suggesting limited specialisation in seed yam production.

In Nigeria, many farmers are reluctant to produce good-quality yam planting materials, which they consider to be a risky business with no immediate returns (Asumugha *et al.*, 2009). Also, seed yam is expensive and in short supply due to the low multiplication rate of yams. The main factors influencing seed yam supply in Nigeria were found to include farm size, education level, disposable income of farmers, experience in seed yam production and labour availability. For commercialisation of seed yam production, Asumughah *et al.* (2009) recommended that farmers should be educated especially on the benefits of seed yam enterprise through extension services.

Unlike Nigeria, information on seed yam supply and demand in Ghana is very sketchy. The purpose of the paper was to examine the supply-demand gap for seed yams and its implications for commercial seed yam production in Ghana. The objectives of the paper were to 1) estimate the quantity of seed yams produced per season by farmers, 2) determine the actual demand for seed yams by yam farmers per season, and 3) examine the potential demand for seed yams per season.

## Materials and methods

### *Study areas/sampling/data collection*

The study was carried out in four major yam growing districts in Ghana in the year 2009. The districts are Techiman and Atebubu in the Brong Ahafo Region, Ejura-Sekyedumasi in the Ashanti Region, and Nkwanta in the Volta Region. These districts were selected purposively due to their strategic importance in the business of yam production and marketing in Ghana. Primary data were collected from a total of 120 yam producers through personal interviews with the use of a standardised structured questionnaire. A sample of 30 yam farmers was selected from each of the four districts. A multi-stage random sampling approach was followed to select respondent farmers. A simple random sampling technique was used to select three yam producing villages in each district. From each of these villages, 10 yam farmers were selected through simple random sampling technique. Data collected included the socio-economic backgrounds and household characteristics of respondents, volume of seed yams required per season, and the actual quantity of seed yams obtained for yam production every season.

### *Data analysis*

Socio-demographic characteristics of respondents were summarised by the use of frequency distribution tables and proportions/percentages. The data collected were analysed using purely descriptive statistics. The descriptive statistics comprised measures of central tendency and dispersion such as arithmetic mean, median and standard deviation. Bar charts were also used to depict the gap between demand and supply of seed yams. An econometric analysis of the

demand and supply of seed yam is beyond the scope of the paper due to data limitations. The study was based on data from a cross-sectional survey. Prices of seed yam faced by farmers did not vary as would have been possible with panel data. Seed yam demand and supply schedules showing different quantities of seed yam demanded and supplied by farmers at different price levels were not available to enable an appropriate econometric specification of seed yam demand and supply function for empirical analysis to indicate causal relationships.

## Results and discussion

### *Characteristics of respondents*

Table 1 shows that instead of the expected 120 respondents, 108 yam producers provided adequate information for the assessment of annual seed yam demand and supply. About 30 per cent of respondents were from Techiman, 28 per cent each from Ejura and Nkwanta, and 15 per cent from Atebubu.

TABLE 1

*Distribution of Yam Farmers by Location*

<i>District</i>	<i>Frequency</i>	<i>Per cent</i>
Ejura	30	27.8
Techiman	32	29.6
Nkwanta	30	27.8
Atebubu	16	14.8
Total	108	100.0

The statistical summary of the characteristics of respondents and their households is shown in Table 2. The average age of respondents was estimated at 46 years with the minimum age recorded in Nkwanta and the highest age obtained in Ejura. On average, a typical yam farmer had spent about 7

years in school. Household size ranged from seven in Nkwanta to 13 in Atebubu, with the average household size being nine people. The total annual household income among yam farmers who demand seed yam was lowest in Ejura and highest in Atebubu (Table 2). The total income for a typical household in the pooled sample was estimated at GH¢1,659.00 per annum.

### *Source of seed yam/planting materials for yam producers*

Table 3 provides the distribution of respondents according to sources of seed yam used to produce yam. Majority (55%) obtained seed yams from their own stocks from previous season, and about 42 per cent obtained seed yams from commercial seed yam growers. For the remaining four respondents, seed yams were obtained from friends and family members. In Atebubu, all the yam farmers used own stock from previous season as the main source of seed yams during the last planting season.

### *Access to seed yam for yam production*

Table 4 shows the ease or difficulty with which seed yams were obtained for yam production during last planting season preceding the survey. About 48 per cent of yam producers had easy access to seed yams, but 52 per cent had difficulties in obtaining seed yam during the last planting season. Farmers in Techiman and Atebubu had relatively easy access to seed yams whereas farmers in Ejura and Nkwanta had limited access to seed yams during the last planting season.

