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# Cost and return analysis of dates (phoenix dactylifera Linn.) Wholesales

marketing in Kaduna state, Nigeria

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## Keywor ds

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## ABSTRACT

This study was conducted on the cost and return of dates wholesales marketing in Kaduna State. A total of 30 respondents that cut across various market locations were randomly selected for the study in the State. Data collected were subjected to descriptive and inferential statistical analysis. The study revealed that over 90% of the respondents were in their productive years of age while more than 50% of the respondents maintain a large household size. Over 70% could speak Hausa language fluently while majority (66.7%) had no formal education. Almost 57% had been in the trade for more than 10years. Furthermore, the study revealed that an average of 5478.67kg of dates was traded /month, the average cost price was 117.33/kg while the average selling price was 129.17/kg. Profitability indexes such as; average revenue and average Net Income (NI) was estimated to be \$745,920.00 and \$614,929.96 respectively. In the same vein, Gross Ratio (GR) and Operating Ratio (OR) were 0.18 and 0.13 respectively. The regression result indicated that both transportation cost and storage cost significantly affect NI and that the market is oligopolistic in structure with 0.4382 calculated gini-coefficients (G). The business is highly profitable in the study area.

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#### Introduction

Date palm (Phoenix dactylifera ) is one of the oldest cultivated plants (Riad, 2006). It is a multi-purpose tree, being highly regarded as a national heritage in many countries. It provides food, shelter, timber products and all parts of the palm can be used. Because of these qualities, and its tolerance to harsh environmental desert conditions, areas under cultivation have increased tremendously in recent years. Dates which is the fruit of the plant is produced in hot arid regions of the world and marketed worldwide as a high value confectionery. It is considered as an important subsistence crop in most of the world's desert areas. In 2001 the top five producing countries -Egypt, Iran, Saudi Arabia, Pakistan and Iraq (FAO, 2003) were responsible for 69% of total world production. Dates are traditionally marketed all over the world as a high value confectionery, but as fresh fruit they remain an important subsistence crop in most of the desert areas (Pascal, 2003). In general, commercial fruit production is possible only where there is a long, hot growing season with daily maximum temperatures of 90°F (32.22°C) and virtually no rain less than 1.25 cm in the ripening season. Dates has been widely recognized as an important product. Its uses have been widely reported in literature (FAO, 2003; Obadimu, 2010) however, its economic benefits in terms of its marketing potentials is yet to be accorded the adequate research recognition and documentations for the benefit of the people in the study area and Nigeria at large. Morakinyo (1996), corroborated this in his report that non timber forest products still remain neglected because most Nigeria government forest policies still focus on timber products. According to Nair (1994), the overall economic and social significance of non timber forest products are based on unreliable statistics. Therefore, direct research towards a systematic investigation into the contribution of dates trade to the Nigerian economy in the study area is of vital importance.

## Objectives of the study

The general objective of this study is to investigate the cost and return to dates trade in Kaduna state, Nigeria. The specific objectives are to:

- (i) determine the profitability of dates trade in the State.
- (ii) assess the structure and conduct of the trade

(ii) identify factors that cause variations in the profit made from dates trade.

## Materials and methods

## The Study Area

The study was conducted in Kaduna state in the north western geopolitical zone of Nigeria and shares common borders with Zamfara, Katsina, Niger, Kano, Bauchi, and Plateau States. To the southwest, the State shares part of its border with the Federal Capital Territory, Abuja. The global location of the State is between longitude  $06^{0}$  and  $09^{0}$  East of the green wich meridian and also between latitude  $09^{0}$  and  $11^{0}$  30' north of the equator. The State occupies an area of approximately 48,473.2km<sup>2</sup> and has a population of 6,066,562 (NPC, 2010).

Kaduna State is the fourth most populous State and economic activities in the nation. It occupies a very strategic position in terms of its historical role, contemporary political development, and economic activities. Consequently, developments in Kaduna State have national implications, ( Makarfi, 1999). Both all purpose and specialized markets exist in the study area as major outlets for various agricultural, forest and processed products.

