

Factors Influencing the Decision to Migrate among Rural Smallholder Arable Crop Farm Households in South Eastern Nigeria

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Abstract: Given that migration is a basic major component of population dynamics as well as a way for household to maximize its chances for survival in an uncertain environment by diversifying its sources of income, there is the need to investigate on the socio-economic characteristics of households influencing their decision to migrate. This was the thrust of this study conducted in South Eastern Nigeria. A multi-stage random sampling and purposive sampling technique was used in choosing the sample. Primary data collected using structured questionnaire and interview schedules were analyzed by the use of such statistical tools as frequency distribution, percentages, means and probit regression analysis. Result of data analysis revealed that the socio-economic factors influencing the decision to migrate were age of household head, household income, amount of household land holdings (proxy for household wealth), education and the dependency ratio. There is therefore, the need for policies that will harness the potential benefits of remittances. This is given to the fact that migration and hence, remittances can help reduce risk to lives, livelihoods and ecosystems and enhance overall resilience of households and communities to the adverse effects of environmental change and economic crises.

Key words : Decision, migrate, smallholder arable crop, farm households

1. Introduction

It is increasingly recognized that migrants constitute an invaluable resource for development and poverty reduction in their home countries (Cotula and Toulmin, 2004). For many developing countries, remittances (defined as the portions of cross-border earnings that

migrants send home) from overseas migrants exceed development aid and foreign direct investment volumes. Moreover, remittances from migrant relatives, either internal or international, are often the main component of rural households' incomes. Unlike aid, remittances flow directly to individual households and unlike loans they incur no debt. Besides contributing to household livelihoods, remittances can foster longer-term development through investment in education, land and small businesses. In some places, migrants' associations channel part of the remittance inflows into community development projects, such as schools, health centres and water wells.

On the significance of remittances, it was believed by many scholars for a long time that remittances form an insubstantial part of village income. A major proponent of this theory was Lipton (1988) who based his argument on the IDS village studies (Connell, 1976) which estimated remittances at 2-7 per cent of village incomes, and less for poor labourers. However, new evidence suggests that this is not necessarily the case. Deshingkar and Start's (2003) research in unirrigated and forested villages of Madhya Pradesh showed that migration earnings accounted for more than half of the annual household earnings. In the more prosperous State of Andhra Pradesh, the overall contribution was much lower but in the village that was in the unirrigated and poor north-western corner, migration contributed 51% of household earnings. However migration income was both from farm and non-farm sources and the relative importance of each depended on the particular skill base and historical migration pattern.

Migration and commuting are now a routine part of the livelihood strategies of the rural poor across a wide range of developing country contexts (Deshingkar, 2004). While past determinants of migration such as drought are still valid and important, there are new driving forces underlying the increase in population mobility. These forces are location specific and include improved communications and roads, new economic opportunities arising from urbanization as well as the changing market context as economies become more globalised and liberalized.

Migration is a major component of population dynamics which is characterized by deliberate rational decision of the migrant. Whereas international migration exacts some forms of checks and limits on intending migrants, internal migration on the other hand is easily more achievable. In Nigeria as in most developing countries of the world, both internal and international migration has become a major issue influencing government policies and program efforts. The differentials in income levels between the sending and destination areas

serve as the basis for such movements. Migration is associated with a compensating counter current in forms of rural development, including family support (Ravestein, 1985 and Fadayomi, 1988). In most cases, people left behind in the villages often look forward to remittances from abroad for their support (Adewuyi and Ebigbola, 1990).

