



Factors Influencing Rural Livelihood Diversification Activities among Women in Northern Region of Ghana

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Abstract

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Livelihood sustainability remains a major challenge for rural households in Northern Ghana. Although farming has traditionally been the core livelihood strategy for most households, diversifying into non-farm activities remains a common livelihood strategy employed to sustain household basic needs, particularly for women, who because of their gender often face challenges in accessing land for farming purposes. There remains a dearth in knowledge regarding understanding fully the factors, which influence livelihood diversification activities women in Ghana. The paper uses a Probit model to examine the factors that influence livelihood diversification activities, using cross-sectional data from households in Northern Ghana. A multi-stage sampling technique was used to select 260 households for investigation. Data were collected by use of survey questionnaire and analysed using Probit model with livelihood diversification being the dependent variable. The findings showed that age, household size, formal education, group membership, participation in training, participation in decision-making, resource access and level of household poverty to influence women's participation in livelihood diversification. The results suggest that policy to improve women's participation in decision-making and provide support to women non-farm livelihood groups in the form of training, credit and markets, which will be vital to enhancing livelihood and reducing poverty in Northern Ghana.

1. Introduction

Poverty remains a major challenge facing rural households in developing countries including Ghana (Dercon, 2008). Although Ghana succeeded in halving extreme poverty from 36.5 per cent to 18.2 per cent between 1991 and 2006, poverty incidence in the three Northern Ghana regions remained over and above the national average, at 52 per cent in the Northern, 70 percent in Upper West and 88 per cent in the Upper East (UNDP, 2012). Livelihood diversification has been employed by many households as one of the major strategies by rural subsistence farmers in Sub-Saharan Africa, including in Ghana to fight poverty (Ellis, 1998; Bryceson, 2002; Stifel, 2010; Asmah, 2011; Hilson & Garforth, 2012). Livelihood diversification has been viewed in many perspectives, such as a multiple livelihood

strategy of combining farm and non-farm activities (e.g. Ellis and Davies, 2004; Liyama, 2006; Yaro, 2006; Rahman, 2007; Dzanku and Sarpong, 2009; Babatunde and Qaim, 2009; Stifel, 2010; Asmah, 2011), or a practice whereby rural dwellers who are largely small scale farmers participate in non-agricultural related activity (off-farm) such as artisanal mining to either sustain living or grow their income (e.g. Bryceson, 1996; 2000; Banchiriga and Hilson, 2009; Hilson, 2010; Conteh, 2011).

The present paper uses a probit model to examine the factors that influence livelihood diversification activities, using cross-sectional data from households in Northern Ghana. The paper views livelihood diversification as the participation in non-farm activities by rural women to either grow their income or minimize risk, for the reason that in

Northern Ghana, participation in non-farm activities is seen as a secondary livelihood strategy to farming. Extensive literature (e.g. Bryceson, 1996; 2000; 2002; 2009; Alderman and Paxson, 1992; Reardon *et al.*, 1992; 2000; Reardon, 1997; Ellis, 1998; 2000a; Barrett *et al.*, 2001; Davis and Bezemer, 2003; Neihof, 2004; Liyama, 2006; Hilson, 2010; Stifel, 2010; Hilson and Garforth, 2012; Dzanku, 2012) has documented the contribution of livelihood diversification to rural economies of developing countries. For example, Reardon *et al.*, (1994) reported that, the non-farm income sources contribute up to 42% to total rural income in Africa, 32% in Asia and 40% in Latin America. Ellis (2000a) has estimated the figures to be 30-50% in Sub-Saharan Africa. Ghana Statistical Service (GSS) in 2008 estimated that between 50-60 per cent of Ghanaian households would draw their income from non-farm based activities.

In Ghana non-farm livelihood activities contribute greatly in supporting the livelihood of poor rural women. Women largely tend to have independence over income they generate from these non-farm livelihood sources as compared to farm incomes (Abujaja *et al.*, 2013). Non-farm activities offer women opportunities to earn livelihoods outside of agriculture, especially when they increasingly have limited access to important resources for production such as land (Apushagah, 2009).

Despite the important contribution of livelihood diversification activities for the vulnerable rural women, few studies have looked at the gender perspective of livelihood diversification (Abdulai & Delgado, 1999; Abujaja *et al.*, 2013; Hudu *et al.*, 2015).

