ANALYSIS OF PRICE VARIATION AND MARKET INTEGRATION OF *prosopis africana* (GUILL. & PERR.) TAUB. SEEDS DURING THE WET SEASON IN MAKURDI METROPOLIS, BENUE STATE, NIGERIA

By Ancha, P.U[1]., G.A. Abu[2] and O. F. Omafu[3]*

[1*&3] Department of Social and Environmental Forestry, University of Agriculture, PMB 2373 Makurdi, Benue State, Nigeria. 1*Corresponding Author: anchapu2@yahoo.com

[2.] Department of Agricultural Economics, University of Agriculture, PMB 2373 Makurdi, Benue State, Nigeria.

ABSTRACT

The study was conducted to provide information on price variation and market integration of Prosopis africana seed marketing for a period of four months in Makurdi Metropolis, Benue State. Nigeria. The study seek to test the hypothesis that there is no significant difference between mean amount of Prosopis africana seeds sold and the Total Variable Cost (TVC) incurred. Purposive sampling technique was used to select five markets based on the presence of traders selling the commodity in the markets. Ten traders were also selected purposively in each of the markets, giving a sampling size of 50 respondents. Semi-structured questionnaire was used to obtain marketing variables from the traders. Descriptive statistics, Correlation and Gross Margin analysis were used to analyze the objectives of the study. The results shows that more than half of the traders 52% belong to the age bracket of 40-59 years and 60% had no formal education. There was a net positive weekly Gross Margin (GM) in all the markets; North Bank N80,320, Wurukum N72,080, Wadata N62,520, High Level N14,240 and Modern Market N130,510. Wadata and Modern markets were more integrated (0.861) than other market pairs. T- test result showed that Prosopis africana seed trade is profitable and should be encouraged. Since the commodity is harvested in the wild, plantation establishment of the tree species is recommended to ensure sustainability of the resource and trade.

Key words: price, variation, gross margin, Prosopis africana.

Introduction

Forest provides man with economic benefits; both tangible and intangible. These benefits can be grouped into direct and indirect uses, option and non use values. Only some of these values are reflected in market prices, due to imperfections and policy failures (Bishop, 1998). Price has been described by Olayemi, (1976) as the chief agent through which the quantities of factors supplied and demanded are brought into a state of equilibrium in the market. Price change on the other hand is the adjustment mechanism by which this equilibrium is attained in the market (Ojo, 1976).

The supply of forest products is affected by natural factors such as weather, diseases or pests. Furthermore, inadequate storage facilities for producers to store food commodities and thus balance the supply of such commodities throughout the year also affect the supply. Consequently, these commodities become scarce at off production seasons, rendering the products expensive due to scarcity (Livinstone and Ord, 1988). After goods and services desired by consumers are produced, price guide them through the channels of trade so that they end up where consumers want them and in good form.

The interrelationship between price movements in two markets is defined as market integration (Abbott et.al., 1979). The transformation of the economics of most developing countries from agriculture to more industrialized economies is making forest products marketing an important area that can no longer be ignored. The rapid increase in population growth especially in the urban areas is putting a lot of pressure on the demand, production and marketing of forest goods and services; the pricing and the marketing systems must therefore be efficient to cope with these pressures (Hays, 1975).

Prosopis africana is a forest tree legume which does not largely depend on use of artificial fertilizers for its growth. The tree fix atmospheric nitrogen and produces protein rich leaves and beans which have long been recognized as valuable food stuff. The seeds are very important to the economy and subsistence of the rural people. The seeds are widely used by many ethno linguistic groups in the middle belt region of Nigeria including Tiv and Idoma in Benue state, Igala and Igbira in Kogi state. Agboola and Kadiri (1998) remarked that the seeds are used in preparing a spice "Gbaaye" in Tiv or "Okpehe" in Idoma. In addition, this food condiment is a fermented product rich in protein and fatty acid contents (Sanni *et al.,* 1993 a and b). The seeds of this forest product are usually harvested in the wild and sold in the markets; the market for this product in the study area is gaining prominence as the seeds are consumed by majority of the people. However, there is no adequate data and information on trade in this forest product for planning and decision-making concerning its market development.

A major cause of concern to the farmers, policy makers and consumers is the frequent fluctuation in food prices and inadequate information on prices of food commodities for planning, budgeting and projection of the enterprises. Prices of food crops are constantly fluctuating and the trend is forecasted as continuous (Oyedeji, 1990). Prices for same quantity and quality of a given commodity at different locations are not always the same at a given point in time. They do also vary from season to season. For agricultural commodities, prices are readily obtained at markets; however, data and information on prices of most forest products are not readily and adequately available. Thus, planning for forest based enterprises is difficult. In addition, most funding agencies in the developed world such as the FAO and UNCEF among others require a firm indication of monetary values of projects for sponsorship (Kengen, 1997).

