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Shocks and Coping Strategies of Rural Households: Evidence from Ogo-Oluwa Local Government, Oyo State, Nigeria

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Abstract

Rural households in Nigeria are vulnerable to shock because of their limited capacity to make informed decision on secured coping strategies which is further aggravated by some households' specific socio-economic characteristics. Attempts were made to identify shocks being faced by households' heads and coping strategies. Multistage sampling technique was used to select 80 respondents and well structured questionnaire was used to collect data through in-depth interview. Data were analysed using descriptive statistics to describe households' socio-economic variables; Probit analysis was also used to determine the relationship between personal socio-economic characteristics of the respondents, shocks and choice of coping actions. The results revealed that a large share of households experience multidimensional shocks, which are mainly associated to ecological but also suffer from other economic, demographic and social factors. Majority of households undertake coping actions in response to shocks; coping strategies employed but not limited to include borrowing, distress sales of assets, remittances, adjustment in food intake, drawing on savings. Educational status, household size, per capita income, shocks type, coping strategies, among others are found to significantly affect the choice of coping actions and are likely to have implications for households' future welfare status.

Keywords:
Rural households, Shocks, Coping strategies, Probit model, Nigeria

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INTRODUCTION

Understanding shocks and their consequences is essential for developing effective poverty alleviation strategies that strengthen existing coping measures in developing economies like Nigeria; at present, a better understanding of this linkage is lacking because comprehensive empirical data are rare (Tongruksawattana *et al.,* 2010). In most developing countries, agriculture remains as one of the main sources of income for the majority of the population in rural areas. Although most of these households are agricultural producers, they also take part in other activities such as salaried employment in agriculture, trade, and other services as well as self-employment in small industries and commercial activities (micro-enterprises); the income generation opportunities of rural households are usually highly correlated. The profitability and seasonality of agricultural production affect, in many ways, not just the lives of farmers but also the lives of other people in their communities, as a large proportion of the landless workers (peasants) also depend on the agricultural sector. Other activities, such as commerce or services, are also correlated to the main income generating activity of most of the households. Thus, the rural areas are particularly vulnerable to systemic shocks (Carlos Andrés Alpízar, 2007). He further emphasized that, in highly dynamic agricultural environments with rapid technological progress (especially in cases of embodied technical change, such as improvements of seeds and plant varieties through biotechnology and adoption of fertilizers, pesticides and other modern inputs), lags in the adoption of the improved technologies can also be a source of inefficiency, thus creating shocks. The rate of adoption of new technologies may depend not only on the level of information of the households, their willingness to adopt innovations and their integration into markets but also on their capacity to purchase the new inputs; due to these numerous circumstances, people who live in the rural areas of developing countries face many challenges. One of their main struggles is gaining their daily subsistence, given unfavorable economic, environmental, and political conditions. In the literature, a distinction is made between individual household-specific (idiosyncratic) shocks such as illness and death of a household member, and covariate shocks which have an impact on a larger group of population in the same area at the same time such as weather adversity and market fluctuation (Dercon, 2002 as cited by Tongruksawattana *et al.,* 2010); in economic terms, shocks can result in income loss or asset loss but shocks can also cause other disutility like pain, grief or depression. Since the majority of rural households engage in agricultural production, they are particularly prone to ecological shocks, e.g. drought, flooding, crop pests or livestock diseases which cause damage on agricultural output and in turn reduce income from agriculture (Tongruksawattana *et al.,* 2008 and Pandey *et al.,* 2007). According to Rashid *et al.,* (2006), households plan strategically for facing risks associated with livelihood security; choosing a particular set of coping strategies depends on a number of factors including the types of crisis households face and options available; often, poor households risk future income generating capacity for maintaining current food consumption. Also, the choice of coping strategies depends on diversity and stability of household income sources; households with higher education have greater access to stable incomes sources and have more income sources, and so are less likely to adopt ex-post coping strategies, households with more assets are more likely to divest assets or obtain secured loans rather than rely on unsecured loans. Wealthier households are not less likely to adopt current adjustment strategies, suggesting that there is a general sequence of coping strategies that all households follow, irrespective of the assets they possess. However, it should be noted that, higher incidence of poverty profile in Nigeria's rural areas have been traced to shocks; according to Oyekale and Yusuf (2010), some environmental problems associated with agricultural production, high vulnerability to health hazards (Alayande and Alayande, 2004 as cited by Oyekale and Yusuf, 2010), low level of education, high fertility rate, lack of access to improved seeds and inputs and poorly developed social infrastructural facilities (Okunmadewa, 2002 as cited by Oyekale and Yusuf, 2010) among others. Similarly, due to lack of appropri-

