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SURVEY OF PLANT SEEDLING PRODUCTION BY PRIVATE NURSERIES IN KANO METROPOLIS-NIGERIA

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ABSTRACT

This study examined the viability of seedling production in Kano metropolis by private nursery operators with the purpose of assessing whether it is financially profitable for people to engage in such enterprises to reduce unemployment in the State. This survey was carried out to assess the socio-economic contribution of private commercial forest/ornamental nurseries in Kano Metropolis. Multi-stage sampling technique was used; where five local governments Areas (LGAs) were randomly selected, ten wards were selected randomly in each of the LGAs; in each of the wards, ten respondents were randomly selected from each nursery. Two nurseries were selected out of which two respondents were administered with the copies of questionnaire. Most of the nursery operator respondents were within the age of 15 to 35 years (75%). This age bracket composed of youths and few (25%) adults which implied that commercial nursery business in the study area can be greatly improved upon, since it is concentrated mostly in the hands of young and able-bodied individuals. The seedlings identified at the nurseries consisted of 30 species; 16 ornamental species, 10 tree crops species and 4 forest species. The result of the economic analysis from this study showed that the rate of returns (RORT) was generally high with the highest returns on Apple (₦8, 900), Golden Palm (₦2,350), Ficus (₦1,193.33), Yellow bush (₦1,050) and Gmelina (₦1,033.33). Nursery business is an attractive business to the people in Kano metropolis and specifically to the unemployed youths. There is great need for adoption of this enterprise in order to reduce poverty and unemployment in the study area.

Key words: Kano metropolis, Nursery, Ornamental plants, Seedling, Unemployment**.**

INTRODUCTION

The importance of ornamental plants in human life cannot be underrated. Ornamental business enterprises are beneficial because of the inherent financial gains, and the ecological benefits they confer. Ornamental plants provide revenue and income to Government and the people; ecologically, they minimize disasters like soil erosion, environmental degradation, wind effects, and watershed obstructions (Tee and Labo, 2010). Ornamental plants also serve as environmental stimulants that trigger pleasant memories. These plants also play a crucial role in cooling the atmosphere through the evapo-transpiration process on their leaves and other parts thereby preventing health hazards (Omokhua, et al, 2002; Fakayode *et al.*, 2008). The importance of having plants both within and outside homes and offices is on the increase and particularly in this era of climate change (Hortson, 1996). People are increasingly realizing the need for planting trees, shrubs and grasses to serve the purposes of protection, production and beautification (Ajewole, 2001).

According to Fakayode *et al.,* (2008), the ornamental plant production sector provides employment for both the rural and urban dwellers. The sector provides wide varieties of jobs for many categories of people. Job positions such as green-house and nursery managers and jobs for individuals involved in the cultivation and marketing of the ornamental plants require skilled labour. The sector has also contributed to the foreign exchange earnings of many states and countries. For instance in 2006, the floricultural items sold at all rated outlets in the United States of America was worth USD 20.8billion (₦5928 billion) (Fakayode *et al.,* 2008). Upon all the great potentials of the ornamental plants business to improve the economy of nations, the sector in Nigeria has been hampered by many problems. It has also received very little attention in the nation's perspective plan for agricultural development (Oseni, 2004). Despite the many roles of horticulture in human life, a lot of problems still militate against the sector, especially the ornamental plants production which is mostly under-developed in Nigeria (Bankole, 2002). Ornamental plants production which is a sub-sector of agriculture in Nigeria is still in a developing state (Adeoye, *et al*. 1996; Ezedinma, *et al.* 1999). Factors reported for the ill state of ornamental plants production in Nigeria include the lack of political will and knowledge of the discipline, land tenure, inadequate credit facilities and farm inputs among others (Fakayode *et al.*, 2008).

