Smallholder Cassava Commercialisation: Implication for Household Income Among Farmers in Oyo State, Nigeria

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Abstract

Crop commercialization by smallholder farmers in Nigeria is virtually non-existent due to a range of constraints, thereby affecting the income status of the farmers. This study investigatedthe effect of agricultural crop commercialization on household income in Oyo state, Nigeria. Data was collected through the use of questionnairesadministered to 203 cassava farmersusing a multistage sampling technique. Data collected included demographic characteristics of respondents, cassava production, sales volume and prices analyses carried out on the data were descriptive statistics, Household Commercialization Index (HCI), ordinary least Square regression and probit regression model. The results reveals that majority of the respondents (84.7%) were male. The average age of the farmers was 45 years while the average household size is 6 members. The results of household commercialization index showed that 97% of the crops by the farmers were commercialized the average household commercialization index was 0.9.Regression analysis of determinants of agricultural commercialization revealed three significant variables, namely:(gender (p<0.01) (β =0.3808)), education (p<0.01) (β=-0.0529))and farm size (p<0.01) (β=0.3751)).Analysisof the effect of commercialization on household income revealed four significant variables, which are gender, education, total cassava produced and farm size. The major constraints to full commercialization as ranked in order of importance to the farmers in the study area are: poor road, credit inaccessibility, unattractive market prices, and transaction bottleneck. These findings demonstrated the need to strengthen policies that encourage effective integrated marketing information, guaranteed market for farm produce, rehabilitation of rural roads and accessibility to credit, ensuring full commercialization.

Keywords: Cassava, Commercialization, Household income, Smallholder farmers, Household Commercialization Index

INTRODUCTION

Agriculture is the dominant sector in most African countries and plays an essential role in rural and overall economic development (Federico *et al*., 2007), which is also true in Nigeria. Agriculture contributes more than 30% to annual Gross Domestic Product, employs about 70% of the labour force, accounts for over 90% of the non-oil exports and provides over 80% of the food need of Nigeria(Adegboye,2004). Commercialization of subsistence agriculture implies increased participation or improved ability to participate in output market. Participation in commercialized agriculture holds considerable potential for unlocking suitable opportunity necessary for providing better income and sustainable livelihood for small scale farmers (Omits *et al.*, 2009).

Agricultural commercialization usually takes along transformation process from subsistence to semi-commercial and then to fully commercialized agriculture (Pingali and Rosegrant, 1995). In fully commercialized agriculture, this involves moving household agriculture from subsistence to producing for the market, which provides a number of benefits and advantages. It could create rural employment and income distribution (Kawagoe, 1994). Von Braun *et al.* (1994) stated that commercialization implies increased market transaction to capture the benefits of specialization. Increased market transactions are more easily attained when there are favourable policies and institutional arrangements that promote open domestic and international trade environments and the development of market infrastructures and support services that facilitate access to existing markets and the opening of new market opportunities under a secured legal system.

Cassava is one of the most important crops in Nigeria and Africa (Nweke *et al.*,2002)It is generally regarded as the foremost food security and poverty alleviation crop for Nigeria and entire Sub-Saharan Africa(SSA) because of its special attributes which include ability to make return of root yield even in extreme stress condition, high tolerance to unfavourable condition and requirement of minimal external inputs all year round (Awah and Tumanteh,2001).Nigeria is the largest producer of Cassava in the world,with an average production rate of 34 million metric tonnes per annum(NRCRI,2005).However, despite the concerted efforts being made by the Federal Government of Nigeria to harness the vast economic, nutritional, industrial and export potentials of cassava in Nigeria in other to ensure national food security and boost rural livelihood (Ekwe and Nwachukwu, 2004), level of commercialization of cassava is still untapped because production is not oriented towards commercial use; instead, farmers produce and process cassava as a subsistence crop. The exact of current and potential demand for cassava and its products in Nigeria is neither known nor documented. Such documentations are importantfor successful commercialization of cassava. The lack of a commercial approach to cassava production and marketing in Nigeria justifies a synchronized approach involving several partners in the development of the sector. It is imperative to

provide data that will inform investors on the actual potential of the industrial cassava sub-sector. The development of the sector will also require initial activities in capacity building, product development, fabrication and transfer of processing technologies to target beneficiaries and development of clusters to supply identified markets (Ezedinma *et al.*,2007)

Crop commercialization among small holder farmers in developing countries has often been signaled as being detrimental to the economic condition and food security of the farmer's household (Immink and Aharcon, 1993). This is due to the fact that small holder farmers find it difficult to participate in markets because of a range of constraints and barriers reducing the incentives for commercialization (Moraka – Nakedi et al, 2001). These may be reflected in hidden costs that make access to markets difficult, lack of assets, market information and training. An added factor is that farmers are located far away from the market and have poor access to infrastructure.