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ate insurance against income shocks, rural poverty is often worsened because farmers dispose their productive assets such as land, livestock, equipments and so on in order to meet immediate consumption needs (Alayande and Alayande, 2004 as cited by Oyekale and Yusuf, 2010). Also, farming households face serious risks from inadequate rains/drought, degraded land, input shortages, disease outbreak and low prices for agricultural products. For a variety of reasons, the poor are often the least equipped to weather the impact of aggregate shocks on their income; they have few assets which they could sell or use as a buffer, limited or no access to formal credit and insurance markets to help smooth income shocks over time, and often lack the education and marketable skills which are necessary for successful migration to other areas with economic opportunities; where the consumption of the good or service (such as healthcare) is necessary, households may be faced with catastrophic spending burdens that drive them deep into debt and destitution. Furthermore, many of their coping strategies are either ineffective, or create harmful consequences, especially for children. Most of the informal risk-coping arrangements and strategies of the poor might work well on idiosyncratic risks (e.g. self-insurance or informal community risk-sharing) but are limited in their effectiveness against covariate risks that create contemporaneous community-wide loses (Agenor, 2004 as cited by Mendoza, 2009). However, FAO (2007) stated that, not all shocks are equally damaging and not all vulnerability reducing instruments are equally effective. Rural households in Sub Saharan Africa live in risky environments and very often they cannot protect their income or consumption from shocks. This inability to cope with shocks may permanently damage their earnings prospects and jeopardize their children's future following disinvestment in their human capital; these insights are increasingly appreciated and reflected in the design of shock/poverty reduction or and alleviation strategies globally.

Problem statement

The effects of shocks on rural households and on their ability to cope with such crises have been a topical issue of increasing concern and debate towards helping the affected households to manage the consequences of the shocks. But, shocks take on many forms; these can be climatic (drought, heavy rainfall), biological (illness, death), institutional (appropriation of land, theft or destruction of property) and economic (unemployment, staple or cash crop price shocks). Their relative importance in affecting household welfare across different settings remains poorly documented and the relative effectiveness of different interventions to mitigate household vulnerability is largely unknown. However, analyzing the effects of these shocks and coping strategies employed remain a challenging assignment. Natural disasters and poverty are widespread in the rural areas of the developing world; households in these rural areas face many risks and experience a wide variety of shocks, some of these shocks are particular to a household (idiosyncratic shocks), but others affect entire towns, sectors of economic activity, or countries, such as natural disasters (systemic shocks). Also, these households have varying access to the resources that allow them to manage risk and cope with the consequences of shocks. Rural households not only have varying access to resources but also to other risk-coping mechanisms, such as informal financial transactions (in thrift and credit associations), migration, remittances e.t.c. Christiansen and Subbarao (2001) as cited by Oyekale and Yusuf (2010) submitted that the need for addressing the issue of shocks becomes paramount because they lead to a wide variability in households incomes. In the absence of sufficient assets or insurance to smoothing consumption, such shocks may lead to irreversible losses; such as distress sale of productive assets, reduced nutrient intake or interruption of education that permanently reduces human capital, thereby locking their victims in perpetual poverty.

Specific objectives: are to:

- identify types of shocks the rural households experience.
- examine shocks coping strategies employed by households.
- determine the relationship between personal

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socio-economic characteristics of the respondents, shocks and choice of specific coping actions.

Hypothesis (H_0): There is no significant relationship between households' personal socio-economic characteristics and the coping actions.

MATERIALS AND METHODS

This study was carried out in Ogo-Oluwa Local Government Area of Oyo state with its' headquarters at Ajaawa. The Local Government Area is approximately located between the longitude of 3'51.18' and 3'58.9' East of Greenwich meridian and the Latitude 7'30.3' and 7'40.2' North of the equator with rainfall between 1500 and 2000mm and temperature between 23'C and 27'C Isotherms in January. It is situated at 233.2meters above sea level and the general elevation is between 178m and 220m above sea level (OYSADEP, 2001). The vegetation of the zone is derived savannah. The climatic and soil conditions of the study area favour the extensive production of food crops like cassava, yam, maize, vegetables, tomatoes, and cash crop like cashew and cocoa. Ogo Oluwa local government area is an extension block of the Oyo State Agricultural Development Programme; the block is made up of eight cells from which the sample for this study was taken. A multistage random sampling technique was used in selecting the respondents for this study. Four cells were randomly selected from the block; from each of the selected cells, two villages were then randomly chosen. Thereafter, ten households' heads were purposively selected from the chosen villages to arrive at a total sample of 80 respondents. A well structured questionnaire was developed based on the objectives of the study to collect information from the respondents through in-depth interview. Frequency distribution, percentages and probit regression model were used to analyse the data.

