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Determinants of Farmer's Participation in Off-Farm Employment: A Case Study in Kedah Darul Aman, Malaysia

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Abstract

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This paper investigates the determinants of agricultural households' participation in off-farm employment. Towards this end, a logit model is employed to identify factors that determine the participation in off-farm employment. Here, determinants of participation in off-farm employment are divided into four categories – individual, household, farm and local area characteristics. With regards to the local area characteristics, the analysis is extended by including a new variable, which is the economic characteristic of the area. The results of the analysis show that the main determinants that influence the farmer's decision to participate in off-farm employment are age, gender, household size, dependency ratio, remittance, land size, types of agricultural activities, working hours allocated to the farm, the ratio of income from agricultural sources in total income of the farmer. Furthermore, this study uncovers that the economic characteristic of the area where the farmer reside is important determinant of the farmer's decision to participate in off-farm job. One of the policy implications from the finding of this study is that, if the agricultural households are to be encouraged to participate in off-farm jobs, a balanced development in the rural areas must be pursued.

Introduction

Agricultural activities usually represent the main source of employment in most rural areas. Thus, it would not be surprising to discover that most rural households are farmers where their main source of income is from agricultural activities. However, this observation would probably the case for an underdeveloped and stagnant rural economy. In countries where the rural areas experiencing a rapid development and transformation, such as the improvement in infrastructure and transportation, development of rural industries and relocation of industrial estates to the rural areas, that observation might no longer relevant. Development in the rural areas might have directly or indirectly open up opportunities for farmers to participate in off-

farm employment, and hence the potential to increase their household income from non-farm sources. In fact, non-farm income could eventually constitute an important and increasing share of total agricultural household income, and the dependence of agricultural households on agricultural activities as their main source of income might be declining. Thus, off-farm employment could become an important option to farmers and agricultural households to increase their household income sources, and hence reducing rural poverty.

The potential of diversifying and participating into off-farm activities among the agricultural households, however, raises the question on the determinants to participate in the off-farm employment. Specifically, what are the

characteristics of the farmers who are most likely to participate in off-farm employment? What are the critical factors that influence farmers in their decision to participate in off-farm employment? The importance of examining these questions cannot be over emphasized since off-farm employment has been recognised to have the potential in raising agricultural household income, and therefore reducing rural poverty (FAO, 1998). In addition, examining this question appears to be important especially in a situation where the prospect to increase income from agricultural sources is limited. Such situation Can happen, for instance, when improvement in technology to increase agricultural production is limited due to small size of land holding. As a result, the prospect to increase agricultural production, and hence income, would also be limited. In this situation, the options available would be to participate in off-farm employment. Besides, off-farm employment (income) is also important for agricultural household to lessen their income vulnerability particularly during poor harvest, and thus helping them to reduce their income risks (Lanjouw and Lanjouw, 2001; Lanjouw and Feder, 2001). Therefore, examining and understanding of the determinants (variables) that influence the probability of agricultural households to participate in off-farm employment is imperative for policy makers in designing appropriate development strategy to raise agricultural household income, and hence reduce rural poverty. Here, we examine the case of agricultural households in Kedah Darul Aman, Malaysia.

This paper is organized as follows. Section II discusses the determinants of farmer's decision to participate in the off-farm employment. Section III describes the methodology of the study, and section IV discusses the findings. Section V provides the conclusion of the study.

The Determinants

In this paper, we define off-farm activities as the participation of individuals in remunerative work away from a home plot of land (FAO, 1988). Thus, any work carried out by the agricultural household other than working on their home plot of agricultural land would be considered as off-farm activities. The question that we would like to examine then is this: what are the main factors that determine the likelihood of a farmer to participate in off-farm activities?

