

Rural Livelihood Strategies and Household Food Security of Farmers Surrounding Derba Cement Factory, Oromia Region, Ethiopia

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Abstract. This study examined the livelihood strategies and food security situation of rural households around Derba Cement Factory by taking a randomly selected sample of 215 heads of farm households from three rural *kebeles*. A mixed research approach was employed to triangulate concurrently collected data through household survey, key informant interviews and focus group discussions. Informed by the sustainable rural livelihood framework, descriptive statistics were used to describe rural households' livelihood strategies and challenges they faced while inferential statistics was employed to explain households' food security situations with different livelihood combinations. While mixed farming was found to be the mainstay of the household economy, small-scale irrigation and extracting forest products were also used as supplementary economic activities. More than a half of the respondents (52.5%) reported at least one non-farm activity. Land shortage was identified as a major constraint to expand crop production and this was further aggravated by the activities (e.g. quarrying leading to displacement) of the Derba Cement Factory. This further affected household labor allocation and natural resources utilization. The result of household food (in) security access scale indicated that 59% of the respondents have experienced food access insecurity in 2016. However, respondents who combined agriculture and non-farm activities appeared relatively more food secure than those engaged in agriculture alone or in non-farm activity only. Overall, households with multiple livelihood strategies had diverse food entitlements to maintain sustainable food consumption. Yet, necessity induced diversification was found to affect food access security of households. This calls for inclusive policies and strategies that integrate rural non-farm activities to subsistence farming in order to assure sustainable livelihood in rural communities.

Keywords: food, food security, livelihood, livelihood strategies, assets.

Introduction

The literature on food security stresses that livelihood strategies pursued by rural households are central in examining their food security (International Food Policy Research Institute, 2015). Food security is an outcome closely linked to viable livelihood strategies (Gathiaka and Muriithi, 2013). Therefore, food security needs to be analyzed within the broader spectrum of the livelihood of the study population (Burchi & De Muro, 2012). Despite concerted efforts, food insecurity remains a critical issue in most developing countries (Sasson, 2012). The majority of the food insecure people in the world are rural smallholder farmers, which inhabit the developing world. Sub-Saharan Africa (SSA), which comprises some 23.8 % of the food insecure people represents

one of the food insecure regions (FAO, WFP, & IFAD, 2014). Of this proportion, 80% live in rural areas, working as peasants, landless laborers and pastoralists, who suffer from a dearth of the most needed resources (e.g. land) (International Fund for Agricultural Development, 2011).

In Sub-Saharan Africa, agriculture, which is the backbone of the rural economy, is dependent on variable climate and operates on fragmented plots. The decimation of farm size is accelerating and hence thwarting efforts to increase farm productivity. Therefore, in line with augmenting agricultural productivity, looking for another way out has been considered vital for addressing household food security (Asmah, 2011; Stifel, 2010). The shortcoming of agriculture to provide sound means of escaping

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food insecurity for the rural poor necessitates policies that inform diversification away from natural resource dependent living. This involves spreading risk against potential livelihood collapse (Rahut *et al.*, 2014). On average, non-farm income accounts for 35% of the total rural income in Sub-Saharan Africa (Bezu, Barrett & Holden, 2012). Studies indicate a positive association between nonfarm livelihood activity, household welfare, and consumption smoothing; but there are no uniform distributions (Barrett, Reardon, & Webb, 2001).