Price analysis is used as a tool for getting price levels for commodities and it also avails producers/farmers the knowledge of what should be produced and quantity to produce to make maximum profit with minimum inputs. The consumers are also informed of the food products available in the market and at what prices. Price linkages among the various markets are expected to result in arbitrage process where prices vary to accommodate various marketing functions of time, place, form and possession utility e.g. transportation, storage, processing and other transaction cost. Knowledge of the relationship between prices in various markets would therefore be a veritable tool for planning and decision-making. Price trend analysis help in making projection, hence planning and budgeting for any enterprise could be easily achieved.

It is against this background that this study was conducted to examine price variation, determine the profitability and assess market integration of *Prosopis africana s*eed marketing in the study area. The study also seek to test the hypothesis that there is no significant difference between the mean amount of *Prosopis africana seeds sold and the total Variable Cost TVC) incurred.*

Methodology
Study Area
The study was carried out in Makurdi metropolis located between latitudes 7°20' and 8°10' North and longitudes 8°4' and 9°40' East. The mean annual temperature is about 32°C with an annual rainfall of 1500-1800 millimeters. The important geographical feature of the area is the River Benue which divides the area into the north and south banks. Makurdi Metropolis is made up of 4 wards namely North Bank I, Wailomayo, High Level, Ankpa/Wadata and Modern Market council wards. Makurdi has a population of about 297,398 people (NPC 2006).

Sampling Procedure
The population of the study comprised of *Prosopis africana* seed traders in Makurdi metropolis. Purposive sampling technique was used to select five markets based on presence of traders selling this commodity. Ten traders in each of the markets were purposively selected for interview. Therefore the sampling size for the study was 50 traders.

Data Collection
The study made use of both the primary and secondary data. The primary data were collected with the aid of semi-structured questionnaire while the secondary data were collected from relevant literature materials. Questionnaire designed to cover the objectives of the study was administered to *Prosopis africana* seed traders in Makurdi metropolis to obtain information on prices of the seeds (bought and sold), quantity of seeds sold in kilograms and the costs incurred (Transport, labor, rent and local government charges) were obtained twice in a month for four months (June to September, 2008) in each of the markets and the weekly means of the transaction obtained.

Statistical Tools
Socio-economic attributes of traders were analyzed using descriptive statistics. Time series analysis was used to achieve price variation of *Prosopis africana* seed marketing in the study area. To obtain the pattern of price movement, the mean price per bag per week of the traders in each of the markets for the commodity was obtained and plotted against the number of weeks for the study period. Correlation analysis was used to analyze degree of integration between markets. According to (Abu, 1996), Correlation co-efficient gives the degree of integration between markets. The higher the price correlation between pairs of markets for a particular product the more integrated are the markets for that product (Raju and Von, 1980).

Gross Margin Analysis (GM) was used to achieve profitability of the seed marketing in the study area. Gross Margin Analysis is expressed as: GM = TR – TVC

Where GM   = Gross Margin,

      TR   = Total Revenue and

      TVC = Total Variable Cost.

Results
Socio-economic Attributes of Traders
Socio-economic attributes of *Prosopis africana* seed traders are shown on Table 1. The age distribution of the traders shows that more than

73

ANALYSIS OF PRICE VARIATION AND MARKET INTEGRATION OF PROSOPIS AFRICANA (GUILL. & PERR.) TAUB.
SEEDS DURING THE WET SEASON IN MAKURDI METROPOLIS, BENUE STATE, NIGERIA

half (52%) of the traders sampled were in the 40-59 years age bracket. There was no trader in the "less than 20 years" age bracket. Few of the traders (32%) were in the 21-39 years age bracket while (16%) were in the 60-70 years age bracket.

The marital status of the traders showed that more than half of the traders (58.0%) are married while only (2%) was single. Few traders (16.0%) were divorced while separated and widow/widower traders were (10%) and (17.0%) respectively.

Educational level of the traders revealed that most of the traders (66.0%) have no formal education. Traders with primary, post-primary and post secondary education were (26.0%), (6.0%) and (2.0%) respectively.

All the traders sampled for this study were females (100%). In addition there was no whole seller found dealing in these two commodities as all the traders reported on retail trading (100%).