Following Huffman (1980), Benjamin (1992), and Howard and Swidinsky (2000), it is postulated that factors that may influence a farmer to participate in off-farm employment are as follows: (i) individual or personal characteristics; (ii) the household (or family) characteristics; and (iii) the characteristics of the agricultural activity itself; and (iv) the local area characteristics. The first three characteristics are variables that are related to the off-farm labor supply, while fourth characteristic are variables that are related to the off-farm demand for labour. Thus, following Huffman (1980), Benjamin (1992), and Howard and Swidinsky (2000), the determinants that may influence likelihood of farmer *i* to participate in off-farm employment could be written as follows:

$$OFFEMP_i = f(INDC_i, HHC_i, AGC_i, LAC_i) \ldots (1)$$

where, OFEMP = off-farm employment, INDC = individual characteristics, HHC = household characteristics, AGC = characteristics of agricultural activities, and LAC = local area characteristics. Each of the characteristics is explained below.

Individual Characteristics (Indc)

The individual or personal characteristics are those characteristics such as age, gender and human capital (Huffman 1980). With regards to age, younger farmers are expected to be more receptive, adventurous and mobile than older farmers, and thus they are more likely to have a higher inclination towards off-farm employment compared to older farmers. In addition, it is also expected that the probability to diversify into off-farm employment is lower for female than male farmers. Benjamin and Guyomard (1994) found that female farmers have less inclination to diversify into off-farm employment if they have children at a lower age that they need to take care of. Furthermore, human capital, i.e. skills and knowledge, owned by the individual farmers might also influence their likelihood to participate in off-farm employment (Benjamin dan Guyomard (1994). Since off-farm employment, especially in the formal sector, normally requires higher skills and knowledge, it is expected that a farmer with a higher level of human capital have a higher probability to participate in off-farm employment.

Household characteristics (HHC)

The household (or family) characteristics are those characteristics such as the household size and the number of employed member in the household. Larger household size might become a push factor for the head of agricultural household to look for off-farm employment as a means to increase their household income. Thus, a farmer with a larger family size is expected to have a higher probability to participate in off-farm employment than a farmer with a smaller family size. Another factor would be the number of dependents in the family. The pressure for a farmer with a larger number of dependents to look for additional income to meet their living expenses is higher than a farmer with a smaller number of dependents. Thus, it is reasonable to expect that a farmer with a larger number of dependents will have a higher probability to participate in off-farm employment than those with a smaller number of dependents. Another factor that is related to household characteristics is the amount of remittance received by the household. A household that receive higher remittance, usually from their working children that are no longer living with them, is expected to have lower probability to participate in off-farm employment than those family that receive lower remittance. This is sensible since the higher the remittance that the household received, the lower the pressure for the farmer (head of household) to look for additional income for the family, and hence, the lower the probability for the farmer to look for off-farm job.

Characteristics of the agricultural activities (AGC)

Agricultural characteristics are those attributes with regards to the size of agricultural land and the type or category of agricultural activity. A farmer who own and work on a small plot of agricultural land is expected to have a higher probability to diversify their income sources by securing off-farm employment for additional income (Benjamin dan Guyomard1994; Leinbach dan Smith 1994; Lim-Applegate, et al.2002; Corsi dan Findeis 2000; Lanjouw dan Lanjouw 2001). On the contrary, a farmer who own and work on a larger size of agricultural land is expected to have less pressure to diversify their income sources and therefore has a lower probability to look for off-farm employment. Another factor that would affect the probability to participate in off-farm employment is the number of working hours allocated to the

farming activities. The longer the working hours allocated to the farming activities, the less likely the farmer to participate in off-farm job. On the other hand, the shorter the number of working hours allocated to the farming activities, the more likely the farmer participate in off-farm job.

Another related factor is the nature (or category) of agricultural activity undertaken by the farmer. Certain agricultural activities needs full attention of the farmer and hence requires the farmer to allocate most of the time on the activity. However, there are some agricultural activities that require the farmer to allocate less working hours on the activity. Thus, it is expected that a farmer that involve in a certain agricultural activity (category) would have a higher probability to participate in off-farm employment than if the farmer involve in some other types of agricultural activities.