According to Mutume (2005), more people are living outside their countries of birth than ever before. In 2000 an estimated 175 million people worldwide (one in every 35) were living outside their native countries. With the advent of globalization, these numbers are set to increase by a projected 2–3 per cent annually. Remittances offer an opportunity for developing countries to look at ways of benefiting from their citizens who have chosen to live and work abroad. Iheke (2010) noted that Families see migration as a form of portfolio diversification in which remittances play an important role. They first invest in migrants leaving, but they do so in the expectation of returns in the form of remittances. Migration is also undertaken as a survival strategy in which the temporary or long-term migration of people from a household is seen as a way for the household to maximize its chances for survival in an uncertain environment by diversifying its sources of income (Bilsborrow, 1998; Massey *et al.*, 1993; Stark, 1991). However, Samal (2006) noted that migration takes place both as individual optimization behaviour and family survival strategy. Migration can help reduce risk to lives, livelihoods and ecosystems and enhance overall resilience of households and communities to the adverse effects of environmental change and economic crises (Boncour, 2010).

Togunde and Osagie (2009), migrants return to their communities of origin with transformed identities, that is, identities that shape their world outlook; further, these migrants are able to develop and sharpen the negotiating skills that they use to situate themselves in these two societies. They further noted that efforts by African return migrants aimed at alleviating poverty in their countries of origin have elaborated to a point at which they are now recognized as a major development initiative by which they have transformed the social, cultural and political landscapes of their countries of origin.

Therefore, this study sought to investigate on the socio-economic characteristics of households influencing the decision to migrate. Migration is considered as the movement of people from one geographical region to another, which may be on temporary or permanent basis (Adewale, 2005). It is a selective process affecting individuals or families with certain economic, social, educational and demographic characteristics which essentially expose households to varying degrees of risks and vulnerability to poverty which according to Osawe (2013) is more especially in the rural marginalised areas of Nigeria that are mainly

agrarian. Risk and vulnerability analysis among poor rural households according to some authors is important to an understanding of the social relations and decision-making processes that underlie households' livelihood diversification strategies such as migration patterns (Blaikie *et al.*, 1994; Ellis, 2000).

2. Methodology

2.1 The study area

This study was conducted in South Eastern Nigeria, which comprises of five states namely: Abia, Anambra, Ebonyi, Enugu and Imo. The area lies between latitudes $4^{\circ} 20'$ and $7^{\circ} 25'$ North and longitudes $5^{\circ} 25'$ and $8^{\circ} 51'$ East. It covers a land area of about 109,524KM² or 11.86 percent of the total land area of Nigeria. The area lies mainly on plains under 200M above sea level (Obi and Salako, 1995; Monanu, 1975). The population of the area is 29,949,530, comprising of 15,326,463 males and 14,623,067 females (NPC, 2006) and farming is the predominant occupation of the rural inhabitants. According to Nwajiuba (2005), four states in Southeast Nigeria (Anambra, Imo, Abia and Enugu) are among the seven most densely populated states of Nigeria, implying that the southeast is the most densely populated area in Nigeria. As a result of this increased human pressure on finite resources, there is intense competition for the available natural resources in the area. Therefore, many people view migration as an alternative option of securing a livelihood.

2.2 The data

A multi-stage random sampling and purposive sampling technique was used in choosing the sample. In the first stage, two States, Abia and Imo, were randomly selected from the 5 states in South Eastern Nigeria. Secondly, from each chosen State two Local Government Areas (LGAs) out of the 17 and 27 in Abia and Imo States, respectively, were selected simple random sampling. Thirdly, from each chosen LGA, three communities were randomly selected. The lists of remittance receiving and non-remittance receiving arable crop farm households formed the respective sampling frames in each chosen community, from which three households each were randomly selected. The last stage involved the listing of migrant remittance receiving and non receiving households with the assistance of community leaders and other key informants. These lists formed the frames from which samples of 3 households each were randomly selected. In all, 120 respondents were use for the study comprising 60 migrants' remittance receiving households and 60 non remittance receiving households.

Cross sectional data were collected using structured questionnaire and interview schedules. By this, the respondents were visited by the help of trained enumerators attached

to each study location. Literate respondents completed their questionnaires with possible explanations from the enumerators while the illiterate ones had theirs completed by the enumerators based on their oral responses.

