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Determinants of Participation in the Nonfarm Sector in a Conflict-Based Resettlement Scheme

By Riithi A. N[1] and Maina J. M

University of Nairobi

Department of Agricultural Economics

Abstract

The rural labour force in developing countries has been growing rapidly, but employment opportunities are not keeping pace. Hence, nonfarm employment must expand if deepening rural poverty is to be avoided. This is even more important for resettled households who are faced by numerous challenges in adapting to new environments which causes major changes in their livelihood activities. The probability of a households decision to participate in the nonfarm sector in a conflict based resettlement scheme is influenced by age, possession of a technical skill, number of dependents, size of cultivated land, wealth and time taken to walk to a water source. This paper recommends incorporating vocational training centers in resettlement schemes, promotion of primary production as a foundation for wealth creation and incorporating good water supply so as to reduce the time taken to walk to a water source.

Key Words: Nonfarm, Resettlement, Solio, Logit

[1] Corresponding author email address ariithi@gmail.com

1.0 Introduction

The rural labour force is growing rapidly, but employment opportunities are not keeping pace in developing countries (Islam, 1997; Page, 2012). Nonfarm employment must expand if deepening rural poverty is to be avoided with available land for expansion of agriculture becoming increasingly scarce (Islam, 1997). An expansion of opportunities in rural areas outside agriculture may also help in stemming the migration of rural dwellers to the cities hence spread of urban congestion and pollution (Lanjouw and Lanjouw, 1995 and Islam, 1997). This is due to the fact that even with any feasible pace of growth of urban industries, they are unlikely to absorb the rapidly increasing labour force. It is therefore up to the more labour-intensive rural nonfarm sector to absorb excess labour, promote economic growth and diversify income sources for the rural households (Islam, 1997).

Nonfarm activities in rural Africa dates back to the 19th century in literature (Bryceson, 1999); however, in the last twenty years literature has highlighted on the increasing importance of non-agricultural income sources to rural dwellers (Reardon, 1997; World Bank, 2008). Livelihood diversification from agriculture entails a process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and/or improve their standards of living (Ellis, 2000). Ellis (2000) further notes that households diversify by adopting a range of farm, nonfarm, and off-farm activities that generate income.

The rural nonfarm sector usually includes manufacturing, trade, construction, transportation, communication, services and income earned by rural family members who commute to jobs in nearby urban centers and remittances from family members who live and work in cities within the country or abroad (Islam, 1997). Past literature shows that nonfarm income sources in SSA's rural households account for between 30 and 50 percent of total household income (Reardon, 1997; World bank, 2008; Zerai and Gebreegziabher, 2011). These statistics accentuate the significance of the nonfarm rural sector in rural poverty and food insecurity alleviation in rural areas.

In Kenya, more than 70 percent of the labor force is found in the rural areas, where agriculture is the main livelihood activity in form of either crop or livestock production (GoK, 2010). The

sector accounts for 24 percent of Gross Domestic Product (GDP) and 60 percent of foreign exchange earnings (GoK, 2014). However, as in other SSA countries, the rural households have diversified livelihood strategies with a large component in the non-farm sector, which contributes significantly to household income.

Conflict-based resettlement literature on the other hand argues that the relocation of a large number of people causes major changes in their livelihood activities and presents difficulties in adapting to their new environment. The resettled group is usually less secure in their livelihoods and in most cases is vulnerable to food insecurity and poverty (Cobo et al., 2009; Magaramombe, 2010). This is particularly so if resettlement places people in environments different from their origins. In this case, livelihood insecurity does not necessarily have to be as a result of infertile land but shortfalls in other factors influencing livelihood reconstruction. Kinsey and Binswanger (1993) note that environmental conditions for growing crops can be sufficiently unfamiliar to require the farmers/households to adopt new cultivation practices, or even be forced to seek other income generating activities.

A stagnant or progressive agricultural sector can be associated with increased nonfarm employment. This is due to the fact that nonfarm employment sometimes is a way out of unproductive agriculture rather than a response to an expansion of agriculture. For good policy decisions on rural development, policy makers need firm information about the nonfarm sector (Islam, 1997). It is precisely for this reason that empirical evidence is necessary to show the determinants of nonfarm sector participation by rural households. This is the entry point for this article, namely to identify the key determinants of resettled households participation in the nonfarm sector. The analysis focuses on rural households in a conflict based resettlement scheme in Kenya. This is because resettled households are often faced by low resource endowment amidst heavy demand for services by the immigrants. In addition, residents of conflict-based resettlement schemes tend to adapt to new environment fraught with underdeveloped physical infrastructure and poor provision of social amenities such as clean water, energy, schools and health facilities (Cernea,1997; Cobo et al., 2009; Magaramombe, 2010).