While Abujaja *et al.*, (2013) focused on effects of Development Interventions on the productivity and profitability of women, Abdulai and Delgado (1999) focused on the determinants of jointly earned incomes by husbands and wives. The niche for this paper is its focus on livelihood activities undertaken by women, particularly the drivers of livelihood diversification among women in Northern Ghana. Fewer still have considered factors influencing the participation in non-farm and by gender (Abdulai & Delgado, 1999). The study by Abdulai and Delgado (1999) in Northern Ghana investigated factors and gender; however the emphasis was placed on jointly determined earnings of husband and wife, with less consideration for women's non-farm activities.

The paper is organized in four sections. Section two describes the study area and discusses the specification of empirical models including the definition and measurement of key variables used in the models. Results, discussions and policy

implications are explored in sections three and four respectively.

2. Materials and methods

Two districts (Savelegu-Nanton & West Gonja) in Northern region of Ghana were purposively selected for the study. The two districts were selected based on their popularity in non-farm livelihood activities. A multi-stage sampling technique was used to select 260 households for investigation. The household questionnaires were administered to women in rural households. The questionnaires elicited information such as, respondent demographic characteristics, forms of livelihood diversification activities being undertaken and factors determining the livelihood diversification activities (e.g. age, education, exposure, credit access, extension, etc.). The household questionnaires consisted of closed-ended and open-ended questions. After data gathering the data from the questionnaires were initially entered into SPSS and later transferred in to Stata software for analysis.

The questionnaire data, which were mainly quantitative in nature were analyzed by descriptive statistics, such as frequencies, percentages and means; and presented in the form of tables and charts. Data were collected by use of survey questionnaire and analyzed using Probit model with livelihood diversification being the dependent variable.

The main objective of the study was to examine the determinants of livelihood diversification among women in northern Ghana. The context of the problem already presents a dichotomous situation in which women either diversify livelihood or does not. The probit model is ideal for models in which the dependent variable for is dichotomous, and equals 1 if the *ith* woman has diversifies at a particular time, and 0 otherwise. Literature demonstrates that the use OLS estimation is inappropriate because the basic assumptions of normality and homoscedasticity of the error term are violated. Moreover, the computed probabilities may lie outside the 0-1 range (Greene, 2003).

The Probit is preferred for this analysis due to its power to limit the utility value of the dependent variable (livelihood diversification) to lie within zero and one, and the ability to resolve the problem of heteroscedasticity (Asante *et al.*, 2011). For this reason, the dependent variable (Livelihood Diversification=1 or 0=otherwise) was captured as a dummy.

In line with any adoption model for choice purposes similar to earlier studies on livelihood diversification which explored personal and household socio-economic factors that could influence livelihood diversifications. Abdulai and Delgado, 1999; Yaro, 2004; Dzanku, 2012 and

Abujaja *et al.*, 2013 have to some degree discussed some of these factors. The Probit model is expressed as:

$$\Pr(y_i = 1 | x_i) = F(x_i) = E(y_i | x_i) \tag{1}$$

$$y_i^* = x_i' \beta + \varepsilon_i$$

Here, Y^* is considered as an underlying propensity for the dummy variable to take the value of 1 and is a discrete variable so that

$$y_i^* = \begin{cases} 1 & y_i^* > 0 \Rightarrow x_i' \beta - \varepsilon_i > 0 \Leftrightarrow x_i' \beta > \varepsilon_i \Leftrightarrow \Pr(y_i = 1 | x_i) = F(x_i' \beta) \\ 0 & y_i^* \leq 0 \Rightarrow x_i' \beta - \varepsilon_i \leq 0 \Leftrightarrow x_i' \beta \leq \varepsilon_i \Leftrightarrow \Pr(y_i = 0 | x_i) = 1 - F(x_i' \beta) \end{cases} \tag{2}$$

Thus, if a woman diversify her livelihood source as a poverty reduction strategy, $y=1$, otherwise, $y=0$. The likelihood function is:

$$L = \prod_{y_i=0} F(-\beta'X_i) \prod_{y_i=1} [1 - F(-\beta'X_i)] \tag{3}$$

Also, the functional form of F for a Probit model is stated as:

$$F(-\beta'X_i) = \int_{-\infty}^{-\beta'X_i/\delta} \frac{1}{(2\pi)^{\frac{1}{2}}} \exp\left(-\frac{t^2}{2}\right) dt \tag{4}$$

t is the standard normal distributed, that is, $t \sim N(0,1)$.

