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Off-Farm Incomes: a Haven for Women and Youth in Rural Tanzania?

by

Lucas Katera

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1.0 INTRODUCTION

The traditional image of farm households in developing countries has been that they focus almost exclusively on farming and undertake little or no rural off-farm activities. This image persists and is widespread even today. Policy debates also tend to equate rural incomes with on-farm incomes, and rural/urban relations with farm/non-farm relations. Industry Ministries have thus focused on urban industry and Ministries of Agriculture on farming, and there has been a tendency even among agriculturists and those interested in rural development to neglect the off-farm sector.

Nevertheless, there is mounting evidence that off-farm income (that is, income derived in this sector from wage-paying activities and self-employment in commerce, manufacturing, other services and even in other peoples' farms) is an important resource for farming and other rural households, including the landless poor as well as rural town residents. Evidence for Africa as a whole shows, for example, that the rural non-agricultural economy is sizable and growing. Surveying about 100 farm-household survey-based studies from the 1970s–1990s, Reardon *et al.* (1998) find an average non-farm income share of 42% in Africa, followed by 40% in Latin America, and 32% in Asia. The non-farm sector further includes a range of activities that are far from homogeneous. Because of the sector's great heterogeneity, policies for a given country must be founded on detailed analysis of the sector in that specific country.

In Tanzania, Ellis (1999) provides a review of the large-scale sample survey evidence on the significance of the non-farm sector in rural Tanzania. While the author accepts existence of measurement problems of non-farm income, the results show that non-monetized incomes remain quite important, suggesting that the transition out of subsistence agriculture is far from complete, but also non-farm income shares are fairly low and there is no clear evidence of a marked expansion of these shares over time. Other studies, however, give a different story. When studying Non-agricultural earnings in peri-urban areas of Tanzania Lanjouw, *et al.* (2001) finds that non-farm income shares rise sharply and monotonically with quintiles defined in per capita income terms. The recent Household Budget Survey of 2007 shows also that rural income appears to be increasingly dependent on off-farm sources relative to on-farm income sources. For instance, there has been a decline in the proportion of income from on-farm sources from 60% in 2000/2001 to 50% in 2007 (NBS, 2009). There are also other signs of increasing non-farm activities in rural areas: 56% of food expenditure in rural areas is from purchasing rather than own production. Furthermore, overall some 45% of rural dwellers reported having a business in 2007 compared to 40% in 2000/2001 (NBS, 2009).

While these studies have concentrated on presence (or absence) and magnitudes of non-farm incomes in rural Tanzania, they have not addressed the determination of their presence as well as the quantitative contribution of such incomes to rural growth, particularly on their contribution to marginalized segments of the population. This paper covers that knowledge gap by answering two main questions. One, what are the determinants of rural off-farm incomes; and two, to what extent do rural off-farm incomes contribute to the empowering of the marginalized segments of the population, particularly landless women and youth. In the second question, the paper explores the extent of participation of rural woman in off-farm activities, noting that this is their main option taking into account that they have limited access to land. In the first question, the paper will quantify determinants of household entry in off-farm activities. In this question, the paper establishes how easy (or difficult) it is for households to participate in these activities. If it is found that there are entry barriers in off-farm activities, this may partly explain the current rural inequality among rural men and the landless women and the recent problem of urban migration among the youth. If this is the case, then the paper will justify government intervention in promoting off-farm incomes through targeted programmes that help the poor households and other marginalized groups to participate

2.0 DYNAMICS OF FARM/OFF-FARM ACTIVITIES IN RURAL TANZANIA

Just as it is the case with other developing countries, farming and related activities continue to dominate the time of majority of its citizens, particularly those in rural areas. Recent survey indicates that three quarters of the adults in rural areas depend on farming (HBS, 2009). While farming remains the giant employer in rural Tanzania, overtime trend shows that its relative importance is declining. In this decade starting in 2000, for example, there appears to have been a decline in adults involved in farming and related activities in rural areas (Table 1).

Table 1: Distribution of Main Activities of Adults in the previous Seven Days by Geographical Area (HBS 2000/01, 2007)

Activity	Dar es Salaam		Other Urban areas		Rural areas		Mainland Tanzania	
	2000/1	2007	2000/1	2007	2000/1	2007	2000/1	2007
Farm	3.0	3.1	26.1	27.6	74.1	72.5	61.8	57.3
Non-farm	97.0	96.9	73.9	72.4	25.9	27.5	38.2	42.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: for individuals age 15 to 60

Source: HBS, 2009

In line with the decreased relative importance of activities that are farm related in rural areas, is the increase in the households reported to depend on business for their livelihood. It is reported that households depending on business in general increased from 42 per cent in 2000/1 to 48 per cent in 2007. In rural areas, statistics show that the households' dependent on business activities increased in the same period from 40 per cent to 45 per cent (HBS, 2009).