Arising from the foregoing, this study will attempt to provide answers to the following research questions:

- What is the extent of commercialization by cassava growers in the study area?
- What are the factors affecting commercialization by smallholder cassava farmers in Oyo state?
- What is the effect of cassava commercialization on household income in the study area?
- What are the constraints to full commercialization of cassava in the study area?

METHODOLOGY

Study area

This study was carried out in Oyo State, Nigeria. The state is located in the southwestern region of the country. It lies between latitude 7^0 and 9^0 3', north of the equator and between longitude 2.5^0 and 5^0 east of the prime meridian. Oyo state covers a total land area of about 27,249,000 km^2 with a total population of about 5.6 million (NPC, 2006). It has a total of thirty-three (33) Local Government Areas grouped under four Agricultural zones by Oyo State Agricultural Development Programme (OYSADEP), which are: Ibadan – Ibarapa, Oyo, Saki and Ogbomoso zones. The vegetation type is rainforest in the south and derived savannah to the north of the state. This makes the state to be rich in flora and fauna species which serve as a source of raw materials to the small and medium scale enterprises within the state. The major food crops grown in the state include yam, cassava, kola, maize, cowpea, vegetable among others.

Sampling procedure

A multistage sampling procedure was adopted in selecting the respondents (farmers). In the first stage, two out of the four Agricultural zones (Ibadan – Ibarapa zones and Oyo zones) of Oyo state were randomly selected. The second stage involved random selection of three Local Government Areas(LGAs) fromeach of the two agricultural zones that predominantly produce cassava. The selected LGAs are: Akinyele, Ibadan north and Iddo LGAs (Ibadan – Ibarapa zone); Oyo west,

Afijio and Atiba LGAs (and Oyo zone). 30 respondents were sampled each from Oyo West, Afijio, Iddo and Ibadan North Local Government Area while 40 respondents were sampled from Atiba and 43 from Akinyele Local Government Area. Thus, there were 203 respondents from all the selected local government area in the study area. Primary data were collected on demographic and socio-economic characteristics of respondents, household cassava production level, land size, access to credit etc using the structured questionnaires and interview schedule.

Analytical Techniques

A combination of analytical tools was employed to analyze the data collected in this study. These include descriptive statistics, Household Commercialization Index (HCI) Food security index, and regression analyses (Probit and Ordinary Least Square).

Household Commercialization Index (HCI)

This was used to profile the extent of commercialization in various characteristics of the smallholder farmers. Govereh *et al*. (1999) and Strasberg *et al*. (1999) stated that HCI is the ratio of gross value of all crop sales per household per year to the gross value of all crop produced.

$$HCI = \frac{Gross\ value\ of\ all\ crop\ Sold}{Gross\ value\ of\ all\ crop\ produced}$$

……. (1)

Descriptive Statistics

Descriptive statistics was used to analysedata on basic characteristics of the sampled household such as socio-economic characteristics, farm size, age, sex, average household index in order to compare the differences in household level of commercialization. These results were presented in frequency, percentage and mean.

Ordinary Regression Model

This was used to identify the factors influencing the farmers' level of commercialization. Multiple linear regression model (equation 2) was adopted to analyze the determinant of household commercialization.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + …… \beta_n X_n + \varepsilon_i. \qquad (2)$$

Y= Household level of Commercialization
B_o, $\beta_1,…\beta_{14}$ = regression constant
X_1 = Age of farmer (in yrs)
X_2 = Sex of the household head (male = 1, female = 0).
X_3 = Household size.
X_4 = Level of education (in years)
X_5 = Marital status (married = 1, 0 otherwise)
X_6 = Farming experience (years)
X_7 = Access to credit (yes=1, no=0)
X_8 = farm size (hectares)
X_9 = Volume of cassava sold (kg)
X_{10} = Farmers association (yes=1, no=0)
X_{11} = access to guaranteed market (yes=1, no=0)
$X_{12 =}$ access to transport facilities (yes =1, no=0)

X_{13}=non-farm income (yes=1, no=0)
X_{14}=extension services (yes=1, no=0)
ε_i = Error term

A multiple regression model (equation 3) was adopted to analyze the effect of household commercialization on household income using demographic and commercialization variables.

