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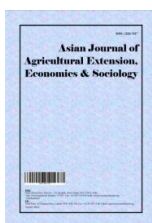
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Economic Analysis of Irish Potato (*Solanum tuberosum*) Marketing in Metropolitan Markets of Bauchi, Bauchi State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author UEU designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors UKI and TMB managed the analysis. Authors JAN and JNA managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2019/v37i430285

Editor(s):

(1) Prof. Sait Engindeniz, Department of Agricultural Economics, Faculty of Agriculture, Ege University, Turkey.

Reviewers:

(1) John Walsh, School of Business and Management, RMIT Vietnam, Vietnam.

(2) Shakeel Rehman, Islamic University of Science & Technology, India.

(3) Keshav Prasad Shrestha, Nepal.

(4) Ranjit Sambhaji Patil, Lokmangal College of Agriculture, Mahatma Phule Krishi Vidyapeeth Rahuri, India.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/46840>

Original Research Article

Received 25 November 2018

Accepted 31 January 2019

Published 13 January 2020

ABSTRACT

Aims: This paper evaluates the economic analysis of Irish Potato (*Solanum tuberosum*) marketing in the metropolitan markets of Bauchi State.

Study Design: A sample random sampling technique was used in selecting eighty (80) respondents (30 wholesalers and 50 retailers).

Place and Duration of Study: The study was done at Bauchi State, Nigeria.

Methodology: Questionnaire was used to collect data on the socio-economic characteristics of the

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marketers and other information on cost/return from the respondents. It was however complemented with oral interviews.

Results: The results shows that the enterprise is a profitable venture in the metropolitan markets of Bauchi with a Benefit Cost Ratio (BCR) of (1.84) Yelwa Tudu market compared to other markets, while acquisition cost constitutes the highest proportion of the total cost of marketing potato. The majority of the marketers were female (57.75%) with 70% of the total respondents falling within the age bracket of 30-50 years. Majority of the marketers had a marketing experience of 1-10 years (58.73%). Also 70% of the marketers were married and 57% started their business with personal savings.

Conclusion: The present study identified different challenges in Irish potatoes production and marketing in Bauchi State, Nigeria.

Keywords: *Economic analysis; metropolitan markets; benefit cost ratio; Solanum tuberosum.*

1. INTRODUCTION

Irish potato (*Solanum tuberosum*) is a tuberous rooted perennial crop grown as an annual crop for its edible tuber. Irish potatoes were introduced into Nigeria during the 1920s probably through the Germans living in the Cameroons and by others involved in the mines on the Jos plateau [1].

Potato contributes a high percentage of nutritive value to our diet which includes potato chips, potato starch (used in pharmaceutical industries and in production of alcohols and wines), it is also used in bread and baking industries, animal feed etc.

Sustained potato consumption in Nigeria depends largely on marketing of the product. This makes the interactive forces of demand and supply very important irrespective of the location of the market [2]. Farmers bring their potatoes to village market and sell them either to local merchants or to the dealers who in turn transport to urban markets. This means market plays an important role in the demand and supply of potatoes for consumption. A market is concern with all the stages of operation which aid the movement of commodities from the farm or point of production to the consumer. Olukosi et al. [3] defines marketing as the performance of all business activities that involves into the forward flow of goods and services from the point of Agricultural production to the hands of the ultimate consumers. These include assemblage of the goods, storage, transportation, processing grading and financing of all these activities. At harvest, potato is surplus in most of the producing area which is a common characteristic of agricultural production in Nigeria. Therefore, the need arises to makes available surpluses at area of deficits. The function of marketing system

includes locating surplus area and bringing them to where there were shortages. Where potatoes are relatively cheap, it is consumed high among poor household. Recent studies shows that in most developing countries, at least rising income and changing food habit associated with economic development and urbanization lead to greater potatoes consumption.

Okonkwo et al. [4] started that 50% of the potato is consumed in the production area while 35 - 40% are sold in cities in Nigeria and the rest are exported to the neighboring West African countries, namely Chad, Niger and Cameroon.

1.1 Problem Statement

It has been observed that in marketing of food stuff, uncertainties exist in the area of value in terms of prices. Problem of seasonality in production affects tremendously the price in the market.

A well developed marketing system is expected to compliment the production effort towards the realization of its desirable goals through the provision of time, place, possession and form utilities potato tuber like some agricultural products are bulky and highly perishable. This raises the unit cost of transportation and shortage and makes quality maintenance costly. All year round availability of potatoes is greatly diminished due to their seasonality. Since this crop had its season, it makes it scarce at a particular time of the year.

1.2 Objectives of the Study

1. To identify and describe the socio-economic characteristics of the marketers in the study area.
2. Determine the cost and returns on potato marketing in the study area.