2.3 The empirical model

Data analyses were by the use of such statistical tools as frequency distribution, percentages, means and probit regression analysis. The implicit form of the probit model was specified as:

$$Y = f(X_1, X_2, X_3, X_4, X_5) \quad (1)$$

Where Y = migration status, a dummy which takes the value of unity for migrant households and zero for non migrant households, X_1 = age of household head measured in years, X_2 = household size, household income measured in naira, X_3 = amount of household land holdings (hectare) and used as proxy for household wealth, X_4 = years of education of household head, X_5 = dependency ratio (measured as the ratio of number of household members that are dependants to those that are working in a household)

3. Results and Discussion

3.1 Socio-economic characteristics of the farmers

The socio-economic distributions of the respondents were presented in Table 1. They include age, marital status, household size, level of formal education, size of farmland, and visitation by agricultural extension agents. According to the Table, about 73.33 percent of the remittance receiving households and 86.67 percent of the non receiving households were under 60 years of age. The mean ages were 51 and 47 years respectively for the remittance receiving and non receiving households. This is similar to Iheke (2006) who reported about 88.73 percent and 98.53 percent of men and women rice farmers as being under 60 years of age, with mean ages of 46 and 43 years. This result implies that the farm households are ageing and that younger people are no longer going into farming. Odii and Nwosu (1996) reported the mean age of 45 years, while Nwaru and Ekumankama (2002) reported mean ages of 42 years and 49 years for men and women crop farmers respectively. However, the result shows that the bulk of the farmers are still energetic and should be reasonably enterprising. As noted by Nwaru (2004), the risk bearing abilities and innovativeness of a farmer, his mental capacity to cope with the daily challenges and demands of farm production activities and his ability to do manual work decrease with advancing age.

Table 1: Socio-economic distribution of the respondents

Age range	Remittance receiving households		Non-remittance receiving households	
	Frequency	Percentage	Frequency	Percentage
30-39	10	16.67	14	23.33
40-49	20	33.33	25	41.67
50-59	14	23.33	13	21.67
60-69	12	20.00	7	11.67
70-79	4	6.67	1	1.67
Mean	51.17		47.17	
Sex				
Male	36	60	38	63.33
Female	24	40	22	36.67
Marital status				
Single	4	6.67	7	11.67
Married	42	70.00	38	63.33
Separated	3	5.00	2	3.33
Divorced	2	3.33	0	0
Widowed	9	15.00	13	21.67
Household size				
1-5	22	36.67	22	36.67
6-10	34	56.67	31	51.67
11-15	4	6.67	7	11.67
Mean	6.5		6.75	
Level of formal education				
No formal education	5	8.33	12	20.00
Primary	28	46.67	21	35.00
Secondary	16	26.67	21	35.00
Tertiary	11	18.33	6	10.00
Farming experience				
1-10	11	18.33	13	21.67
11-20	32	53.33	24	40.00
21-30	9	15.00	15	25.00
31-40	4	6.67	2	3.33
41-50	4	6.67	6	10.00
Mean	18.5		19.5	
Source of farm land				
Inheritance	40	66.67	43	71.67
Purchase	39	65.00	21	35.00
Leasehold/rent	13	21.67	18	30.00
Farm size				
0.1-2.0	28	46.67	36	60.00
2.1-4.0	20	33.33	21	35.00
4.1-6.0	7	11.67	2	3.33
6.1-8.0	4	6.67	1	1.67
8.1-10.0	1	1.67	0	0
Mean	2.72		1.98	
Extension contact				
Contact	24	40.00	21	35.00
No contact	36	60.00	39	65.00

Source: Survey data 2009

The Table also revealed that 60 percent of the remittance receiving and 63.33 percent of the non-remittance receiving households were headed by men. This is typical in the study area where the man, most often the husband, takes major decisions concerning the household except where he is no longer alive. On marital status, the bulk of the respondents (70 percent of the remittance receiving households and 63.33 percent of the non-remittance receiving households) were married. The result implies that majority of the farm households are stable. According to Nwaru (2004), this stability should create conducive environment for good citizenship training, development of personal integrity and entrepreneurship, which are very important for efficient use of resources.

