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Analysis of Ornamental Plants Production in Edo and Delta States, Nigeria

Emokaro, C. O.*; Alufohai, G.O. & Ogbeni, G. L.

Department of Agricultural Economics and Extension Services, University of Benin, Edo State, Nigeria.
Christopher.emokaro@uniben.edu, emokaro@yahoo.com. * Corresponding author

ABSTRACT

The business of ornamental plants production plays a very important role in income generation, both to the farmers and other ancillary workers along the value chain of the enterprise. The employment generating potentials of the industry for both urban and rural dwellers has not been fully exploited in Nigeria, as in other continents. This paper therefore, focused on the economic analysis of ornamental plants production in Edo and Delta States, Nigeria. The data used in the study were obtained from a cross-sectional survey of 120 ornamental plants producers in both States, selected through a multi-stage sampling technique. The Gross Margin technique and Stochastic Profit Function were used to analyse the data. Results from the study indicated that, Hedges, Trees, Palms, Grasses and Houseplants, were the predominant types of ornamental plants produced in the study area. The results further showed that, landscaping, sales of potted plants, gardening services and export trade, were the types of services rendered by ornamental gardens. Gross Margin analysis indicated that ornamental plants production was not as profitable as expected, a priori, in both States. The estimated mean gross revenue was N 383, 756.80 / ha while the average gross margin was estimated as N 127, 833.40 / ha, for both States as an aggregate. The return to operators' labour and management was estimated at an average of N79, 370.20 / ha. It was evident from the profitability analysis that costs of labour, fertilizers, planting materials, and irrigation were significant factors determining profit realizable from ornamental plants production It therefore means that enough room exists for improving on the current profit level of ornamental plants production, and by implication, income and employment generation in the study area.

Key words: Gross Margin, ornamental plants, Stochastic Profit Function

INTRODUCTION

In Nigeria, agriculture provides a means of livelihood for over 70% of the population, raw materials for agro-allied industries and a potent source of much needed foreign exchange earnings (National Bureau of Statistics, 2006). Based on this, the country's agricultural development would naturally lead to achieving economic development. However, the low sectoral contribution to Nigeria's Gross Domestic Product (GDP) is an indication that more still needs to be done to resuscitate the sector.

Floriculture is a field in agriculture that deals with the science and practice of growing, harvesting, storing, designing and marketing of ornamental plants. It also involves the intensive production of flowers and ornamental shrubs (Muthoka and Muriithi, 2008). The establishment of ornamental nurseries has become a major feature of the urban landscape in Nigeria, springing up mainly along major roads and highways, along streets, foot paths and even in private homes. Poincelot (2004), described ornamental nurseries as a means of creating opportunities for start-ups or beginners for either full-time or part-time employment.

The ornamental plants industry has potentials for generating employment for both urban and rural dwellers directly or indirectly (Usman et al., 2002). These categories include; skilled labour jobs such as nursery managers, jobs for individuals in cultivation and marketing of plants.

The importance of ornamental plants in human health cannot be over-emphasized, they are not only sources of medicinal herbs which are primary forms of therapy for treatment of diseases; they are also known to have therapeutic values (Fakayode et al., 2008). For instance walking through a botanical garden can be very relaxing and healthy. Another benefit of ornamental plants is in the area of sports and recreation. Turfs are cultivated for sport fields and community garden plots that are strategically located along walking paths which serve as convenient places where people converse and interact. Acquaah (2008), reported that in many societies some flowers are associated with specific events. For example; the rose flowers are used to mark valentine seasons while the poinsettias flowers are associated with yuletide periods.

With economic development, interest in ornamental plants is growing in many countries of tropical Africa, not only from plant lovers for their home gardens, but also from owners of resorts, private and public parks, shopping centres and other commercial venues. In an economy with a high percentage of working people but with unemployment problems, there is need for studies that create awareness for people in prospecting the hidden opportunities in the economy, in order to ease the pressure on the government for the provision of jobs and create awareness on how people could become self-employed. The seedling production business is a form of self-employment

opportunity that generates income with relatively low investment expenditure, and thereby possesses the potential for enhancing the socio-economic aspect of the economy. With respect to Nigeria, what is of immediate research interest is the quest to know the common types of ornamental plants produced in the study area, the marketing pattern employed by the florists, the current level of profitability of the business in the study area and factors determining such profit (if any).