Ethiopia is a country the economy of which is dependent on smallholder agriculture and where 84% of its total population lives in rural areas, of which 90% depend mainly on crop production for its livelihood (Gecho *et al.*, 2014). Smallholder farming dominates its production. Agriculture contributes to 45% of Gross Domestic Product, more than 80% of employment opportunities and over 90% of the foreign exchange earnings of the country (Yizengaw, Okoyo, & Beyene, 2015). Nonetheless, Ethiopian agriculture is less productive even by the SSA standard. Thus, the nation has a large population of the poor and food insecure ones. Rural people with insufficient assets to produce and purchase food constitute a higher proportion of the food insecure (Ocho *et al.*, 2017). Food insecurity is evident even in non-drought years and in surplus producing areas. Approximately, 10% of the Ethiopian population is chronically food insecure (Endalew, Muche and Tadesse, 2015). Landless, ox-less, female-headed, elderly, poor nonagricultural households and newly established settlers are largely food insecure. Their chronic food insecurity is mainly attributed to the low return livelihood system (Weldarufael, 2014). For political economists, with small per capita landholding, the agriculture failed to play the role of transforming the economy as expected. In Ethiopia, recent land transfer for investors as a way of complementing smallholder farming opens up competition over resource than improving the condition of rural poor. Diversion of scarce land from food production has a less-than-desired impact of surmounting food insecurity (Lavers, 2012).

From a livelihood perspective, household food security is the result of adequate access to livelihood activities that allow members to lead a hunger-free life (Patel *et al.*, 2015). Thus, treating household food security without due consideration of the livelihood security of household members is inadequate in making feasible policy recommendations (Burchi & De Muro, 2012). Yet, in Ethiopia, studies on the outcome of livelihood strategies are of mixed results. Some consider the spread of rural livelihood as the best prospect of improving household food security, while others treat the effort as mere survival

strategies (Gesese & Ignatious, 2012). These arguments are related to two debating perspectives: de-agrarianisation and sustainable rural livelihood. The former argues that the diversification of non-farm activities is a process of eroding agrarian way of life. Farmers thus strive to secure cash outside farming in order to secure food (Bryceson, 2000). On the other hand, sustainable livelihood emphasizes the contribution of farming, and non-farm livelihood activities in households' efforts to attain positive livelihood outcomes (Stifel, 2010).

Various studies have been conducted on determinants of household food security (Goshu, Kassa & Ketema, 2013; Beyene & Muche, 2010; Jemal & Kyung-Ryang, 2014; Ocho *et al.*, 2017). Most of these studies examined specific household assets against nutrition security rather than stressing the ways in which people combine their available resources to make certain livelihoods and maintain their food access. Nutrition security involves a stable and adequate access to a healthy diet that provides all nutrients required for a healthy life, thus focusing only on the utilization dimension of food security. Furthermore, many of these studies conducted on rural livelihood stressed determinants of livelihood strategies rather than their linkages with food security (Gecho *et al.*, 2014; Carswell, 2002; Yizengaw, Okoyo, & Beyene, 2015). Others studied the livelihood strategies and food security situations using national nutritional threshold; 2200 kilocalories /adult/day to identify food security situation rather than focusing on household-specific experience of food access security. As a result, it overlooks variations among rural households' food access. The point here is *what if the standard calories are attained in extreme worry and uncertainty about lacking food: are such households food secure?*

Bazezew, Bewket & Nicolau (2013) examined the livelihood activities and food security outcomes in the drought-prone areas of Amhara Region. They found low productivity and drought-vulnerable nature of the livelihood system as contributing factors to chronic food insecurity. However, the study did not use direct indicators of food security rather employed annual income as an indicator of food security. The present study, however, does not employ the income-based approach, as it is the *indirect measure of food security*. Access based approach that embraces the direct household level experience of producing, purchasing and accessing food, as well as uncertainties surrounding food production and accessing, was used in this study. Therefore, issues beyond the nutritional approach to food security like affordability, stability, physical access, worry of food shortage were addressed.

In Sululta District, where the present study is conducted, farm households' resources (mainly land) are constantly changing. This is evident with the introduction of mining investments, which have affected the livelihood activities of the local people. Yet, in Ethiopia, scientific investigation on livelihood and food security situation of the rural households in such a changing environment has not been done. It is this gap that the present research has tried to address. More specifically, this study addresses the following objectives. First, it identifies the livelihood strategies of rural households in the study area. Second, it explores context-specific challenges facing the study communities while trying to secure their livelihood around the Derba Cement factory. The third objective is to examine the food security situation of those farm households who are pursuing different livelihood strategies in response, in part, to the activities of the Derba cement factory.