## Data collection and Sampling technique

Primary data was used for this study. This was collected with the aid of a well structured questionnaires and personal interview by the researcher. The questionnaires consist of both open and closed ended questions. The service of two members of staff of the state department of forestry was also employed during interview of the respondents especially those whose first language is Hausa and Hausa-fulani.

| Variables               | Category       |       | Frequency | % of Total |  |
|-------------------------|----------------|-------|-----------|------------|--|
| Age                     | Less than 31   |       | 9         | 30         |  |
| 31-40                   | 12             | 40    |           |            |  |
| 41-50                   | 8              | 26.67 |           |            |  |
| 51-60                   | 1              | 3.33  |           |            |  |
| State of origin         | Kano           |       | 12        | 40         |  |
| Kaduna                  | 7              | 23.33 |           |            |  |
| Jigawa                  | 3              | 10    |           |            |  |
| Borno                   | 3              | 10    |           |            |  |
| Niger                   | 1              | 3.33  |           |            |  |
| Zamfara                 | 2              | 6.67  |           |            |  |
| Katsina                 | 2              | 6.67  |           |            |  |
| Ethnic group            | Hausa Fulani   |       | 7         | 23.33      |  |
| Hausa                   | 23             | 76.67 |           |            |  |
| Sub-ethnic group        | Hausa-fulani   |       | 8         | 26.67      |  |
| Hausa                   | 11             | 36.67 |           |            |  |
| Kanawa                  | 3              | 10    |           |            |  |
| Kanuri                  | 3              | 10    |           |            |  |
| Gwari                   | 3              | 10    |           |            |  |
| Nupe                    | 1              | 3.33  |           |            |  |
| Fulani                  | 1              | 3.33  |           |            |  |
| Educational achievement | No formal educ | ation | 20        | 66.67      |  |
| P/Schl. Cert.           | 7              | 23.33 |           |            |  |
| Quranic Schl. Cert.     | 3              | 10    |           |            |  |
| Work experience         | 1-5            |       | 3         | 10         |  |
| 6-10                    | 10             | 33.33 |           |            |  |
| 11-15                   | 8              | 26.67 |           |            |  |
| 16-20                   | 2              | 6.67  |           |            |  |
| 21-25                   | 2              | 6.67  |           |            |  |
| 26-30                   | 5              | 16.67 |           |            |  |
| M arital status         | M arried       |       | 25        | 83.33      |  |
| Single                  | 5              | 16.67 |           |            |  |
| No of wives             | None           |       | 5         | 16.67      |  |
| 1                       | 7              | 23.33 |           |            |  |
| 2                       | 14             | 46.67 |           |            |  |
| 3                       | 4              | 13.33 |           |            |  |
| Household size          | 1-5            |       | 13        | 43.33      |  |
| 6-10                    | 10             | 33.33 |           |            |  |
| 11-15                   | 7              | 23.33 |           |            |  |

## Source: Field Survey 2011

| Table 2. Market Location and Distribution of Respondents in Kaduna state |           |            |  |  |
|--|-----------|------------|--|--|
| Location   | Frequency | Percentage |  |  |
| <b>W</b>   | 4         | 12.22      |  |  |
| Katinkwari   | 4         | 13.33      |  |  |
| Zaria central market   | 7         | 23.33      |  |  |
| Kawo   | 5         | 16.67      |  |  |
| Chikun   | 5         | 16.67      |  |  |
| Kakuri   | 6         | 20         |  |  |
| Ungwan Sarki   | 3         | 10         |  |  |
| Total  | 30        | 100        |  |  |

Source: Field Survey 2011

#### Table 3. Estimated Market Margin Analysis of Kaduna Wholesalers

| Variable                             | Mean Value (#)/Annum    |  |  |  |  |
|--------------------------------------|-------------------------|--|--|--|--|
| (i) Revenue                          | 745,920.00              |  |  |  |  |
| (ii)Variable Cost (VC)               |                         |  |  |  |  |
| Commission to government             | 600.00                  |  |  |  |  |
| Transportation cost                  | 68,264.00               |  |  |  |  |
| Loading and off-loading cost         | 15,240.00               |  |  |  |  |
| Labour                               | 5,400.00                |  |  |  |  |
| Cost of Packaging material           | 10,820.04               |  |  |  |  |
| (iii) Total Variable Cost (TVC)      | 100,324.04              |  |  |  |  |
| (iv) Fixed Cost (FC)                 |                         |  |  |  |  |
| Rent                                 | 30,400.00               |  |  |  |  |
| Depreciation for Table               | 266.00                  |  |  |  |  |
| (v)Total Fixed Cost (TFC)            | 30,666.00               |  |  |  |  |
| (vi)Total Cost = TVC + TVC           | 130,990.00              |  |  |  |  |
| (vii) Net Income (NI)                |                         |  |  |  |  |
| Revenue                              | 745,920.00              |  |  |  |  |
| Net Income (NI) = Revenue $- TC$     | 614,929.96              |  |  |  |  |
| Rate of Return on Investment (RORI)% | 469.45                  |  |  |  |  |
| Gross Ratio                          | 0.18                    |  |  |  |  |
| Operating Ratio                      | 0.13                    |  |  |  |  |
| c c                                  | Sumaa Eigld Sumaay 2011 |  |  |  |  |