Majority (56%) of yam producers indicated that they had money and wanted to purchase more seed yams but could not get (Table 5). The remaining 44 per cent of re-

TABLE 2

*Summary of Personal and Household Characteristics of Respondents*

<i>District</i>	<i>Actual age of respondent (yrs)</i>	<i>Actual number of years in school</i>	<i>Household size</i>	<i>Household members under 18 years</i>	<i>Total annual income (GH¢)</i>
Ejura	52.27	1.00	8.87	2.33	368.33
Techiman	43.25	8.00	7.63	3.83	1,176.56
Nkwanta	40.60	9.79	7.27	3.27	1,728.33
Atebubu	46.19	11.00	13.44	6.75	3,343.33
Pooled sample	45.45	6.53	8.75	3.69	1,658.79

TABLE 3

*Source of Seed yam/Planting Materials for Ware Yam Production*

<i>Source of seed yam</i>	<i>District</i>				<i>Total</i>
	<i>Ejura</i>	<i>Techiman</i>	<i>Nkwanta</i>	<i>Atebubu</i>	
Own stock from previous season	3	13	27	16	59
Commercial seed producer	27	16	2	-	45
Family & friends	-	3	1	-	4
Total	30	32	30	16	108

TABLE 4

*Ease of Obtaining Seed Yam for Yam Production*

<i>Response</i>	<i>District</i>				<i>Total</i>
	<i>Ejura</i>	<i>Techiman</i>	<i>Nkwanta</i>	<i>Atebubu</i>	
Very easy	-	9	2	2	13
Easy	-	22	8	9	39
Difficult	1	1	12	4	18
Very difficult	29	-	8	1	38
Total	30	32	30	16	108

spondents were able to access enough seed yam. It could be inferred from the results (Table 5) that access to seed yams was quite limited to about half of the farmers. In Ejura and Nkwanta, access to adequate quantities of seed yam was limited. It may be recalled

that no farmer produced seed yam on commercial basis in Ejura. Farmers sold only surpluses after satisfying their own seed yam requirements. In such places, seed yam is likely to be in short supply.

*Seed yam demand and supply analysis*

Tables 6ab provide the average quantities of seed yam demanded and quantities obtained by yam farmers across the four study districts over the past three planting seasons. From Table 6a, average potential demand for seed yams per season was estimated at 10,875 setts for the pooled sample. The potential demand was found by multiplying the average land area put under yam culti-

vation by the recommended number of yam setts required to cultivate a hectare of land. Using the recommended seed rate of 2500 setts per acre (6250 setts ha<sup>-1</sup>), the estimated potential demand for seed yams ranged from a minimum of 3,425 setts in Ejura to 19,325 setts in Nkwanta. With the recommended seed yam rate per hectare and the average land area put under yam cultivation in each district known, the estimated total potential

TABLE 5  
*Accessibility to Adequate Seed Yams*

<i>Response</i>	<i>District</i>				<i>Total</i>
	<i>Ejura</i>	<i>Techiman</i>	<i>Nkwanta</i>	<i>Atebubu</i>	
Unable to access enough	29	10	18	3	60
Able to access enough	1	22	12	13	48
<b>Total</b>	<b>30</b>	<b>32</b>	<b>26</b>	<b>16</b>	<b>108</b>

TABLE 6a  
*Estimation of Potential Demand for Seed Yams*

<i>District</i>	<i>Land cultivated (ha)</i>	<i>Yam setts (ha<sup>-1</sup>)</i>	<i>Estimated potential demand (setts)</i>
Ejura	0.55	6250	3,425.00
Techiman	1.19	6250	7,450.00
Nkwanta	3.09	6250	19,325.00
Atebubu	2.52	6250	15,775.00
<b>Pooled sample</b>	<b>1.74</b>	<b>2500</b>	<b>10,875.00</b>

TABLE 6b  
*Seed Yam Demand and Supply Analysis for the Past Three Cropping Seasons*

<i>Year</i>	<i>Ejura</i>		<i>Techiman</i>		<i>Nkwanta</i>		<i>Atebubu</i>		<i>Pooled sample</i>	
	<i>Quantity demanded (setts)</i>	<i>Quantity supplied (setts)</i>	<i>Quantity demanded (setts)</i>	<i>Quantity supplied (setts)</i>	<i>Quantity demanded (setts)</i>	<i>Quantity supplied (setts)</i>	<i>Quantity demanded (setts)</i>	<i>Quantity supplied (setts)</i>	<i>Quantity demanded (setts)</i>	<i>Quantity supplied (setts)</i>
2009	506.90	301.72	957.14	466.67	2875	2489.29	366.67	366.67	1,245.45	913.46
2008	675.86	318.97	1144.44	687.5	2418.75	2021.43	1100	1100	1,264.29	853.77
2007	642.31	369.23	1716.67	945.45	1776.67	1608.57	600	600	1,174.11	820.74

demand for seed yams can easily be computed when the population of yam farmers is obtained.