The main objective of this paper is thus, to analyse the economics of ornamental plants production in Edo and Delta States, Nigeria. The specific objectives are to; identify the types of ornamental plants produced in the study area, determine the marketing pattern employed by the respondents, estimate the profitability of the business and to analyse the determinants of profit realizable from ornamental plants production in the study area.

Not much research effort is known to have been undertaken on the economics of ornamental plants production compared to other crops like cereals in Nigeria. Unlike many foods where some of the attributes can be quantitatively measured, such as grams of fat in meats and milligrams of cholesterol in fluid milk, these aesthetically pleasing products present an array of attributes that are closely tied to the buyer's reasons for making the purchase. Also, the production of ornamentals and its awareness as regards its profitability or otherwise has remained low (Fakayode et al. 2008). A study like this in Nigeria is important and timely since it stands to educate citizens on the characteristics and role of ornamental products in the society. Although the nursery industry is very important in the nurturing and distribution of plants and in the landscape industry, it has received less attention over the years by way of monitoring and evaluation of their activities and how it is impacting the development of various sectors of the economy.

METHODOLOGY

Study Area

This study was carried out in Edo and Delta States, Nigeria. These two States made up the former Bendel State before its bifurcation into Edo and Delta States. Administratively, the two States are divided into 43 blocks (Local Government Areas) with 18 in Edo and 25 in Delta and each State has three Agro-ecological zones as delineated by their respective Agricultural Development Programmes (ADP's). The location was specifically chosen for its high economic activities in the region which is reflected in the living conditions of the region.

A multi- stage sampling technique was used in this study to select respondents within the study area. The first stage involved a purposive sampling of one agro-ecological zone out of the three agro-ecological zones that make up each of the State. These are: Edo South in Edo State and Delta South in Delta State.

Edo State is located between Latitudes 05° 44'N and 07° 34'N, Longitudes 06° 04'E and 06° 43'E while Delta State is situated between Latitudes 05° 00 and 06° 30'N, Longitudes 05° 00 and 06° 45'E (ESOW) (2014). Edo State and Delta State both occupy a total land area of 35,500 km with a total population of 5,788,514 (National Population Commission, 2006), representing about 11.5% of the nation's population

The second stage also involved a purposive selection of one major urban city in each of the selected zones in both States; due to the fact that ornamental garden businesses are usually concentrated in urban areas (Abegunde et al., 2006). This selected urban cities were; Benin City in Edo South and Warri in Delta South. The third and final stage involved random selection of sixty (60) ornamental plant producers in each of the selected city and its immediate environment, giving a total of 120 respondents for the for the study.

The data that were used in this study were collected from a cross - sectional survey of ornamental plants producers in both States with the use of a well-structured questionnaire. Data were collected on the socio economic characteristics of the producers, costs of production.

Data Analysis

Data collected were subjected to both descriptive and inferential statistics.

The objective of identifying the types of ornamental plants produced in the study area was met by the use of simple descriptive statistics such as; percentages and frequency count. Gross Margin was used to estimate the profitability of ornamental plants production. The equation is given as used by (Olukosi and Erhabor, 2005):

GM=TR–TVC (1)

Where: GM = Gross Margin, TR = Total Revenue, TVC = Total Variable Cost which comprised of expenses (direct and imputed) on seed/seedling, fertilizer, agrochemicals and labour, and other expenses excluding the non-paid family labour. The model used in estimating the operator's returns to labour and management is as presented in equation 2 as used by Fakayode et al. (2008).

RLM=GM – (r+Rl+D+Lu) (2)

Where: RLM is the Return to operator's Labour and Management, GM is the gross margin. r is the imputed interest on capital which represents the interest paid by ornamental nursery operators on informal loans. Rl is the imputed rent on land. This variable represented the sums farmers would have paid for their nursery land if they did not own it. D is the depreciation charge which was determined using the straight line method with no salvage value at the end of useful life for items like watering cans, hoes, cutlasses, polythene bags, jute bags, pots e.t.c. and Lu is the imputed cost of non-paid labour, which comprised the family and exchange labour. This variable is estimated, since the use of the family labour and exchange labour implies a corresponding opportunity cost (Fakayode et al. 2008).