Food Security: Concept, Evolution and Dimensions

Food security becomes an important organizing concept in development, which has attracted the attention of academic literature, aid agencies, national and local programmes, mainly in sub-Saharan Africa (Maxwell & Smith, 1992). The introduction and surge of the concept of food security is traced back to the 1970s food crisis. Subsequently, the concept of food security has evolved and tends to comprise different elements across time and space (Young *et al.*, 2001). The World Food Summit first coined the concept of food security in 1974 and defining it as, *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*. This definition initiated food availability approach, which conceptualized food security as a function of production. Stating differently, food insecurity is a result of production failure. Thus, the path out of food insecurity can be accelerated through increasing production. This view coincides with Malthusian assumptions of incommensurable population growth rate and production pace all over the world (Burchi & De Muro, 2012).

Yet, limitations of availability approach were immediately noted. While successes were recorded in increasing food supplies through improved agricultural production, hunger and malnutrition persisted around the world (Moltedo *et al.*, 2014). It was noted that national level food availability (supply side) is not a guarantee to household level food security for the access to food by all people be a matter of concern. What is available, must be accessed by people (Deitchler *et al.*, 2010). The situation of Ethiopian famine in 1984 attested the shortcoming

of the food availability approach (Degefa, 2005). Therefore, widespread household food insecurity has led to a new approach – that is, emphasis on food entitlement decline (FED), due to lack of resources to command food (Gathiaka & Muriithi, 2013).

Informed by recent developments in the evaluation of the concept of food security, FAO (2009) announced the latest definition of food security. *Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life*. This definition seems to question objective measurements of food insecurity (like calories requirement) due to the ambiguity of what is considered 'enough' for an individual (Paramitta, 2013). The working definition of food security of FAO (2009) comprises four core dimensions: availability, access, utilization, and stability. Availability addresses the supply side of food security (FAO 2008). The access dimension comprises the economic level of the household to afford the food needed (Benedict, 2011). In agreement with Sens' (1981) thesis, Young *et al.* (2001) indicated that the root cause of food insecurity is the inability of people to gain access to food due to poverty. Stability of access denotes the ability of the household to have a continuous access to the food source with minimal risks (Moltedo *et al.*, 2014). Finally, utilization is understood as the quality of food that meets the nutritional requirement for the household (Wiggins & Leturque, 2010). Thus, the quantity of food does not necessarily lead to well-nourished households; there may be malnutrition due to health care and sanitation (Young *et al.*, 2001; ACF, 2010).

Three main transitions were observed from the evolution of food security concept. The first is from food availability approach to entitlement approach. The latter acknowledges endowments of households and activities to access food through own production, exchange, and trade. The second aspect is the unit of analysis (Clover, 2003). Units of analysis used in the food availability approach are the country (its food balance sheet) and the agricultural sector (its outputs, productivity). This lacks disaggregation and hence misleads policy interventions (Burchi and De Muro, 2012). For food entitlement approach, the units of analysis are individuals as well as households (ACF, 2010).

Food insecurity is the opposite state of having access to adequate food (Wiggins & Leturque, 2010). It occurs either temporarily or persistently. Chronic food insecurity is a situation in which a household runs a continually high risk of inability to meet the food needs of household members due to a lack of assets. In contrast, transitory food insecurity occurs

when a household faces a temporary decline in the security of its entitlement and the risk of failure to meet food needs (Woller, 2009; Degefa, 2002). In rural Ethiopia, the situation of household food insecurity is worrisome due to the nation's structural food deficit. Asset-poor rural Ethiopians experience all forms of food insecurity. Households cannot fulfill their food needs even under good weather conditions. In addition, they suffer from seasonal hunger or famine in years of low or erratic rainfall. Landlessness, smallholdings and limited off-farm employment opportunities leave people trapped in increasingly unviable smallholder agriculture (Devereux, 2000:1).