There is need to enhance the aesthetic nature of towns and cities. People are increasingly realizing the need for planting trees, shrubs and grasses. These are expected to serve the purposes of conservation, environmental protection, production and beautification amongst others; consequently commercial seedling production centres have gained attention and patronage in many cities. Few people own commercial nurseries in Kano metropolis based on preliminary studied. Furthermore, forest tree seedlings for urban afforestation and plantations are produced in small quantities in the commercial nurseries in the study area. It is important to understand if it is financially feasible for people to engage in such forestry enterprises in Kano Metropolis and why commercial nurseries produce more ornamental seedling than forest trees seedlings. Such knowledge would greatly enhance proper management decisions and would provide the base line information to facilitate the development of policies.

The objectives of this study are to: assess the type and quantity of seedlings produced by the private nursery operators; estimate the rate of return of investment on seedling production and identify the problems of commercial nursery enterprises in Kano Metropolis

METHODOLOGY

Study Area

The research was carried out within Kano metropolis in Kano State. Kano is the largest city in the Sudan Region of Nigeria. It is located between latitude 12^{o} 25 to 12^{o} 40N and longitude 8^{o} 35N to 8^{o} 45E. The Kano metropolitan area covers 499 km^2 and comprises eight Local Government Areas which include: Kano Municipal, Fage, Dala, Gwale, Tarauni, Nasarawa , plus Ungogo and Kumbotso. It is located in the Sudan ecology zone of Nigeria. Hausa and Fulani, who are predominantly Muslims, inhabit Kano State. Kano State has a population of about 9, 383, 682 (NPC, 2006). It has 44 local governments, with a total land area of 20,479.6 square kilometer. Kano State lies within the Sudan Savanna vegetation zone. The annual rainfall is between 75 - 1000 mm in the northern part and increases to 1,120mm in the southern part of the state. The rainy season lasts within the months of May to October. The topography is mainly undulating highland with a few hills in the southern part.

Sampling Design and Data Collection

A–multi-stage sampling design was used for data collection. Five (5) local governments in Kano Metropolis were selected randomly, and in each of the local governments areas ten (10) wards were selected randomly, in each of the wards, ten (10) respondents were randomly selected from each nursery making up one hundred respondents. The data obtained represents a subjective subset of the randomly selected wards and adequately describes the characteristics of commercial private nurseries in Kano metropolis. The data used for the study

were collected from the managers and workers of various nurseries in five council wards in Kano metropolis.

A structured questionnaire and interview schedule were adopted as instruments for data collection. These contained questions related to the organizational structure, operational activities, socio economic issues and other relevant issues in the production process. Those who could not fill the questionnaire themselves were helped since they could neither read nor write. The seedling species found at the nurseries were identified and named by their botanical and common names. They were considered indicators of commercial species of interest in the area.

Data analysis

The statistical technique applied in this study was descriptive analysis, such as frequencies, means and percentages. The economic evaluation of nursery activities was estimated using Gross margin (GM) and Rate of return (RORT). Gross margin (also called gross profit margin or gross profit rate) is the difference between revenue and cost before accounting for certain other costs. Generally, it is calculated as the selling price of an item, less the cost of goods sold (production or acquisition costs, essentially). According to Farris *et al* (2010) the purpose of margins is "to determine the value of incremental sales, and to guide pricing and promotional decision-making.
Gross margin was estimated with the following formula: G.m = TR – TVC

Where: Gm= Gross margin, TR= total revenue, TVC = Total variable cost

The rate of return (RORT) is the ratio of money gained or lost on an investment relative to the amount of money invested. The rate of return was estimated using the formula;

$$RORT = \frac{TR-TC}{TC} \times 100$$

Where TR = Total revenue and TC = total cost.