Table 1 depicts that 56.67 percent and 51.67 percent of the remittance receiving and non-remittance receiving households respectively, had a household size of between 6-10 persons and the mean household size for both farm households are about 7 persons per household. This is consistent, desirable and of great importance in farm production as rural households rely more on members of their households than hired workers for labour on their farms. According to Nwaru (2004), this is so if members are not made up of the aged and very young people, otherwise scarce capital resource that should have been employed for farm production would be channeled for the upkeep of these dependent household members.

On education, 91.67 percent of the remittance receiving farm households and 80 percent of the non-remittance receiving farm households had one form of formal education or the other ranging from primary to tertiary education. This is desirable because according to Obasi (1991), the level of education of a farmer not only increases his farm productivity but also enhances his ability to understand and evaluate new production techniques. This result departs markedly from the findings Jaja *et al* (1998) and Nwaru (2001) who noted that the Nigerian agricultural landscape is characterized among other things by numerous isolated smallholder farm operators, the overwhelming majority of whom cannot read or write.

On the average, the remittance receiving households has spent about 19 years in arable crop farming while the non-remittance receiving households has spent about 20 years in the same enterprise. It has been noted that farmers would count a lot more on their farming experience for increased productivity rather than their education attainment (Olomola 1988; Obasi, 1991 and Nwaru, 1993). The result has some positive implications for increased rice

productivity because according to Nwaru (2004), as the number of years a farmer has spent in the farming business may give an indication of the practical knowledge he has acquired on how he can overcome certain inherent farm production problems.

The major source of farm land for both households was inheritance. Also, while 65 percent of the remittance receiving households obtained their land through purchase, only 35 percent of the non-remittance receiving households obtained theirs through this means. This could be as a result of higher purchasing power of the former made possible by migrants' remittance income.

The mean hectareage cultivated by the 2 groups of farmers were 2.72 and 1.96 hectares respectively. This result is consistent with the findings of Nwaru and Ekumankama (2002), Iheke (2006) and Iheke and Nwaru (2009). These farms are usually small-sized, fragmented and scattered and not contiguous land holdings. According to Nwaru (2004), this poses a great challenge to the much-desired agricultural modernization through mechanization and commercialization and therefore depicts the need for urgent land reform policies and programmes that would give farmers access to more contiguous land holdings for increased agricultural production.

Table 1 shows that only 40 percent of the remittance receiving households and 35 percent of the non remittance receiving households had contact with extension agents during the cropping season. This implies that both groups of farm households were not substantially exposed to technical innovation; a measure if reversed would increase their productivity. Iheke (2006) noted that as change agents, extension workers serve as channels for diffusion of technical innovations.

Statistical tests were carried out to determine whether significant differences exist between major socio-economic characteristics of the remittance receiving and non receiving households. The result of the t-test was presented in Table 2. The results show that there were significant differences in age, farm size, output and income between the remittance receiving and non-receiving households. This result implies that the remittance receiving households were relatively older, cultivated more farm land, produced greater output and had higher income than the non-remittance receiving households. The more farm land cultivated might have been made possible by remittance income which enabled them to acquire more land. It is expected *a priori* that farm size would be positively related to output. This explains the

increased output achieved by the remittance receiving households and the concomitant increase in income.