3.0 DETERMINANTS OF RURAL OFF-FARM ACTIVITIES

Although rural households tend to turn to off-farm activities to meet their needs and offset income shortfalls, participation appears to be constrained by capital assets—human, social, financial, and physical. In their study of off-farm employment participation in Honduras, Ruben and Van den Berg (2001) show that educated and wealthier households take advantage of their human and physical capital by participating more in off-farm activities. In addition, in their study of off-farm employment in Columbia, Deininger and Olinto (2001) show that investment in a single income source is the most beneficial to capital-constrained households with limited education and other human capital. The limitations from access to credit and lack of education are also highlighted by Escobar's (2001) study of income diversification in Peru. Constraints to physical and human capital capital are also found to be important in the choice of off-farm activities in many developing countries. Haggabade *et al.* (2009) argue that poor men and women dominate low-return activities, such as small-scale trading and unskilled wage labour used in construction, pottering, and many personal services. Wage labour, in both agriculture and non-farm businesses, also accrues primarily to the poor. In contrast, white-collar jobs such as medicine, teaching, accounting, and administration figure most prominently among higher income households. Similarly, Lanjow *et al.* (2007) show that human and physical capital (education, wealth) have influence in determining the access to non-farm occupations. Further, direct contribution of the non-farm sector to poverty reduction is possibly quite muted as the poor lack the assets (Seebens, H. 2009).

What we see from this literature suggests that rural off-farm incomes would be higher in regions with higher levels of income per capita. Such regions have better infrastructure and relatively stronger agriculture sector, which induce rural non-farm activities. Contrary to that, Africa has lower income per capita but has higher share of rural non-farm incomes, a fact suggesting that the region has strong incentive to diversify, perhaps due to low farm income, risks etc.

4.0 REGIONAL SHARE AND NATURE OF OFF-FARM INCOMES

The share of rural non-farm incomes (which is just part of off-farm incomes) to total incomes is higher in Africa (42%) and Latin America (40%) than Asia (32%), (See Ellis, F, 1999; World Bank 2008a). Also, the nature of rural non-farm activities differs significantly between regions and sub-regions (Lanjouw, J., and P. Lanjouw, 2001; Lanjouw, P., A. Shariff& D.Rahut, 2007). The pattern in the level and composition suggest that Africa and South Asia regions are in what is considered first stage of rural non-farm sector transformation. At this stage, rural non-farm tends to have production or expenditure linkages with agriculture where farming directly employ majority of rural population and rural non-farm tends to be centred on countryside itself, with little or no dependence on rural-urban links (*Ibid*; Mduma, J. 2003). Activities under this stage are mainly home based and small scale production of non-tradable goods (goods mainly sold locally) produced in the countryside (rather than rural towns). In the farm/non-farm relations, agriculture tends to depend on local supplies of inputs and services and on local processes and distribution of farm products, usually carried out by small to medium scale firms (Mduma, J., and P. Wobst, 2005). Example of activities include manufacture or mixing of fertilizers manufacture, rental and repair of animal traction equipment; cart production; tractor services; crop processing; transport; construction or maintenance of market facilities and commerce.

Latin America is in the second stage (Reardon, T, 2001; P., A. Shariff& D.Rahut, 2007; World Bank 2008a). This has greater mix of activities, that is, those with agriculture linkages and those that are separate, e.g. tourism, mining and services, though the later grew out of agriculture linkages. The share of population depending on agriculture is lower than in Africa and South Asia (*Ibid*). There is a greater weight of rural-urban links with urban or foreign companies sub-contracting rural companies (mainly in light durables such as clothing). This stage is also characterised by a lot of commuting of labour force between the countryside and rural towns and intermediate cities. Also there is a tendency of “agro-industrialization” in commercial agriculture areas, both on small scale and particularly on medium to large scale. Furthermore, there are mixed levels of capital intensity, thus small-scale labour intensive production in countryside is observed alongside relatively capital intensive enterprises producing the same outputs in local intermediate cities.

East Asia appears to be in the third stage (Reardon, T, 2001; P., A. Shariff& D. Rahut, (2007); World Bank 2008a). This stage is identified by intensification of characteristics that differentiate stage I and II: more advanced rural-urban linkages with more labour commuting between the two; expansion of sub-contracting beyond

light durables to medium durables (e.g. vehicle parts); substantial rural non-farm employment arising outside linkages with agriculture (e.g. economies such as Taiwan province of China).

5.0 WOMEN AND OFF-FARM INCOMES

Both men and women play substantial – though different – roles in developing economies. There is a large body of micro-economic empirical evidence, and emerging macroeconomic analysis, which show that gender inequality directly and indirectly limits economic growth. The principal policy implications of this analysis are that, because gender inequality acts as a powerful constraint to growth, removing gender-based barriers to growth will make a substantial contribution to realizing growth potential. Reducing gender-inequality in access to and control of key productive resources necessary for growth is a concrete means of accelerating and diversifying growth, making growth more sustainable, and ensuring that the poor both contribute to, and benefit from, that growth, i.e., that growth is “pro-poor.” However, gender inequality in access to and control of a wide range of economic, human, and social capital assets and resources remains pervasive in Africa, particularly Sub-Saharan Africa, and is a core dimension of poverty in the Region.