Livelihoods strategies underpin food security (Patel *et al.*, 2015). The means by which people produce food by themselves and the means of securing income to buy food from other sources are crucial in analyzing household food security. Strategies (agricultural or others) may lead to more or less satisfactory livelihood outcomes (food security in this study). Food insecurity is the result of unsatisfactory livelihood strategies (ACF, 2010). If the livelihood activities of households are easily vulnerable or less adaptive to the changing situation, the ability of that household to produce for themselves or acquire food from other sources is quite challenged (Devereux *et al.*, 2004; Gathiaka & Muriithi, 2013). Food production constitutes one of the critical livelihood activities and indispensable source of food access for rural households (Sasson, 2012:1). Consequently, poor households, whose farm activity is less productive and who have limited non-farm opportunities, are prone to food access insecurity. Now poor are potentially food insecure (Clover, 2003; Gathiaka & Muriithi, 2013).

Study Setting and Research Methods

Sululta *District* is one of the *Districts* in Oromia regional state of Ethiopia, which is situated at about 40 km North West of Addis Ababa, the capital city of Ethiopia. The study area is found between 9.07°-9.52° N and 38.53° -38.98° E. Sululta *District* is characterized by three major agro-ecological conditions. These are Kola (Lowland), which accounts for 3.6%, Dega (highland) that covers 71% of the district and Woina Dega (Midland) comprising 25.4% of the area. The altitude of the study area ranges from 1500 to 3571 m. The mean annual temperature is 15.36 °C with a mean minimum of 6.2 °C in December and maximum 22.9 °C in February and May. The average annual rainfall of the district is about 1722.6 mm with an average of 1143.5 mm. Sululta District is characterized by two main rainy seasons, *Meher* and *Belg*. The former is relatively longer lasting for 3-4 months (June-August/

September), which is, of course in line with other parts of Ethiopia. According to Sululta District Agricultural and Rural Development Office (SWARDO, 2014), the district's topography consists of plains (46%), rugged topography (22%), plateau (26%) and mountains (6%). Cambisols, Nitosols, and Vertisols are typical of the soil composition in the *district*, accounting for 49%, 24.5% and 0.5% respectively. The remaining soil typologies make up 26% of the land.

According to 2007 Population and Housing Census Report, the total population of the district is 129,000 of which 64,516 are males and 64,484 are females. The same report shows that 11.74% of the Suluta District population is urban. The population density of the area is 147 people per km². Sululta district has 23 rural *kebeles*¹ and 3 towns. Of the rural *kebeles*, 9 are in highland, 11 in midland and 3 are in the lowland. The dominant economic activities in the area, in order of their importance, are crop production, livestock raising, handcraft and trade arranged from the higher to lowest rank. Cropping is mainly of subsistence nature and livestock production particularly dairy farming is the major source of livelihood.

Research Design

This study employed a mixed research approach combining both qualitative and quantitative methods. Mixed approach involves collecting and analyzing diverse data to comprehend a research problem (Creswell, 2003). The quantitative approach helps to assess household-specific data such as indicators of food security, household composition, possession and access to assets, household income and food intake patterns. Survey method was used in order to collect measurable data from sample households using questionnaire. Qualitative data pertaining to farm households' livelihood and food security involves the various livelihood activities, institutional contexts governing access to resources, vulnerability to shocks, subjective meaning with respect to food security, experience, social relations and networks in rural livelihood. Moreover, qualitative data include location specific challenges facing smallholder farmers. Focus Group discussions (FGD), in-depth interviews, key informant interviews, and observation were employed to generate qualitative data.