RESULTS AND DISCUSSION

The socio-economic characteristics of the respondents showed that most of the respondents were between the ages of 26 and 35 years. This age bracket composed of youths. This implies that nursery business in the study area can be greatly improved upon, since it is concentrated mostly in the hands of young and well-bodied individuals. This result was in accord with Larinde and Ruth (2014) who stated that the dominant age range recorded (in Port Harcourt, Rivers state) was between 21 and 40 years which are composed of youths. Table 1 indicates that most of the respondents were males (85%) with few females engaged in seedlings production. The presence of more male respondents into nursery business than the female showed that ornamental plants production business is not popular among the women in the study area. This may be as a result of Islamic religion of the majority respondents; which prohibited women from social interacting (associating) with people especially when married. It could also be due to the high labour requirements for nursery operations and land tenure laws which forbid women from holding title to land (Fakayode *et al.*, 2008; Larinde and Ruth, 2014). Thus, private seedlings nursery enterprise can greatly empower and create jobs opportunity for the well body and agile youths in the study area.
The result on table 1 shows that 50% of the respondents were secondary school leavers, 35% were primary school leavers, while 15% of the respondents had tertiary education from post-secondary institutions like the polytechnics, colleges of education and the universities. This indicated that commercial nurseries operators in the study area are not illiterates. They all acquired formal education that could enable them to introduce improvements into the nursery business and the use of new technology which would increase their risk management skills. The more educated the nursery owner is, the greater the production output and quality of the seedlings produced, because since their educational background enables them to adopt new and modern innovations. Level of education has greater impact in the management of plant seedlings nurseries in developing nationals. Nursery operators that had undergone formal education were able to manage their enterprises properly, because they kept adequate record of

income and expenditure, and would be able to raised seedlings through modern propagation methods.

The plant seedlings nursery was mostly managed by single (unmarried) people (90%) as obtained from the study area. This result is not in accord with Larinde and Ruth, (2014), who stated that plant nursery enterprise seems to be very popular among married people compared to the unmarried and this suggests availability of family labour.

Table 1: Socio-economic Attributes of Respondents in Kano Metropolis-Nigeria

Variable	Category	Frequency (N=20)	Percentage
Age	15-25 years	6	30
	26-35 years	7	35
	36-45 years	4	20
	46-55 years	3	15
Gender	Male	17	85
	Female	3	15
Educational level	Primary	7	35
	Secondary	10	50
	Tertiary	3	15
Marital status	Single	18	90
	Married	2	10

Table 2 shows the responses of respondents on job description and types of employment available in the nurseries business. It indicates that most of the respondents were employees (85%) while 15% were managers. Most of the workers in the nurseries were in temporary employment (75%) with only 25% being permanent workers. This showed that the workers engaged into nurseries operations for the time being due to poverty and lack of employment opportunity within Kano metropolis. Most of the respondents (85%) depended solely on their jobs at the nurseries as their source of income, while only 15% had alternative jobs. This implies that the nurseries contribute greatly to the economic status of the metropolitan people. The major reason why many of the respondents engaged in seedling production were for employment and income generation as observed in the area. This result is supported by Tee and Labo (2010), who stated that Ornamental business enterprises are beneficial because of the inherent financial gains; also, ornamental plants provide revenue and income to Government and the people.

Table 2: Job Description and Type of Employment held by the Nursery Workers in Kano Metropolis, Nigeria

Variable	Category	Frequency (N=20)	Percentage
Job description	Manager	3	15
	Employee	17	85
Type of employment	Permanent	5	25
	Temporary	15	75
Alternative jobs	Trading	1	5
	Civil service	2	10
	None	17	85

Initial Capital before Starting Nursery Business and Price Unit per Seedling in Kano Metropolis, Nigeria

Table 3 shows the initial capital of the nursery owners/operators before they commenced their nursery operations. The highest percentage of respondents (50%) had initial capital of ₦10,000.00 while 10% of respondents had the least initial capital of ₦25,000.00. This indicated that nursery establishment is feasible even with small capital. While the unit price for selling seedlings in the nurseries also showed that ₦50.00 was the least unit price per seedling. The selling price of above ₦200.00 was the highest unit price. This study revealed that nurseries operation within Kano–metropolis is really a source of income to those that engage in the operation.

