

# Profitability of yam production in Southern Guinea Savanna zone of Nigeria

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## ABSTRACT

Yam production is a component of farming activities by most farmers in the Southern Guinea Savannah zone of Nigeria. However, many farmers do not seem to find farming a financially rewarding exercise. This study therefore aimed to find out the profit margin of yam production by farmers in this zone. A survey of farmers' fields was carried out in 2013 in five major yam producing areas in Nigeria, namely; Benue, Kogi, Kwara, Niger Nassarawa States and Abuja Federal Capital Territory. Fifty four (54) respondents were recruited into the study sample using structured questionnaire and interview method. The farmers cultivated mainly *Dioscorea rotundata* Poir (white or guinea yam) for commercial purposes while *D. alata* L. (water yam), *D. cayenensis* Lam (yellow yam), *D. dumetorum* Kunth (bitter yam) and *D. bulbifera* L. (aerial yam) are intercropped with *D. rotundata* for home consumption only. Yam production includes cultural operations such as heap preparation, staking and weed control. Some of the major constraints identified by the farmers were high cost of input such as planting materials (yam seed or setts), unreliable source of credit and unpredictable weather conditions. Net income benefit analysis revealed a positive return per hectare of land under yam production. The production of yam on one hectare of farm field will translate to a net profit of ₦450,000.00 equivalent to US \$2,000.00. It was recommended that yam production could be a financially profitable endeavor if cost-reducing steps are engaged.

**Keywords:** Net-income, yam, production, Savanna, Nigeria.

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## INTRODUCTION

Yam (*Dioscorea* spp.) is a staple food crop, cultivated for its edible tuber. It is the main carbohydrate intake for most people in sub-Saharan Africa. Yam has more than 600 species out of which six are economically important. Some thirty wild varieties are used for industrial purpose in the production of sex hormones dioscorin and diosgenin (Abang et al., 2001; Kenyon et al., 2001). The important yam species grown in Africa are *Dioscorea rotundata* (white guinea yam), *D. cayenensis* Lam (yellow yam), *D. dumetorum* (bitter yam), *D. alata* (water yam), *D. bulbifera* (aerial yam) and *D. esculentus* Lour (Chinese yam). The species *D. bulbifera* produces aerial tubers (Coursey, 1967), while the others produce underground tubers. The variety *D. rotundata* is the principal commercial yam and constitutes about 80% of the total yam produced in Nigeria (Coursey, 1967; Degras, 1993).

Yam is a source of income and provides over 200 dietary calories per day for more than 150 million people in West Africa. Yam is rich in carbohydrate (75.5 to 83.3%), proteins (3 to 4%), amino acid, vitamins (Thiamine, Riboflavin and Ascorbic acid) and other minerals such as calcium, phosphorus and iron (IITA, 1998; FAOSTAT, 2009).

West Africa produces about 90% of the total output of yam in Africa with Nigeria producing 67.6% of world total production, followed by Ghana, Côte d'Ivoire, Benin and Togo (FAOSTAT, 2009). Yam is an important tuber crop and most preferred in West Africa with over 60 million people depending on it for their dietary calories per day (Nweke et al., 1992). It is one of the principal root crops of the Nigeria economy both in terms of land under cultivation, volume and value of production (Bamire and

Amujoyegbe, 2005). According to Food and Agricultural Organization Statistics (FAOSTAT, 2011), Nigeria produces 37,889,500 tons of yam per year on 2,889,050 hectares of land. The Nigeria's food security programme is to increase agricultural production for food sufficiency of which yam and cassava are important root crops (IITA, 1998; Bamire and Amujoyegbe, 2005; Sanusi and Salimonu, 2006; Ekunwe et al., 2008).

In recent years, yam has become expensive as production has not kept pace with population growth, and the demand exceeds supply. Hence, deliberate effort to increase production of yam in Nigeria needs to be urgently put in place if the challenges of food security must be put under control (Kushwaha and Polycap, 2001). There are indications that yam has great prospect to contribute to the alleviation of the projected food deficit in Africa in the 21<sup>st</sup> century (Tetteh and Saakwa, 1991). Because of the importance of yam, this survey was conducted to find out the net-income of farmers who grow yam in the Guinea Savanna zone of Nigeria. This is vital because sustainable yam production depends on the revenue from yam production.