Besides, another characteristic which might be incorporated under agricultural characteristics is the relative importance of agricultural income to total income of farmer. A farmer that receives relatively higher income from agricultural sources in his or her total income is expected to be less likely to participate in off-farm employment. The reason being, income from agricultural sources is already sufficient for him to support his family.

Local area characteristics (LAC)

Local area characteristics are those attributes with regards to the demand for off-farm labor. Most previous studies include the distance to the nearest town as one of the factor that influence the farmer to participate in off-farm job. The nearer the farmer lives to town, the higher the expected probability for the farmer to participate in off-farm employment. Here, we extend the analysis of local area characteristics to include local area economic characteristics. Specifically, we investigate the effect of the intensity of industrialisation (in the area that the farmer lives in) on the farmer's decision to participate in off-farm job. For instance, a farmer that lives in an industrial area would be expected to have more opportunities, and hence higher probability, to participate in off-farm employment than those who live in an agricultural area. On the other hand, a farmer that lives in an area which is basically an agricultural area, is expected to have

less opportunities to off-farm job, and thus less likely to participate in off-farm employment.

Data And Method

The data and sampel

The data used in this study is primary data which is gathered through a survey carried out among agricultural households in Kedah Darul Aman, Malaysia. A total of 384 agricultural households participated in this survey. The survey is carried out between the month of April and December 2008. A face to face interview were carried out with the the respondents, where they were chosen through a stratified random sampling. Six of the eleven districts in Kedah were chosen in this study. These are Kubang Pasu, Sik, Kota Star, Baling, Kulim dan Pulau Langkawi. Table 1 shows the number of respondents by district.

For each district, the respondent is divided further according to the local economic characteristics. As being mentioned earlier, the purpose is to investigate the effect of local economic characteristics on farmer's decision to participate in off-farm employment. In this study, we divide the local economic characteristics into four, which is based on the intensity of agricultural and industrial activities in the area. These are as follows (see also Figure 1):
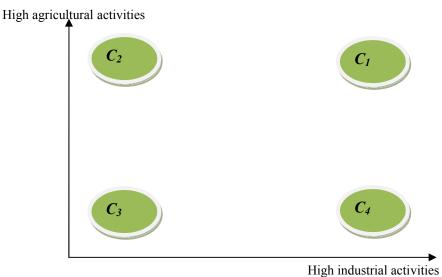
(i) C_1 = area which has significant agricultural and industrial activities.

(ii) C_2 = area which has significant agricultural activities but has no or minimal industrial activities.

(iii) C_3 = area which has minimal agricultural activities but also has no or minimal industrial activities.

(iv) C_4 = area which has minimal agricultural activities, but is a major industrial area.

Table 1: Respondents by district

District	Estimated agricultural households	Number of respondents
Kubang Pasu	8,736	71
Kota Star	16,541	135
Baling	5,913	48
Kulim	9,455	77
Pulau Langkawi	3,541	29
Sik	2880	23
Total	**47,067**	**384**

Source: Population and Family Development Board (2004)

Figure 1: Category of local (area) economic characteristics

The logit model

For the purpose of determining the effect of the various characteristics – individual, household, characteristics of agricultural activity, and the local area characteristics on the probability for participating in off-farm employment, we employ econometric approach that relies on logit model. This approach has been used by various authors such as Abdulai and Crolerees (2001), Bagamba, Burger, and Kuyvenhoven (2007).

Thus, to estimate the decision of the farmer (head of agricultural household) to participate in off-farm employment, we employ a binary choice model based on maximum likelihood method. Dummy dependence variable of 0 and 1 is used with the value of 1 for the farmer (head of agricultural household) participated in off-farm employment while the value of 0 for those who did not participate. Given the value of the independent variables, the estimated value for the dependence variable could be interpreted as the probability to participate in off-farm employment, (Greene 2000; Long dan Freese 2006; Maddala 1983; Wooldridge 2000).