Table 3: Selling price Per Seedling and Initial Capital of Respondents before Starting Nursery Business in Kano Metropolis, Nigeria

Variable	Category (₦)	Frequency (N=20)	Percentage
Initial capital before starting business	10,000.00	10	50
	15,000.00	4	20
	20,000.00	4	20
	25,000.00	2	10
Least unit price per seedling	50.00	2	10
	150.00	6	30
	200.0	10	50
	>200.00	2	10

Nursery knowledge and duration of establishment of nurseries in Kano metropolis

The duration of established of the nursery within the study area (Table 4) shows that 1-5 years had 50% responses, 6-10 years had 30% while 11-15 years had 20% responses. This indicated that most of the nurseries within the study area were established between 1-5 years. Nine nursery workers had prior knowledge of nursery operations and techniques before establishment of their nurseries while one of the nursery workers had none. Nevertheless, nursery operators need to have adequate experience on how to propagate and take care of the plants, know the species names, and establish good customer relationships. Furthermore, the longer an individual stays in the nursery occupation, the greater the number and improved quality the tree seedlings they can raise.

Table 4: Responses on nursery knowledge and the duration of establishment of nurseries in Kano metropolis

Variable	Category (₦)	Frequency (N=20)	Percentage
Knowledge acquisition before establishment	Yes	18	90
	No	2	10
Duration of establishment	1-5years	10	50
	6-10years	6	30
	11-15years	4	20

Types of seedlings and their uses in within Kano metropolis nurseries

Table 5 shows that all the nurseries within Kano metropolis engaged in producing seedlings for different uses, with beautification having the highest percentage of 50%, protection uses/purposes had 25% and plantation establishment had 10% while multipurpose uses had 15% responses. This indicates that most nurseries engaged in beautification than any other Use categories. Also, the nurseries produced different ornamental flowers and fruits trees as the most produced seedlings (21.28% each) while hedge seedlings had the lowest percentage responses (2.13%). This result is not in accord with Tee and Labo (2010), the result of their studied on the ornamental seedlings in makurdi metropolis reveal that out of forty (40) respondents interviewed 5.0% indicated that the seedlings were utilized for production (e.g. landscaping), 20.0% for protection of the environment against degradation forces, 25.0% for beautification of the environment and 50% for multiple uses, which involves any of the purposes above.

Table 5: Tree Seedlings found in Nurseries and their Uses in Kano Metropolis, Nigeria

Variable	Category	Frequency (N=20)	Percentage
Uses of seedling	Protection	5	25
	Beautification	10	50
	plantation establishment	2	10
	multipurpose	3	15
Type of seedling	Ornament	10	21.28
	Fruits	10	21.28
	Hedge	1	2.13
	Grasses	6	12.77
	Flower	10	21.28
	Shade	8	17.02
	Plantation plants	2	4.26

Seedling Species Produced in the Nurseries within Kano Metropolis

The seedlings identified at the nurseries consisted of 30 species. In terms of their taxonomy, these species belonged to 20 different families. For ease of reference locally, the common names of each species are presented in Table 6. These species are indicator of marketable species in the Kano metropolis. King palm, Queen palm, orange, Ixora, Yellow bush, flamboyant, golden palm and Masquerade seedling plants were the most occurrence among the seedlings produced. These are the species that were highly demanded for in the area.

Table 6: Seedling Species Produced and Frequency of occurrence in Nurseries Surveyed in Kano Metropolis-Nigeria