2.0 Methodology

2.1 **Study area**

The study was conducted in Solio resettlement scheme which is located in the semiarid Laikipia County of Kenya. The resettlement scheme is within a grass savannah with few scattered trees. The scheme was purposively selected for this study since it was the first resettlement scheme in Kenya to be established after the 2007/2008 post-election violence. The residents composed of two categories of internally displaced people: (a) due to post-election conflicts, (b) people who were evicted from the Aberdares and Mt Kenya forest in the late 1980's and early 1990's, who had been squatters on the roadsides near the two forests. The resettlement scheme was seen appropriate for this study because the households had already established livelihoods and the fact that it was not too old to have attained the qualities of a typical rural setting.

2.2 Sampling and data collection

Data were collected using focus group discussion and administering a semi-structured questionnaire. The study interviewed 196 households who were selected based on proportionate to size sampling with larger villages having more respondents. In order to identify the specific respondents, lists of all households were generated with the assistance of the village elders, hence used as the sampling frame for the respective villages. Respondents were randomly selected from these lists, where the household head was interviewed or the spouse in his absence in June 2013.

2.3 Model specification

A binary logit model was used in assessing determinants of household's participation in nonfarm livelihood strategies. The logit model was preferred due to the fact that the dependent variable was discrete and binary in nature. Households that participated in any nonfarm livelihood strategy were assigned the value of Y_i=1 and 0 otherwise. The nonfarm sector included business, waged nonagricultural labour, remittances and salaried employment; while the farm sector included crop farming, livestock keeping and waged agricultural labour as identified earlier (Riithi, 2014). The model was specified as follows:

$Y_i = \beta_0 + \beta_1 AGE + \beta_2 EDUCATION + \beta_3 DEPENDENTS + \beta_4 WEALTH + \beta_5 LAND + \beta_6 SKILLS + \beta_7 DTOWN + \beta_8 DWATER + \beta_9 MEMBERSHIP$ (2.1)

Following Greene (1993), the probability that the i^{th} household participates in the rural nonfarm sector can be modeled as:

$$\text{Prob} = \left[Y_{ij} = 1\right] = \frac{\exp(\beta' X_i)}{1 + \exp \beta' X_i} = \wedge(\beta' X_i) \quad (2.2)$$

Equation (2) above represents the reduced form of the binary logit model, where x_i is a vector of explanatory variables and the non-observed ε_i is assumed to follow a distribution of logistic probability with a density function:

$$F'(\beta' X_i) = \wedge(\beta' X_i)[1 - \wedge(\beta' X_i)] \quad (2.3)$$

The probability that the i^{th} household participates in the rural nonfarm sector is estimated as:

$$\Pr\left[Y_i = 1\right] = \beta_i X_i + \varepsilon_i \quad (2.4)$$

Where X_i is a vector of explanatory variables, β_i is a vector of parameters to be estimated while ε_i is the stochastic random term. The study also estimated the marginal effects as follows:

$$\beta m = \left[\frac{\partial(\beta_i X_i + \varepsilon_i)}{\partial \beta_i X_i}\right] \beta_i \text{ for continuous variables} \quad (2.5)$$

$$\text{For dummy variables } \beta m = \Pr[Y_i = 1] - \Pr[Y_i = 0] \quad (2.6)$$

2.4 Justification for inclusion of explanatory variables

AGE: The age of the household head in years was used because livelihood decisions are mostly taken by the household head in rural areas (Khatun and Roy, 2012). This study hypothesized that the younger the household head the higher the probability of participating in the nonfarm sector, because supply of labour for nonfarm activities is higher for younger household heads than for older household heads (Woldenhanna and Oskam, 2001). A negative relationship would therefore exist between age and participation in the rural nonfarm sector.

EDUCATION: The number of years of formal education of the household head was used. It was hypothesized that a positive relationship would exist between education and nonfarm sector participation. Higher levels of education contributes to the growth of the rural non-farm sector, through stimulating entrepreneurial capacity and making it easier to master skills provided through on-the-job training (Islam,1997). This makes it easier for more educated people to get non-farm employment.

DEPENDENTS: This was a continuous variable composed of the number of dependents the household had. The study defined dependents as children under the age of 18years old as well as older children who were students and depended on the household head for their upkeep at the time of the survey. In the same category were the very old members of the household as well as household members with disability and therefore are not involved in any livelihood activity.