Table 2: Test for difference in major socio-economic variables of the remittance receiving and non receiving households

Variable/Household type	Mean	Std. error	Std dev.	t value
Age				
Remittance receiving household	50.2	1.38	10.70	2.11**
Non remittance receiving household	46.03	1.26	9.74	
Household size				
Remittance receiving household	6.43	0.32	2.49	-0.18
Non remittance receiving household	6.52	0.33	2.53	
Years of formal Education				
Remittance receiving household	8.17	0.59	4.59	0.69
Non remittance receiving household	7.57	0.68	5.28	
Farm size				
Remittance receiving household	2.75	0.27	1.07	7.89***
Non remittance receiving household	1.98	0.11	0.82	
Output				
Remittance receiving household	4952.58	344.43	2667.91	3.11***
Non remittance receiving household	3137.11	455.72	3529.99	
Income				
Remittance receiving household	762800	49800.44	385752.5	7.68***
Non remittance receiving household	465319.9	21077.05	163262.2	
Years of farming experience				
Remittance receiving household	19.77	1.48	11.48	0.99
Non remittance receiving household	18.03	1.19	9.22	

Source: computed from Survey data, 2009

3.2 Factors Influencing the Decision to Migrate

The probit estimates of the socio-economic factors influencing the decision to migrate is presented in Table 2. The Pseudo R² was 0.5274 which implies that 52.74 percent of the variations in migration decision was explained by the variables included in the model. The likelihood ratio Chi square was significant at 1 percent which attests to the goodness-of-fit of the probit model. The Table revealed that the significant factors influencing the decision to migrate were age of the household head, household income, household asset holding, years of education of household head and household dependency ratio.

Age of the household head was significant at 1 percent and positively related to the decision to migrate. This implies that there is more likelihood for some members of the household to migrate as the household head advances in age. This could be so as to generate more income in form of remittances to take care of the family members since the earning capacity of the household head decreases with age. Nwaru (2004) and Iheke (2010) noted that

household head gets older, he becomes dependent on other people since his ability to do manual work and cope with the daily challenges of work declines with advancing age.

Table 3: Factors Influencing the Decision to Migrate

Variable	Coefficient	Standard Error	Z - value
Constant	-1.924	1.265	-1.52*
Age	0.038	0.021	1.81*
Household size	-0.041	0.069	-0.60
Income	-2.81e-06	8.53e-07	-3.30***
Household asset holding	-0.896	0.532	-1.68*
Education	0.064	0.038	1.67*
Dependency ratio	0.594	0.153	3.89***
Pseudo R ²	0.5274		
Likelihood Ratio Chi square	87.74***		

Source: Survey data, 2009

Household income is significant at 1 percent and negatively related to migration decision. This result implies that there is less likelihood to migrate with increases in household income. Income differential is a major factor influencing migration. If rural wages and incomes are high, there will a decline in the rate of migration.

Household asset is significant at 10 percent and negatively related to migration decision. Physical asset endowment influences household welfare status. It is expected that farmers or households with larger assets have higher income which bears a direct effect on welfare and standard of living. This influences migration negatively. Also, the amount of land holdings is another useful determinant of consumption; the proportion of land holding area has a proportional direct effect on household consumption. Households with large land areas are likely to have higher income than households with low land holdings.

Years of formal education of the household head influences migration positively and is significant at 10 percent. This implies that educated heads of households are more likely to encourage the migration of their household members than the less educated. This stems from the fact that they recognize more, the importance of migration as a livelihood diversification option. Iheke (2010) noted that migration can be seen by such households as a form of portfolio diversification in which remittances play an important role. Under the survival strategy, Chianu *et al* (2008) noted that although farming activities remain crucial, rural

dwellers must look for diverse opportunities to increase and stabilize their income for long-term sustainable livelihoods and improved welfare.

Dependency ratio is significant at 1 percent and positively related to migration decision. This implies that migration increases if the dependency ratio is high. As the number of dependents in a household increases, household income is over-stretched to cater for them and migration is seen as a veritable option for increasing household income. This explains the positive relationship between dependency ration and migration.

4. Conclusion

This study provided ample evidence that the socio-economic profiles of households influences their decision to migrate. Such socio-economic characteristics included age of household head, household income, amount of household land holdings (proxy for household wealth), education and the dependency ratio. Since migration is undertaken as a survival strategy in which the temporary or long-term migration of people from a household is seen as a way for the household to maximize its chances for survival in an uncertain environment by diversifying its sources of income, there is therefore, the urgent need for the government, policy makers and other stakeholder to pursue policies that will harness the potential benefits of remittances. This is given to the fact that migration and hence, remittances can help reduce risk to lives, livelihoods and ecosystems and enhance overall resilience of households and communities to the adverse effects of environmental change and economic crises.