Sampling and sample size

Multi-stage cluster sampling was used to select a sample as there was no document consisting of all rural households of *Sululta District*. Since rural livelihood analysis in Ethiopia is agro-ecological sensitive,

¹ The lowest administrative unit in Ethiopia

agro-ecology was used as a stratifying variable. As a result, the sampling technique for this study was stratified area cluster sampling. The procedure began with categorizing the district into agro-ecological conditions as discussed above; namely, Kolla, Woina Dega and Dega. Twenty-three rural *kebeles* were classified into the three agro-ecological zones based on the data from Sululta District Agricultural and Rural Development office. Secondly, three *kebeles* (one from each agro-ecological zone) were selected through lottery method. Based on the procedure, Handa Woizero (Kolla), Becho Kidanemihiret (Woina Dega) and Derba Gulalle Baressa (Dega) were selected. The total number of households of each *kebele* was 498, 626 and 544 respectively. The sample size was determined using simple random generating formula through computer at 95% confidence interval for the total number of households – that is 1668. Using Rao soft sample determination formula it resulted in a sample size of 215 household heads. Finally, the sample size was determined proportionate to the size of the households in each *kebele* selected.

Methods

Both primary and secondary data were used in this study. Primary data on household livelihood activities, determinants, challenges and food security situation was collected from the household survey and key informant interviews. Secondary data in this study comprises reports of the Sululta district agricultural and rural development office, reports at *kebele* level, review of related books and journals, unpublished baseline assessments and CSA reports. Quantitative data was gathered through a semi-structured questionnaire with close-ended supplemented by open-ended questions to extract post-coded data based on the pattern of response. The questionnaire had two parts. The first part dealt with livelihood assets, activities, determinants, and challenges. The second part comprised of measure of household food (in) security using, household food insecurity access scale (HFIAS). The scale consists of nine questions divided into two main categories. These ‘occurrence questions’ indicate the prevalence of particular food insecurity condition over the time specified and frequency of occurrence questions that determines how often the condition occurred.

Occurrence question statements have a time-frame and two response options (0 = no, 1 = yes). There is also a ‘skip code’ next to each “no” response option. The frequency of occurrence is skipped if the

respondent reported that the condition described in the corresponding occurrence was not experienced (0, meaning no for occurrence) within the reference period. Each frequency of occurrence question has three responses (1 = rarely, 2 = sometimes, 3 = often) if the occurrence response is answered ‘Yes’ that is coded 1. Accordingly, the maximum score for a household is 27 (if a household responded to all nine frequency-of-occurrence questions “often”, coded with a response code of 3). The minimum score is 0 (if a household responded “no” to all occurrence questions, frequency-of-occurrence questions were skipped by the interviewer, and subsequently coded as 0). The higher the score the more food insecurity (access) the household experienced and vice versa. Severely, moderately, mildly food insecure and food secure category results from the scale score (Deitchler *et al.*, 2010).

Qualitative data concerning livelihood activities, vulnerability to shocks, subjective meaning of livelihood and food security was collected through FGDs, key informant interviews, observation, and in-depth interviews. Three FGDs (one for each selected *kebele*) were conducted. Discussants were selected based on their age, sex, wealth rank, main livelihood. Key informant interviews were conducted with each of the three *kebele* chairpersons/managers and three agricultural extension workers. At the District level, officials from Agricultural and Rural Development Office, and Rural Land and Natural resource Management Office were interviewed. In-depth interviews were employed to extract detail data from key informants through face-to-face interaction. Two model farmers², three households affected by the Derba Cement factory and three relatively poor household heads per *kebeles* were interviewed in-depth. Direct observation was also employed to supplement data obtained through FGDs, survey and key informant interviews.

