

# DETERMINANTS OF RURAL HOUSEHOLD MARKETED SURPLUS FOR CEREAL CROPS IN NORTH CENTRAL NIGERIA

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## ABSTRACT

This study investigated factors influencing farm households' decision regarding the availability and supply of cereal crops to the market (market surplus). The study utilized cross sectional data obtained through multistage random sampling method. Ordinary least square method was used for the analysis. Finding revealed that the quantity of food crops reserved for home consumption by households increased their tendency to offer more for sale. Furthermore, the farther away households are from the market (Distance to market), the less crop surplus they offer for sale. It was therefore recommended that farmer productivity should be improved to in the first instance, secure home consumption thus enabling them have more crops to offer for sale and thereby averting food crop scarcity in the market.

**Keywords: Market surplus and farm households**

## INTRODUCTION

Farmers' decision making in developing countries can be explained in terms of the series of goals they intend to achieve within the context of their livelihoods (Zhou *et al.*, 2010; Daydé *et al.*, 2014). Crop surplus marketed by rural households is important in the bid to earn needed cash income to meet other obligations (Achterbosch *et al.*, 2014). Furthermore, it serves as the only means through which farm households participate in the rural market economy for empowerment (Duncan *et. al.*, 2007). Hence, the welfare of the households is tied to the type and quantity of crop surplus marketed. Choices made by farm households are usually influenced by needs and goals and the resources available. The tendency to market crops by households may be influenced by certain factors, which when investigated would provide a better understanding of the behavior of the farm households (Adenegan *et al.*, 2013). Crops made available for sale by households keep sustain the local economy as well as satisfy demand for food by urban dwellers. It therefore becomes imperative to identify factors influencing the market surplus farm households take to the market. Birachi *et al.*, (2011) included Price of the produce, transaction cost and socioeconomic variables as major determinants. There is need to explore the extent and direction these factors impact on the market surplus decision. Therefore, the objective of this study was to estimate the determinants of market surplus for cereal crops among farm household in North Central Nigeria.

## METHODOLOGY

Data collected from farm households in North Central Nigeria was utilized for the study. Multistage random sampling was the method adopted, this consisted of three stages. The first stage was the selection of five states within the region, in the second stage ten Local Government Areas were selected and finally 20 villages in the third stage giving a sample of six hundred farm households through the administration of structured questionnaires. Multivariate regression was used to model the determinants of marketed surplus. The model is specified thus in the equation;

$$Ms_p = f(Pr, Frm_z, Trn_C, A_g, Hm_con, Dt_Mkt) \dots\dots\dots 1$$

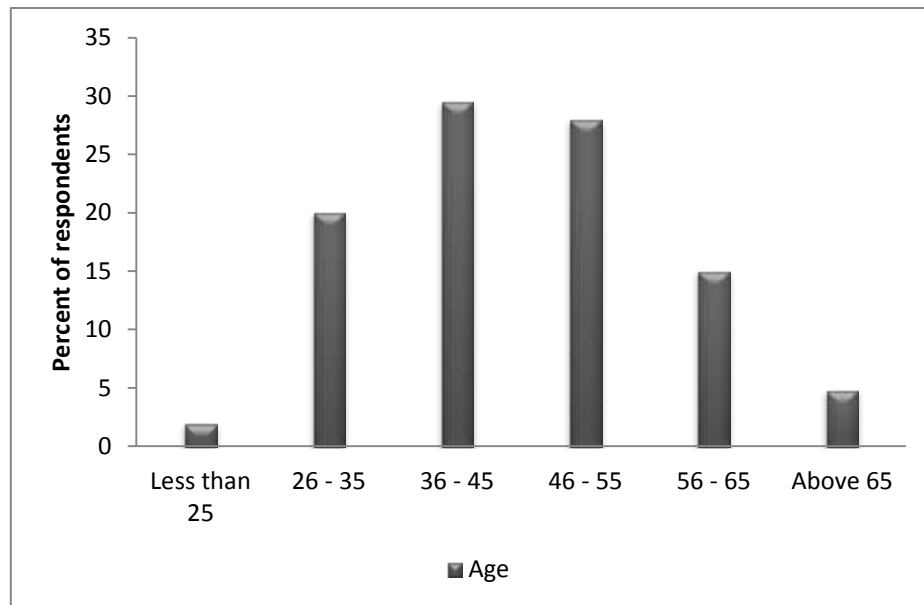
Where:

Ms_p	= marketed surplus (kg)
Pr	= Price of produce (N)
Frm_z	= Farm size (ha)
Trn_C	= Transaction cost (N)
A_g	= Age of household head (yrs)
Hm_con	= Home consumption of cultivated crop (kg)
Dt_Mkt	= Distance to market (km)