References

1. Adewale, J. B. "Socio-Economic Factors Associated with Urban-Rural Migration in Nigeria: A Case Study of Oyo State, Nigeria", *J. Hum. Ecol.*, 17(1): 13 – 16, 2005.
2. R. Bilborrow "The State of the Art and Overview of the Chapters", in *Migration, Urbanization, and Development. New Directions and Issues.* ed. R. Bilborrow. UNFPA, Kluwer Academic Publishers, Pp. 1-56. 1998.
3. P.M. Blaikie, T. Cannon, I. Davis, and B. Wisner *At Risk: Natural Hazards, People's Vulnerability and Disasters.* London and New York: Routledge Publisher, 1994. In: O. W. Osawe, "Livelihood Vulnerability and Migration Decision Making Nexus: The Case of Rural Farm Households in Nigeria", *IOSR Journal of Humanities and Social Science*, Vol. 16 (5): 22-34.

4. P. Boncour, Climate change, the environment and migration: from global challenges to regional opportunities. Paper presented at the Regional Consultation Meeting International Organization for Migration, Damas, Syria 15-16 September, 2010.
5. P. Deshingkar, *Understanding the Implications of Migration for Pro-poor and Agricultural Growth: Issues Paper*. Overseas Development Institute Paper prepared for the DAC POVNET Agriculture Task Group Meeting, Helsinki, 17 – 18 June, 2004.
6. P. Deshingkar and D. Start “Seasonal Migration for Livelihoods in India: Coping, Accumulation and Exclusion”, Working Paper 220, *Overseas Development Institute* London, 2003.
7. F. Ellis, *Rural Livelihoods and Diversity in Developing Countries*. Oxford University Press : Oxford, UK, 2000. In: O. W. Osawe, “Livelihood Vulnerability and Migration Decision Making Nexus: The Case of Rural Farm Households in Nigeria”, *IOSR Journal of Humanities and Social Science*, Vol. 16 (5): 22 - 34.
8. O. R. Iheke “Gender and Resource Use Efficiency in Rice Production Systems in Abia State of Nigeria”, M.Sc. Thesis, Michael Okpara University of Agriculture, Umudike, Nigeria, 2006.
9. O. R. Iheke “Impact of Migrant Remittances on Efficiency and Welfare of Rural Smallholder Arable Crop Households in South Eastern Nigeria”, Ph.D. Dissertation, Michael Okpara University of Agriculture, Umudike, Nigeria, 2010.
10. O. R. Iheke and J. C. Nwaru “Gender, farm size and relative productivity of cassava farmers in Ohafia Agricultural Zone of Abia State, Nigeria”, *Nigerian Journal of rural sociology* Vol. 9 (1): 69 - 75, 2009.
11. J. S Jaja, E. C. Chukwuigwe and D. I. Ekine “Stimulating Sustainable Agricultural Development through Youth Mobilization Schemes: A Case of school-to-Land Programme in Rivers state, Nigeria” *Sustainable Investment in Nigeria*. Nwosu, A. C. and J. A. Mbanasor (eds) proceedings of the 13th Annual conference of Farm Management Association of Nigeria, Alphabet Nigeria Publishers, Owerri, pp 294 - 301, 1998.
12. M. Lipton, ‘Rural Development and the Retention of the Rural Population in the Countryside of Developing Countries’, in: J. Havet (ed.), *Staying On: Retention and Migration in Peasant Societies*, University of Ottawa Press, 1988.
13. D. S. Massey, “Theories of International Migration: review and Appraisal”, *Population and Development Review*, 19(3): 421-466, 1993.