The study hypothesized that the number of dependents would affect nonfarm sector participation either positively or negatively. Dependents in the household might increase resource needs and drive the pursuit of extra income from nonfarm employment (Demeke and Zeller, 2012). Alternatively, having more dependents than active productive members in the household reduces participation in the nonfarm sector as there are fewer laborers to allocate to additional jobs (Ibid).

WEALTH: Household wealth index was used which was a continuous variable. The wealth index was constructed using Principal Component analysis (PCA), which aggregates several binary asset ownership variables into a single dimension (Moser and Felton, 2007). The underlying principle of this method is that each asset has a latent (unobservable) variable C^i for each type of capital C^i which manifests itself for owning different types of asset $a^i....a^k$ in each household. For example, suppose a household t owns assets $a_{i,1}$ if $_i \sim _{i\,i} C >$ w. It turns out that the maximum likelihood estimators of the w's (weights) are the Eigen vectors of the covariance matrix which are also known as the principal components of the data set (ibid).

The data subjected to PCA was of a binary nature where 1 represented that a household owned an asset while 0 otherwise. The Eigen values generated by the PCA were used as weights for the asset ownership by the household (ibid). The principal components were subjected to the number

of a given asset(household assets,livestock assets and productive assets) owned by a household as follows:

$$HHWI^t = \sum_{i=1}^{n} w_i^t a_i^t \qquad (2.7)$$

Where w_i is the PCA weight of asset *i* owned by household *t* while a_i is the number of asset *i* owned by household *t.* $HHWI^t$ is the household wealth index for household t interviewed. A positive relationship was hypothesized to exist between household wealth index and the number of livelihood strategies adopted by a household.

Non-farm activity is typically positively correlated with wealth in rural Africa, because the poor face entry barriers to remunerative livelihoods in the non-farm sector resulting from inadequate or differential access to markets, due to low levels of physical and financial assets (Ellis, 2000; Barret et al., 2001 and Khatun and Roy, 2012). Individuals own assets some of which (non-productive assets such as household valuables) generate unearned income and others in which (productive assets such as livestock, motorbike, sewing machine, welding machine, and donkey cart) generate earned income only indirectly through their allocation to activities such as tailoring, farming or commerce.

Diversifying into non-farm activities is made even more difficult for the poor than for rich farm households in the presence of entry barriers and rationing in the labour market (Reardon, 1997). This is due to liquidity constraints that make it difficult for poor farm households to finance investment (such as equipment purchase or rent, skill acquisition, capital for initial investment and a license fee) needed to participate in nonfarm activities (Woldenhanna and Oskam, 2001). Household wealth can therefore affect the type of non-farm activities a household picks up (Reardon and Taylor, 1996). The study therefore hypothesized that a positive relationship would exist.

CULTIVATED LAND: This was the total land the household had opened up for crop production in hectares. If a household had opened up a large portion of land for crop production, this would mean that a lot of family labour would be engaged in the family farm, and hence the household would have less labour to engage in the nonfarm sector (Islam, 1997; Khatun and

Roy, 2012). Therefore the study hypothesized that a negative relationship would exist between cultivated land size and participation in the nonfarm sector.

SKILLS: This was a dummy where 1= household head who possesses a technical skill while 0=a household head that does not possess any technical skill. The main technical skills were carpently,masonry,mechanics,tailoring,cobbler,plumbing,driving,welding,weaving,painting, tinsmith, hair dressing and blacksmith.

According to Khatun and Roy (2012), possession of a technical skill increases the possibility of a rural dweller getting a non-farm job. Hence, this study hypothesized a positive relationship between possession of a technical skill by the household head and participation in the nonfarm sector.

Distance to the nearest town: The distance to the nearest town in kilometers was used. Geographical variables are important determinants of livelihood diversification, because wage employment is more available in areas nearer towns (Woldenhanna and Oskam, 2001; Khatun and Roy, 2012). On the other hand areas far from urban centers, farm households can be engaged in petty trade, as competition from urban traders is very low (Woldenhanna and Oskam, 2001). This study therefore hypothesized that a negative or positive relationship exists between distance to the nearest town and participation in the nonfarm sector.