## MATERIALS AND METHODS

A survey of farmers' fields was carried out in July and August of 2013 in five major yam producing States (Benue, Kogi, Kwara, Niger and Nassarawa) and Abuja FCT in the Guinea Savanna zone of Nigeria to find out the profitability of yam production. The Southern Guinea Savanna zone lies within latitudes 8° 4' and 11° 3' N, longitudes 2° 41' and 13° 33' E, with bimodal rainfall ranging from 1000 to 1300 mm per annum, minimum and maximum temperatures of 26 to 38°C (Manyong et al., 1995; Blench et al., 2003). The geographical location (GPS coordinates) of each sampled field was recorded at the time of the survey (Asala et al., 2012). A total of 54 farmers representing heads of households were interviewed using a content-validated questionnaire. The following socio-economic characteristics of the farmers were studied: sex, age, occupation and educational qualifications of farmers, varieties of yam grown, source of seed, size of farm, years under production, presence of pests and diseases, type of intercropping done, yam variety most preferred by consumers, source of labour for farm operations, farm operations based on cost and production. The questionnaire was administered to the farmers by the researcher face to face and they were interviewed. Interpreters were used where necessary to interpret the questions into local languages. Nine farmers were interviewed per State. All the results were subjected to descriptive statistics (means comparative test, percentage) and T-test used to assess the level of statistical significance of the variables.

## RESULTS

### Socio economic characteristics

The result in Figure 1 shows that out of the 54 farmers interviewed, 46% were full-time yam farmers, 37% were, in addition to yam production doing other business, while 17% were civil servants involved in yam farming. Most of the farmers engaged in yam farming were male (83.3%)

while (16.7%) were female. The result also shows that the age of the majority of farmers fell between 41 and 70 years (55.6%). Yam production is almost exclusively in the hands of local farmers with about 77 % either uneducated or were educated only to secondary school level (Figures 1 to 4).

### Yam varieties cultivated and their relative importance

Most farm sizes ranged from 0.5 to over 20 hectares and were commercially cultivated mainly with *D. rotundata* (white yam) and *D. alata* (water yam) to a lesser extent. Other species such as *D. dumentorum* (bitter yam), *D. cayenensis* (yellow yam) and *D. bulbifera* (aerial yam) were grown exclusively for home use (Figure 5). The choice of the variety of yams that farmers grew was based on consumer preference, early maturity, storability, yield, adaptability and availability of planting material, in increasing order of importance. The varieties "Pepa", "Makakusa" and "Dan-anachia" which are local varieties of white yam were of high preference for its taste in Benue, Nassarawa, Abuja FCT and Niger while Gbakumo was most preferred in Kwara and Kogi States.

The cultural management practices are the same for all varieties of yam grown in all parts of the Guinea Savanna zone of Nigeria.

### Net-cost benefits for the production of yam

The data generated from the questionnaires were also used to determine the farmer's net income in the production of yam in the six major yam producing areas of Guinea Savanna Zone of Nigeria. Most farming operations were done manually. Consequently, yam production was labour-intensive requiring ₦950,000 to produce 14 metric tons (14,000 tubers/ha) of yam per hectare (Table 1). The results shows that the variable costs incurred included labour cost (land preparation, heaping, planting/staking and harvesting) and planting material such as yam setts and chemicals. The analysis shows that yam seed and chemicals accounted for the total variable cost (₦620,000). The total variable cost per hectare was ₦950,000, while the total gross revenue per hectare was ₦1,400,000.00 and the gross margin was ₦450,000.00 (Table 2).

## DISCUSSION

This study shows that males are more involved in yam production than females and this may be due to the fact that yam production is labour intensive; hence females would prefer to grow other crops that require less labour (Izekor and Olumese, 2010). This study also shows that the majority of farmers were mature and active and would understand the constraints that could hinder yam