The main natural resource suffering from gender inequality in both access and ownership, but which is key ingredient in production particularly to rural citizens is land. While women appear to be key players in activities related to land, they have limited say in the land as well as in the output from land. In Kenya, the structural roles of men and women in the agricultural cycle reveal that women are more active in agriculture than men, specifically in food crop production, marketing, and processing of agricultural products (90%). Women work 50 percent more hours than men on agricultural tasks. This has been discussed extensively in World Bank reports (World Bank 1989, Horenstein 1989). Women provide approximately 75% of total agricultural labor but they own only 1% of the land. Building on this, the 2003 World Bank Country Economic Memorandum for Kenya confirmed that inequality, notably gender inequality, is a contributing factor in keeping Kenya’s growth performance below its long-run potential. The same trend of engagements in farm production vis a vis ownership of land is the case in other parts of Africa (See M, Nancy and Y. Sun, 2009; B, Christopher et, al. 2001)

While women are marginalized in resource access, there is an increasing pressure, resulting from economic hardship, for women’s contribution to ensuring family survival, especially in farm households (Aston, 2003; Jefferson, T. and A. Mahendra, 2012). As the result, there has been an increased participation of farm women in the paid workforce in recent times (Alston 1994; Feder and Lanjouw 2000; Barret et al. 2001; T. and A. Mahendra, 2012). In Australia, Alston’s (1995) study found that 50 per cent of farm women were engaged in off farm employment, predominantly in part time work. The Missed Opportunities report (1998) provided insights into the significance of women’s off-farm employment when it estimated that over 80 per cent of off-farm income was attributable to women’s contributions (Aston, 2003). In

Tanzania, Seebens, H (2009), shows that although women entrepreneurs often run enterprises that exhibit low productivity, they provide important supplements to household income. More than 39% of those women who are employed in the informal sector as the main activity report that they do this in order to generate additional income for the family as opposed to 25% of men

Difference in gender participation is also informed by participation decision, which may differ for male and female members of the household. Participation in off-farm activities has been found to empower women, increasing their bargaining power within the household and increasing household welfare (Newman and Canagarajah 1999), indicating relatively higher returns from such participation outside of simple cash earnings. While much empirical work indicates that female household members are less likely to be involved in nonfarm work in Africa in general (Matshe and Young 2004; Abdulai and Delgado 1999), Ghana has a long tradition of female traders in particular (Canagarajah, Newman, and Bhattamishra 2001). Local community-based groups are also pervasive in Ghana, some of which are gender specific, and many of which have mixed membership. Women may also improve their intra-household bargaining position by participation in groups (Weinberger and Jutting 2001). The above suggests that even if returns to men’s and women’s labor in crop agriculture are the same, different members may face different marginal benefits from participating either in off-farm work or in local community groups.

In Rural Tanzania, gender participation in economy still shows that majority of women (75 per cent) than men (70 per cent) depend on agriculture for livelihood. However, the relative attempt to move out of agriculture into off-farm activities seems to be higher for women than men. For example the percentage of rural women who reported depending on self-employment either with or without employees more than doubled from 2.9 per cent in 2000/1 to 6 per cent in 2007. Within the same period, percentage of men increased from 5.2 per cent to 10.2 per cent (HBS, 2009). Generally, Women play an important role in generating non-farm income: according to the Tanzanian National Bureau of Statistics (URT 2006), the female share of the labor force employed in the informal sector is 45%. There is a slight decline in gender disparities in monthly average incomes (Table 2).

Table 2: Ratio of men to women average monthly earnings

	Dar es Salaam	Other Urban areas	Rural areas	Mainland Tanzania
2000/1	2.4	2.3	1.7	1.9
2007	2.4	2.4	1.4	1.7

Source: Author’s computation using HBS, 2009

Men’s average earnings are nearly 1.7% times higher than women’s, decreased from 1.9% times in 2000/2001. The differences are largest in Dar es Salaam and

other urban areas where men earn 2.4% times as much as women. And lowest in rural areas where men earn 1.4% times as much as women. This observation confirms findings of other researchers, showing that increased income diversification from farm to off-farm economic activities tend to benefit relatively women than men. While this is likely to contribute to women's empowerment, it is potentially likely to lead to increased intra-household tensions (DFID, 2001).

6.0 YOUTH AND RURAL ECONOMY

Limited research on youth exists. This problem is even more serious when it comes to research that links rural economy and young people (Sumberg. J, *et al.*, 2012). Consequently, policy advocates, policy makers and development planners rely heavily on common knowledge, anecdotal and narrative to develop and argue policy alternatives for youth. While this may be good politically, it is unlikely to result in good policy and development outcomes, particularly when the problems being addressed are associated with complex phenomena such as poverty, livelihoods, agrarian transitions, social justice or sustainability.