## RESULTS AND DISCUSSION

### Socioeconomic characteristics of the farm households

The farm household surveyed were classified into five categories according to the age of the farm household heads. It was observed that most of the respondents are within the age range of thirty six (36) and fifty five (55) years (figure 1): The dominant group are those below the 55 year age range. This implies that majority of those practicing agriculture in the area can be classified to be young, strong and agile. The dominance of this group among the farming population can be of benefit to the sector because African agriculture is labour intensive, and requires the participation of people in this age group. This is because their participation ensures the supply of labour.



**Figure 1: Distribution of respondents according to age (%)**

Source: Survey Data

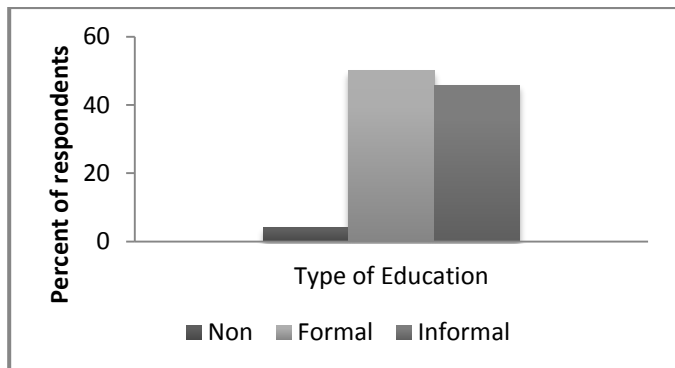
The results show that more than 90% of the household heads are married (Table 1). The participation of married household heads in agriculture imply the availability of labour from household members; while those that are single, widowed or divorced have to supplement their excess labour requirements with hired labour or work overtime. Majority of the farm households have household range of 1 to 8 persons. There are also households within the family size range of 25 to 32 members and above (Table 1). This implies increased consumption of cereal crops produced leading to a reduction in the quantity supplied to the market.

**Table 1: Socioeconomic Characteristics of household heads**

Variable	Frequency	Percentage
<b>Marital Status</b>		
Single	14	2.30
Married	564	94.20
Divorced	1	0.20
Widowed	20	3.30
Total	599	100
<b>Family Size</b>		
1 – 8	290	48.41
9 – 16	219	36.60
17 – 24	54	9.00
25 – 32	23	3.80
>32	13	2.20
Total	599	100
<b>Educational Level</b>		
<7	230	40.35
7 – 12	248	43.51
13 – 18	91	15.96
>18	1	0.18
Total	570	100

**Source: Survey Data 2011**

The study showed that many (43.51%) of the farm household heads had educational level ranging between 7 to 12 years, while 40.35% had less than 7 years of education (Table 1). About 15.96% of the respondents had 13-18 years of education. This implies the uptake and acceptance of livelihood improvement strategies among the respondents in the study area. Dercon and Krishnan (1998) attributed the decline in poverty between 1989 and 1994 to improvement in educational status of households. This is because the decline was greater for household heads who had completed primary schooling than for those who had less (or no) education. Almost all the farm household heads were educated through the formal or non-formal system of education. Majority had formal education training. Heads that had formal education constitutes 50% of the total respondents, while those that had non-formal experiences constitute about 45% (Figure 2). Admassie and Asfaw (1997) asserted that educated farmers were found to be relatively and absolutely more efficient than those without education.



**Figure 2: Type of education attained by farm households**

Source: Survey Data 2011

Education leads to refined attitudes, beliefs and habits and hence cannot be disconnected from the willingness to accept risk, adopt innovations, or generally to embrace best practices which corresponds to a systematic, organized educational model, structured and administered according to a given set of laws and norms (Claudio 1987). It is also characterized by the involvement of the teacher, institution and student. Furthermore, the institutions are administratively and physically organized and require a minimum classroom attendance. Where any of these characteristics is missing, the system collapses to non-formal education. Croppenstedt *et al.* (1998), using data from a 1994 USAID fertilizer marketing survey, noted that literate farmers are more likely to adopt use of fertilizer than those who are illiterate, though the quantity of fertilizer demanded does not depend upon literacy. Education could increase access to sources of information or enhance the ability to acquire such through experience with best practices. It may also complement farm experience in agricultural production or even be a substitute; hence, education enhances farmers' ability to efficiently learn on the job (Rosenzweig 1995).