S/N	Common name	Scientific name	Local Name (Hausa)	Family	Frequency of occurrence
1	Acalypha	*Acalypha godseffiana*	Acalypha	Euphorbiaceae	2
2	Apple	*Malus domestica*	Tuppah	Rosaceae	2
3	Cashew	*Anacardium occidentale*	Yazawa /Kanju	Anacardiaceae	3
4	Coconut palm	*Cocus nucifera*	Kwakwa	Arecaceae	3
5	Crotus	*Crocus spp*	Crotus	Iridaceae	2
6	Eucalyptus	*Eucalyptus camaldulensis*	Turare/Sandal	Lecythidaceae	4
7	Ficus	*Ficus benjamina*	Durumi	Moraceae	6
8	Flamboyant	*Delonix regia*	Dorawar turawa	Leguminosae	4
9	Gmelina	*Gmelina arborea*	Malena	Lamiaceae	2
10	Golden palm	*Washingtonia robusta*	Golden palm	Arecaceae	5
11	Guava	*Psidium guajava*	Goba	Myrtaceae	1
12	Ice plant	*Carpobrotus edulis*	Ice plant	Aizoaceae	1
13	Juja pine	*Casuarina equisetifolia*	Juja pine	Casuarinaceae	1
14	King palm	*Archontophoenix cunninghamiana*	King palm	Arecaceae	7
15	Kolanut	*Cola nitida*	Goro	Malvaceae	1
16	Lavender	*Lavandula spp*	Lavender	Lamiaceae	1
17	Mango	*Mangifera indica*	Mangwaro	Anacardiaceae	4
18	Masquerade tree	*Polyalthia longifolia*	Masquerade tree	Annonaceae	5
19	Neem	*Azadirachta indica*	Darbejiya/Dogonya	Meliaceae	3
20	Oil palm	*Elaeis guineensis*	Kwakwar Manja	Arecaceae	1
21	Orange	*Citrus spp*	Lemon Zaki	Rutaceae	4
22	Paw paw	*Carica papaya*	Gwanda	Caricaceae	1
23	Pear	*Pyrus spp*	Fiya	Rosaceae	2
24	Queen palm	*Syagrus romanzoffiana*	Queen palm	Arecaceae	7
25	Royal palm	*Roystonea regia*	Royal palm	Arecaceae	2
26	Single ixora	*Ixora coccinea*	Izora	Rubiaceae	4
27	Step tree	*Terminalia mentalis*	Step tree	combretaceae	4
28	Teak	*Tectona grandis*	Teak	Lamiaceae	3
29	Umbrella tree	*Terminalia catappa*	Umbrella tree	combretaceae	2
30	Yellow bush	*Duranta repens*	Yellow bush	Verbenaceae	7

Economic Evaluation of Nursery Seedlings

According to Laarman (2007), the strongest arguments in the development of policies and plans of action in forest management and planning involve economic analyses. This is important to understand whether it is financially feasible for people to engage in such forestry enterprises and what can be done. The result of the economic analysis from this study is given in Table 7. It shows that ornamental plant seedlings had highest economic value of 53% which meant that the seedlings were widely used within Kano metropolis, followed by tree crops with an economic value of 33.3% while forest plantation species had an economic value 13.3% as the lowest. Ornamental plants ranked the highest as a

result of their patronage and accrued profit. Plant nurseries provide income generating opportunities for the operators as obtained from the surveyed results.

Table 7: Economics Analysis for Seedlings Produced in Kano Metropolis, Nigeria

Seedling species	Quantity sold/year	Production Cost (N)	Selling Price/Seedling (N)	Total Revenue (N)	Gross Margin (N)	RORT(N)
Ornamental plants (53.3%)						
Acalypha	120	6000	250	30,000	24,000	400
Crocus	150	7500	300	45,000	37,500	500
Ficus	3,000	150,000	646.67	1,940,000	1,790,000	1,193.33
Flamboyant	500	25,000	500	250,000	225,000	900
Golden palm	1500	25,000	408.33	612,500	587,500	2350
Ice plant	300	60,000	500	150,000	90,000	150
Ixora	4000	200,000.00	383.33	1,533,333.33	1,333,333.3	666.67
Juja pine	500	73,333.33	366.67	183,333.33	110,000	150
King palm	2500	125,000	500	1,250,000	1,125,000	900
Lavender	1800	90,000	250	450,000	360,000	400
Masquerade tree	3500	175,000	325	1,137,500	962,500	550
Queen palm	2000	100,000	487.50	975,000	875,000	875
Royal palm	2500	125,000	350	875,000	750,000	600
Step tree	3000	150,000	300	900,000	750,000	500
Umbrella tree	500	25,000	550	275,000	250,000	1,000
Yellow bush	3200	160,000	575	1,840,000	1,680,000	1,050
Tree crops (33.3%)						
Apple	20	1,000	4,500	90,000	89,000	8,900
Cashew	70	3,500	300	21,000	17,500	500
Coconut	100	5,000	550	55,000	50,000	1000
Guava	120	6,000	300	36,000	30,000	500
Kolanut	50	2,500	500	25,000	22,500	900
Mango	400	20,000	500	200,000	180,000	900
Oil palm	900	45,000	400	360,000	315,000	700
Orange	200	10,000	466.67	93,333.33	83,333.33	833.33
Pawpaw tree	70	3,500	250	17,500	14,000	400
Pear	50	2,500	300	15,000	12,500	500
Forest plantation species (13.3)						
Eucalyptus	50	2,500	475.00	23,750	21,250	850
Gmelina	40	2,000	566.67	22,666.67	20,666.67	1033.33
Neem	60	3,000	300	18,000	1,500	500
Teak	20	1,000	466.67	9,333.33	8,333.33	833.33