The model $Y = \beta_0 X_0 + \beta_1 X_1 + \ldots + \beta_i X_i + \mu_i$ (3)

Y = Household income from cassava production
X_1= Age of farmer (in yrs)
X_2 = Sex of the household head (male=1, female=0)
X_3 = Household size
X_4 = Level of education (in years)
X_5 = Marital status (married= 1, 0 otherwise)
X_6 = Farming experience (years)
X_7 = Access to credit (yes=1, no=0)
X_8 = Farm size (hectares)
X_9 = Volume of cassava sold (kg)
X_{10} = Farmers association (yes =1, no=0)
X_{11} = Access to guaranteed market (yes=1, no=0)
X_{12} = Access to transport facilities (yes=1, no=0)
X_{13} = Non- farm income (yes=1, no=0)
X_{14}=Extension services (yes=1, no=0)

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

The results (Table 1) showed that the mean age of the farmers in the study area is 45 years with a standard deviation of 8 years. Majority of the farmers (46.3%) werebetween 41 and 50yearsold. The implication of the average age of the farmers is that they are not too old and might have enough experience in cassava farming. Age influences the level of commercialization; the older household heads might have acquired better experience on cropping practices and market interaction over time while the younger farmers, whomight not be fully involved in farmingprobably because it is energy demanding, always seek for lucrative jobs that bring returns within a very short time. The results also indicated that 36.9% of the respondents acquired only primary education while 21.2% were educated up to secondary school level and 29.6% acquired vocational education, only 8.4% of the respondents had no formal education (Table 1). The low level of education among the respondents could have serious implications on their ability to access information, use new technological innovations and even access or procure credit from formal financial institutions.

Table 1: Socio-Economic Characteristics, Farming and Marketing experience of Respondents

Variables	Frequency	Percentage
Age of respondent		
21-30	10	4.9
31-40	48	23.6
41-50	94	46.3
51-60	43	21.2
>60	8	3.9
Educational status		
No formal education	17	8.4
Vocational education	60	29.6
1-6	75	36.9
7-12	43	21.2
Above 12 years	8	3.9
Gender		
Male	172	84.7
Female	31	15.3
Marital status		
Single	6	3.0
Married	196	96.6
Widowed	1	0.5
Household size		
1-5	79	38.9
6-10	121	59.6
11-15	3	1.5
Farm size (ha)		
≤2	150	73.9
2.1-3.0	24	11.8
3.1-4.0	26	12.8
4.1-5.0	3	1.48

Variables	Frequency	Percentage
Years of market participation		
1-10	103	50.7
11-20	74	36.5
21-30	22	10.8
31-40	4	2.0
Years of farming experience		
1-10	66	32.5
11-20	78	38.4
21-30	51	25.1
31-40	8	3.9

Source: Survey 2011

The gender distribution of the respondent in the study area showed that 84.7% were male while the remaining 15.3% were female. This agrees with the study of Adenegan *et al* (2013), which claimed that a typical Nigerian farming system is predominantly dominated by men The results also showed that 98.5% of the respondents have their household size ranging between 1 and 10 members with an average household size of 6 members and standard deviation of 2. Large households with more dependents are likely to have a lower level of commercialization due to increased household consumption. This is confirmed by Lapar *et al*. (2003) that propensity to commercialize declines with the number of household members.

Majority of the households (73.9%) own at most2 hectares, 24.6% own between 2 and 4 hectares of land while 1.48% own between 4.1 and 5 hectares for cassava production (Table 1). The average cassava farm size in the study area is computed to be approximately 1.41 hectares while the minimum and maximum farm size per household is 1 and 5 hectares of land, respectively, with a standard deviation value of 0.76 hectares. These figures demonstrate that majority of the cassava farmers in the study area are smallholders which could negatively affect commercialization as larger farm sizes serves as incentive to produce surplus for market. This is supported by the study of Makhura *et al,* (2001). Results on Table 1revealed that 50.7% of the farmers had 1 to 10 years'experience in market participation, 36.5% had 11-20 years market participation experience while 10% had 21-30

years' experiencein market participation. Theaverage market participation experience of all the farmers in the study area is 12.36 years with standard deviation of 8.23. Participation in the market is a function of marketing experience. The result showed that 32.5% of the respondents had 1 to 10 years of farming experience, 38.4% had between 11 and 20 years while 25.1% had between 21 and 30 years farming experience. The average farming experience of all the respondents is 15.18 years with standard deviation of 7.24 which could be an indication of higher level of commercialization among the farmers in the study area.

