

The Role of Off-Farm Incomes on Household Food Security: The Case of Damote Woyde District, Wolaita Zone, Ethiopia

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Abstract

This paper analyzes the role of off-farm income on 149 households' food security in rural Ethiopia using an original panel data set. Simultaneously, the study states out identifying types of off-farm activities and respective income levels, measuring households' food security status and the potential determinants of the households' participation on off-farm activities. In order to achieve the stated aims, respondent rural households were selected randomly following a two stage sampling procedures. Primary and secondary data were also used. The data regarding determinants of participation on off-farm activities were analyzed using binary logistic regression model. Inferential statistics such as t-test and chi-square (X^2) tests were also used to describe characteristics of participants and food security status. This study followed a consumption based calorie deprivation indicator to measure the household food security status using seven days recalling technique. Therefore, the survey result shows that major sources of off-farm incomes identified in the study area were daily labor, petty trade, sale of charcoal, sale of firewood, donkey renting, and micro enterprises. About 109 (73.15%) and 40 (26.857%) of sample respondents were participants and non-participants respectively. All the 60 households participated on off-farm activities were food secured and no household was found food secure from non-participant groups. Among 89 food insecure households, about 49 and 40 were food secured and insecure respectively. Out of 10 independent variables used in binary logistic regression model, age and household size in AE were found significant at less than 1% probability level, credit utilization and frequency of extension contacts were found significant at less than 10% probability level and ownership of livestock resources by the household was significant at less than 5% probability level. The model estimate correctly predicted 73.8% of the sample cases, 82% participants and 80% non-participants. Finally, there is a need to strengthen the link between farm and off-farm activities, diversification of off-farm employment opportunities for rural households, give attention for old aged and female headed households in rural development interventions, limit population size through integrated health and education services, introduce appropriate livestock packages, promote and facilitate effective credit services, strengthening the role of DAs and entrepreneurial skill development to enhance participation of the households in off-farm activities and protect natural forests and vegetation cover of the District.

Key words: Damot Woyde • Off-farm income • Food security

Introduction

Concepts of food security have evolved in the last thirty years to reflect changes in official policy thinking. The term food security first originated in the mid-1970s, when the World Food Conference defined food security in terms of food supply - assuring the availability and price stability of basic foodstuffs at the international and national level: "Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" [1].

In 1983, FAO analysis focused on food access, leading to a definition based on the balance between the demand and supply side of the food security equation: "Ensuring that all people at all times have both physical and economic access to the basic food that they need". The definition was revised to include the individual and household level, in addition to the regional and national level of aggregation, in food security analysis. In 1986, the highly influential World Bank Report on Poverty and Hunger focused on temporal dynamics of food insecurity. However, widely accepted definition that "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets

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their dietary needs and food preferences for an active and healthy life" was adopted by the World Food Summit of 1996 [2].

The widely accepted World Food Summit definition reinforces the multidimensional nature of food security and includes food access, availability, food use and stability. It has enabled policy responses focused on the promotion and recovery of livelihood options. Therefore, household food security is the application of the concept at household level that is when all the people living in the household have physical, social and economic access to sufficient, safe and nutritious food at all times that meets their dietary needs and food preferences for an active and healthy life. If these conditions are not fulfilled then the household is said to be in the state of food insecurity [3].

The off-farm income is the sum of rural non-farm income and wage earning in agriculture. defined as off-farm referring all income-generating activities except crop and livestock production. Off farming income generating activities supposedly avoid the seasonality of primary agricultural production and create a continuous stream of income to cater for necessities of life. The type of off-farm income generating activities varies across geo-political locations and countries. Therefore, off-farm activities involve participation in remunerative work outside the participant's own farm and have been recognized to play an increasingly essential role in sustainable development and poverty reduction particularly in rural areas [4].

Different development economics literatures have identified two main factors that drive diversification into off-farm activities among farm households in developing countries. These factors are broadly classified into "pull factors" and "push factors". Reasons why a farm household can be pulled into the off-farm sector include higher returns to labor and or capital and the less risky nature of investment in the off-farm sector. Similarly the main identified driving forces are to increase income when the resources needed for the main activity are too limited to provide a sufficient livelihood, to reduce income risk in the face of missing insurance markets, to exploit strategic complementary and positive interactions between different activities and to relate to the third point to earn cash income to finance farm investments in the face of credit market failures [5].