Model Specification

The model specified for this study is built from the work of Rashid *et al.,* (2006) who opined that, the choice of coping actions also depend on household characteristics, most importantly the diversity and stability of household income sources, household assets and education of the household head, among others. Assessing the choice of households to take or refrain from coping actions can be illustrated by means of a neo-classical random utility model for discrete choice decision-making (Greene, 2003). Facing a shock, a household has two choices, i.e. to cope or not to cope. In this context, a coping action is defined as an explicit and active action undertaking to counteract the negative shock effect such as asking for remittances and public transfers, re-allocating household resources, borrowing loans, drawing on savings or selling assets. On the other hand, households are categorized as "do not cope" if they respond to shocks in a passive way such as reducing consumption. The value or utility associated with coping U_1 and utility associated with not coping U_0 are index functions of deterministic and stochastic elements:

Utility from coping: $U_1 = X'\beta_1 + \varepsilon_1$ ----------1

Utility from not coping: $U_0 = X'\beta_1 + \varepsilon_0$ -----2

Holding all other things constant, the household will make the choice that is associated with the highest utility constrained by the coping ability and possibility of the household. However, the observed choice only reveals which one provides higher utility but the magnitudes of utilities are unobserved. Therefore, the probability that U_1 is chosen, observed through the coping action Y =1, is the probability that utility from coping is higher than utility from not coping and the opposite is observed for Y = 0 for no coping action.

Probability to cope: $Pr [Y = 1/ x] = Pr [U_1 > U_0]$-----3

Probability not to cope: $Pr[Y = 0/x] = Pr[U_1 \leq U_0]$------4

To estimate the likelihood of coping action, a discrete choice decision-making model was applied since the choice made is qualitative with the dependent variable being an indicator of a discrete binary choice. The latent unobservable decision variable Yi* is assumed to be a function of some household characteristics Xi and error term εi for all households i up to n (Tongruksawattana *et al.,* 2010 citing Maddala, 1999).

$Yi^* = Xi\beta + \varepsilon_i = n$ ----------5

Probit regression model is chosen for this type of response probability analysis due to the practicability of a two-step model. First of all, the affected household has to decide whether or not to take any coping action; for households who decide to take a coping action, the next decision is to choose which of the available and possible coping measures/strategies to take; the use of probit regression is becoming widely accepted

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in similar literature which explores the correlation between shocks and coping activities and multivariate probit is appropriate for making j-different choices at a point in time where the dependent choice variables are binary (Rashid *et al.,* 2006, Takasaki *et al.,* 2002 as cited by Tongruksawattana *et al.,* 2010).

The explicit form of the probit model is specified as: Pr (Yi = 1) = *f* (Xi β), where, Yi = Coping action (1 and 0, otherwise)

X_1 = Age, X_2 = Gender, X_3 = Marital Status, X_4 = Educational Status, X_5 = Household Size, X_6 = Membership of Social Organization, X_7 = Primary Occupation, X_8 = Secondary occupation, X_9 = Per capita income (pooled), X_{10} = Type of shocks, X_{11} = Coping strategies, β_1 - β_{11} = Coefficients, ε_1 = Error term.

RESULTS

Table 1 and Table 2.