The logit model used in this study is specified as follows:

Latent variable specification:

$$Y_i^* = \beta X_i + u_i \quad \text{.............................. (2)}$$

where:

Y_i = 1 (participate in off-farm employment) if $Y_i^* > 0$

Y_i = 0 (did not participate in off-farm employment) if $Y_i^* < 0$

u_i = error term

β = estimated parameter.

X_i = vector of independent variables

The error term, u_i, is assumed to be logistically distributed. Thus, the probability of individual i to participate in off-farm employment or not, i.e. $\Pr(Y_i=1)$, depends on the vector of individual (INDC), household (HHC), agricultural (AGC), and local area (LAC) characteristics as specified in equation (1). It is written as follows:

$$Pr(Y_i = 1) = \beta_0 + \beta_1 INDC + \beta_2 HHC + \beta_3 AGC + \beta_4 LAC + u_i \quad \text{...(3)}$$

where $\beta_1, \beta_2, \beta_3, \beta_4$ are the estimated parameters, u_i is the error term, and *INDC, HHC, AGC, and LAC* are the independent variables. The variables

used in the estimation are explained and summarised in Table 2.

Equation (3) will be estimated and used to examine the probability of the respondents to participate in off-farm employment or otherwise. It is worth mentioning here that the sign of the estimated parameter is already sufficient to conclude whether the independent variable has a positive or negative impact on the dependent variable (Wooldridge, 2002). In addition, the magnitude of the impact could be found out by looking at the odds ratio.

The Findings

There are a few questionnaires that are not complete and therefore cannot be used for the analysis. As a result, only 381 respondents (questionanaires) are used and analysed. Table 3 reports the results of the estimated logit model. The estimated parameter and the odds percentage change are reported together with the log likelihood value, Wald Chi-Square, Mc Fadden's R-squared, as well as the percent correctly predicted. The estimated logit model show that the value of McFadden's R-squared is 0.484. The percent correctly predicted is 84.28%, which indicates that the estimated logit model is generally good. Generally speaking, the results show that the category agricultural activity and the local economic characteristics are significant to explain the decision of the farmer (head of agricultural household) to participate in off-farm employment. Individual characteristics, on the contrary, are found insignificant. The results for each category are discussed below.

Individual characteristics (INDC)

The results show that age and gender are found statistically significant. Quite surprisingly, education is found not significant. Nonetheless, this is probably due to the nature of the off-farm job. In the rural areas, most off-farm jobs are probably self-employed jobs in the informal sector. Thus, the education level of the farmer might not be that important compared to a situation where the farmer is seeking off-farm job in the formal sector.The results also show that age has a negative relationship with the probability to participate in off-farm employment. This implies that the older the respondent (farmer), the lower the probability for