In the contemporary context of profound and significant global change, youth unemployment levels have hit historic highs (ILO, 2012a,b,c; OECD, 2012), and despite improved undernourishment estimates in the two decades to 2007, one in eight people suffered chronic undernourishment in 2010-2012 - one in four in sub-Saharan Africa - according to the recent United Nations Food and Agriculture Organization state of food insecurity and hunger in the world report (2012). Add to the twin challenges of youth unemployment and hunger and food insecurity, an apparent ageing of the farm population – the average age of farmers is now in the range of late-50s to early 60s across the globe from The United States to Europe, to Africa, to Australia. On the surface the answer seems simple enough: encourage young people to farm and we solve these problems in one fell swoop. Within this context, it can be argued that agriculture will provide under- and un-employed young people with employment and income. This in turn will provide the food we need via increased production, and ensures farming is passed from one generation to the next. This message adds yet another framing of young people as the saviours of under-nutrition to the many other framings and narratives that place young people in the role of saviours of the agriculture sector. This is, however, not a straightforward thing due to young people's attitudes towards agriculture as well as dynamics within the agriculture sector that are not in favour of young people engagement in agriculture.

Most young people have no interest in agriculture—it is not within their own visions for their future. This is often echoed by their parents (Leavy, J (2012). By agriculture, people invariably think of farming: back-breaking work, low input, 365 days a year for little or low return. Hence, agriculture is not considered to be delivering the types of lifestyles and status that young people desire and expect. These are important dimensions of the attractiveness, or otherwise, of agriculture (invariably farming) as an occupation. Agriculture is not considered able to deliver via incomes and working conditions the kinds of lifestyles young people aspire for in the 21st century, lifestyles that are ever more visible thanks to revolutionary advances in communications technology that is accessible to (almost) all, even people living in the most remote rural areas. In this respect, agriculture is regarded as a poor person's activity, going

beyond living standards to people's sense of pride and self-respect. These are important dimensions of wellbeing and take us beyond narrow, one-dimensional conceptions of what it means to be poor, marginalised and disadvantaged. If agriculture is not able to deliver either the desired living standards or the prospects for upward mobility, then the likelihood of attracting young people into or retaining them in the sector is low. Those who do see a future for themselves in farming believe it needs to be 'smarter', more productive and more reliable.

Furthermore, education is a double-edged sword. Ideally, it is expected that higher education should be able to transform agriculture from peasantry to modern farming practices, a situation which is not happening in practice especially in developing countries. With higher levels of education, young people seek jobs with higher skill levels than those of the smallholder farming activities that most face. Put differently, higher education is seen as a way of escaping from low prestige farming in rural areas to more prestigious jobs in urban areas. Studying young people and farming in Ethiopia, Tadele, G. and A. A. Gella, (2012) found negative perception on farming in that, life as a farmer is tied to life in village which is considered hard and demanding. People still donot realize that one can live in a village and yet live a good life. Even when you find the odd young person who has gone into agriculture after failing to pass the national exams and they succeed and lead a good life, people still refuse to see their success. They don't say "so and so's son has become a good farmer". They would rather say "So and so's son became a farmer after all those years of education" (*ibid*). Agriculture is still seen as a degrading occupation – especially when someone is educated. On the other hand, education seems not to yield the desired results. Higher unemployment levels, especially among the youth, suggest that work and education are failing as key routes by which people move out of poverty, and as crucial mechanisms linking economic growth to poverty reduction. More children than ever go to school, but what they learn appears to be far removed from the skills needed in the 21st century (UNESCO, 2012; World Bank, 2012). This is as also true for agriculture sector skills as any other.

More important in the literature is the line that young people are being "pushed" out of agriculture against their will. Here the emphasis is on aspects of agrarian structures, economies and transitions that are barriers to young people's access to productive resources (Tadele, G. and A. A. Gella, 2012). At the forefront of these is increasing population density and the resulting pressure on land, to the point where increasing numbers of smallholder farmers in Africa are working plots that are so small as to be unavailable (Jaime *et al.* 2012). Associated with this is the process of commodification that, in Ghana for instance, is increasingly blocking young people's access to family land (Amanor 2010). In Sierra Leone, the grievances around deeply rooted agrarian structures and relations that restricted young people's access to land labour-and thus limited their ability to build a livelihood in rural areas-were

fundamental to the dynamics of the 1991-2002 war (Peters and Richards, 2011). In connection to the aforementioned discussion, it is highlighted that in Malawi, young people have expressed their feelings of marginalization leading to powerlessness, alienation and hopelessness resulting from land grabs (Sumberg, J. *et al.*, 2012).

These emerging findings suggest inexistence of environment in the agriculture setting that encourages youths to participate in. Subsequently, any policy option that addresses rural economy and employment, especially in developing countries, by focusing attention to farming *per se* is unlikely to yield tangible results for the youth. Policymakers need to think beyond the conception of (young) people as units of labour to be placed in jobs. To engage and empower young people in agriculture, the sector needs to be able to address young people's aspirations and their expectations, and offer potential for social mobility. Using the language of the International Labour Organization (ILO) and FAO, rural employment needs to be 'decent work'— but as the importance to people of self-respect and status highlights, it needs also to address broader conceptions of human wellbeing. Farming needs a change of image to get over entrenched, though not unfounded, beliefs that it involves dirty, laborious work at low skill levels for low returns. Otherwise, the current urban unemployment which has a substantive contribution from migration from rural areas will still be a problem because young people are pushed to follow the so called "descent jobs" in urban areas. Thus, modernizing farming by creating environment that is considered "conducive" for youth or creating employment outside farming within rural areas that youth may consider similar to what they follow in urban areas may partly address youth unemployment and rural poverty. In our context, promoting off-farm income generating activities may partly address this twin challenge.