This paper follows these earlier studies and socio-economic context analysis to identify variables for the model. Factors such as age, marital status, widowhood status, years in education, household size, social group participation, city exposure, participation in training, decision-making, resource access and level of household poverty were considered as independent variables and hence the model is expressed as:

$$P(X=1/LD) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + Q$$

Based on the above theory, model was thus specified as follows: Livelihood Diversification = 1, 0= Otherwise

Where Livelihood Diversification (LD) =1 if a respondent diversifies, 0 otherwise, β_i 's are estimates while Q is the error term. The definition and measurement of the variables used in the model are presented below.

Table 1. Means of measuring dependent and independent variables

Dependent Variable	Independent Variable (β_i)	Means of Measurement	<i>A prior Expectation</i>
Livelihood Diversification (Yes=1, 0= Otherwise)	Age	Years	+/-
	Education	Years	+
	Experience	Dummy variable assuming value 1 if a respondent exposed to training, 0 otherwise	+
	Extension contact	Dummy (1= Visited, 0= otherwise)	+
	Access to Credot	Dummy (1=Access, 0=Otherwise)	+
	Migration	Dummy (1=travelled to a city for at least a year, 0=otherwise)	+
	Social group membership	Dummy (1=Membership, 0= otherwise)	+
	Leadership position	Dummy (1=Leadership position, 0= otherwise)	+
	Vulnerability	Dummy (1=less vulnerable, 0= otherwise)	+
	Access to res	Dummy (1=access to resources, 0= otherwise)	+
	Participation in decision	dummy (1= participates, 0= otherwise)	+

3. Results and discussion

This section presents results of the Probit analysis to assess the effect of the determinants of livelihood diversification in the Northern region of Ghana. Twelve independent variables comprising of age, marital status, widowed, years in education, household size, group membership, leadership position, travel to city, participation in training, participation in decision making, resource access, level of household poverty were identified and this was regressed over livelihood diversification as the dependent variable.

3.1 Demographic characteristics of respondents and variables used in the Probit model

The study results indicated that the highest figure recorded by respondents was within the age bracket of 36-45 and 46-55 with each recording 28.1%. The majority (79.6%) of the respondents were married. Up to 10% of the 260 respondents were found to be widows. There was a high illiteracy rate among the respondents because, out of the 260 respondents, the majority (80.3%) lacked formal education, followed by primary level (9.2%), while the least (0.4 %) had bachelors/diploma. In terms of household size, the highest figure fell within the household bracket of 9-12 (23.8%), followed closely by household within the bracket of 6-8 (23.5%), while the least was recorded by households within the bracket of households above 25 (7.7%). The majority (54%) of the women belonged to a social group. The majority (84.2%) of the respondents had never been leaders, while only a few (49) representing 15.8% were either leaders or had ever been leaders. More than half of the respondents (65.8%) had ever travelled to cities to seek livelihood, while only small proportion (34.2%) had never travelled to the city/town to seek a livelihood. The study found that the majority (60%) of the respondents never had any form of training, while the least (40%) had ever been part of training programmes.

3.2. Determinants of Livelihood Diversification

The study used the Probit model to assess personal and household factors that influence livelihood diversification among women in Northern Ghana. The dependent variable was dichotomous between diversification or otherwise. Following literature (e.g. Abdulai & Delgado, 1999; Abujaja *et al.*, 2013; Hudu *et al.*, 2015) we identified and included 13 socio-demographic factors hypothesised to influence livelihood diversification. Table 3 presents results of the probit model.

The overall goodness of fit measure, log-likelihood ratio (LR) was statistically significant at

1% indicating that all the variables included in the model jointly explained livelihood diversification among rural women in the study area. The Pseudo R^2 of 0.38 shows that the model explained about 38% of the variation in the independent variables best explains the probability of rural women diversifying their livelihoods. The overall probability of rural women diversifying their livelihoods given the factors modelled was predicted to be about 86% (Table 2).

Age was found to be statistically significant at 5% and positively influenced livelihood diversification. The result is consistent with those made by Kepe, (2008) that age positively influences the type of activities people do for living. The square of age had the expected negative coefficient sign and was significant at 1%. The sign of the age-squared variable implies that as women grow older the likelihood to diversify reduces. This was expected because as people become old, they are less active and rely more on their children and family for sustenance. It is also common practice in the area for older people to pass their livelihood activities to their children who are still strong and capable of managing the enterprises. The finding is consistent with the argument of Canagarajah *et al.* (2001) that earnings of people increase early in their years and diminish as they grow older. Similarly, Adam *et al.* (2014) found that younger farmers were more likely to be classified as adopters than older farmers in Northern Ghana.