The rate of returns (RORT) which is the ratio of money gained from an investment relative to the amount of money invested is generally high with the highest returns on Apple (N8,900), Golden Palm (N2,350), Ficus (N1,193.33), Yellow bush (N1,050) and Gmelina (N1,033.33).

The highest quantities of seedling species produced per year were Ixora (4000) and the least/lowest seedling species produced was Queen palm which had 2000 seedlings produced per year. Step-trees (300) and Masquerade trees (3500) were not amongst seedling with the highest returns yet they were produced in high quantities due to high demand for them. Forest tree seedlings were produced in small quantities due to low demand for them; nevertheless they generated high returns whenever sold. It should be noted that the cost structure is nothing but a summation of the market prices of all purchased inputs and other imputed cost. This cost structure is equally dynamic in that it changes with time.

Constraints to Seedling Production in the Study Area

Table 8, indicates the frequency distributions of constraints to nursery activities in the study area. Problems encountered in the business by the various nurseries include inadequate finance (35%), transportation (10%), pest and diseases (10%), inadequate water supply (25%) and shortage of propagules (20%). This result is in accord with Fakayode et al., (2008), reported that the most prevalent limitation to ornamental plants nursing business is the operators' inability to access adequate funds necessary to capitalize their farms

Table 8: Constraints to Seedling Production in Nurseries in Kano Metropolis, Nigeria

Constraints	No. of nurseries	Percentage
Inadequate finance	7	35
Transportation	2	10
Pest and diseases	2	10
Inadequate water supply	5	25
Shortage of propagules	4	20
Total	**20**	**100**

Although from the economic evaluation the nursery business seemed viable, all nurseries assessed experienced inadequate finance problems and needed support from governmental and non governmental bodies. Transportation of seedlings to customers posed a major problem due to lack of vehicles especially when large quantities of seedlings were ordered.

Well water served as the main source of water used by the nurseries. Water was usually sufficient during the rainy season but posed huge problems during the dry season especially since there was no efficient water supply system in the–Metropolis. During the dry season, shortage of water led to water stress of seedlings and this invariably resulted in low survival rate and hence losses. During the dry season, the nurserymen reduced their selling prices to dispose of seedlings that were incurring a higher production cost on account of water supply. In contrast, there was a boost in production of seedlings in the rainy season, as more people were engaged in planting, which led to increase in demand for the seedlings and subsequently led to general increase in unit selling prices.

CONCLUSION AND RECOMMENDATIONS

This study examined the viability of seedling production by private nurseries in Kano metropolis by identified the seedling species produced, factors affecting nursery operation and assessed the rate of returns on investment. The major reasons why many of the respondents engaged in seedling production were for employment and income generation. Most of the nursery operator

composed of youths and few aged adults; this implies that commercial nursery business in the study area can be greatly improved upon, since it is concentrated mostly in the hands of young individuals. The seedlings identified at the nurseries consisted of 16 ornamental species, 10 tree crops species and 4 forest tree species. These species are considered indicators of marketable seedling species in the study area. The result of the economic analysis from this study shows that the rate of returns (RORT) was generally high with the highest returns from Apple (₦900), Golden Palm (₦2,350), Ficus (₦1,193.33), Yellow bush (₦1,050) and Gmelina (₦1,033.33). The result of this research indicates that commercial seedling production is profitable, hence it contributes to the economic well being of the nursery workers. Inadequate funding was indicated as a major constraint to nursery production. The results also indicate that more ornamental plants are produced than forest tree species due to market demand. There is need to educate youths and members of the public on the gains derivable from nursery production business especially considering its viability and profitability.

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