Table 2: Description of variables and expected sign

Variables	Definition	Expected Sign
DEPENDENT VARIABLE		
OFFEMP (Off-farm employment)	Participation in off-farm employment (Binary) Yes = 1, No = 0	
INDEPENDENT VARIABLE		
Individual Characteristics (INDC)		
AGE (Age)	(Continuous) Age of the head of household	+
GEN (Gender)	(Dummy) Male = 1, Female = 0	+
EDUC (Education)	(Continuous) Highest level of education attained by the head of household	+
Household characteristics (HHC)		
HHSIZE (Household size)	(Continuous) Household size	+
DEPEND (Dependency ratio)	(Continuous) Dependency Ratio (KIR/number of dependence)	-
REMITT (Remittance)	(Continuous) Total income received from remittance	-
Characteristics (Category) of Agricultural Activity (AGC)		
LAND (Land Size)	(Continuous) Land size in "relong"	-
TYPE1 (Paddy)	(Dummy) Paddy; Yes =1; No = 0	-
TYPE2 (Commercial crops)	(Dummy) Commercial crops; Yes =1; No = 0	+
TYPE3 (Other crops)	(Dummy) Other Crops; Yes =1; No = 0	+
TYPE4 (Animal Husbandry)	(Dummy) Animal husbandry; Yes =1; No = 0	+
TYPE5 (Fishermen)	(Dummy Fishermen; Yes =1; No = 0	+
TYPE6 (Aquaculture)	(Dummy) Aquaculture; Yes =1; No = 0	+
TIME (Working hours)	(Continuous) Time allocated to agriculture activities per week	-
RFTHHI (Ratio of farm income to total income of the farmer)	(Continuous) Ratio of Farm Income to Total Income of the Head of Household	-
Local area (economic) characteristics (LAC)		
C1(agriculture and industrial area)	(Dummy) agriculture and industrial area	+
C2 (agricultural area, no industrial activity)	(Dummy) agricultural area, no industrial activity	+
C3 (neither agriculture nor industrial area)	(Dummy) neither agriculture nor industrial area	-
C4 (industrial area, with some agriculture activities)	(Dummy) industrial area, with some agriculture activities	+
Distance to nearest town (DIST)	(Continuous) Distance between the respondent's house to the nearest town	-

Table 3: Estimated Logit Model

DEPENDENT VARIABLE			
OFFEMP (Off-farm employment)	Participation in off-farm employment ((Binary) (Yes = 1, No = 0)		
INDEPENDENT VARIABLE	**ESTIMATED COEFFICIENT**		
	Parameter	**Standard Error**	**Odds Ratio**
CONSTANT	4.7002	1.6498	--
Individual Characteristics (INDC)			
AGE (Age)	-0.0662***	0.0175	0.9360
GEN (Gender)	1.1635*	0.5994	3.2014
EDUC (Education)	0.1283	0.1429	1.1369
Household characteristics (HHC)			
HHSIZE (Household size)	-0.3093**	0.1116	0.7339
DEPEND (Dependency ratio)	-2.9056*	1.2162	0.0547
REMITT (Remittance)	-0.0025**	0.0008	0.9975
Characteristics (Category) of Agricultural Activity (AGC)			
LAND (Land Size)	0.0995*	0.0465	1.1046
TYPE1 (Paddy) (Reference)	--	--	--
TYPE2 (Commercial crops)	1.5389**	0.5012	4.6598
TYPE3 (Other crops)	2.6692***	0.6577	14.4279
TYPE4 (Animal Husbandry)	3.5847***	0.6643	36.0408
TYPE5 (Fishermen)	1.6902**	0.6306	5.4206
TYPE6 (Aquaculture)	1.1129	1.1588	3.0430
TIME (Working hours)	-0.0376**	0.0110	0.9631
RFTHHI (Ratio of farm income to total income of the farmer)	-7.1274***	0.8499	0.0008
Local area (economic) characteristics (LAC)			
C1(agriculture and industrial area)	3.1011***	0.6604	22.2226
C2 (agricultural area, no industrial activity)	2.3765***	0.6187	10.7677
C3 (neither agriculture nor industrial area) (Reference)	--	--	--
C4 (industrial area, with some agriculture activities)	2.5443***	0.6741	12.7342
Distance to nearest town (DIST)	0.0042	0.0225	1.0042
Log likelihood = -137.0678 Number of obs = 381 LR chi2(18) = 203.66 Prob > chi2 = 0.0000 Pseudo R2 = 0.4262 Percent correctly predicted = 84.25% McFadden's R2 = 0.426 Significance level: ***p<0.01; **p<0.05; *p<0.1			

the respondent to participate in off-farm employment. The odds ratio for age is 0.93, which implies that a one unit (year) increase in the age of the respondent will result in the odds of the respondent to participate in off-farm employment to decline by a factor of 0.93. It should be worth mentioning here that these results are quite similar to a study by Howard and Swidinsky (2000) in Canada and also by Matshe and Young (2004) in Zimbabwe. As for the gender variable, it is found significant in determining the decision of the farmer to participate in off-farm employment. Besides, it is also found to have a positive sign, which implies

that the probability for male respondent (farmer) to participate in off-farm employment is higher than female.