The rural off-farm sector plays a vital role in promoting growth and welfare by slowing rural-urban migration, providing alternative employment for those left out of agriculture, and improving household food security through income diversification. On average, 32% and 40% of the Ethiopia's population are undernourished and consume less than the recommended daily calories, respectively. Moreover, the situation report indicates that more than 10.2 million people needed food assistance in 2016, more than at any other time since 2006. The prevalence of food insecurity and related vulnerability is generally high in rural parts of Ethiopia, where 79% of the population live, with rain-fed subsistence farming dominating agricultural production.

As an income diversification alternative off-farm activities have potential to increase farm investment leading to higher productivity through reducing income uncertainty. Moreover, diversifying rural livelihoods into other non-farm activities has potential implications for their food security status as well. Non-farm income not only augments purchasing power, but also reduces the risk of intra-year food availability.

As noted by employment diversification helps households to smooth income through the spread of risks across different activities since the reduction in income uncertainty opens up opportunities to invest in improved production technologies to enhance agricultural production thereby improving household welfare including food security. According to, farm households diversify their income sources by allocating productive resources among diverse income generating activities including farm and off-farm work. Diversification may be a deliberate household strategy or a spontaneous response to crisis as noted by. It may serve as a safety net for the poor whereas for the rich it may be a means of accumulation. Income diversification by farm households may also be attributed to dwindling and uncertain farm incomes, rising poverty, and emerging opportunities for off-farm work.

Incomes from off-farm activities enable rural households improve their livelihood in general and food security specifically. It can also supplements on farm income and helps to expand economic activity and employment opportunities in rural areas. Incomes from off-farm activities, for the agricultural sector, is an alternative source of income which may be used to finance agricultural production.

In rural Africa, evidences indicate that off farm activity accounts 40 to 45% of average household income and positively correlated with income and wealth and hence it is a way out of poverty Off-farm income opportunities have been reported as an important strategy for overcoming credit constraints faced by the rural households in many developing countries.

Smallholder farm households usually maintain a portfolio of income sources, with off-farm income being a major component. But often a clear policy strategy to promote the off-farm sector is lacking. In the available literature, considerable attention has been given to the poverty implications of off-farm income in developing countries. In contrast, much less is known on off-farm income and food security nexus. It is against this backdrop that this study examined the contribution of incomes from off-farm activities on the household Food Security Status of small holder farming households in Damot Woyde District, Wolaita Zone Ethiopia. Thereafter, implications for effective policy interventions to enhance food security through appropriate incomes from off-farm activities in the study areas are drawn.

Materials and Methods

Description of the study area

Damot Woyde District, the study area under this systematic inquiry if found in Wolaita Zone, SNNPR. Hence, as to CSA. Damot Woyde District's absolute location is 06° 53' 23" north and 37° 56: 55" East. Further, the District having 20 rural Kebeles, a total area of 32398.26 hectare with a total population of 111,311 people and among them 61688 are male and the rest 49623 female.

The District is characterized by subsistence mixed farming system in which production of both crops and livestock is common economic activity. Due to varied agro-ecology of the area, major agricultural crops growing in the area may include cereals, legumes, vegetables, root crops, perennials and fruits, etc. Commonly produced crops in the area may include maize, teff, coffee; root crops such as sweet

potato, yam, taro; haricot bean, enset (false banana), and fruits. Agricultural production system is relying on traditional method in which domestic animals such as oxen supply drought power. There is tendency of making the system modernized in terms of technological input adoption such as, improved varieties, fertilizer, chemicals, etc. Livelihood system of the area is mainly based on mixed agriculture. Small scale trade, off-farm and non-farm activities are also serving as the way of sustaining life and meeting basic needs for the certain portion of population in the area.



Figure 1. Map of study area.

Research Design

Contribution of off-farm incomes on household food security case of Damot Woyde District had inquired about the situation. Hence, it investigated as of the influence of the independent variables which are the incomes from off-farm activities on the dependent variable which is household security.

Data and data sources

The data collected for this study were mainly quantitative and qualitative in nature. As a primary data source, respondent sample household heads who were selected randomly following stratification of the District based on agro-ecology. On the other hand, the study made use of secondary data from different Wolayta Zone and Damot Woyde District Agricultural Coordination offices. The quantitative data collected for this study were type and amount of food consumed by the household for the last seven days, household demographic characteristics, and participation on off-farm activities, and types of off-farm activities and annual incomes obtained from each by the households. The quantitative data used for the study were obtained from the key informants interviews and focus group discussions about the way how they lead their life with the prevailing incomes from farm and off-farm activities.