Table 1: Selected personal socio-economic variables of households' heads

Variable	Frequency	Variable	Frequency
Age (years)		Monthly per capita income (₦)	
30 - 39	4 (5.0)	< 5,000	7 (8.7)
40 – 49	12 (15.0)	5,001 – 10,000	28 (35.0)
50 – 59	43 (53.8)	10,001 – 15,000	20 (25.0)
60 – 69	19 (23.7)	15,001 – 20,000	14 (17.5)
> 69	2 (2.5)	> 20,000	11 (13.8)
Gender (dummy)		[a]Households' assets	
Male	59 (73.8)	Land	47 (58.8)
Female	21 (26.2)	Livestock	26 (32.5)
Marital status		Personal building	11 (13.8)
Single	5 (6.2)	Cars	4 (5.0)
Married	64 (80.0)	[a]Social infrastructural facilities	
Separated	11 (13.8)	Road	29 (36.3)
Household size		Potable water	0 (0.0)
1 – 5	23 (28.7)	Borehole	23 (28.7)
6 – 10	55 (68.8)	Schools	11 (13.8)
> 10	2 (2.5)	Electricity supply	15 (18.7)
Educational status		Health care	7 (8.7)
No formal	32 (40.0)	[a]Types of Shocks	
Primary	29 (36.3)	Degraded land	34 (42.5)
Secondary	12 (15.0)	Land appropriation	7 (8.7)
Tertiary	7 (8.7)	Drought	12 (15.0)
		Flooding	6 (7.5)
		Crop pests / livestock diseases	37 (46.3)
Farm size (ha)			
< 3	62 (77.5)	Low prices of agric. produce	21 (26.2)
3.1 – 6	14 (17.5)	Inadequate improved inputs	11 (13.8)
> 6	4 (5.0)	High inputs price	23 (28.7)
Primary occupation		Income loss	24 (30.0)
Farming	43 (58.8)	Death of breadwinner	2 (2.5)
Petty trade	14 (17.5)	Coping Action	
Civil service	7 (8.7)	Yes	56 (70.0)
Tailoring	3 (3.7)	No	24 (30.0)
Artisan / Crafts	13 (16.3)	[a]Coping Strategies	
Secondary occupation		Remittances	8 (10.0)
None	25 (31.3)	Borrowing	16 (20.0)
Petty trade	19 (23.7)	Distress sales of assets	12 (15.0)
Farming	27 (33.8)	Drawing on savings	17 (21.2)
Traditional doctors	9 (11.7)	Migration	7 (8.7)
Membership of co-op. dummy)		Income from off/non-farm jobs	6 (7.5)
Yes	63 (78.8)	Reduction of production inputs	4 (5.0)
No	17 (21.2)	Adjustment in food intake	13 (16.2)
Total	80 (100)	Interruption of education	8 (10.0)
		Total	80 (100)

Source: Field survey, 2010, Figures in parentheses are percentages, [a] is multiple response.

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Table 2: Probit Estimates of selected explanatory variables on the dependent variable.

Variable	Probit Coefficient	Std. error	Z statistics	|P| z > z|
Constant	-2.521	1.102	-2.29	0.000
Age (X_1)	0.371	0.251	1.47	0.312
Gender (X_2)	-0.431	0.506	-0.85	0.182
Marital Status (X_3)	-1.158	1.175	-0.98	0.041**
Educational Status (X_4)	-0.037	0.094	-0.39	0.097***
Household Size (X_5)	-1.760	1.062	-1.65	0.000*
Membership of co-op society (X_6)	0.680	0.801	0.84	0.175
Primary Occupation (X_7)	2.864	1.086	2.63	0.492
Secondary occupation (X_8)	1.687	1.769	0.95	0.032**
Per capita income (X_9)	-1.028	0.501	-2.05	0.049**
Type of shocks (X_{10})	-1.767	0.906	-1.95	0.068***
Coping strategies (X_{11})	2.017	1.215	1.66	0.029**

Log likelihood ratio = - 126.46186
n = 80
LR. Statistics = 23.24189
Prob > chi^2 = 0.0942
*** = significant at 10% probability level
** = significant at 5% probability level
* = significant at 1% probability level
Source: Computer print out of probit analysis result