The stochastic profit function was used to identify the determinants of profit among ornamental plant producers in the study area. The profit function is an extension and formalization of the production function (Sadoulet and de Janvry 1995). It combines the concepts of technical and allocative efficiency in the profit relationships and any errors in the production decision would translate into lower profits or revenue for the farm (Rahman, 2003). Following Rahman (2003), the general specification of a stochastic profit function is given as:

$$f(P_i, Z)\exp(\varepsilon_i); \varepsilon_i = v_i - \mu_i \quad (3)$$

Where: $\prod_i$ is the normalized profit of the ith farm defined as gross revenue less total variable cost, divided by farm output price; P_i is the price of the variable input used by the ith farm divided by output price; Z is the price of fixed input used in the ith farm; ε_i is the error term; $i = 1,2,3.....n$, number of farms in the sample.

The error term is assumed to behave in a way consistent with the frontier concept (Ali and Flinn 1989; Rahman 2003). The v_i's are assumed to be independent and identically distributed random error having a normal $N(0, \sigma_v^2)$ distribution independent on the μ_i's. The μ_i's are profit inefficiency effects, which are assumed to be non - negative truncation of the half -normal distribution $N(0, \sigma_u^2)$.

The explicit Cobb -Douglas functional form for the determinants of profit in ornamental plant production in the study area is therefore specified as follows:

$$\prod_i = b_0 + b_1 \ln X_{1i} + b_2 \ln X_{2i} + b_3 \ln X_{3i} + b_4 \ln X_{4i} + b_5 \ln X_{5i} + b_6 \ln X_{6i} + b_7 \ln X_{7i} + (v_i - \mu_i) \quad (4)$$

Where, $\prod_i$ represents normal profit computed as total revenue less variable cost, divided by output price, X_1 represents average cost of fertilizer in Naira, X_2 represents average cost of labour per man day in Naira, X_3 represents average cost of seeds/planting materials in Naira X_4 represents average cost of agro -chemicals in Naira, X_5 represents average cost of farm tools in Naira, X_6 represents average cost on irri gation in Naira, X_7 represent average cost of land/rentage of land in Naira.

Other parameters estimated include sigma squared (δ^2) which indicates the goodness of fit of the model used. It is expressed as:

Variance of error term due to profit inefficiency effects.

$$\delta^2 = \delta^2_v + \delta^2_u \quad (5)$$

Where: δ^2 = Overall variance of the model ; δ^2_v = Variance of error term due to noise ; δ^2_u =

Table 1: Production Resources Profile of Respondents (n=120)

Variable	Description	Frequency	Percentage	Mean
Source of land	Own	4	3.3	
	Rental	114	95.0	
	Lease	2	1.7	
	Total	**120**	**100**	
Size of land (ha)	0.01-0.50	95	79.2	
	0.51-1.0	13	10.8	0.37
	>1.0	12	10.0	
	Total	**120**	**100**	
Type of fertilizer used	Organic	74	61.7	
	Inorganic	-	-	
	Both	46	38.3	
	Total	**120**	**100**	
Type of labour used	Hired	42	35.0	
	Family	18	15.0	
	Both	60	50.0	
	Total	**120**	**100**	
Type of planting materials used	Vegetative propagation	12	10.0	
	Seeds	-	-	
	Both	108	90.0	
	Total	**120**	**100**	
Traditional tools	Hoes	120	100	
	Cutlasses	120	100	
	Secateurs	120	100	
	Watering can	120	100	
	Spade	120	100	
	Shovel	120	100	
	Wheelbarrows	120	100	
Mechanical tools:	Mower	12	10	
	Sprinkler	42	35	
	Pump	87	72.5	

Source: Field survey data, 2013.

All the respondents used organic manure with about 61.7% solely dependent on organic manure while 38.3% used both organic and inorganic fertilizer. Nurseries had no reliable source of planting materials with a large number of them admitting they had difficulty in obtaining planting materials and had to rely on their fellow farmers.