Marital status usually plays an important role in women's livelihood activities in Northern Ghana (Apuigah, 2009). The Probit results showed that marital status was not significant to livelihood diversification, which implies that being married is not likely to influence women's diversification activities. Married women living with their husbands receive significant livelihood support from their husbands, which significantly reduces poverty and the pressure to earn extra income. Studies by Vepa, 2005 and Aphanee *et al.*, 2010 have documented established that female-headed households were relatively poorer. Contrary to a priori expectations, the study did not find widowhood status a significant determinant of livelihood diversification.

Formal education enhances the ability of a person to adapt innovations. Studies have shown that rural people who have formal education adopt innovations more than others who lack formal education (e.g. Kunfaa, 1999; Rahman, 2007; Jackson and Rao, 2008; Adam & Boateng, 2012, Adam *et al.*, 2014). The regression results showed that number of years spent in formal education exhibited positive and a significant effect on livelihood diversification at 10% for Savelegu-Nanton and 5% each for both West Gonja district and the

overall results, which implies that the number of years spent in formal education influences diversification activities. This finding is consistent with other literature (e.g. Abdulai and Delgado; Tacoli, 2003; Ribot and Peluso, 2003). For instance, Abdulai and Delgado (1999) found a significant difference between the probability of participation in non-farm livelihood activity and formal education.

Household size determines the labour strength of rural household in Northern region of Ghana. This is because rural households largely depend on family labour for their livelihood activities. The results showed that household size had a negative and significant effect on livelihood diversification, which implied that women from larger household size were less likely to diversify their livelihood activities. This finding is consistent with the findings of other rural studies, which have argued that household size is not necessarily a determining factor in participation in non-farm activities (Sahn and Alderman, 1988; Abdulai and Delgado, 1999).

Group membership has been found to influence women participation in non-farm livelihood activities (e.g. Alhassan, 2007). The overall regression results showed group membership had a significant effect on livelihood diversification. The group membership variable was significant at 5% and increased the probability of livelihood diversification. The finding is consistent with Alhassan's (2007) who found individual women who were part of a beneficiary group in the Karaga district of the Northern region to improve their livelihood activities as compared to those who were not part of the support groups. Similarly, previous studies (e.g. Berry, 1989; Fafchamps and Minten, 1998; Lanjouw, 1998b) found membership networks to have a positive relationship with reduction in vulnerability.

Leadership position used as a proxy for social status in the community influences the status of individual in the society. In the rural communities in Northern Ghana people who hold leadership position usually tend to have greater advantage to participate in decision-making. Contrary to what was expected, the regression results did not show significance with respect to leadership position, which implies that leadership does not influence women's livelihood diversification activities. This is not surprising because the study observed that leadership positions were given to older women who probably are not actively involved in diversification activities. The finding is contrary to the argument that households with higher status are likely to engage in higher diversification, and those with low status will be compelled to participate in less remunerative non-farm activities (Davis & Bezemer, 2004).

Traveling to the city to seek livelihoods is a common characteristic of rural communities in the Northern region (Awumbila, 2006). The probit results show that city exposure is not significant to livelihood diversification among rural women. This implies that there is no significant difference in the probability of diversification between women who have ever experienced city life and those who have not. This finding is surprising because city exposure often encourages people to seek non-farm livelihood activities (Owusu, 2007).

Training enhances the knowledge, attitude and skills of people. Extension agents or development agents often give rural people in order to enhance their livelihood activities. Training was found to be positive and significant for livelihood diversification activities at 10% each for both West-Gonja district and overall results. This implies that training influences diversification among rural women. This finding is consistent with previous findings (e.g. Adensina, 2001; Adam *et al.*, 2010). For instance, Adam *et al.* (2010) found a significant difference between training received and adoption of small ruminant innovations. Similarly, Adensina (2001) found the rate of adoption to be higher among alley farmers in Cameroon who received training than others who did not receive any form of training.

Participation in decision-making plays a key role in resource access. It has been argued that women who have the opportunity to participate in household decision-making tend to have higher access to resources (Argawal, 2010a). Participation in household decision-making was found to be a positive and significant for diversification at a 1% confidence level. This implies that participation in decision-making influences livelihood diversification of women. This finding is obvious because probably having the freedom to participate in household decision-making gives the women the opportunity to engage in any kind of livelihood activity that will give them income. Similarly, previous studies (e.g. Kinoshita, 2003; Argawal, 2010a) argue that women who participate in decision-making tend to be less vulnerable to poverty.