Sampling technique

A three step sampling method was used to select the sample household heads. First, the rural Kebele's were stratified based on the two Kolla, one Dega and 17 W/dega agro-ecologies of the

District. Secondly, simple random sampling method was administered to select one Kebele from Dega and Kolla agroecologies and two Kebeles from W/Dega agro ecologies. Then at last, proportional probability to sample size (PPS) technique was implemented to determine the number of sample households from each Kebele following simple random sampling technique to select sample household heads from selected four rural Kebeles.

Results and Discussions

Household demographic characteristics

The demographic characteristics of the respondent households in relation to household food security status in concern were sex, age, and educational level of the household head, the household size (AE), the households' livestock ownership (TLU), land holding size, credit and farm input utilization. Therefore, in the next session they all were discussed in detail.

Age of the household head

The age of the total sample household heads ranged from 35 up to 67 years and the overall mean age value is 47.46 years. The mean ages of household heads who were food secured and food insecure were 47.62 and 47.36 respectively.

	Food secured (n=60)	Food insecure (n=89)	Total (n=149)
Mean	47.62	47.36	47.46
SD	6.51	6.46	6.46
p-value	23.83***		

Table 1. Summary of the age of the respondents.

In addition, as depicted on the above table, the p-value was found to be 23.83 implies that it was significant at less than 1% probability level when observed independently with the household food security status.

Conclusions

The result found regarding the participation status of the District shows that 109 accounting 73.15% households were participant on at least one type of off-farm activities and 40 households (26.85%) were found non-participants on all the identified off-farm activities. Among the identified off-farm activities, about 51 households (34%), 37 households (25%), 24 households (16%), 45 households (30%), 14 households (9.4%), and six households (4%) were participated on casual daily labor, petty trades, sale of charcoal, sale of firewood, renting donkey, and micro enterprise respectively. As the result indicated that majorities were getting involved in daily labor and sale of fire wood activities implies that limitation on the availability of off-farm activities in the study area.

The study found that out of 109 participant households, 60 were found food secured and the remaining 49 households were food insecure. On the other hand, all 40 non participant households were food insecure. Based on the result it can be concluded that, though the types of off-farm activities were limited, participation in the off-

farm activities complemented the households improve their food security status.

When we look at the contribution of off-farm incomes on the household food security status, among 51 participants on daily labor activities, 28 and 23 households having mean annual income 23028.57 and 19976.09 were food secure and insecure respectively and consequently the statistical level of significance observed to be highly significant in favoring the food security status at less than 1% since the p-value was 28.08.

The majority of households (about 41) accounting 91% who got additional incomes from petty trade in the study area were food secure and only 9% were found food insecure. The average annual incomes of the food secure and insecure households were 142124.40 and 48250 and the p-value 61.863 indicated that the participation on petty trade strongly and positively influenced the food security status of the household at 1% significant level.

Among 24 households who engaged on sale of charcoal 15 and nine were found food secure and insecure respectively and got 5153.33 and 5411.11 mean annual incomes respectively. The p-value -20.82 indicated that participation on sale of charcoal is disfavoring the households' to be food secure. Here, since charcoal is made up of wood logs obtained from either natural or plantation forests, it can possibly results in deforestation thereby disturbing the micro climate of the District. Therefore, it cannot be advised to be continued regardless of improving the status of household food security. Donkey renting was categorized as an off-farm activities and its income had been assisting the households' food security status. Among 14 sample households who had participated on donkey renting, about 11 and three households were food secure and insecure and their respectively and their respective annual mean incomes were 1850 and 1500. The p-values 7.76 indicated that it was strongly favoring the households to be food secure.

To check the level of effect of the independent variables on the participation status of the households on off-farm activities, about five independent variables were found statistically significant in expressing the status of participation. These variables were age of the house hold head, household size in AE, ownership of livestock resources, credit utilization and frequency of extension contacts. Age of the household heads was found to be significant in affecting the participation status of the households on off-farm activities at less than 1% probability level in favor of younger headed households. That means, younger headed households tended to be participant than the non-participant households. This shows that the household heads who are at the range of active working age engage in different off-farm activities and get income to be invested to improve their livelihood including household food security status. On the other hand, as the result implied that due to younger household heads cannot get enough land to support their livelihood; they involve more on off-farm activities than older heads.