Distribution of respondents based on total value of cassava sold to total value of cassava produced

This study employed the Household Commercialization Index (HCI) to measure the level of commercialization of cassava among the respondents. The result showed that the average household commercialization index was 0.9. This means that respondents sold 90% of their total cassava output. There were indications that 1% of the respondent sold up to 40% of their total cassava output, 2% sold about 70% of their total output while 97% sold between 80 and 100% of their total cassava production (Table 2). This revealed that most of the cassava farmers in the study area are fully commercialized; they participate in the market which offers opportunities for increasing their farm income.

Table 2: The volume of cassava sold to volume produced (HCI)

Household Commercialization Index (HCI)	Frequency	Percentages
0.11-0.40	2	1.0
0.41-0.70	4	2.0
0.71-1.0	197	97.0

Household Level of Commercialization

Goitom (2009) have stipulated convincing reasons why total value of crops sold is used in place of Household Commercialization Index (HCI). Several of a farm household's demographic and socio-economic factors are hypothesized to explain the variation in total/gross value of crops sold. These include gender, age, education, marital status, household size, total cultivated farm size (including

rented-in), number of years of farming, access to credit, access to farmers group, access to guaranteed market, access to transport facilities, farm distance to market, access to non farm income. The OLS estimation result showed that about 30% (R^2 0.3199) (Table 3) of the variation in the dependent variable is explained by the variation in the explanatory variables.

Table 3: Factors Influencing Household Level of Commercialization

Variable	Coefficient	Std.error	t-statistics	Prob>/t/
Gender(1=male,0=female)	0.3808	0.1399	2.72	0.007**
Age (years)	-0.0027	0.0099	-0.28	0.783
Marital status(1=married,0=otherwise)	0.2471	0.2838	0.87	0.385
Household size (number)	-0.0308	0.0286	-1.08	0.282
Education (years)	-0.0521	0.0135	-3.86	0.000***
Farming experience (years)	-0.0126	0.0094	-1.34	0.182
Access to transport facilities (yes=1, no=0)	0.0680	0.1389	0.49	0.625
Access to farmers group (yes=1,no=0)	0.0982	0.1302	0.75	0.451
Access guaranteed market (yes=1, no-0)	0.0249	0.1603	0.16	0.877
Long dist from farm to market (yes=1,no=0)	-0.0527	0.1005	-0.52	0.601
Access to credit(yes=1, no=0)	0.0530	0.1213	0.44	0.663
Non-farm income (naira)	-4.68e-07	4.79e-06	-0.10	0.922
Farm size (hectares)	0.3751	0.0548	6.84	0.000***
Constant	12.6029	0.3973	31.72	0.000

Note: *** =1% sig level, **=5% sig level, * = 10% sig level; Prob>F = 0.0000; R^2 = 0.3199; Adjusted R-squared =0.2731 Root MSE = 0.67313

Three out of the thirteen variables are significant. There is a positive significant relationship ($p<0.05$), between the volume of cassava sold and gender as expected (β =0.3808, p =0.007) (Table 3). Accordingly, total volume of cassava sold is higher by 0.3808 if the household head is male. This could be as a result of household chores women are shouldered with, that is, women spend a great deal of their time on domestic chores. Another possible explanation could be related to the fact that many smallholder farmers travel long distances to the market and this requires physical fitness which men are better off than women.

Table 3 revealed that the level of education is strongly significant and negatively related with the volume of sale (β= -0.0521, p = 0.000) as against a priori expectation. This means that the likelihood to sell more decreases with the level of education. The regression result also indicated that farm size had a significant and positive impact (β =0.3751, p= 0.000) on the level of total cassava sold. This implies that an increase in farm size will increase the probability of the household to sell more of their produce. This could be associated with the fact that a larger area of farm size provides a greater opportunity for surplus production and it is important to know that size of land is very essential because transaction costs are largely fixed costs that can be spread across more output on large farms (Randela *et al.*, 2008).