7.0 FRAMEWORK OF ANALYSIS

7.1 Conceptual Framework

The analytical framework is based on a number of assumptions as follows:

1. Farming household is endowed with labour and land as means of production.
2. At any given time, household labour is fixed. This means, division of labour among on farm and off-farm activities depends on the opportunity cost of the forgone activity.
3. Entry to non-farm activities is constrained by barriers like capital, skills, infrastructure and others.
4. As a measure to address income shocks and smoothen consumption, farm households opt to diversify income to non-farm incomes.

Given the above assumptions, at any time t , a rural household i is said to maximize utility from consumption which is a function of allocating a fixed household labour between on-farm and off-farm activities,

$$U_{it} = C_{it}(L_p, L_q) \text{----- (1)}$$

Where U_{it} is utility derived by household i in time t ; C_{it} is a consumption of household i in time t ; and L_p and L_q are labour allocation between on-farm and off-farm activities respectively.

In maximizing the above utility function, each household faces intertemporal constraints, let it be budget, an endowment constraint or any other constraints. The first order conditions for labour allocation obtained from solving the above programming problem can be used to illustrate how households allocate labour resources across on-farm and off-farm activities. If the marginal utility of allocating labour to on-farm were greater than the marginal utility derived from off-farm activities, the household would tend to specialize in on-farm production, without any investment in off-farm activities.

Now assuming the returns to the off-farm activities is denoted as:

$$P_m g(H_m | M_n) \text{-----}(2)$$

where P_m and M_n represent the output price and entry constraint—such as investment capital or skill—respectively, the relationship between the expected marginal utilities can be expressed as:

$$E \left[U'(C_t) P_{f_t} \frac{\partial h}{\partial H_{f_t}} \right] > E \left[U'(C_t) P_m \frac{\partial g}{\partial H_m} \right], \text{ with } H_{f_t} > 0 \text{ and } H_m = 0 \text{---}(3)$$

where E is the expectation operator, (U_{ct}) denotes marginal utility of consumption; H_{f_t} and H_m denote labour allocated to on-farm production and off-farm activities, respectively; and P_{f_t} represents output price of goods produced in on-farm activities. According to equation (3), the household does not need to undertake any other activity besides on-farm ($H_{f_t} > 0$ and $H_m = 0$), since the marginal utility of allocating labour to on-farm activities is larger than the marginal utility of engaging in off-farm activities.

However, with the near absence of credit and insurance markets, and with severe food-cropping instability, households might invest in a diverse range of activities rather than specializing in on-farm activity in order to diversify some of the income risk. Such measures might reduce expected income, but also reduce the variance of income. In particular, poorer households will choose activities that reduce the variance of their incomes, even though this lowers expected income. Given that off-farm activities are normally considered less risky than crop production, a risk-averse household would engage in off-farm work relative to a less risk-averse household.

A household-level land constraint might also translate into limited food output, leading to a need for households to get involved in other income-generating activities (Reardon et al., 1992). It is worth noting also that only households with access to the capital for investment or specific skills for entrance into the off-farm sectors might do so. If households choose to allocate labour to other activities besides on-farm, the first-order optimal conditions for labour allocation will equalize the marginal utility of allocating labour to on-farm and the off-farm activities. This can be formally written as:

$$E \left[U'(C_t) P_{f_t} \frac{\partial Y}{\partial H_{f_t}} \right] = E \left[U'(C_t) P_m \frac{\partial g}{\partial H_m} \right], \text{ with } H_{f_t} > 0 \text{ and } H_m > 0 \text{---}(4)$$

Thus, households will allocate labour to on-farm production as well as the other activities ($H_f > 0$ and $H_m > 0$). Certainly, it is the poor who need diversification mostly to defend against entitlements failure and severe food insecurity. However, as pointed earlier on, there can be entry barriers in the off-farm labour market because non-farm activities may require investment on equipment purchase or rent, skill acquisition and license fees. If households face binding liquidity and credit constraints, poor households are least able to diversify (Reardon et al., 2000; Woldenhanna, T., and A. Oskam, 2001.). As a result less wealthy farmers spend most of their time in low paying off-farm activities for which the entry barrier is very low. The actual participation of farmers in off-farm activities (income diversification of household) depends on the incentive and the capacity to participate (Reardon, 1997; Woldenhanna, T. and A. Oskam, 2001).

In other words, a farming household's choice of whether or not to work off-farm depends on the reservation wage rate and market wage rate. If the reservation wage rate is less than the prevailing market wage rate net of commuting cost, a farm household will choose among the available off-farm activities depending on the relative wage rates. If the farmer faces a liquidity (or credit) constraint, he will prefer the one that requires less initial capital. Most probably, the credit constrained farm household will choose wage employment above non-farm self-employment. A farm household with a better asset position may face relatively less credit constraints and hence may prefer to work in off-farm self-employment.