The family size was found to be strongly affecting the households' participation status on off-farm activities at less than 1% probability level in favor of small family sizes. That means households having more number of family members were not participants on off-farm activities than household having comparatively small family sizes. This indicates that household with more family members had more

number of dependent household members who had no physical strength to engage in the off-farm activities available in the study area.

Livestock resources had been affecting the households' participation on off-farm activities at less than 5% significant level. It was found to be positively related with large livestock resources meant to be households who possess large herd size had higher probabilities of being participant since they could rent their donkey and oxen. When they rent their donkey and oxen, one of the family member take the animals and hold the activities done by those rented animals.

The households who were using credit were found to be participants than those who were not making use of credit. It was found significant in explaining the participation status of the households' on off-farm activities at less than 10% probability level. Therefore, it can be concluded that those households who had been using credit for different purposes were not involving on off-farm activities. That mean they were getting financial resources to be invested on their basic necessities as household food consumption, purchase of agricultural inputs, etc.

The frequency of extension contact was found an important variable in the rural areas since the households who had been contacted by extension workers and experts were found to be participants on off-farm activities than non-frequently contacted households. It had been explaining the households' participation status at less than 10% probability level. Therefore, those households having more contact with extension would have greater involvement in their agricultural activities to apply the advice from the knowledge and experience obtained from Das and experts.

Off-farm income is important for the rural economy in anywhere in Ethiopia. Rural households with diversified sources of income had higher probabilities to be food secured. Expenditure on farm inputs is dependent on off-farm income, which helps to finance farming activities, as well as agricultural production. The positive link between farm and off-farm income implies that increasing agricultural output and raising agricultural productivity cannot be done in isolation. Narrowly focused sectoral approaches with the sole target of raising agricultural output and productivity are less likely to achieve significant advances unless considerable attention is given to the importance of off-farm income in the rural economy. Current agricultural extension programs should include farm and non-farm activities, encourage growth of small-scale business and create off-farm employment opportunities in rural areas. Complementary policies and programs must be developed to strengthen the link between farm and off-farm activities.

Poverty-focused rural non-farm investment will need to target non-farm activities in which the poor can participate, or address the underlying factors that prevent poor rural households from participating. This calls for establishment of training centers, provision of credit for the poor, business extension, creation of favorable conditions and improvement of infrastructures.

The finding stated that old aged household heads were not participating on the off-farm activities and were not getting additional incomes to improve their livelihoods since they could not have capability to take part in the available off-farm activities. Therefore, strategies that favor old aged household heads must be designed to

facilitate them get improve their livelihoods. That can be aid and arranging off-arm activities that can be done by the old aged heads.

The increasing population pressures need to be retarded through designing and implementing appropriate decisions and measures. This can be acted by the agricultural sector offices and the health offices in collaboration. Therefore, both sectors can play a role in strong awareness creation activities and facilitating integrated health and education services as far as the issue is concerned. Arranging training complementing different family planning alternatives available in the study area can somehow meet the goal.

The appropriate livestock packages need to be introduced and promoted in the study area since livestock resources favors the households' participation on off-farm activities. The appropriate livestock type requiring focus are cattle, small ruminants like sheep and goat and poultry besides farming practice. This may be done through identifying the need, potentials and threats to be worked on to improve the household food security status.

Credit facilities are important for the rural households to get financial resources to buy seeds and fertilizers to increase their productivity and production thereby improve their food security status. Therefore it is pertinent to arrange the credit organizations to work in the study areas to avail credits at critical agricultural production season. The credits should be available at the smallest possible interest rates and accessed easily and timely without any complications.

The frequency of extension contact had a positive association with the participation on off-farm activities imply that households develop a positive attitude to engage in applying new farming practices. Therefore, government stakeholders should focus in strengthening the role of DAs and entrepreneurial training and skill development through adult education strategies would probably enhance the participation of households in off-farm activities.

Since, sale of charcoal and firewood were considered as off-farm activities to augment the households' food security status in the study

area, appropriate natural resources conservation and utilization principles has to be introduced and applied to prevent the deforestation of the natural as well as plantation forests. On the other hand, to conserve the natural climatic conditions, plantation and conservation of forests has to be promoted by the concerned bodies.

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