Source: Field Survey 2011

## Table 4. Multiple Regression Results of Profit Model for Dates Wholesalers in Kaduna state.

| Functional forms                |           |                          |            |  |  |
|---------------------------------|-----------|--------------------------|------------|--|--|
|                                 | Linear    | Semi-log                 | Double-log |  |  |
| Wholesalers (Kaduna)            |           |                          |            |  |  |
| Constant terms                  | -17764.47 | 12.629                   | -0.7396    |  |  |
| Regression coefficient          |           |                          |            |  |  |
| $X_1 = Revenue$                 | 0.997***  | 1.36 X 10 <sup>-6</sup>  | 1.208***   |  |  |
|                                 | (103.01)  | (17.426)                 | (71.035)   |  |  |
| $X_2 = Transportation cost$     | -0.966*** | -9.32 X 10 <sup>-8</sup> | -0.099***  |  |  |
|                                 | (-5.594)  | (-0.067)                 | (-4.018)   |  |  |
| $X_3 = $ Storage cost           | -1.178*** | -1.74 X 10 <sup>-6</sup> | -0.055***  |  |  |
|                                 | (-4.809)  | (-0.882)                 | (-3.665)   |  |  |
| $X_4 = Packaging cost$          | 0.790     | -1.52 X 10 <sup>-6</sup> | 0.009      |  |  |
|                                 | (0.576)   | (-0.138)                 | (0.294)    |  |  |
| $X_5 =$ Loading and off-loading | -1.447    | -1.90 X 10 <sup>-5</sup> | -0.072     |  |  |
|                                 | (-0.747)  | (-1.220)                 | (-1.184)   |  |  |
| $\mathbb{R}^2$                  | 0.99      | 0.96                     | 0.99       |  |  |
| Adjusted R <sup>2</sup>         | 0.85      | 0.81                     | 0.83       |  |  |
| F – Stat                        | 4743      | 150                      | 2357       |  |  |

Note: The figures in parenthesis are t – values

\*\*\* Significant at 0.01 level

\*\* Significant at 0.05 level

In this study, the lead equation is as follows:

 $LogY = -0.7396 + 1.208^{***}logX_1 - 0.099^{***}logX_2 - 0.055^{***}logX_3 + 0.009logX_4 - 0.072logX_5 + 0.858.$ 

Table 5. Distribution of Dates Wholesalers by size of annual sales in Kaduna State

| Sales<br>Range<br>( <del>N</del> ) | Number of<br>Sellers<br>(Frequency) | Percentage<br>of Sellers<br>(X) | Cumulative<br>Frequency | Cumulative<br>Percentage of<br>Sellers | Total<br>Sales<br>(₦) | Percentage of<br>total sales | Cumulative %<br>of Total Sales<br>(Y) | XY     |
|------------------------------------|-------------------------------------|---------------------------------|-------------------------|--|-----------------------|------------------------------|---------------------------------------|--------|
| 400000-<br>600000                  | 6                                   | 20.00                           | 6                       | 20                                     | 3124800               | 13.45                        | 13.45                                 | 0.0269 |
| 600001-<br>800000                  | 13                                  | 43.33                           | 19                      | 63.33                                  | 8904000               | 38.32                        | 51.77                                 | 0.2243 |
| 800001-                            | 7                                   | 23.33                           | 26                      | 86.66                                  | 6190800               | 26.64                        | 78.41                                 | 0.1829 |
| 1000000<br>1000001-                | 1                                   | 3.33                            | 27                      | 89.99                                  | 1108800               | 4.77                         | 83.18                                 | 0.0277 |
| 1200000<br>1200001-                | 3                                   | 10.00                           | 30                      | 100                                    | 3906000               | 16.81                        | 100                                   | 0.1    |
| 1400000                            |                                     |                                 |                         |  | 23234400              |                              |                                       | 0.5618 |

Multistage sampling technique was employed in this study. The first stage involves the purposive selection of six markets where wholesale traders were found in the State. The second stage involves the distribution of thirty (30) questionnaires in proportion to the population size of the wholesale traders in each market location.