Empirical studies have documented that the reservation wage rate that determines the households' participation in off-farm activities is an endogenous variable (Lasset al., 1991). It depends on farm characteristics, family characteristics, locations, and endogenous and exogenous household incomes. Farm characteristics include the farm size (area of land cultivated), livestock wealth, and the number of animals used for transportation (donkey and horse). Family characteristics include age and educational level of family members, family composition. Endogenous household income consists of farm income, which depends on farm and location characteristics. Exogenous household income consists of non-labour income such as transfer income (remittance, gift, and food aid) and rent income from property. Off-farm wage is also an endogenous variable, which depends on individual and location characteristics.

7.2 Empirical Model

Off-farm labour supply of farm households is analysed using tobit model. The tobit model is specified as follows. Let latent variable off-farm labour hours be denoted by L_m^* and observed off-farm labour hours by L_m . In an agricultural household model an

individual is willing to participate in off-farm work when his/her reservation wage (w_{ri}) is less than the off-farm wage net of commuting cost (w_{mi}) offered:

$$D_i = 1 \text{ if } w_{ri} \leq w_{mi}, D_i = 0 \text{ if } w_{ri} > w_{mi} \text{ -----(5)}$$

where D_i is the participation decision of a farm household to work off-farm. Consequently the latent variable off-farm labour hours (L_m^*) and observed off-farm labour hours (L_m) can be specified by a tobit model:

$$L_{mi}^* = \beta' X_i + e_i, e_i \sim N(0, \sigma_e^2)$$

$$L_{mi} = \begin{cases} L_{mi}^* & \text{if } D_i = 1 \\ 0 & \text{if } D_i = 0 \end{cases} \text{ ----- (6)}$$

where β' is a row vector of parameters; X is a column vector of variables that affect the reservation and market wage; e_i is the error term.

Explanatory variables in this model are farm characteristics, family characteristics and endogenous household incomes. Farm characteristics variables include cattle wealth (raise_cattle), goat wealth (raise_goat), sheep wealth (raise_sheep), pig wealth (raise_pigs) and the size of land cultivated (land_size). Family characteristics include gender of the household head (male); whether the household head can read and write at least one language (literacy); education level of the household head presented in the form of number of years of schooling (edu_level), age of the household head (head_age), total number of dependants in the household (tot_dep), household size (hh_size) and distance from the household to the nearest township (remote). Endogenous household income is the household wealth (hh_wealth), which was generated using household asset ownership.

7.3 Data

The paper uses the Agriculture sample survey, conducted by the National Bureau of Statistics (NBS) in collaboration with the sector ministries of agriculture.¹ The survey was conducted at the end of the 2008/09 Agriculture Year. It collected data by interviewing a sample of 48,315 small scale farming households and 1,206 large scale farming households. The survey covered agriculture in detail as well as many

¹ Ministry of Agriculture and Food Security, Ministry of Water and Livestock Development, Ministry of Cooperative and Marketing and the President Office-Regional Administration and Local Government

other aspects of rural development and was conducted using three different questionnaires: Small scale farm questionnaire; Community level questionnaire; and Large scale farm questionnaire. The small scale farm questionnaire was the main census instrument and includes questions related to crop and livestock production and practices; population demographics; access to services, resources and infrastructures; and issues on poverty, gender and subsistence versus profit making production units. Given the scope of the small scale farm questionnaire, data was collected at household/holding level, allowing for sex disaggregation of most variables at the head of household level.

The sample consisted of 3,221 villages. These villages were drawn from the National Master Sample (NMS) developed by the National Bureau of Statistics (NBS) to serve as a national framework for the conduct of household based surveys in the country. The National Master Sample was developed from the 2002 Population and Housing Census. Nationwide, all regions and districts were sampled with the exception of two urban districts. A stratified two stage sample was used. The number of villages/EAs selected for the first stage was based on a probability proportional to the number of villages in each district. In the second stage, 15 households were selected from a list of farming households in each selected Village/EA, using systematic random sampling, with the village chairpersons assisting to locate the selected households.

7.4 Results and Discussions

We first present the summary statistics of the variables used in the regression analysis of the decision to participate in off-farm activities.

Table 3 Definitions and summary statistics of the variables used in the analysis

Variable	Definition	Mean	StdDev
tot_dep	Total number of dependants in the household	2.57	1.98
male	Gender of household head (=1 if the household head is male)	0.80	0.40
raise_cattle	Household raising of cattle (=1 if the household raised cattle)	0.26	0.44
raise_goat	Household raising of goats (=1 if the household raised goats)	0.28	0.45
raised_sheep	Household raising of sheep (=1 if the household raised sheeps)	0.11	0.31
raised_pig	Household raising of pigs (=1 if the household raised pigs)	0.07	0.26
literacy	Literacy rate of the household head (=1 if the household head can read and write at least one language)	0.69	0.46
remote	Distance of the household residence to the	1.38	1.80

Variable	Definition	Mean	StdDev
	nearest township		
land_size	The actual land size (in acre) cultivated by a household in the 2007/8 agricultural season	2.65	3.74
hh_wealth	Household wealth index created using type of household asset	18.14	2.57
head_age	Age of the household head	45.18	15.54
edu_level	Years of schooling of the household head	4.51	3.62
hh_size	Household size	5.14	2.73
off_farm_inc	Household with members in off-farm income activities (=1 if the household has at least one member in the off-farm activities)	0.73	0.45

Note: Means are based on the 40,015 households (out of 48,315 households surveyed by the National Bureau of Statistics) which indicate to have practiced farming in the 2007/8 farming year.