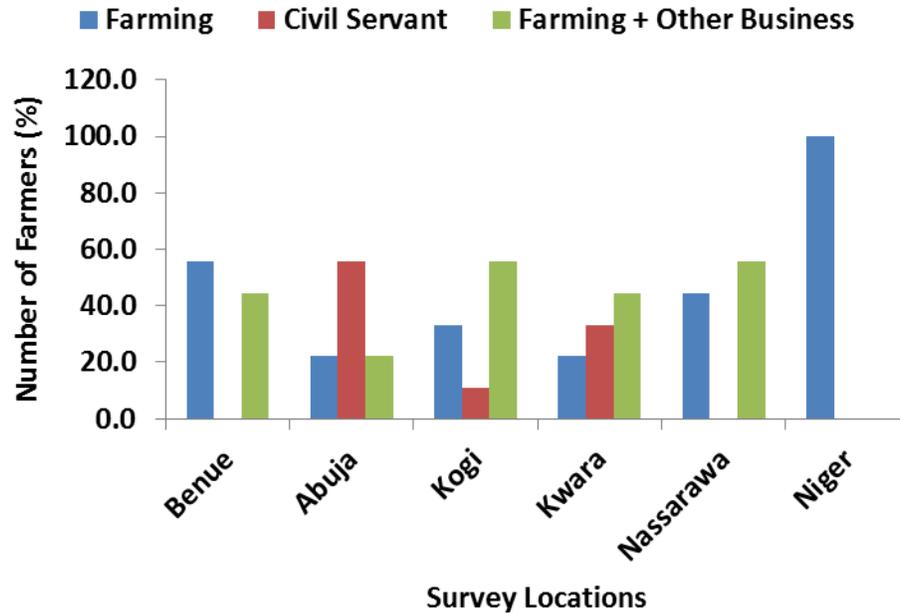


Figure 4. Occupation of the farmers.

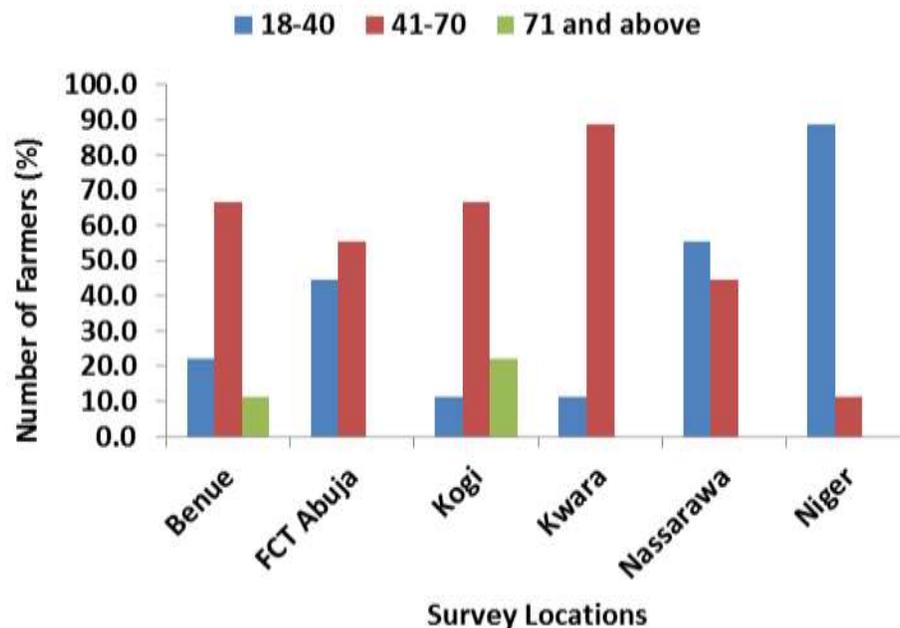


Figure 2. Age distribution of the farmers.

production (Figure 1 to 4). This is in agreement with the report by Agwu and Alu (2005) which indicates that active age of farmers is a positive factor in high and sustainable yam food production required for the alleviation of poverty in the society. The farmers in the study zone have been growing yam for a long period. Majority of them intercropped their yams with other crops such as maize, okra, cassava, beans, Bambara nuts, spinach, pepper, sweet potatoes, plantain and garden egg, a practice which has

also been reported by Agwu and Alu (2005), and Ayanwuyi et al. (2011).

As a result of the generally poor financial base of the majority of the farmers in the zone under study, they are unable to sustain consistent farming on large scales. In order for the farmers to obtain loan facilities from commercial banks, they are expected to have human or material sureties, which are often not available. However, the present study clearly reveals positive returns per