#### Data Analysis/ Model specifications

Descriptive statistics such as frequency and percentages and inferential statistical tools which include Gini-coefficient, budgetary tools; Net Income (NI), Rate of Return on Investment (RORI), Gross ratio (GR) and Operating Ratio (OR) are used while multiple regression model involving the use of Ordinary Least Square (OLS) was used in explaining the relationship between profits and factors affecting the level of profit derived from the business.

Net Income (NI) is defined as Gross Income (GI) less Gross Cost (GC) (Olukosi and Erhabor 1988). In this study GC is equivalent to Total Cost (TC). Total Cost (TC) comprises of Fixed Cost (FC) and Variable Cost (VC). Fixed Costs were costs incurred on fixed assets such as; rents, tables, and depreciation of structures. The straight line method of depreciation was adopted. This is;

C-S / Y, where;

C = cost of fixed assets in naira

S = salvage value

Y = economically productive years of fixed input.

Variable Costs (VC) includes: transportation cost, commission, loading and off loading, handling/packing and purchase costs.

The Net Income (NI) for Dates was determined for the wholesalers follows:

NI = GI – TC equation (1) Where:

GI (Revenue) = Total quantity of product sold X unit selling price

TC = Variable Cost (VC) + Fixed Cost (FC)

Performance of the trade was determined with the use of Gross Ratio (GR) and Operating Ratio (OR) as follows:

 $Gross Ratio (GR) = \frac{Total Cost (TC)}{Total Revenue (TR)} \qquad \dots equation (2)$ 

This indicates the proportion of the total income that goes into the total cost of the trade.

Operating Ratio (OR) =  $\frac{\text{TVC}}{\text{TR}}$  ..... equation (3)

This indicates the proportion of the total revenue that pays for the variable cost.

#### Multiple Regression Model

This model was used in explaining the relationship between profit from Dates trade and factors affecting level of profit that is derived from it as specified below following Owen and Jones (1994);

$$\begin{split} Y &= a + b_1 x_1 + b_2 x_2 + \ldots + b_n x_n + e_1 \\ \text{Where } Y &= \text{Dependent variable (Profit)} \end{split}$$

 $x_1 \ldots \ldots x_n$  = Independent variables. These include; revenue, transportation cost, commission, storage, handling, loading and off loading charges.

a = intercept

 $b_1 \dots b_n =$ Regression coefficient.

 $e_i = error term$ 

Three functional forms of regression models were fitted to determine the best fit equation that explains the relationship between NI and the variables factors identified. Among the three models specified, Double-log was chosen as the lead equation. This was due to its satisfaction of the statistical and econometric criteria for selection of a lead model.

## Gini- coefficient

The Gini-coefficient (GC) is the technique that gives a more measure of market structure. It is a measure of statistical dispersion most prominently used as a measure of inequality of wealth or product distribution. It is defined as a ratio with values between 0 and 1. A low Gini-coefficient indicated more equal income, wealth or product distribution while a high Ginicoefficient indicates more unequal distribution. Zero (0) corresponds to perfect equality and (1) corresponds to perfect inequality. The Gini-coefficient is specified thus:

GC = 1 - XY..... Equation (5) GC = Gini-coefficient

X = Percentage of marketers per period of study

Y = Cumulative percentage of the marketers sales/purchase per period of study.

## **Results and Discussion**

Socio-economic Characteristics of Dates (Phoenix dactylifera) Marketers (Table 1) in Kaduna state revealed that 40% of the respondents were within the age group 31 - 40 years, 30% were less than 30 years of age, 26.67% respondents were between 41 - 50 years of age while only 3.33% of the respondents were between the age group 51 - 60 years. This shows that majority (96.67%) of the respondents were still in the most active productive years as at the time of this study. The marital status; number of wives and household sizes indicated that out of the 30 respondents, 83.33% were married while 16.67% were singles. Over 46% married 2 wives each, 13.33% had 3 wives each while, 16.67% were not married. This indicated that most of the respondents practice polygamy and this may not be unconnected with the culture and tradition prevailing in this area. Almost half (43%) of the respondents had a household size of 1 - 5 each, 33.33% had a household size of between 6 - 10 members each while 23.33% respondents had a household size of between 11 - 15 members each hence, half of the respondents household is characterized by large family size.