Marketing Experience of Traders

The result presented in Table 2 shows marketing experience of the traders. Few traders (30%) were in the trade between 16-20 years, 11-15 years (26%), 6-10 years (24.0%) while traders with more than 20 years experience were (14%). Furthermore, (6%) of the traders were in the trade between 1-5 years.

Reasons for Trading

Majority (70%) of the traders reported that better income was their main reasons for being in the trade as shown on Table 3. Other reasons put forward by the traders is lack of money to continue schooling (14%) and following footsteps of parents (16.0%).

Gross Margin Analysis for *Prosopis africana* Seed Marketing

The Gross Margin (GM) analysis for *Prosopis africana* seed marketing is shown on Table 4. Modern market had the highest market GM of N13,0510 and also the highest weekly GM of N13,051 per trader while Wurukun market had the least market GM of N72,080 and also least weekly GM of N7,208 per trader. However, North Bank had the highest marketing activity with 93 bags of *Prosopis africana* seeds sold weekly, followed by Wurukum market (75), Modern market (64), Wadata market (61) and lastly High-level market with 15 bags sold weekly.

Test of Hypothesis

HO: There is no significant difference between mean amount of *Prosopis africana* seeds sold and the Total Variable Cost (TVC) incurred. The result of t-test (Table 5) shows a significant difference at 0.05 significance level (t= 3.87, P<0.05). This shows that trade in *Prosopis africana seeds in the study area is profitable.*

Market Integration of *Prosopis africana* in Five Markets

Table 6 shows the correlation amongst the five markets for Prosopis africana seed marketing. Correlation analysis shows a high integration value of 0.861 between Wadata and Modern markets; and 0.847 between Wurukum and North Bank markets. There was a weak integration value of 0.352 between North Bank and Modern Markets.

Pattern of Weekly Price Variation for *Prosopis africana* Seed Marketing

The pattern of the weekly price variation for *Prosopis africana* seed marketing is shown in Fig 1. There was a general irregular upward price

movement in the five markets. However, the prices in Wadata market were fairly stable between the 6th to the 8th weeks under study. Wurukum market had the highest observed price at the 7th week while Modern market had the least price at the 1st and 8th week.

Table 1. Socio-economic Attributes of Traders

Attributes	F	%
Age		
Less than 20	-	-
21-39	16	32
40-59	26	52
60-70	8	16
Total	50	100
Marital Status		
Single	1	2
Married	29	58
Divorced	8	16
Separated	5	10
Widow(er)	7	14
Total	50	100
Educational Level		
No Formal Edu.	33	66
Primary	13	26
Post Primary	3	6
Post Secondary	1	2
Total	50	100
Gender		
Female	50	100
Total	50	100
Type of Trader		
Retailer	50	100
Total	50	100

Table 2. Marketing Experience of Traders

Experience (yrs)	F	%
1-5	3	6
6-10	12	24
11-15	13	26
16-20	15	14
Above 20	17	14
Total	50	100

Table 3. Reasons for Trading

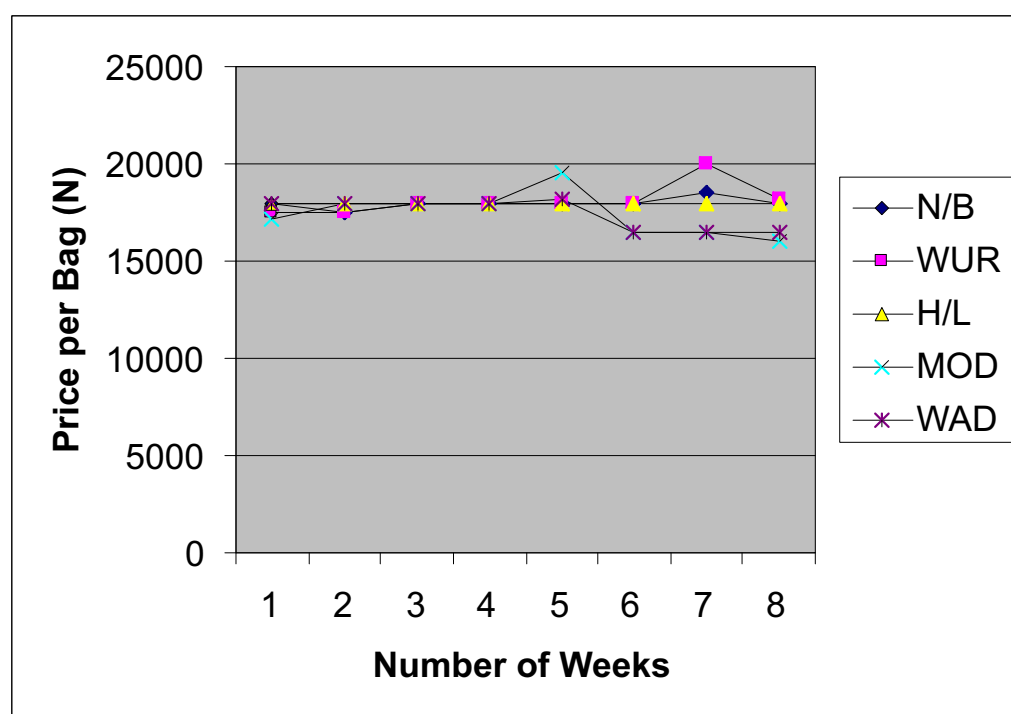| Reasons	F	%
Lack of money to continue schooling	7	14
Better income earning	35	70
Following footsteps parents	8	16
Total	**50**	**100**