Effect of commercialization on the household income
The model's adjusted R^2 is 32% with a significant overall fit. Three out of thirteen variables are significant. Total cassava produced ($p<0.01$), gender ($p<0.05$) and farm size ($p<0.01$), all had a significant and positive relationship with household income (Table 4), which suggests that an increase in any of these variables will lead to an increase in the household income. However, the number of years in education ($p<0.01$) had a negative and significant relationship with the household income, and which is against a priori expectation. This might be as a result of most respondents not being well educated while those educated are young and prefer off-farm jobs.

Table 4: Factors of Commercialization Affecting Household Income

Variable	Coefficient	Std.error	t-statistics	p> /t/
Gender(male=1,female=0)	0.4027	0.1636	2.46	0.015**
Age(number)	-0.004	0.1167	-0.38	0.708
Marital status(married=1,otherwise=0)	0.2529	0.3317	0.76	0.447
Household size(number)	-0.3324	0.0334	-1.00	0.321
Education(years)	-0.0586	0.1581	-3.71	0.000***
Farming experience(years)	-0.0125	0.0109	-1.13	0.259
Total cassava produced(tones)	0.5395	0.0156	3.21	0.000***
Access to transport facilities (Yes=1,No=0)	0.0901	0.1624	0.56	0.580
Access to farm group(Yes=1,No-0)	0.1132	0.1522	0.74	0.458
Access to guaranteed market(Yes=1, No=0)	0.0141	0.1874	0.08	0.940
Access to Credit(yes=1, No=0)	0.0070	0.1417	0.05	0.960
Non- farm income(Naira)	-5.75e-07	5.59e-06	-0.10	0.918
Farm size (ha)	0.3029	0.0641	4.73	0.000***
Constant	12.6138	0.4644	27.16	0.000

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level; Prob>F= 0.0000; R-squared= 0.3721 Adjusted R Squared= 0.3221;   Root MSE=0.7868

Constraints faced by the sampled farmers

There were a lot of factors affecting the farmers to fully commercialize. Among the problem militating against them is bad road which was ranked first by the farmers. In most rural farm settlements, tarred roads are often lacking and where they are available, they are mostly not motorable throughout the year because they are laced with pot holes. This makes it difficult for vehicles to get to farm sites to evacuate farm produce. In addition to this, is the fact that there are no sufficient vehicles that can convey farm produce from the farm site to the markets. This makes transportation cost to account for a very high percentage of the marketing costs. Credit inaccessibility and unattractive price were ranked by the farmers as second and third most important respectively, while transaction bottleneck, inadequate market infrastructure, storage facilities, land tenure were ranked as the fourth, fifth, sixth and seventh problem affecting farmers, respectively.

The seasonal pattern of production and the perishable nature of food crops create some problems to farmers. Usually crop seasonality creates surpluses at harvest period, which must be sold at low prices, or stored for future sale at greater costs. During the off-season period, there is shortage of the products, which leads to a gap in the supply-demand situation and high fluctuations in prices for food crops in the country. Market infrastructure such as market information is also inadequate.That is, Sellers and buyers of food products are usually not well informed about the sources of supply and thereby reducing potentialefficiency in the market.

The possible solution suggested by the farmers were: provision and rehabilitation of rural roads, accessibility of credit to assist farmers especially female farmers with little or no collateral, farmer should cooperate and sell their produce at least in a uniform price and market information should be made known to farmers to reduce excess crop production that causes cassava glut which can encourage selling the productsat a very low price. To address transaction bottleneck, which is mostly caused by the exploitation of middlemen especially those that take the products to the market for sell, there should be an association or a union that can caution the activities of the middlemen, ensuring that farmers are given better returns for their effort.

CONCLUSION

It has been revealed that as the farm size increases, the volume of cassava sold increases, while education was found to have a negative effect on the level of commercialization. In the same vein, increase in volume of cassava produced as well as increase in farm size increases the positive effect of commercialization on household farm income increase.

Based on the study's findings, there is need for a policy that will help eradicate the constraints militating against cassava commercialization such as poor road, inaccessibility to credit, unattractive prices and other transaction bottlenecks. It is hereby recommended that farmers should be more organized and develop an effective integrated marketing information system; farmers should ensure that there are guaranteed markets for their products as this will serve as surety against uncertainty in getting potential buyers. Concerted efforts should be made towards upgrading or rehabilitating the roads to reduce transaction costs as well as towards provision of marketinfrastructures.