2. METHODOLOGY

2.1 Study Area

Bauchi metropolis is the capital city of Bauchi State and the seat of the Bauchi L.G.A with the population of about 6,537,314 (2016 est). The metropolis is bounded on the south and west by Zungur district and on the north and east by Galambi district. It falls within the southern Senatorial district of Bauchi State.

2.2 Sampling Procedure

Four markets were purposively selected based on their status as main markets where potato marketing takes place in the metropolis. They include Muda lawal, Wunti market, Railway market and Yelwa tudu market. However, a sample random sampling technique was used in selecting eighty (80) respondents (30 wholesalers and 50 retailers). The respondents were distributed according to the market as shown in Table 1.

Table 1. Details of the participants

Markets	No. of wholesalers	No of retailers	Total
Muda lawal	10	24	34
Wunti	8	12	20
Railway	6	7	13
Yelwa	6	7	13
Total	30	50	80

2.3 Data Collection

Questionnaire was used to collect data on the socio-economic characteristics of the marketers and other information on cost/return from the respondents. It was however complemented with oral interviews. Data such as age, sex, educational level, marital status, number of year in the business, prices of potato/bag, transportation cost, rent paid on stalls and constraints etc.

2.4 Analytical Tools

The analytical tools used include descriptive statistics, frequency, mean, percentages, cost and returns was used to analyze the profitability of the potato marketers.

2.5 Model Specification

In order to determine the total cost and return of the potato marketers in the study area, farm

budgeting technique was used to achieve objective two (2). The costs include the various cost incurred in marketing of the potato during in-season and off-season. Two types of cost were identified, they include total variable cost (TVC) and the total fixed cost (TFC). This two cost make up the total cost (TC) of marketing Irish potato as represented below:

$$TC = TFC + TVC. \quad (1)$$

$$NP = TR - TC \quad (2)$$

Where:

NP = Net profit

TR = Total revenue

TC = Total cost

The rate of return ratio is an indication of the return per capital invested in the business. According to Banjo et al. [5], higher the value of the required rate of return (RRR), the better for the business.

RRR represent the return of cash to the business. For the purpose of this study the fixed cost is negligible thus, the Net income will represent the profit and the calculation follows the formula:

$$RRR = \frac{NP}{TC} \quad (3)$$

Where:

RRR =Rate of Return Ratio

3. RESULTS AND DISCUSSION

Profitability Analysis: Table 2 shows the cost of Irish potato per bag, quantity sold, acquisition cost selling price per bag and revenue generated from the sales of Irish potato from the four (4) metropolitan markets in Bauchi both for seasonal and off-seasonal sales. Muda lawal market had the highest number of sales with 613 bags sold during the seasonal sales per week, followed by Wunti market, Railway market and Tudu market. The same is for off-seasonal sales too, Muda lawal had the highest.

Tudu market had the highest Benefit Cost Ratio (BCR) of 0.84 during the off –season period followed by Railway market (0.13), Wunti market (0.12), then Muda lawal (0.7) while during seasonal sales Tudu market recorded the

Table 2. Cost and returns on potato marketing metropolitan markets per week (#)/person

Marketing parameter	Muda lawal season	Market off season	Wunti season	Market off_season	Railway season	Market off_season	Tudu season	Market off_season
Cost of potato per bag	2330	4984	2614	5950	2779	3125.55	2350	4150
Qty sold	613	63	417	53	354	17	249	16
Acquisition cost	1428290	313,992	1090038	315350	983766	53134.35	585150	66400
Selling price/bag	3373	6011	3636	7120	3821	7400	3357	4950
Total market cost	1823914.07	378693	1516212	377360	1352634	125800	835893	79200
Revenue	2067460	378693	1516212	377360	1352634	125800	835893	79200
Profit	243734.93	24041.43	258581.7	40709.30	246189.3	14083.65	165873.84	36146.56
Benefit cost ratio	1.13	1.07	1.21	1.12	1.22	1.13	1.25	1.84
Rate of return ratio	0.13	0.07	.021	0.12	0.22	0.13	0.25	0.84

Source: Field survey, 2009

highest BCR of (0.25), Railway market (0.22), Wunti market (0.21) and Muda lawal (0.13). In all, Irish potato market is a profitable venture in the study area.

4. BENEFIT COST RATIO CALCULATION

The BCR is calculated by dividing the proposed total cash benefits of a project by the proposed total cash costs of the project. Prior to dividing the numbers, the net present value (NPV) of the respective cash flows over the proposed lifetime of the project — taking into account the terminal values, including salvage/remediation costs — are calculated.

To calculate the net present values, we use the (NPV) formula, in which the values are divided by the sum of 1 and the discount rate raised to the number of periods:

$$NPV = \sum_{t=1}^T \left(C_t / (1 + r)^t \right) - C_0$$

C_t = net cash inflow during the period t

C₀ = total initial investment costs

r = discount rate, and

t = number of time periods

4.1 Socio-Economic Characteristics of Irish Potato Marketers

Information on the socio-economic characteristics remains very vital in understanding the nature of the marketers

operating within the marketing system. The socio-economic characteristics examined includes age, marital status, years of marketing experience, educational level, sex and source of capital.