The table shows clearly that Tanzanian agriculture is still largely small holder with limited use of modern technology. The figures in this table are comparable to others in similar National Surveys, like Household Budget Survey and the National Panel Survey. The average size of holding is 2.6 hectares, which is the same as the 2011 figure produced by the National Panel Survey, a fact suggesting there is no expansion. Similarly, rural households are characterized by high level of illiteracy rates among heads of households (21 percent), and generally few years of schooling (4.5). Household size among rural Tanzania is also large with the average level of 5.1 persons per household. Over recent years the number of households headed by women has increased, with the current level being 20 percent. The HBS (2009) shows the level of female headed households to have increased in recent years overall, mainly accounted for by the increased widowhood, separation and divorce. In rural areas, percentage of female headed household stood at 16.4 percent in 1991/92. Furthermore, we see that very few farmers practice mixed crop farming and animal keeping. Hardly 30 percent of crop farmers raise cattle and goat and less than 15 percent raise sheep and pigs.

Table 4: Results of the Tobit model of decision to supply labour in off-farm activities

Variable	Coefficient	T-ratio	P-value
male	-0.005	-0.56	0.577
raised_cattle	-0.117***	-14.27	0.000
raised_goat	-0.076***	-9.53	0.000
raised_sheep	-0.087***	-7.65	0.000
raised_pig	0.021	1.82	0.068
literacy	-0.009	-0.63	0.530
Ln of edu_level	0.101***	-3.34	0.001
Ln of remote	-0.096***	5.46	0.000
Ln of land_size	-0.038***	-9.99	0.000

Variable	Coefficient	T-ratio	P-value
Ln of hh_wealth	0.337***	13.66	0.000
Ln of head_age	-0.032***	4.21	0.000
Ln of hh_size	0.032***	11.14	0.000
Ln of tot_dep	-0.041***	-5.24	0.000
Constant	-0.287***	-3.73	0.000
sigma	0.584		

The results from the Tobit model shows that the main factors determining the supply of labour to off-farm activities are livestock wealth, years of schooling of the household head, location of the household in relation to the nearby township, size of household land cultivated, household wealth, age of the household head, family size and the number of dependents. For most of the variables, the results obtained meet our expectations. The impact of gender (=1 if male and 0 if female) on the supply of labour for off-farm activities is negative, but statistically not significantly different from zero. This means that, women are only slightly more likely to participate in off-farm activities than men. Livestock wealth is negatively related to household supply of off-farm activities, suggesting substitution effect between the labour available for raising animal and that for off-farm income generating activities. It may also be the result of income effect in that the income derived from livestock replaces potential income from off-farm income generating activities or that there is prestige derived from keeping animals. Education variable-which in this context is the number of years of schooling-is positive and significant with supply of labour to off-farm activities. This is so, especially the case of self-employment, participation of which requires some levels of formal schooling. The literacy variable-which represent whether a household head can read and/or write at least one language is negative but insignificantly different from zero. The unexpected negative sign as well as insignificance may perhaps be the results of potential multicollinearity between the variable and year of schooling of the household head.²

Distance of the household from the township (remote) affects negatively the supply of labour to off farm activities, implying that household in the proximity of towns have high probability to participate in off-farm than their counterparts away from towns. This may also tell us that most of the off-farm activities have to do with trade and commerce and similar kinds of activities success of which depend on clustering of the people, thus, giving advantage to citizens in the neighbourhood of small towns.

The household farm size is negatively related to supply of labour to off-farm activities. Again, this may perhaps be explained by both income and substitution effect, in that big farm sizes tend to exhaust all the time available for household

² The variable "literacy rate" of the household head can be correlated with the variable "education level" of the household head.

labour supply at the expense of off-farm activities. But also, expected incomes resulting from big farm sizes outweigh the expected income from off-farm income generating activities. Putting it differently, farm households who have smaller farms are the once likely to opt to off-farm activities to escape from poverty by supplementing farm incomes.