Fig.1: Weekly Prices of *Prosopis africana* Seeds in Makurdi Metropolis

Table 4. Gross Margin Analysis for *Prosopis africana* Seed Marketing in Makurdi Metropolis

Market	A	B	C	D	E	F	G	H	I	B X D	C X D	I + J	K-L	
										J	K	L	M	N
									E+F+G+H					
	Tra-ders	Amount		Weekly Qty sold(₦)	Weekly variable cost(₦)				Total weekly variable cost(₦)	Total amount		TVC (₦)	GM (₦)	GM/Trader (₦)
		Bought (₦)	Sold (₦)		Transport (₦)	Labour (₦)	Rent (₦)	L.G.C (₦)		Bought (₦)	Sold (₦)			
North Bank	10	171500	180000	93	550	300	250	80	1180	1592500	1674000	1593680	80320	8032
Wurukum	10	170000	180000	75	760	330	380	80	1550	1276500	1350000	1278050	72080	7208
Wadata	10	169500	180200	61	490	360	250	80	1180	1035500	1099200	1036680	62520	6252
High level	10	169500	180200	15	490	340	250	80	1160	255000	270400	256160	14240	1424
modern	10	160500	180200	64	790	470	250	80	1590	1020500	1152600	1022090	130510	130510

Source: Field Survey, 2008.
1 Bag = 151.2kg.

Table 5. T- test between Total Amount of *Prosopis africana* Seeds Sold and Total Variable Cost

Markets	Total amount Sold	Total Variable Cost	T	Prob.
North Bank	1674000	1593680	3.87	0.018
Wurukum	1350000	1278050		
Wadata	1099200	1036680		
High Level	270400	256160		
Modern	1152600	1022090		
Mean	1109240	1037332		

Significance level = 0.05

Table 6. Correlation amongst Five Markets for *Prosopis africana* Seeds Marketing

Markets	Correlation				
High Level	1.00				
Modern	0.00	1.00			
North bank	0.00	-0.352	1.00		
Wadata	0.00	0.861	-0.501	1.00	
Wurukum	0.00	-0.374	0.847	-0.601	1.00
	High level	Modern	North Bank	Wadata	Wurukum

77

ANALYSIS OF PRICE VARIATION AND MARKET INTEGRATION OF PROSOPIS AFRICANA (GUILL. & PERR.) TAUB.
SEEDS DURING THE WET SEASON IN MAKURDI METROPOLIS, BENUE STATE, NIGERIA

Discussion

The socio-economic attributes of traders in Makurdi metropolis, Benue State is an indication that trade in *Prosopis africana seed* is an income-generating venture. This is observed by the number of years put into the trade by the traders and the gross margins of the trade in the different markets. Thirty percent of the traders put in between 1 – 10 years while others were involved in the trade for more than ten years. Marketing experiences could increase trader's profit margin as the trade is based on bargain. Female traders (100%) dominated the retail trade; however, there was no male trader in the retail trade. This finding is in line with Awono et al., (2002). They concluded that, in Cameroon, women dominated the retail trade in *Dacroyodes edulis (Safou) while* men concentrated on wholesale trade. Results further showed that most of the traders were illiterates. This finding is also in line with Soaga, (2001). He observed a high level of illiteracy among traditional forest product entrepreneurs in parts of Ogun State. Low illiteracy level has been identified as the bane of poverty amongst other factors (FAO, 1997)

The absence of traders of less than 20 years in the trade could be as a result of many persons in this age group being in school within and outside their localities. Also the low number of persons in the age bracket of 60-70 years could be that these persons might have left the trade for their children due to old age or might have taken to other businesses. Better income was the main reason for trading in *Prosopis africana* seeds. Other reasons provided by the traders were lack of money to continue schooling and following the footsteps of parents.