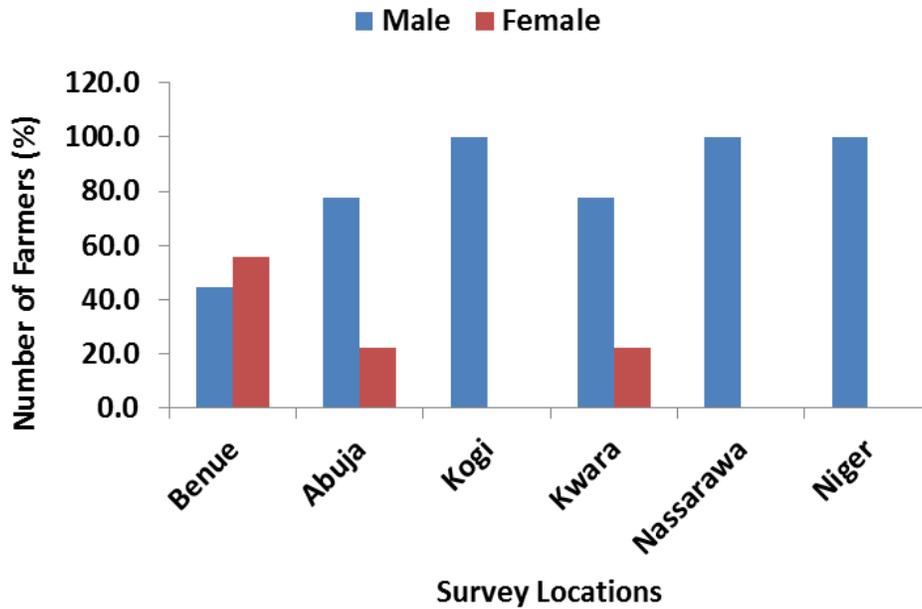


Figure 3. Sex distribution of the farmers.

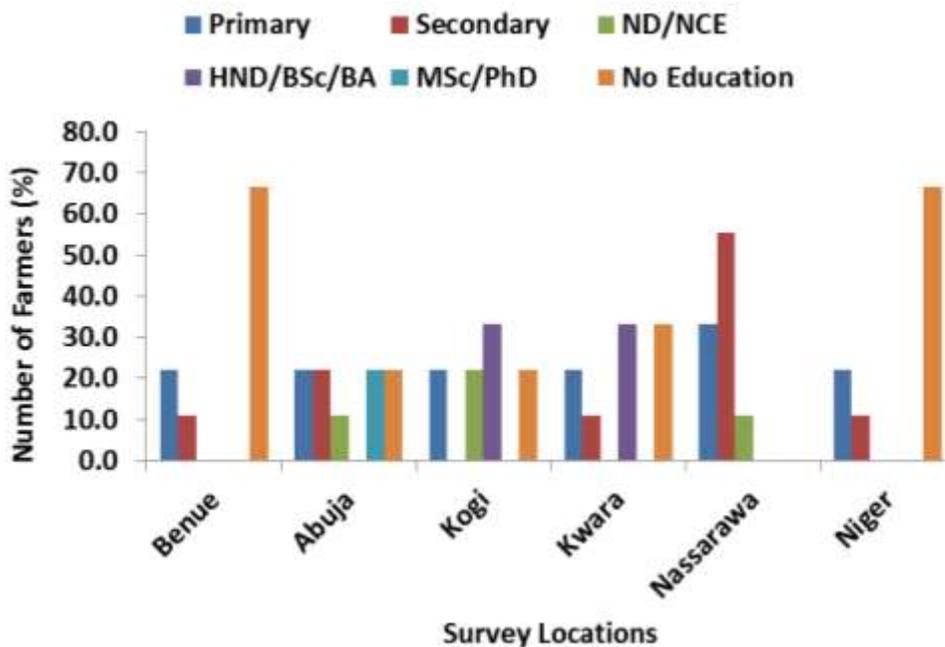


Figure 4. Educational qualification of the farmers.

hectare (N450,000.00 equivalent to US \$2,000.00) for the production of yam in the Guinea Savanna Zone of Nigeria. This return should encourage greater and wide spread involvement of farmers in yam production in the zone and the country at large. The higher and the more reliable the net income of producers are, the more they will want to remain in business (Gwary and Asala, 2006; Aiyedun et al., 2008). The study is also supported by

findings of Acquah and Evange (1991) and Bamire and Awujoyegbe (2005) that yam enterprise is profitable. But government will have to encourage the farmers by putting in place measures that will reduce the cost of yam growing through provision of subsidized yam seeds and other inputs. Availability of subsidized mechanized farming methods will also reduce farming operational costs, increase profit and enhance food security in the society.