Household wealth positively affects the supply of off-farm labour in rural Tanzania. The coefficient of the variable is significant and has a high magnitude in size, suggesting the importance of household initial capital in entry to off-farm activities. Consistent to the variable on distance from a household to township above, this variable suggests that most off-farm activities have to do with self-employment, the start of which needs an initial capital. Putting it differently, most of the off-farm activities in rural Tanzania have little to do with employment neither in other peoples' farms nor in other peoples' enterprises since these do not require an initial capital, which apparently seems to be an important factor determining the entry. The age of the household head affects the off-farm labour supply negatively implying that the supply of labour for off-farm activities is higher for younger household heads than for older household heads. The negative impact of age on labour supply to off-farm activities may be explained by the fact that due to traditional ownership of land, young farm households cannot get enough land to support their livelihood compared to older farm households. Hence the younger households have to rely on off-farm activities to support their livelihood. Besides, the older household heads may not have experience to start off-farm undertakings, because historically they have been working on on-farms, thus have relatively higher experience in that direction. This means they are more productive on-farm and less productive off-farm. On the other hand, young families may not have an agrarian ethic, as happens in many agrarian societies in the process of modernization. Hence, when agrarian economies are open for off-farm work, the younger are the first to go.

Table 5: Marginal Effects (dy/dx) at various levels of Y

Variable	E(y/x,y>0)	E(y/x)*	E(y/x, 0<y< \bar{y})
male	-0.003	-0.004	-0.001
raised_cattle	-0.077***	-0.101***	-0.014***
raised_goat	-0.050***	-0.066***	-0.010***
raised_sheep	-0.057***	-0.075***	-0.010***
raised_pig	0.014	0.018	0.003
literacy	-0.006	-0.008	-0.001
Ln of edu_level	0.069***	0.090***	0.013***
Ln of remote	-0.064***	-0.083***	0.012***
Ln of land_size	-0.025***	-0.033***	-0.005***
Ln of hh_wealth	0.222***	0.291***	0.041***
Ln of head_age	-0.021***	-0.028***	-0.004***
Ln of hh_size	0.022***	0.028***	0.004***
Ln of tot_dep	-0.027***	-0.035***	-0.005***

Farming households' probability of participating in off-farm activities increases with family size and decreases with number of dependents. These results imply that farm households are involved in off-farm activities due to insufficient farm given the available labour supply. In other words, off-farm activities are considered to be a residual employment that absorbs the surplus family labour, which cannot be fully employed on the farm.

Results from marginal effects are similar with those of the Tobit model in terms of trend, signs of coefficients and significance. The difference occurs in the magnitudes of the coefficients depending on the condition we impose on the expected value of off-farm. Coefficients of the marginal effects when expected value of off-farm supply of labour is above 0, that is, $E(y/x, y > 0)$ are roughly one half of those in the Tobit model. On the other hand, when we condition the value of the off-farm supply of labour to be on the average, that is, $E(y/x)^*$ the magnitude of coefficients are roughly 70 percent of the original Tobit model. Finally, when we condition expected value of supply of off-farm labour to be between 0 and mean, that is $E(y/x, 0 < y < \bar{y})$, the magnitudes of coefficients are very small due to small range existing in the dependent variable.

8.0 CONCLUSIONS FOR POLICY

Two main conclusions can be derived from these findings: (1) participation in off-farm activities in rural Tanzania is a result of push factors, i.e. potential participants do not realize earnings from on-farm activities and so are pushed to off-farm activities. Majority of these are the landless, women and young families. (2) While off-farm activities remain their last option, there is an entry barrier, caused by two main reasons: (i) In the absence of well-functioning credit market, wealthy households have better chances to participate than relatively less wealthy families. Or, participation of poor households will be in lower paying easy-entry farm wage labour market as well as labour intensive low paying rural off-farm activities and less in high paying rural non-farm self-employments. Put differently, our findings show that as a result of wealth barrier, the better-off farm households are able to dominate the most lucrative forms of off-farm activity such as masonry, carpentry and trading. This is an important point for policy makers to be aware of. (ii) Lack of formal training hinders rural household participation in the off-farm activities. Absence of special entrepreneurial skill would make it difficult for less or no education rural farms to participate in rural off-farm income generating activities.

The current Tanzanian agricultural policy which is popularly known in Swahili as *Kilimo Kwanza* advocates transformation of rural economy. However, attention is given to farm productivity and hence all policies are devoted towards addressing agriculture rigidities in the direction of on-farming. Our findings show farming is just a one of the many aspects that need to be addressed to transform rural economy. In that case, policy options should not be limited to farming, but rather go beyond it to off-farm activities, since both are equally important for rural economy. Specifically, promoting rural economy by focussing attention on farming and neglecting off-farm activities is likely to lead to rural income inequality and worsen the problem of urban migration among the youth. It is, therefore, imperative that the policy aiming at targeting marginalized groups, in our context women and youth with credits to enable them to engage in rural self-employment activities. Equally important is to implement targeted entrepreneurial skills development centres focusing on small business and other rural activities. In other words, the establishment of training centres to tackle skill barriers is necessary. As we have seen earlier, remoteness hinders also rural family participation in off-farm activities. Development of infrastructure to open up rural areas to the rest of the world may be a good option. Rural roads connecting to small towns as well as other infrastructure like hospitals, schools would encourage clustering hence open up the economy for marginalized groups to participate in off-farm economic activities. In this way, the country will have addressed the twin objective of addressing rural poverty and inequality but also current urban youth migration.

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