It may be inferred from Table 6b that apart from Atebubu District, where farmers obtained exactly the quantity of seed yams demanded, demand for seed yams was far higher than supply in the other three districts. On average, a typical yam farmer in the pooled sample demanded about 1,245 setts of seed yams but only 913 setts were obtained, giving a supply shortage of about 332 setts in the 2009 planting season. The quantities of seed yam supplied in the past 3 years were about 70 per cent of the total quantities demanded (Fig. 1). This implies that for the pooled sample, about 30 per cent of seed yam demand was hardly satisfied.

Fig. 2 provides the seed yam demand and supply gap analysis per district. One hundred per cent of seed yam demand in Atebubu was satisfied and a little over 80 per cent of the demand for seed yams in Nkwanta was satisfied. However, in Ejura and Techiman less than 60 per cent of the demand for seed yams was satisfied. The unfulfilled demand imply that seed yam suppliers and yam producers are not linked through the market system. This is not surprising since seed yam producers have not commercialised the activity, and only sell surplus of seed yams meant for own use. Also there is very little transaction in seed yams between suppliers and yam producers. Few seed yam producers sell the commodity in the main marketing centres.

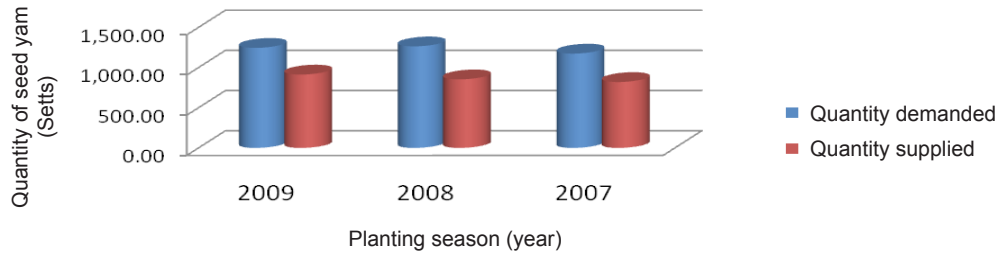


Fig. 1. Seed yam demand and supply gap analysis

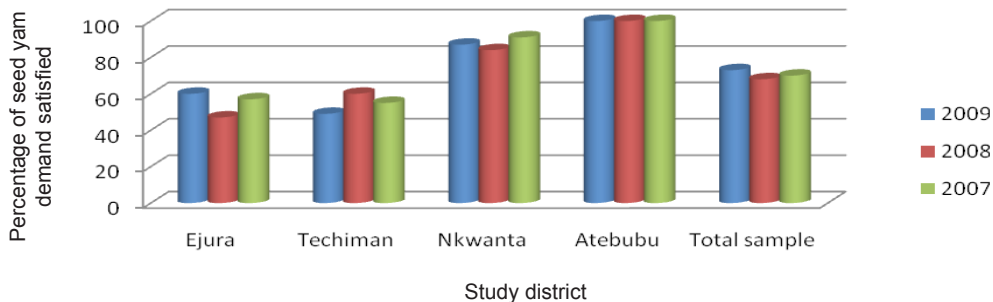


Fig. 2. Seed yam demand and supply gap analysis by district for the past three planting seasons

### Conclusion and recommendations

The paper examined seed yam production and demand across four yam producing districts in Ghana. Generally, seed yam suppliers in yam producing districts in Ghana are also yam producers and, therefore, sell surplus seed yams after planting their own yam fields. The study shows that majority of yam producers have difficulties in obtaining seed yams for cultivation. Demand for seed yams in yam producing districts in Ghana far exceeds supply, implying that there is high potential demand for seed yam in the country. During the period 2007 – 2009, the quantities of seed yam supplied by farmers could hardly meet farmers' demand. The unfulfilled demand for seed yams in yam producing districts, therefore, presents a business opportunity for private investors to produce the commodity in commercial quantities. A more commercial approach to seed yam production could bridge the demand-supply gap by linking seed yam and yam producers through urban and local markets in the producing districts.

It is recommended that farmer based organizations (FBOs) in yam producing districts, and the District Directorate of the Ministry of Food and Agriculture should engage private investors or local entrepreneurs to explain the prospects of seed yam production to them. This will encourage them to take up seed yam production as another investment opportunity to expand their business portfolio, while addressing a critical yam production constraint for farmers. It is also recommended that future studies should focus on econometric analysis of seed yam demand and supply through the use of panel data. This will bring out the causal relationships between important variables, espe-

cially price, and seed yam demand and supply. Policy could then be targeted at more influential variables to boost the supply of, and demand for seed yams in yam producing districts.

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