14. P. C. Monanu, *Geographical boundaries of Nigeria*. University of Ife Pres, 1(2): Pp. 3, 1975.
15. G. Mutume, Workers' remittances: a boon to development, *Africa Renewal*, Vol.19 (3): Pp. 10, 2005.
16. NPC (Nigerian Population Commission) 2006 Nigerian Census Figures. Nigerian Population Commission, Abuja, 2006.
17. C. Nwajiuba, "International Migration and Livelihoods in Southeastern Nigeria", *Global Migration Perspectives* No. 50, October 2005
18. J. C. Nwaru "Stimulating, Entrepreneurship in Nigerian Farms through Sustainable Agricultural Extension Service Delivery in Nigeria: Prospects and Questions, Olowu, T.A. (ed), Proceedings of the 7th National Conference of *Agricultural Extension Society of Nigeria* 19 - 22 August. Pp. 19-27, 2001.
19. J. C. Nwaru, "Gender and Relative Production Efficiency in Food Crop Farming in Abia State of Nigeria" *The Nigerian Agricultural Journal*, Vol. 34 Pp 1-10, 2003.
20. J. C. Nwaru, "Rural Credit Markets and Resource Use in Arable Crop Production in Imo State of Nigeria", Ph. D Dissertation, Michael Okpara University of Agriculture, Umudike, Nigeria, 2004.
21. J. C. Nwaru and O. O. Ekumankama "Economics of Resource Use by Women Arable Crop Farms in Abia State", Research Report Submitted to the Senate Grant Committee, Michael Okpara University of Agriculture, Umudike, December 40 Pp, 2002.
22. J. C. Nwaru and O. R. Iheke, "Comparative analysis of resource Use Efficiency in Rice Production Systems in Abia Satte, Nigeria", *AMSE Journals, Modelling D*, Vol. 32(2): 1 – 19, 2011.
23. P. C. Obasi, "Resource Use Efficiency in Food Crop Production: A Case Study of the Owerri Agricultural Zone of Imo State, Nigeria", M.Sc. Thesis, University of Ibadan, Ibadan, Nigeria, 1991.
24. M. E. Obi and F. K. Salako, "Rainfall Parameters influencing erosivity in South Eastern Nigeria", *CATENA*, 24(4): 275 – 287, 1995.
25. M. C. A. Odii, and A. C. Nwosu "Cost and Returns of Rice Production under Alternative Production Systems", *AMSE Journals, Modelling D*, 13; 1& 2, 1996.
26. J. K. Olayemi and C. E. Onyenweaku, *Quantitative Methods for Business Decisions*, Bosude Printers Ltd, Ibadan: Nigeria, 1999.
27. A. S. Olomola, "Agricultural Credit and Production Efficiency". *NISER Monograph Series, No. 4*. Ibadan: Nigerian Institute of Social and economic Research, 1988.

28. C. E. Onyenweaku and J. C. Nwaru “Application of a Stochastic Frontier Production Function to the Measurement of Technical Efficiency in Food Crop Production in Imo State, Nigeria”, *AMSE Journals, Modelling D*, Vol. 28(2): 15 – 26, 2007.
29. O. W. Osawe, “Livelihood Vulnerability and Migration Decision Making Nexus: The Case of Rural Farm Households in Nigeria”, *IOSR Journal of Humanities and Social Science*, Vol. 16 (5): 22 - 34, 2013.
30. C. K. Samal, “Remittances and Sustainable Livelihoods in Semi-Arid Areas”, *Asia-Pacific Development Journal* 13 (2): 73, 2006.
31. O. Stark, *The migration of Labor*, Cambridge & Oxford: Blackwell, 1991.
32. L. Tanko and C. E. Onyenweaku, “Optimum Combination of Food Crop Enterprises in Zuru Agricultural Zones, Kebbi State, Nigeria: A linear Programming Approach”, *AMSE Journals, Modelling D*, Vol. 28(2): 59 – 77; 2007.