REFERENCES

Adegboye, R. O. (2004). Land, Agriculture and Food Security in Nigeria. Lecture presented in the *Faculty of Agriculture Lecture, University of Ilorin, Feb. 25th*, 2004.

Adenegan, K.O., Adams, O and Nwauwa, L.O.E (2013): Gender Impact of Small-Scale Farm Households on Agricultural Commercialisation in Oyo State, Nigeria. *British Journal of Economics, Management & Trade* 3(11): 1-11.

Awah, E. T., and Tumanteh, A. (2001). Cassava based cropping systems and use of inputs in Different Ecological zones of Central Africa. *African Journal of Root and Tuber Crops*, 4(2): 20-27.

Awoyinka, Y. A. (2009). Effect of presidential initiatives on cassava production efficiency in Oyo State, Nigeria. *Ozean journal of applied sciences*, 2(2): 185-193.
.

Ekwe K.C and Nwchukwu I. (2004): Factors Associated with utilization of improved Garri processing technology in South Eastern Nigeria: Report of research project submitted to Department of Agricultural Extension and Rural Sociology, National Root Crop Institute, Umudike, Nigeria.

Ezedinma P.; Kormawa G.; Asunugba K.; Makinde K. and Okechukwu R. (2007): Opportunities in the industrial cassava market in Nigeria. 36(1):1-25.

Federico, B., Patrizia, L. and Jane, M. (2007): Promoting Commercial Agriculture in Africa. African Technology Development Forum Journal, 5: 32-40.

Goitom Abena (2009). Commercialization of smallholder farming: determinants and welfare outcomes: a cross-sectional study in Enderta district, Tigrai, Ethiopia. Unpublished PhD thesis, University of Agder, Kristiansand, Norway.

Govereh, J., Jayne, T. S., and Nyoro, J. (1999). Smallholder commercialization, interlinked markets and food crop productivity: Cross-country evidence in eastern and southern Africa.Unpublished thesis in the *Department of Agricultural Economics and Department of Economics, Michigan State University.*

Immink M.D.C and Alarcon J.A. (1993): Household income, food availability, and commercial Crop production by smallholder farmers in the western highlands of Guatemala. Economic Development and Cultural Change 41(2):319–342.

Jaleta, M., Gebremedhin, B., and Hoekstra, D. (2009). Smallholder commercialization: Processes, determinants and impact. Discussion Paper No 18. Improving Productivity and Market success of Ethiopian Farmers Improving Market Opportunities. ILRI.

Kawagoe T. (1994): Income and employment generation from agricultural processing and marketing at the village level: A study in Upland Java, Indonesia. In: von Braun J and Kennedy E (eds). Agricultural commercialization, economic development, and nutrition. Johns Hopkins University Press, Baltimore, Maryland, USA., pp. 176–186.

Lapar, M..L., Holloway, G. and Ehui, S. (2002). Policy Options Promoting Market Participation among smallholder livestock producers: a case study from the Philippines. Food policy 28:187-211.

Makhura M.N., J. Kirsten, C. Delgado (2001); Transaction Costs and Smallholder Participation in the Maize Market in the Northern Province of South Africa. Proceedings of seventh Eastern and Southern African Regional Maize Conference, 11th-15th February, 2001, pp 463-467.

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

Nweke, F. I., Spencer, D. S. C., and Lynam, J. K. (2002). The cassava transformation. *Africa's best kept secret., East Lansing*. *Michigan State University* Press Project MUSE.

Omits J.M, Otieno D J, Nyanamba T O and Mccullough E. (2009). Factors influencing the intensity of market participation by smallholder farmers, a case study of rural and peri-urban areas of Kenya. Afjare3(1):57-82.

Pingali L.P and Rosegrant M.W. 1995. Agricultural commercialization and diversiication: Processes and polices. Food Policy 20(3):171–185.

Randela, R., Alemu, Z. G., and Groenewald, J. A. (2008). Factors enhancing market participation by small-scale cotton farmers. *Agrekon*, *47*(4), 451-469.

Randolph T.F (1992).The impact of agricultural commercialization on child nutrition.A case study of smallholder households in Malawi. PhD dissertation.Cornell University, Ithaca, New York, USA.

Von Braun, J. (Ed.). (1992). Improving food security of the poor: Concept, policy, and programs. Washington D.C. International Food Policy Research Institute.