Time taken to a water source: The minutes an adult in normal conditions takes to walk to a water source was used. Water supply is a key constraint to households in Solio resettlement scheme, which does not have any surface water and depends on water from boreholes for household uses. Basic infrastructure like water supply has an important role in the development of a region (Khatun and Roy, 2012). This would, by extension, dictate the livelihood activities that would present themselves to a household depending on the distance to the water source; water intensive livelihood strategies like hotel businesses would be found near the water source. Additionally, the time taken to walk to a water source would determine the time available to the household which is allocated for productive purposes. This study hypothesized a negative relationship between time taken to the water source and household participation in the rural nonfarm sector.

Membership to a group: This was a dummy where 1= a household head is a member of a group while 0= otherwise. In a rural setting there are several types of groups that a household head can choose to join. The groups of interest in this study were those related to livelihood strategies which were: produce marketing, input access, saving and credit and asset purchasing groups. Membership to a group is important in determining livelihood diversification, because it elevates the household head's social status and increases access to common property resources as well as different government/NGO schemes (Khatun and Roy, 2012). This could give such a household comparative advantage in participating in the rural nonfarm sector. It was therefore hypothesized that group membership by the household head would positively influence participation in the nonfarm sector.

3.0 Results and Discussion

3.1 Socio-economic and demographic characteristics

Socio-economic and demographic characteristics are presented in Table 1 below. The average age of the household heads was 52.1 years, which suggests that a majority of the household heads were above 50 years old. The ages ranged from 24-93 years. In the same breath most of the household heads had below eight years of education as evidenced by the mean number of years of formal education, which was 6.9 years.

The household size ranged from a household of 1-14 members, with an average household size of 6.2 members per household in the scheme. This was slightly higher than the national average of 5.1 persons per household (GoK, 2006). The number of dependents ranged between 0-8 persons, with an average of 1.8 dependents per household. The mean household wealth index was 13.7, which ranged from 0-59.9 units. Most of the households had cultivated less than half of their 1.82 ha of land given, evidenced by the mean cultivated land of 0.7ha. This means that most of the land was left fallow or set aside for grazing.

The nearest towns to the scheme were Naro Moru to the north east, Chaka to the south and Mweiga to the south west of the scheme respectively. The average distance of the households to the nearest town was 10KMs, and ranged from 3-18 KMs. Boreholes were the main sources of water for the households, where it took an adult in normal health on average 15.1 minutes to

walk to the household's water source. This ranged from 1-75 walking minutes depending on where the household was located within the scheme.

Technical skills possessed by the household heads in the resettlement scheme included: carpentry, masonry, mechanics, tailoring, cobbler, plumbing, driving, welding, weaving, painting, tinsmith, hair dressing and blacksmith. Among the interviewed households 28.1% of the household heads possessed a technical skill. The household heads that were members of a livelihood related group accounted for 31.6% of the interviewed households.

3.2 Determinants of participation in the nonfarm sector

The results of the logit model are presented in Table 2 below. The probability of a household's decision to participate in the nonfarm sector in a conflict based resettlement scheme is influenced by age of the household head, possession of a technical skill, number of dependents, size of the cultivated land, wealth and time taken to the water source.

As the age of the household head increased the probability of participating in the nonfarm sector reduced and was significant at 5% level of significance. This could be attributed to the fact that nonfarm activities participation e.g. waged non-agricultural labour or salaried employment might have been limited by age since it required energetic and educated labour which give the younger household heads a comparative advantage in getting employment there.

Possession of technical skills positively influenced participation in the nonfarm sector in the scheme and was highly significant at one percent level of significance. In fact the marginal effects show that possession of technical skills increased the probability of participating in the nonfarm sector by 29.7%. This may be attributed to the ease of getting nonfarm employment for one who possessed a technical skill as well as the ability of starting businesses that were as a result of these technical skills such as tailoring, hairdressing among others.

The higher the number of dependents a household had the lower the probability of participating in the nonfarm sector, as evidenced by the negative and statistically significant at one percent level of significance "DEPENDENTS" variable. This could be attributed to the fact that the higher the number of dependents a household had the lower the total household labour force available for employment in the nonfarm sector. This also meant that some labour that would

have been employed in the nonfarm sector might have been needed to take care of the dependents, especially if the dependents composed of very young children and physically challenged individuals.

Wealthy households were likely to participate in the nonfarm sector more as compared to poor households, as the wealth coefficient was statistically significant at 5% level of significance. These results agree with literature which argues that wealthy households can easily overcome entry barriers in the nonfarm sector as compared to poor households. These barriers include investment capital, skills acquisition and equipments purchases that may be necessary to enter into the nonfarm sector, which the poor households may not have.