Household characteristics (HHC)

All of the variables under household characteristics – household size, dependency ratio and remittance - are found significant in the decision of the respondent (farmer) to participate in off-farm employment. The result shows that the household size variable has a negative sign. This implies that the larger the household size, the lower the probability for the respondent (farmer) to participate in off-farm employment. In addition, the value of odds ratio for household size is 0.73, which suggest that an addition of one more member in the household would result in the odds of the the respondent (farmer) to participate in off-farm employment to decline by a factor of 0.73.

The result also reveals that the remittance received by the respondent (farmer) has a negative relationship with the probability for the respondent (farmer) to participate in off-farm employment. The result suggests that the larger the amount of remittance received by the respondent (farmer), the lower the probability for the farmer to participate in off-farm employment, as expected. The finding also shows that the dependency ratio, which is the ratio of the farmer to the number of dependent in the household, has a negative relationship with the probability to participate in off-farm employment. This signifies that the lower the dependency ratio, i.e. the larger the number dependents, the higher the probability for the farmer to look for off-farm employment. This is understandable since a farmer with a larger number of dependents requires a higher income to sustain the family and hence, has a higher probability to look for off-farm job.

Characteristics of agricultural activity (AGC)

The result of this study shows that the size of the agriculture land is significant to explain the probability of the respondent (farmer) to participate in off-farm employment. However, quite surprisingly, it has a positive sign. This result suggests that as the size of the agriculture land increases, the probability for the respondent (farmer) to participate in off-farm employment is also increases. The odds ratio change indicated

that a one unit increase in the agriculture land size would increase the probability of the respondent (farmer) to participate in off-farm employment by a factor 1.1. While the finding of this study shows that land size has a positive sign, which is contrary to prior expectation, this finding however, is similar to the findings of a study by Benjamin dan Guyomard (1994), and Benjamin dan Kimhi (2003). One possible explanation for this finding is that a larger size of land would enable the farmers to use more intensively modern technology as well as using paid labor to carry out their agricultural activities than small size of land. This is possible to do since those who own large land size normally find it easier to get credit from financial institutions than those with small land size. Thus, farmers with large size of land would probably spend less time at their plot of land, which enable them to participate in off-farm employment.

This study also discovers that the the number (length) of working hours allocated to agricultural activity is significant and has a negative relationship with the decision to participate in off-farm employment. This is expected since the longer the hours allocated to perform the agricultural activity, the shorter the time available to perform non-farm activity. Thus, as more time is allocated to the agricultural activity, the lesser the probability of the respondent (farmer) to participate in off-farm employment.

It is also found that the ratio of income from agricultural sources to total income of the respondent (farmer) is significant and as expected, has a negative relationship with the probability to participate in off-farm employment. This implies that the higher the proportion of income from agricultural sources in total income of the respondent (farmer), the lower the probability for the respondent (farmer) to participate in off-farm employment. This is sensible since those farmers whose main income is from agricultural sources probably they are also those who spend most of their time in agricultural activity. Obviously, they will have less inclination for participating in off-farm employment. Furthermore, the larger the contribution of farm income in total income of the farmer, which might indicate that income from farm sources are already sufficient to sustain the family, the lower therefore the need to participate in off-farm employment.

With regards to the type (or category) of agricultural activities, paddy planting (TYPE1) activities is made as a reference. It is interesting to discover that, except aquaculture, all other categories (types) of agricultural activities are significant and have a positive signs. The results suggest that, respondent (farmer) who involve in these activities – commercial crops, other crops, animal husbandry, fishermen - have a positive probability to participate into off-farm employment. It is worth mentioning the odds ratio for respondent (farmer) that involve in agricultural activities categorised as animal husbandry and other crops is larger. This implies that respondent (farmer) that involve in animal husbandry and other crops have a relatively higher probability to participate in off-farm employment compared if they were involved in paddy planting.