Access to resources is fundamental in seeking livelihoods (Parveen, 2008). Studies have shown that there is a positive relationship between livelihood activities and access to resources (Coulbaly-Lingani *et al.* 2009; Seebens, 2011). The probit results found access to resources to be positive and significant at 1% with respect to livelihood diversification. This implies that resource access is more likely to influence livelihood diversification activities among women in Northern Ghana. This agrees with findings of Alhassan's (2007) who found while studying development intervention among she

abutter processors in Northern region of Ghana that women who had access to resources such as credit had their lives improved as compared to others who did not benefit from similar interventions. It is also consistent with the findings of Asmah (2011) who reported that access to inputs; public transport and proximity to market are more likely to influence the diversification patterns of household.

Availability of assets within household is important for livelihood diversification. Therefore, this study sought to ascertain whether there was a significant difference between rich and poor households with respect to diversification. The regression did not show any significant difference

between women from households perceived to be rich and those from poor households. This implies that coming from a rich household does not influence women's participation in diverse activities. This finding can probably be attributed to the fact that non-farm activities are largely considered as individual activity rather than as a household livelihood strategy in Northern Ghana. The results contradict literature, which argue that rich households are more likely to diversify their livelihoods (Beyene, 2008; Al-hassan, & Poulton, 2009).

Table 2. Probit regression results of livelihood diversification as against independent variables

Variable	df/dy	Std Error	P-value
Age	0.0382	.0122	.002**
Age ²	-0.0005	.0001	.000***
Married	0.1149	.1263	0.307
Widowed	0.0474	.1009	0.672
Years in education	0.0696	.0215	0.005**
Household size	-0.1566	.0606	0.009**
Group membership	0.1682	.0532	0.002**
Leadership position	-0.0706	.0919	0.404
Travel to city	0.0179	.0561	0.746
Participation in training	0.1232	.0553	0.024**
Participation in decision making	0.3406	.0849	0.000***
Resource access	0.3249	.0862	0.000***
Level of household poverty	-0.0607	.0662	0.328
Observation		260	
Log likelihood		-96.23	
LR Chi ² (13)		102.13	
Prob> Chi ²		.0000	
Pseudo R ²		.3467	

***, ** & * denotes 1%, 5% and 10% respectively

Dependent variable: Livelihood diversification

4. Conclusion and recommendations

This paper examined the factors influencing rural livelihood diversification among women in Northern Ghana. The findings showed that age has a positive and significant effect on women's likelihood to participate in non-farm activities. However, when they begin to grow older, their participation in diversification activities tends to decline, as revealed by the negative and the significant influence of age squared on livelihood diversification, a situation which can be attributed to the likelihood of a person to become weak as the age begins to diminish. Education was especially found to be important in influencing non-farm activities. The probit results showed that education has a positive and significant relationship with livelihood diversification. In the rural Northern Ghana where households depend on family for labour, one would expect high household size to positively influence livelihood diversification. However, surprisingly, household size rather has a negative significance with livelihood diversification. The results also revealed that being part of a social group positively influence women's participation in diversification activities. This can be understood because probably the women benefit from the social group, which could serve as a source of motivation for them to engage in diversification. Thus, it will be important for policy to motivate women to form groups in order to sustain diversification activities.

Participation in training was also found to exhibit a positive and significant relationship with livelihood diversification, which can be understood because women in Northern Ghana are more likely to participate in activities, which are more relevant to their activities. The results support the views that women who participate in household decisions is likely to participate in non-farm activities. Furthermore, having access to household resources was found to have a positive and significant influence in the participation in non-farm activities. This finding is obvious because resources are key to participating in non-farm activities. Thus, policy aim at improving women's non-farm diversification should facilitate their access to resources such as credit, training, formal education and market. In conclusion, the non-farm livelihood activities as noted from the beginning plays an important role in rural economies, particularly on the poor and vulnerable women, who largely depend on it as an alternative source of income to farming which they have less access to. Thus, rural policy planning and implementation need to take into accounts the factors that positively influence women's livelihood diversification activities. This will help to implement intervention policies that are relevant and sustainable to rural Northern Ghana.

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