Hausa represented the largest (76.67%) number of respondents in the ethnic group while the distribution of the respondents according to State of origin indicated that 40% of the total respondents were from Kano, 23.23% were from Kaduna, 10% respondents were from Jigawa and another 10% were from Borno. Zamfara and Katsina States were represented by 6.67% of the total respondents each.

The educational achievement of the respondents showed that majority (66.67%) had no formal education. Nearly 23% had primary school education and the rest (10%) had Quranic education. The working experience indicated that 56.68% had been trading for more than 10 years. The market location and distribution of respondents indicated that 23.33% of the respondents were located in Zaria central market, 20% of the respondents were found in kakuri market, kawo and chikun markets had 16.67% of the total respondents respectively (Table 2).

In this study, the average quantity of dates traded by the wholesalers was 5478.67kg per month. The average cost price was N117.33 per kilogram while the average selling price was N129.17 per kilogram as indicated by Kaduna respondents. The estimated market margin per annum of Kaduna State wholesalers is revealed in Table 3. The costs incurred and the revenue generated was estimated based on the prevailing market prices as at the time of this study. The variable costs were found to include; commission to government agents, loading and off-

loading, labour, packaging cost and transportation which was found to be the highest variable cost with a mean value of N68, 264.00 per annum. The total variable cost was N100, 324.04 while the total fixed cost was N30, 666.00. A trader was able to generate an average total revenue of N745, 920.00 per annum and an average Net Income (NI) of N614, 929.96. Other measures of profitability employed in this study include Gross Ratio (GR) and Operating Ratio (OR). The GR of 0.18 indicated that the total business/trade cost was 18% of the revenue generated; it also implies that from every 100 return to the venture 18 is spent. This ratio is in agreement with the submission of Olukosi and Erhabor 2008 which signified that the lower the GR the higher the return per naira invested. Furthermore, the OR of 0.13 implies that only 13% of the revenue goes into the variable inputs, this is equally good for the business.

The estimated  $R^2$  of 0.99 means that the estimated variables included in the model explained 99% of variations in the NI of respondents while the remaining 1% was due to error term. The result revealed that  $X_2$  (Transport cost),  $X_3$  (Storage cost) were negatively related to NI in accordance with a-priori expectations and were significant at 1% probability levels thus, 0.099 and 0.055 unit increase in each of  $X_2$  and  $X_3$  will result in corresponding unit decrease respectively in respondents NI. The revenue ( $X_1$ ) is positively related to NI hence, 1.208 unit increases in  $X_1$  will bring about a corresponding unit increase in the revenue. Packaging cost and loading and off-loading were not significant at both 1% and 5% probability levels. This may not be unconnected with the abundant availability of packaging materials and cheap labour services in the study area (Table 4)

The distribution of dates (phoenix dactylifera) marketers by size of annual sales among Kaduna State wholesalers (Table 5) shows that about 43% of the respondents earned between N600,001.00 and N800,000.00 per annum from the sales of dates while 23.33% of the respondents earned between N800,001.00 and N1,000,000.00; 20 % of the respondents earned between N400,001.00 and N600,000.00; 10% earned between N1,200,001.00 and N1,400,000.00 while 3.33% of the respondents earned between N1,000,001.00 and N1,200,000.00. The average annual and monthly sales for dates in the study area were estimated to be N774,480.00 and N64,540.00 respectively. The calculated gini-coefficient is 0.4382. This implies that there is income inequality among the traders. Thus the market can be described to be oligopolistic in structure. According to U.N.D.P. (1992), it was reported that gini-coefficient with high inequality typically lies between 0.5 and 0.7.

## Conclusion and Recommendation

This study concludes that trade in dates is highly profitable in the study area. Transportation cost and storage cost significantly affect the net income generated in the business. The structure of the market is oligopolistic which means that it is dominated by few marketers and this enables them to optimise their profits.

Since it is the intention of the government to diversify the source of income or revenue generation in the country, date palm marketing both locally and internationally is a promising resource from which such great revenue could be derived.

Marketing of the product will also go a long way to alleviate the poverty level of the people not just in the study areas alone but also in the entire country.

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