4.2 Age of Respondents

Age connotes the stage of development of an individual [6], either young or old. It is measured in years. It is an invaluable variable in decision making and risk taking. Old people are risk averters and young people are prone to taking risk because they recover faster (Ayoola, 1999). As shown in Table 4, majority of the respondents fall within the category of 30-50 years, constituting about 70% of the total respondents while 16.25% constitute respondents that falls within the age bracket of 21-30 years and 13.75% for those within the age limit of 51-60 years.

4.3 Marital Status of the Respondents

Marriage is considered an important variable in the determination of maturity and responsibility. It indicates that, 70% of the respondents were married hence portray a level of maturity in their age and probably in the marketing of Irish potato and 16.25% were single. This supports the findings of Adinya [7] on the analysis of the cost and returns in groundnut marketing in Bekwarra Local Government Area of Cross River State, who reported that 75% of the groundnut marketers were married.

Table 3. Description of the sex of respondents in detail

Category	Variable Sex	Frequency	Percentage
Wholesalers	Male	17	21.25
	Female	13	16.25
Retailers	Male	16	20.00
	Female	34	42.50

Table 4. Description of the age of respondents in detail

Category	Variable Age	Frequency	Percentage
Wholesalers	21 – 30	5	6.25
	31 - 40	12	15.00
	41 - 50	8	10.00
	51 - 60	5	6.25
Retailers	21 - 30	8	10.00
	31 - 40	22	27.50
	41 – 50	14	17.50
	51 - 60	6	7.50

4.4 Educational Attainment of the Respondents

The literacy status of the respondents is necessary to explain the strength or weakness observed in their managerial capacity and adoption in innovation (Ayoola, 1999). The table shows that majority of the respondents 46.25% had primary education, 28.75% had secondary education while 18.75% had quoranic and 6.25% have never been to school.

4.5 Marketing Experience of the Respondents

Researches on agricultural marketing has identified that experience is one of the major factor that increases the marketers income or profit. Table 2 shows that majority of the marketers (58.75%) had marketing experience of 1–10 years, 27.50% had 11 – 20 years of experience while 10% and 1.25% represent those with 21-30 years and 31-40 years of

Table 5. Description of the sex of respondents in detail

Category	Variable	Frequency	Percentage
	Marital status		
Wholesalers	single	3	3.75
	Married	24	30.00
	Widow	7	8.75
Retailers	single	10	12.50
	Married	32	40.00

Table 6. Description of the educational qualification of respondents in detail

Category	Variable	Frequency	Percentage
	Education		
Wholesalers	Never been to school	-	-
	Quaranic education	5	6.25
	Primary education	15	18.75
	Secondary education	10	12.50
Retailers	Never been to school	5	6.25
	Quaranic education	10	12.50
	Primary education	22	27.50
	Secondary education	13	16.25

Table 7. Description of the marketing experience and source of capital of respondents in detail

Category	Variable	Frequency	Percentage
	Years of marketing Experience		
Wholesalers	1 – 10	8	22.50
	11 – 20	5	6.25
	21 – 30	5	6.25
Retailers	1 – 10	29	36.25
	11 - 20	17	21.25
	21 - 30	3	3.75
	31 – 40	1	1.25
	Source of capital		
Wholesalers	personal saving	20	25.00
	Friend/relatives	4	5.00
	Money lenders	4	5.00
	Banks	2	2.50
Retailers	personal saving	26	32.50
	Friends /relatives	20	25.00
	Money lenders	4	5.00
	Banks	-	-

marketing experience respectively. This is in tandem with the findings of Nwanosike [8] who reported that the majority of respondents had a marketing experience of 1–10 years.

5. CONCLUSION

The present study identified different challenges in Irish potatoes production and marketing in Bauchi State, Nigeria. The following recommendations are suggested to farmers, policy makers (government) and researchers for the improvement of Irish potatoes production and well marketing performance of Irish potatoes in the study area.

1. Farmers are recommended to use modern farming equipment/tools which are within their ability.
2. Farmers should form stronger organizations/associations for Irish potatoes growers in the study area so as to be able to facilitate marketing process as well as proper technology transfer and effective capacity building.
3. It is also recommended that farmers in the study area should increase the scale of production in order to enjoy the benefits of Irish potatoes.

DISCLAIMER

This paper is based on preliminary dataset. Readers are requested to consider this paper as preliminary research article, as authors wanted to publish the initial data as early as possible. Authors are aware that bigger sample size is required to get a scientifically established conclusion. Readers are requested to use the conclusion of this paper judiciously as authors have worked with a small sample size. Authors also recommend working with bigger sample size for similar future studies.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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