This compares favourably with the findings of Asiedu et al. (2011), who reported that majority of the ornamental plants producers in Ghana faced the same problem and this could probably affect production. Most ornamental plants producers employed the use of mainly conventional input like hoes, cutlasses, secateurs, watering cans spades, shovels and wheelbarrows for production. However, very few of the respondents employed the use of mechanical equipment like mowers, and sprinklers. The tools and equipment inventory of the respondents only indicates that ornamental plant production is crude with very low capital outlay, since very few improved tools and equipment are used for production.

Marketing pattern for ornamental plants in the study area:
Results presented in Table 2 show that ornamental plant producers either sell to consumers directly or on contract basis. This is an indication that there is a ready market for floricultural business in the study area. With respect to type of services rendered by ornamental gardens; landscaping, sales of potted plants and gardening services ranked the highest with 56.7% followed by landscaping and sales of potted plants (22.5%), sales of potted plants and gardening (9.2%), sales of potted plants (8.3%) and landscaping, sales of potted plants, gardening and export trade (3.3%).

Table 2: Marketing of Ornamental Plants in Edo and Delta States

Variable	Description	Frequency	Percent
Types of services rendered	Landscaping and Sales of plants	27	22.5
	Landscaping, Sales of plants and Gardening	68	56.7
	Sales of plants	10	8.3
	Sales of plants and Gardening	11	9.2
	Landscaping, Sales of plants, Gardening and Export trade on Plants	4	3.3
	Total	**120**	**100**
Marketing channels:	Direct sales	15	12.5
	Contract sales	-	-
	Both	105	87.5
	Total	**120**	**100**

Source: Field survey data, 2013.

Profitability analysis of ornamental plants production in Edo and Delta States
To assess the profitability of ornamental plant production, attempts were made to estimate cost and return from ornamental plants production. Results presented in Table 3 show that ornamental plants producers in Benin City generated comparatively higher profit than the ornamental plants producers in Warri Metropolis. This is evident in the value of their respective gross margins. Also the return to operators' labour and management showed ornamental plant production in Benin City to be comparatively more profitable than in Warri Metropolis. This perhaps could be attributed to the extent of urbanization and development in Benin City as compared to that of Warri Metropolis. Overall, the estimated Total Variable Cost (TVC) of production incurred per hectare by respondents was N 255, 923.40. This included the cost for labour, fertilizer, polythene bags, pots, agro-chemicals, planting materials and cost for irrigation. This indicates that variable cost of production is a major cost associated with ornamental plant production. The cost for labour was N 141, 736.7 representing about 55.4% of the total variable cost. This agrees with the findings of Fakayode et al. (2008), whose report showed that labour constituted the bulk of TVC implying that ornamental plants production is labour intensive. This shows the importance of labour in ornamental plants production. However, the use labour saving devices and sprinkler irrigation techniques will go a long way in reducing expenditure on labour in the long run. This is true because from the finding of the study, majority of the producers employed the use of crude implements for production with only a few having mechanical equipment like pumps and sprinklers. Overall, the gross revenue recorded in the study area was N 383, 756.80 / ha while the average gross margin recorded was N 127, 833.40 / ha. This amounts to a meager N 47,298.36, for the mean farm size of 0.37 ha., with the implication that only the few (12) farmers with more than one hectare-sized land for cultivation, can earn above the average gross margin. Since some of the inputs like land and non-paid family labour were not purchased, the cost had to be inputted. Hence, the return to operators' labour and management was estimated to be N79, 370.20 / ha. These values indicate that the gardeners of ornamental plant are currently not making enough profit that could ensure sustainability of the industry.