The total land cultivated by a household influenced participation in the nonfarm sector where households that had large portions of land cultivated were less likely to participate in the nonfarm sector as compared to those with small cultivated land sizes. This was evidenced by the negative and statistically significant at 5% level of significance "LAND" coefficient. The marginal effects show that an increase of cultivated land by 1ha reduced the probability of participation in the nonfarm sector by 15.8%. The larger the size of cultivated land the higher the share of household labour likely to be employed, therefore reducing the available labour to be employed in the nonfarm sector. The farm sector may have provided the households with larger cultivated land areas with enough food and farm income hence reducing their need for nonfarm employment.

As the time taken to a water source increased, the probability of participating in the nonfarm sector reduced and was statistically significant at 10% level of significance. Perhaps this could be attributed to some household labour being used to fetch water therefore reducing the available labour which could be employed in the nonfarm sector. On the other hand some nonfarm activities in the scheme such as businesses were located near/around the boreholes which were the main sources of water in the scheme; because many people congregated around them. Therefore, reducing the time taken to walk to a water source would increase the time as well as labour available to participate in the nonfarm sector.

Conclusion

Livelihood diversification through participation in the nonfarm sector by agricultural households has become a development strategy in SSA. This study has demonstrated that age of the household head, possession of a technical skill, number of dependents, wealth, cultivated land and time taken to walk to a water source determine participation in the nonfarm sector by resettled households. It is therefore important for resettlement policies to be established that reduce the barriers to entry into the nonfarm sector by resettled households, as well as policies that make it easier for the resettled households to reconstruct their livelihoods. This is due to the fact that the farm sector may not be sustainable enough for the resettled households especially if the resettlement area has different environmental conditions to the ones the resettled households were used to before resettlement.

The study therefore recommends the following: first, the resettlement agencies should come up with vocational training centers in the scheme which will teach technical skills especially to the youth in the scheme. This will make it easy for them to participate in the nonfarm sector. Secondly, primary production in resettlement schemes should be promoted as households that had managed to open up more of their land relied more on the farm sector. The proceeds from the farm sector can therefore be to invest in the nonfarm sector as wealth will be generated and this study has shown that increase in household wealth increases the probability of a household to participate in the nonfarm sector. Thirdly, resettlement schemes should be planned with a good water supply so as to reduce the time taken to walk to the household's water source. This is due to the fact that households that spend less time fetching water have less time which can be spent on productive activities. Additionally, water intensive activities can only thrive where the water source is nearer the household, and this makes it easier for the resettled households to reconstruct their livelihoods.

Tables and Figures

Table 1: Summary of Socioeconomic and demographic characteristics

Variable	n	Mean	Std. Dev.	Min	Max
AGE	196	52.1	14.7	24	93
EDUCATION	196	6.9	3.6	0	17
HH Size	196	6.2	2.7	1	14
DEPENDENTS	196	1.8	1.7	0	8
WEALTH	196	13.7	11	0	59.9
LAND	196	0.7	0.4	0	1.82
DTOWN	196	10	3	3	18
DWATER	196	15.1	13	1	75
		Frequency	**Percentile**		
SKILLS	Possessed	55	28.1%		
	Did Not	141	71.9%		
MEMBERSHIP	Member	62	31.6%		
	Nonmember	134	68.4%		

Table 2: Logit results and marginal effects

Variable	Coef.	P-value	Marginal effects	P-value
AGE	-0.034**		-0.005**	
	(0.017)	0.047	(0.003)	0.048
EDUCATION	-0.056		-0.009	
	(0.057)	0.308	(0.009)	0.313
SKILLS	2.761***		0.297***	
	(0.788)	0.000	(0.050)	0.000
MEMBERSHIP	0.370		0.053	
	(0.450)	0.411	(0.062)	0.393
DEPENDENTS	-0.379***		-0.057***	
	(0.121)	0.002	(0.019)	0.003
WEALTH	0.051**		0.008**	
	(0.021)	0.017	(0.003)	0.018
LAND	-1.055**		-0.158**	
	(0.489)	0.031	(0.717)	0.028
DTOWN	-0.092		-0.014	
	(0.062)	0.138	(0.009)	0.142
DWATER	-0.03*		-0.005*	
	(0.017)	0.068	(0.003)	0.073
CONSTANT	4.906***			
	(1.480)	0.001		

Notes: Standard errors shown in parentheses. Statistical significance levels: ***1%, **5% and *10%. Pseudo-R^2 = 0.27.

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