DISCUSSION

The empirical estimation of the probit analysis revealed a log likelihood of -126.46186 and LR statistic of 23.24189, all significant at 10 percent probability level. This shows that the model has a good fit. Considering |P| z > z| values for the variables included in the model, X_4 and X10 are statistically significant at 10%; X_3, X_8, X_9 and X_{11} are statistically significant at 5% while X_5 is significant statistically at 1% α-level having confidence interval of 99 percent. In the same vein, X_2, X_3, X_4, X_5 X_9, and X_{10} have negative coefficient values. This simply connotes that increase in the level of any explanatory variables with positive sign, X_1, X_6, X_7, X_8 and X_{11} in this case will have a positive effect on the coping actions, whereas those explanatory variables with negative sign as mentioned earlier will exert a negative relationship on the coping actions. And, the implication of all these from the finding is, age (X_1) with a mean of 53.8 years is positive, indicating that, older people tend to adopt better coping strategies especially in the areas of remittance, borrowing and sales of valuable assets (if any); Membership of co-operative society (X_6), occupations (X_7 and X_8) and coping strategies (X_{11}) having positive signs shows that, access to credit facilities positively influences the coping action likewise the occupation because a jobless person will have nothing to mitigate any shock; access to any of the coping strategies also positively affects coping decision but any contrary situation locks the victim in a vulnerable state. As expected, household size (X_5) with a mean of 7.9 members and type of shocks (X_{10}) have an inverse relationship with coping action because a large household size implies more responsibilities on the household head; most of them experience more of ecological shocks which is peculiar to agricultural production, and in the light of having little or nothing to cope with, making result-oriented coping decision becomes difficult; this renders the victims vulnerable to shocks. This is in line with Rashid *et al.,* (2006) and Tongruksawattana *et al.,* (2010). Conversely, the negative coefficients of educational status (X_4) and monthly per capita income (X_9) is at variance with a-priori expectations and findings of Rashid *et al.,* (2006) who opined that households with higher education have greater access to stable incomes sources and have more income sources, and so are less likely to adopt unsecured coping strategies; this is because education being a human capital is expected to

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boost chances of mitigating any shocks (in case of any) by taking well informed decisions on coping strategies to adopt; all the same, per capital income is expected to contribute positively to coping action by adopting best coping strategies. Deviation from a-priori expectations can be attributed to poor educational status of most respondents (40.0% and 36.3% with no formal and primary education respectively) as well as mean monthly per capita income of (₦11,642.00k).

CONCLUSION

The major shocks experienced by most rural household heads is more of ecological shocks in form of incidence of crop pests and livestock diseases, drought and degraded land which are common to agricultural production; these shocks significantly affect household heads with poor educational status and per capita income which is reflected in their capability and possibility to take a coping action and choice of a specific coping activity(s). Most of the rural household heads usually cope with shocks through several coping strategies such as borrowing, distress sales of assets, remittances, adjustment in food intake, drawing on savings, e.t.c among others. Older people adopt coping strategies especially in the areas of remittance, borrowing and sales of valuable assets while few younger ones take to participation in off-farm and non-farm activities and migration in search of green pasture. A mean household size of 7.9 as observed from the result implies more responsibilities on the household head because of a relatively large household size; most of them experience more of ecological shocks which is peculiar to agricultural production, and in the light of having little or nothing to cope with, making result-oriented coping decision becomes difficult; this eventually renders the victims vulnerable to shocks and locks the victims in a vulnerable state. Then, education is a significant factor as people with education have greater access to stable and diversified incomes sources; and is less likely to adopt unsecured coping strategies; this is because education being a human capital development index is expected to boost chances of mitigating any shocks by taking well informed decisions on coping strategies and risk management.

In order to reduce the shocks and manage risks experienced by these rural households, government needs to embark on programs that would alleviate poverty level especially in the area of increased per capita income so as to make available secured options to explore in mitigating the shocks; this can be done through mass enlightenment on the need for participation in livelihood diversification activit

ies such as involvement in non-farm and off-farm activities, which has to be backed up by financial assistance in form of soft loans with affordable and friendly interest rate; such arrangement can be made through the existing social network (cooperative societies) to ensure proper disbursement and timely payback; this is capable of reducing/limiting the rate of drawing from savings, distress sales of assets and avoid reduction of production inputs, all in an attempt to cope with shocks. There is need for public-private partnership investment in educational sector (with education being one the major human capital development index) through enlightenment campaign on the need for adequate education by non-governmental organisations as well as provision and adequate funding of schools in strategic places with high proximity to all the communities by government, if not in all communities; it is worth noting that, the long established missionaries schools taken over by several state governments need to be managed with these missionaries (Anglican, Baptist and Methodist, to mention few) as we have in Lagos state of Nigeria presently, by engaging the owners of these schools in the management and administration process for effective teaching and learning which will ultimately enhance an effective public-private partnership investment in education; thus, government still needs to play a major role for the standard and level of education not to be compromised especially at the basic levels through commitment devoid of political and ethnic interference because education exposes individuals to a better and alternative means of livelihood and ultimately prevents or reduces shocks and risks to the bearest minimal. Also, government should make available and accessible, improved agricultural inputs and sub-

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sidize its prices so as to ensure relative stability of these inputs prices through adequate extension services.

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