There was a positive net gross margin in all the markets studied; however, Modern market recorded the highest weekly GM of N13,051 per trader while Wurukum market had the least GM of N7,208 per trader. This result indicates that *Prosopis africana* seed trade can support livelihood of the rural people. Therefore Modern market could be recommended for any trader who wishes to go into the trade of *Prosopis africana* seeds in the study area since it had the highest gross margin.

Only few markets were highly integrated; there was high price integration of 0.861 value between Wadata and Modern markets and 0.847 value between Wurukum and North Bank markets which could be attributed to the closeness in their location and flow of information between the markets. However, weak integration values were recorded between North Bank and Modern markets which could be due to long distance between these markets. Information helps to balance supply and demand in markets and thus avoid gluts and surplus with their corresponding fluctuations in prices. Price fluctuation and problems of uncertain prices may arise mainly from the fact that most traders are either inaccurately informed about prices in the markets in which they sell and sometimes almost totally uninformed about prices outside the market in which they sell (Olukosi, 1990).

Conclusion

The study concludes that the price of *Prosopis africana* seeds sold varies between markets in the study area; however marketing of the seeds is profitable and capable of supporting livelihoods. Some of the markets were more integrated than others showing the level of closeness and flow of information between the markets.

REFERENCES

Abbott, J.C and Makeham, J.P. 1979. Agricultural Economics and Marketing in the Tropics: Longman group limited.149pp.

Abu, G.A. 1996. Structure, Conduct and Performance of Soyabean Marketing in Benue State, Nigeria. M.Sc. Thesis, Department of Agricultural Economics and Rural Sociology, Ahmadu Bello University (ABU), Zaria.

Agboola, D.A and Kadiri, M. 1998. Chemical Analysis of seeds; Determination of Cation Composition, Total Nitrogen and Crude Protein in Seeds of *Prosopis africana* (Guill and Perr) Taub. *Journal of Tropical Forestry* April- June 1998 Vol. 14 (11): 66-80.

Awono, A., Ndoye, O., Schreckenberg, K., Tabuna H., Isseri, F and L,Temple. 2002. Production and Marketing of (Safou) *Dacryodes edulis* in Cameroon and Internationally: Market Development Issues. *Forests Trees and Livelihoods*, 2002. Vol.12:125-147.

Bishop, J.T. (ed.) 1999. Valuing Forests. A review of Methods and Applications in Developing Countries. *International Institute for Environment and Development:* London. 169pp.

FAO, 1997 Non-Wood Forest Products, the Way Forward. *Forestry Paper, FAO, Rome*, 97pp.

Hays, H.M. 1975. The Marketing and Storage of Food Grain in Nigeria: *Samara Miscellaneous Paper No58 IAR, ABU, Zaria.*

Kengen, S. 1997. Linking Forest Valuation and Financing Uvasylav, 188:44, 48-49.

Livinstone, I. and H.W. Ord. (1988). Agricultural Economics for Tropical Africa. *Agricultural Pricing Policy in Nigeria*. Charles Harvey (Ed.) Macmillan Publishers Ltd.

National Population Commission (NPC) 2006. Abuja, Nigeria.

Ogundipe, O.A. 1992. A Selective Analysis of Food Price and Market Margin in Nigeria" (1980-1990) Ibadan University Press.

Ojo, O. 1979. An Analytical Study of the Behavior of Price Level. *Bulletin of Rural Economics and Sociology* Vol. 8(1):24-28.

Oyedeji, A.A. 1990. Analysis of Food Price Movement in Ibadan City. Unpublished MSc. Thesis, Department of Agricultural Economics, University of Ibadan (UI).

Rajo, V.T. and M.O.Von. 1980. Marketing Margin and Price Correlation as a Measure of Marketing Efficiency for Important Crops in Semi Arid Tropical Indian. Ardhra Pradesh.

Sanni, A.I., E, Lie and A.M. Lindberg 1993b. Biochemical Changes during Production of Okepehe a Nigeria Fermented Soup Condiment. *Journal of Food Chemistry and Microbiology Technology*. Vol. 15(3/4): 97-100

Sanni, A.I., E. Lie and A.M. Lindberg 1993a. Fatty Acid Composition of *Prosopis africana* and its Fermented Product Okpehe, J*ournal of Food Chemistry and Microbiology Technology.* 15 (3/4): 89-90.

Soago, J.O. 2001 Socio Economic Assessment of Traditional Forest Industries in Parts of Ogun State Nigeria. Unpublished M.F.Disssetation, Department of Forestry and Wild life Management. University of Agriculture Abeokuta (UNAAB). 99pp.