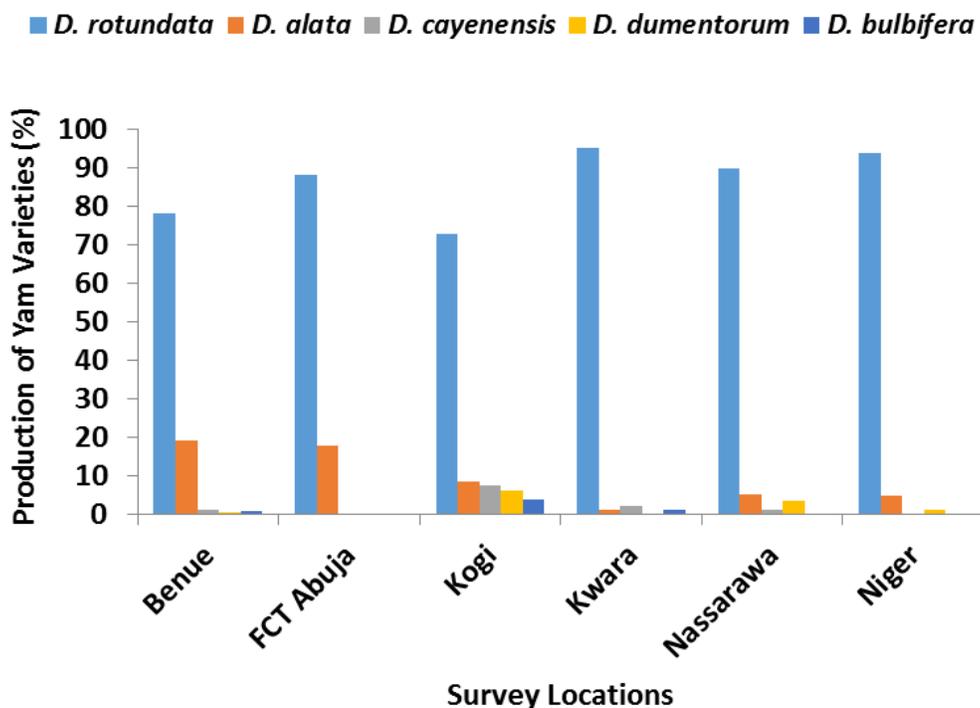


Figure 5. Varieties of yams planted by farmers.

Table 1. Farming operations on the basis of cost implication.

Operation	Man-days per operation	Cost per hectare (Naira)	Percentage (%) of total production cost
Land clearing	10	60,000.00	6.3
Mounding (heaping)	50	120,000.00	12.6
Seed yam*		500,000.00	52.6
Plantings/Staking	10	50,000.00	5.3
Weeding/chemicals	15	120,000.00	12.6
Harvesting	20	80,000.00	8.4
Transportation of produce to market	4	20,000.00	2.1

Total variable cost per hectare = ₦950,000.00

\* Cost of seed yam purchased.

Table 2. Net income of yam production in the Guinea Savanna zone of Nigeria.

States	Average cropped area per farmer (Ha)	Average output of tubers per farmer (Kg/Ha)	Average output of farmers (Mt/Ha)	Gross revenue (₦)	Variable cost (₦)	Average net income (₦)
	A	B	C	D	E	D-E
Benue	8.44	118,160	118.2	11,816,000.00	8,018,000.00	3,798,000.00
FCT Abuja	2.06	28,840	28.8	2,884,000.00	1,957,000.00	927,000.00
Kogi	0.54	7,560	7.6	756,000.00	513,000.00	243,000.00
Kwara	0.50	7,000	7.0	700,000.00	475,000.00	225,000.00
Nassarawa	14.70	205,800	205.8	20,580,000.00	13,965,000.00	6,615,000.00
Niger	3.38	47,320	47.3	4,732,000.00	3,211,000.00	1,521,000.00

Ha = Hectare; Mt/Ha = metric tons per hectare; Operating expenses (E) = operational cost per Ha (₦950,000.00) × average cropped area per farmer.

## CONCLUSION

Apart from inputs such as yam seeds that were expensive, the cost of preparation of farm operations such as heaps, planting, staking and weeding was also high. Any new technology that is cost effective and will reduce the use of human labour and provide cheap seed yam to farmers will greatly enhance yam production and profitability in Nigeria. Inadequate staking materials and poor access to financial capital were other constraints faced by farmer especially in Kwara and Kogi States. Farmers should be assisted to access credit facilities so as to increase yam production and consequently improve food security among farming and non-farming household.

## RECOMMENDATIONS

1. Measures that will increase profitability of yam production should be put in place by private individuals and government in order to encourage greater participation of farmers in this professional endeavour.
2. Generally, concerted efforts should be geared towards increased production of yam in order to meet the demands of yam for food security in both the study area and the country (Nigeria) in general.
3. The labour-intensive nature of yam production needs to be ameliorated through mechanization of the farming process for improved output.
4. The cost of seed yam alone constitutes 52.6% of cost of yam production. This is outrageously high and government intervention through massive supply of seed yam to farmers would go a long way to reduce the cost of production.

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