Table 3 : Gross Margin Analysis / Haand Return to Operator's Labour and Management

Items	Warri Amount (₦)	Benin Amount (₦)	Pooled Amount (₦)
Gross revenue	376, 341.8	391,171.8	383,756.8
Total variable cost (TVC):			
Fertilizer	37, 090.0	49, 042.0	42,575.0
Polythene bags	15, 503.3	16, 188.8	20,764.1
Pots	7, 739.0	10, 445.9	10,800.8
Marketing & transportation	8, 814.8	10, 725.4	14,657.7
Agro chemicals	4, 677.8	5,138.3	5,138.3
Seeds/planting materials	3, 838.2	4, 334.2	3,859.1
Cost of irrigation	16, 338.9	16,524.1	16,391.7
Hired labour	172, 045.3	140, 203.5	141,736.7
Gross margin	**110,294.5**	**138, 569.6**	**127,833.4**
Less			
Imputed rent on land	14, 204.1	14,603.6	15,603.6
Less			
Depreciation of farm tools	10, 421.0	10,600.0	12,600.0
Less			
Imputed cost of family labour	20, 204.1	18,259.6	20,259.6
Return to farmers' labour and management (RLM)	**65, 465.3**	**95,106.4**	**79,370.2**

Source: Field survey data, 2013.

Determinants of Profit

The maximum likelihood estimates of the parameters of the stochastic frontier profit function (Table 4), showed that all coefficients of the variables of the profit function conformed to a priori expectations, except for cost of farm tools. Cost of irrigation, agro-chemicals and planting materials were found to be positive and significant, demonstrating that they had positive effects on profit accruing from ornamental plants production in the study area. The estimated coefficients of cost of seeds/planting materials was 0.38 ($p < 0.01$) and cost of agro-chemicals, implies that planting materials and agro-chemicals such as pesticides and herbicides were important in ornamental plant production in the study area. This agrees with the work of Okpe (2012), who reported that planting materials and agro-chemicals positively affected output of small, medium and large scale rice production. The positive sign on rent of land contrasts with the findings of Orefi and Demonongo (2011). This may be due to the location of land used which were mostly government statutorily owned land given out for free or for a small token since it is assumed that the ornamental plants producers also provide maintenance and aesthetic value in these places. The positive and significant sign of the coefficient of fertilizer show that the use of both organic and inorganic fertilizer contributed positively to profit. This is understandable, since most ornamental gardens used polythene bags and pots which consume more fertilizer compared to ridges and heaps. The negative coefficient of labour and farm tools show that they both contributed negatively to profit. This evidently suggests possible over-utilization of labour resource and farm tools and if profit is to be successfully maximized, the cost expended on these inputs should be reduced. This agrees with the work of Orefi and Demonongo (2011); Oguniyi (2011); Hyuha (2006) who found cost of labour and other inputs to negatively influence profit. However, the significant coefficients of costs for labour and fertilizer agrees with the findings of Fakayode *et al.* (2008) and Muhammed-Lawal et al. (2009) who reported labour and fertilizer to be significant factors that affects profit in ornamental plants production.

The estimated profit function equation is given as:
LnY = 0.09 + 0.27

Table 4: Maximum Likelihood E stimate of the Cobb-Douglas Frontier Profit Function for Ornamental Plants Production in the Study Area

Variables	Parameter	T-values
Constant	0.09	0.84
Fertilizer	0.27	10.08*
Labour	-3.24	-13.36*
Agro chemicals	0.50	3.12*
Seeds/planting materials	0.38	8.33*
Farm tools	-0.10	-0.52
Cost of irrigation	0.40	1.89***
Diagnostic statistics:		
Sigma squared (δ^2)	11.59	2.13**
Gamma (γ)	0.99	407.58*
Log-likelihood function	-168.08	
L-R lest of one sided error	101.90	

* (p < 0.01), ** (p < 0.05) *** (p < 0.10)

Source: Computed from survey data, 2013.

CONCLUSION AND RECOMMENDATIONS

The results point out the importance of examining not only profitability but also the determinants of profit among ornamental plants producers. The following recommendations were made based on the findings from this study; (i) Ornamental plants producers should have access to soft loans as this will help boost overall ornamental plants production in the study area. (ii) Ornamental plants producers can be mobilized into viable cooperatives so that they can gain from the use of pooled resources, finance incorporations as well as marketing of ornamental plants. (iii) The consumption of ornamental plants for beautification and protection of the environment should be encouraged as this would widen the market scope for ornamental agriculture, thereby encouraging participation in ornamental plants production.

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