Local area characteristics (LAC)

The result shows that the distance to the nearest town is insignificant to explain the decision to participate in off-farm employment. However, all local economic characteristics of the area, i.e. variables C1, C2, and C4, are significant and have the expected positive signs. Variable C3, which represents an area categorized as neither agricultural nor industrial areas, is made as a reference as it is expected that respondent (farmer) who live and work in this area category would be less likely to involve in non-farm activities compared to the other areas.

The finding also uncovers that the odds ratio for respondent (farmer) who resided in area C1, i.e. an area that has significant agricultural and industrial activities, is considerably larger than the odds ratio for other areas. This implies that, if the respondent (farmer) in C3 is to be relocated to area C1, the probability of the respondent (farmer) to participate in off-farm employment is significantly higher. The results also shows that the impact of relocating the respondent (farmer) in C3 to area C2 (area which has significant agricultural activities but has no or minimal industrial activities) and C4 (area which has minimal agricultural activities, but is a major industrial area), the probability for respondent (farmer) to participate in off-farm employment will be higher, but less than the impact if they are relocated to area C1 (an area that has significant agricultural and industrial activities).

CONCLUSION

Most poor households are found in the rural areas where majority of them involved in agricultural activities. Thus, improving their income and uplifting their socioeconomic status are important. In this regards, it has been argued in the literature that diversification into off-farm employment appears to be one of a viable options in uplifting the socioeconomic status of the rural-agricultural community. If the agricultural household could diversify their income through an off-farm job, and hence, improve their household income, the problem of poverty could probably be reduced. Thus, the issue of how to increase participation of farmers in off-farm employment is an important question to be addressed. This entails an understanding on the determinants of farmers' participation in off-farm employment. In this study, we consider this issue and investigate the important determinants in farmer's decision to participate in off-farm employment.

This study uncovers that the main determinants that influence the farmer's decision to participate in off-farm employment are age, gender, household size, dependency ratio, remittance, land size, types of agricultural activities, the length of working hours allocated to the agricultural activity, the ratio of income from agricultural sources in total income of the farmer, and the local economic characteristics where the farmer reside. Variables that are found to have a negative relationship with the decision to participate in off-farm employment are age, household size, dependency ratio, remittances, hours spend on agriculture activity, and the ratio of income from agricultural sources in total income of the farmer. On the other hand, land size is found to have a negative relationship with the decision to participate in off-farm employment.

It is interesting to highlight that the evidence from this study suggest that respondent (farmer) who resided in an area that has significant agricultural and industrial activities has higher probability to participate in off-farm employment than in other areas. Thus, if the rural-agricultural households are to be encouraged to look for off-farm jobs, one of the policy challenges is to pursue a balanced development in the rural areas. A balanced development in terms of agricultural and industrial sector in the rural areas would increase the likelihood of the farmer to participate in off-farm job. This will

consequently increase their income and uplift their standard of living.

REFERENCES

Abdulai, A. and Crolerees, A. (2001) "Determinants of Income Diversification amongst Rural Household in Southern Mali." Food Policy, Vol. 26, pp. 437-452.

Baumgartner, H.W. (1965) "Potential Mobility in Agriculture: Some Reasons for the Existence of A Labor-Transfer Problem." Journal of Farm Economics, 47:1, pp.74-82.

Bagamba, F., Burger,K. and Kuyvenhoven, A. (2007) "Determinants of Smallholder Farmer Labour Allocation Decisions in Uganda." Paper presented in the EAAE seminar on Pro-Poor development in low income countries: Food, agriculture, trade and environment. Montpellier, France.

Benjamin, C. and Guyomard, H. (1994) "Off-Farm Work Decisions of French Agricultural Households," in Agricultural Household Modelling and Family Economics by France Caillavet, Hervé Guyomard, Robert Lifran, Eds., Elsevier: Amsterdam ; New York.