### Determinants of market surplus availability

The tendency for households to make available crops for sale is hinged on the fact that it serves as a main source for cash needs of the households for other socioeconomic obligations. Crops investigated in this study include maize, sorghum and rice; these consist of 464, 310 and 245 farm households cultivating the crops. Two models each were estimated for the crops, these are the semi-log and double-log ordinary least square models. From the results, it was observed that the double-log model had the best fit. The observation with regards to maize crop revealed all variables coefficients except age to be significant in the relationship (Table 2). Furthermore, price of crop plays a significant role in the determination of the quantity of market surplus farm households make available for sale, followed by the quantity of the crop consumed and or reserved for home consumption. This implies that the level of food reserved by households dictates the quantity of market surplus.

**Table 2: Regression Estimates of Determinants of Marketed Surplus for Cereal crops**

Crop	Maize		Sorghum		Rice	
	a <sub>m</sub>	b <sub>m</sub>	a <sub>s</sub>	b <sub>s</sub>	a <sub>r</sub>	b <sub>r</sub>
<b>Coefficients</b>	Semi log	Double log	Semi log	Double log	Semi log	Double log
<b>Constant</b>	-5290** (-2.752)	2.33* (1.839)	281.94 (0.395)	3.76** (2.38)	-807.44 (-0.523)	6.55*** (3.722)
<b>Home consumption</b>	465.93*** (4.024)	0.66*** (8.635)	258.72*** (5.467)	0.89*** (8.05)	493.59*** (4.615)	0.54*** (4.445)
<b>Price of crop</b>	-56.23 (-0.293)	-0.68*** (-5.435)	-178.69* (-2.428)	-0.32* (-1.725)	-118.06 (-0.545)	-0.63* (-2.506)
<b>Farm size</b>	49.64 (0.500)	0.18* (2.566)	155.06** (3.510)	0.45*** (4.260)	222.13* (2.353)	0.396** (3.565)
<b>Distance to market</b>	-192.09 (-0.820)	-0.33* (-2.148)	-11.47 (-1.170)	-0.03 (-0.110)	275.76 (1.216)	0.27 (1.046)
<b>Transaction cost</b>	322.83 (1.276)	0.43** (2.629)	-198.54 (-2.234)	-0.04 (-0.013)	-286.87 (-1.220)	-0.15 (-0.542)
<b>Age</b>	542.44 (1.549)	0.25 (1.077)	-17.53 (-0.130)	-0.52* (-1.885)	-100.44 (-0.351)	-0.27 (-0.826)
<b>Number of farmers</b>		464		310		245
<b>R<sup>2</sup></b>	0.082	0.33	0.29	0.59	0.20	0.29
<b>F - Ratio</b>	5.50	21.66	12.94	25	5.90	8.02

\*significant at 1%, \*\*significant at 5%, significant at 10%

Figures in parentheses are t values

The coefficients for distance to market had an indirect relationship with the quantity of market surplus made available by households. This observation is intuitively in line with literature where distance to market hampers farmers' to access markets (Senyolo *et al.*, 2009). The sign of the price variable is however counter-intuitive, this is because it is expected that the higher the market price offer for crops produce by households in the market, the more the quantity offered for sale. One explanation for this relationship could be that, even though households may wish to sell more at higher prices, the need for home consumption supersedes that for cash hence achieving household food security is imperative (Richard *et al.*, 2014; Ahmed and Abah (2014).

Therefore, even though price may be attractive for farmers, it is a threat to their food security, hence the decline of surplus offered for sale at higher crop prices. Furthermore the sign of the home consumption variable, suggest that food crop reserve for the home increases with increased market surplus availability. The response trend for the explanatory variables in the case of sorghum suggests a similarity with the maize crop with regards to crop price variable. The results show home consumption variable with more influence in the determination of market surplus. The age variable reveals a negative relationship with market surplus availability; suggesting that the older the farm household's head, the lower the tendency for the household to have more market surplus. This intuition is logical because farmer productivity tend to diminish with age. Hence, the quantity of market surplus may decline with age (Oluwasola, 2012). For rice, result show home consumption to be significant determinant of the quantity of market surplus offered for sale by households. This finding implies that the more secured the household is concerning its food reserve for consumption, the more market surplus will be offered for sale (Emerta 2014).

## CONCLUSION

Farmers depend on the quantity of crops they produce for both home consumption and for cash. When a crop plays a double role as food and cash crop to a farm household, the decision on the quantity of crop to be reserved for home consumption and for sale become important. Based on the findings of this study, we noted that farm households will tend to offer more crops for sale as their home consumption increases. Transaction cost also lowers the quantity of market surplus offered by households for sale. It is therefore recommended that farmer productivity be improved in the first instance to secure home consumption and secondly to increase the quantity of market surplus made available the market.