Benjamin, C and Kimhi, A. (2003) "Farm Work, Off-Farm Work, and Hired Farm Labor: Estimating a Discrete - Choice Model of French Farm Couples' Labor Becisions." Discussion Paper No.5.03 May 2003.

Benjamin, D. (1992) "Household Composition, Labor Markets, and Labor Demand: Testing for Separation in Agricultural Household Models." Econometrica, 60:2, pp. 287-322.

Chinn, D. L. (1979) "Rural Poverty and the Structure of Farm Household Income in Developing Countries: Evidence from Taiwan", Economic Development and Cultural Change, Vol. 27, pp. 283-301.

Collier, P., Radwan, S. and S. Wangwe (1986) Labour and Poverty in Rural Tanzania, Oxford: Clarendon Press.

Corsi, A and Findeis, J.L. (2000) "True State Dependence and Heterogeneity in Off-Farm Labour Participation." Review of Agricultural Economics, 27:2, pp. 127-52.

Davis, J.R. (2004) The Rural Non-Farm Economy, Livelihoods and their Diversification: Issues and Options. Chatham, UK: Natural Resource Institute.

Dennis Anderson and Mark W. Leiserson (1980) "Rural Nonfarm Enterprise in Developing Countries", Economic Development and Cultural Change, Vol. 28, No. 2, pp. 227-248.

FAO. (1998) Rural Non-Farm Income in Developing Countries. The State of Food and Agriculture 1998.

Greene, W.H (2000) Econometric Analysis. New Jersey: Prentice-Hall International, Inc.

Howard, W. and Swidinsky, M. (2000) "Estimating the Off-Farm Labor Supply in Canada." Canadian Journal of Agricultural Economics, 48:1, pp. 1-14.

Huffman, W.E. dan Lange, M.D. (1989) "Off-Farm Work Decisions of Husbands and Wives: Joint Decision Making." The Review of Economics and Statistics 81 XXI: pp. 471-80.

Huffman, W.E. (1980) "Farm and Off-Farm Work Decisions of Husbands and Wives: Joint Decision Making." The Review of Economics and Statistics, 62:1, pp. 14-23

Lanjouw, J.O. and Lanjouw, P. (1995) "Rural Non-Farm Employment: A Survey." Policy Research Working Paper 1463, World Bank, Washington D.C.

Lanjouw, J. O. and Lanjouw, P. (2001) "The rural non-farm sector: Issues and evidence from developing countries". Agricultural Economics, 26, pp. 1-23.

Lanjouw,P. and Feder.G (2001) "Rural Non-Farm Activities and Rural Development: From Experience Towards Strategy." Rural Development Strategy Background Paper #4. The World Bank.

Leinbach, T.R. and Smith.A. (1994) "Off-farm Employment, Land, and Life Cycle: Transmigrant Household in South Sumatra, Indonesia." Economic Geography, 70:3,pp. 273-96.

Lim-Applegate, et al. (2002) "Determinant of Non-Farm Labour Participation Rates Among Farmers in Australia." The Australian Journal of Agricultural and Resource Economics, 46:1, pp. 85-98.

Matshe, I. and T. Young (2004) "Off-farm labour allocation decisions in small-scale rural households in Zimbabwe." Agricultural Economics, 30(3):175-186.

Reardon, et al. (2002) Promoting Farm/Non-Farm Linkages for Rural Development: Case Studies from Africa and Latin America. Rome: Food and Agriculture Organization of the United Nations.

Ryohei, Kada (1983) "Changing Rural Employment Patterns: Role of Off-Farm Employment for Balanced Rural Development", in Allen Maunder and Kazushi Ohkawa (eds.) (1983), Growth and Equity in Agricultural Development, Aldershot: Gower Publishing Co.

Wooldridge, J.M. (2002) Econometric Analysis of Cross Section and Panel Data. Massachusetts: The MIT Press.