## REFERENCES

- Adenegan K. O., S. O. Olorunsomo and N. L. O. Ezealaji (2013). Determinants of Market Orientation among Smallholders Cassava Farmers in Nigeria. *Global Journal of Management and Business Research Finance* Volume 13
- Achterbosch, T.J., S. van Berkum and G.W. Meijerink (2014). Cash crops and food security; Contributions to income, livelihood risk and agricultural innovation. Wageningen, LEI Wageningen UR (University & Research centre
- Ahmed, F. F., P. O. Abah (2014). Determinants of Food Security among Low-Income Households in Maiduguri Metropolis of Borno State, Nigeria. *Asian Journal of Social Sciences & Humanities* Vol. 3(1)
- Ana R. R., G. E. Shively, and W. A. Masters (2009). Farm Productivity and Household Market Participation: Evidence from LSMS Data Contributed Paper prepared for presentation at the International Association of Agricultural Economists Conference, Beijing, China.
- Admassie, A., and A. Asfaw (1997). The impact of Education on Allocative and Technical Efficiency of Farmers: The Case of Ethiopian Smallholders. Presented at the Seventh Annual Conference on the Ethiopian Economy in Nazret, Addis Ababa: Addis Ababa University Department of Economics.
- Birachi, E.A., J. Ochieng1 , D. Wozemba , C. Ruraduma , M.C. Niyuhire and D. Ochieng (2011). Factors Influencing Smallholder Farmers' Bean Production and Supply to Market in Burundi. *African Crop Science Journal*, Vol. 19, No. 4, pp. 335 – 342.

- Emerta A. A. (2014). Household production, home consumption and market supply in peasant economies: The case of Ethiopia. *African Journal of Agricultural Economics and Rural Development* Vol. 2 (6), pp. 155-164
- Claudio, Z. D. (1987). Formal, Non-Formal And Informal Education: Concepts/Applicability. In *Cooperative Networks in Physics Education* (pp. 300–315). Presented at the Interamerican Conference on Physics Education, New York: American Institute of Physics.
- Croppenstedt, A., Mulat Demeke and Meloria M. Meschi. (1998). Technology adoption in the presence of constraints: The case of fertiliser demand in Ethiopia. Centre for the Study of African Economies Oxford.
- Dercon, S. and P. Krishnan. (1998). Changes in Poverty in Rural Ethiopia 1989-1995: Measurement, Robustness Tests And Decomposition. Centre for the Study of African Economies , Oxford.
- Daydé, C., S. Couture, F. Garcia, and R. Martin-Clouaire (2014). Investigating Operational Decision-Making in Agriculture. In Daniel P. Ames, Nigel W.T. Quinn and Andrea E. Rizzoli (Eds.) *International Environmental Modelling and Software Society (iEMSS) 7th International Congress on Environmental Modelling and Software*, San Diego, CA, USA. <http://www.iemss.org/society/index.php/iemss>.
- Duncan B., D. Mather, C. B. Barrett, R. Benfica, D. Abdula, D. Tschirley and B. Cunguara (2007). Market Participation by Rural Households in a Low-Income Country: An Asset-Based Approach Applied to Mozambique. *Faith and Economics Journal* Vol. 50, 64-101
- Oluwasola, O. (2012). Integrating Small Holder Food Crop Farmers Into the National Policyfor Commercialization and Large Scale Agriculture in Nigeria: a Case Study of Ekiti State. *International Journal of Agriculture and Forestry*, Vol. 2 No. 5, pp 247-256
- Rosenzweig, Mark R. (1995). Why are there returns to schooling? In *Papers and Proceedings of the American Economics Association*. Presented at the American Economics Association.
- Richard K., A. Bogale and J. Thamaga-Chitja (2014). Evidence for Supporting Vulnerable Households to Achieve Food Security in SADC Countries African. *Journal of Human Ecology*, 47(1): 73-85
- Senyolo, G. M., P. Chaminuka, M. N. Makhura and A. Belete (2009). Patterns of access and utilization of output markets by emerging farmers in South Africa: Factor analysis approach. *African Journal of Agricultural Research* Vol. 4 (3), pp. 208-214
- Zhou, Y. H. Yang, H. J. Mosler, K. C. Abbaspour (2010). Factors affecting farmers' decisions on fertilizer use: A case study for the Chaobai watershed in Northern China Consilience. *Journal of Sustainable Development* Vol. 4, Iss. 1, pp. 80–102