Data Analysis

Qualitative data generated from key informants and in-depth interviews and recording activities were transcribed, categorized and organized into themes (objectives of the study) and discussed. Qualitative data results were triangulated with survey results in order to address the main objective of the study. Quantitative data analysis was done using Statistical Package for Social Science (SPSS) version 20. Descriptive statistics were employed to describe the features and distribution of livelihood strategies. Frequency distributions, averages, and measures of

² Farmers, which have relatively better income, adopt more farm technology, produce more and better sustain their food need.

dispersion were computed. Bivariate analysis was also used to identify the association between variables. Cross-tabulation was employed to show patterns of association between categories of independent and dependent variables. Inferential statistics were computed to locate the parameter of interest in the population through drawing a conclusion from sample statistic. Multinomial logistic regression (MLR) was used to test the effect of pursuing different livelihood strategies on household food security. Prior to the estimation of the logistic regression model, the existence of multi-collinearity was checked among explanatory variables.

Results and Discussions

Socio-demographic profile of Sample Households

This study involved 72.1% male and 27.9% female respondents. With regard to marital status, 151 (70.2%) were married, and 23 (10.7%) of the respondents were never married. Divorced and widowed respondents constitute 10.2 % and 8.8% respectively. Of the total respondents, 43.7% did not attend formal educational establishments; 38% were not able to read and write while 5.6 respondents were only able to read and write. The number of households gently decreases with an increase in educational level. Almost half, 107 (49.7%) of the respondents had elementary education. While 12 (5.6%) respondents attended high school (grade 9-12), only one % of respondents had diploma level of education. Concerning age, the majority of respondents belong to the productive age group, 18-65 years. The average age of respondents was 44.

Livelihood Strategies

Rural areas are characterized by having diverse livelihood activities; farm related and non-farm activities. This study followed clustering livelihood activities based on sectors. Accordingly, sample households were grouped into agrarian, non-farm and those who pursue both agricultural and non-agricultural livelihood strategies. Households pursuing only agricultural livelihood constitutes 47.4% of the sample. These groups of households are those who make their livelihood from crop cultivation and livestock raising. The non-farm livelihood category consists of households whose main living is based on activities outside agriculture. These include wage labor in rural-based factories (e.g. Derba Cement Factory), self-employment in own business, trading activities, living on transfers like remittance, charcoal or fuel selling and traditional brewing of different local drinks. About 15% of the sample household heads live only on non-farm³ livelihood activities. A third

cluster involves households diversifying their means of living across sectors. This group, according to Ellis and Freeman (2005) lead livelihood activities, with different risk factors. Rural households, who cultivate crops, raise livestock and undertake at least one of the non-farm livelihood activities were identified under this cluster. Accordingly, 37.2% of the sample household heads pursue both agricultural livelihood and supplementary activities outside agriculture.

Agricultural livelihood activities

In the study *kebeles*, mixed farming is the dominant agricultural activity and includes both crop cultivation and animal husbandry. Agricultural intensification is the main livelihood strategy in highland *kebele* while agricultural extensification is more common in the lowland *kebele* of Handa Woizero. Secondary data from Sululta district indicated that midland and highland sample *kebeles* more than half of the total fertilizer distributed in the district each year. Besides, applying inorganic fertilizer, traditional soil fertility maintenance was also noted as the main activity for households to increase crop productivity from limited land size. Intercropping, though not common, is typical of the intensive use of land. In Handa Woizero *kebele*, cereal crops grown simultaneously include maize, millet, and sorghum. Pepper was the most frequently intercropped vegetable with maize. The practice of intercropping allows farmers to increase the productivity of different crops per acres without increasing the size of land. Agricultural intensification can also be more noted from the absence of fallowing system and frequency of cultivation. No farmer reported the use of fallowing; all lands suitable for cultivation were used from year to year intensively.

An alternative to agricultural intensification is extensification; expansion of cultivation into the previously uncultivated land. Expanding land for cultivation is a widely practiced agricultural activity in the midland and lowland sample *kebeles*. Farmers in the study area undertake extensification on two fronts: expanding formerly uncultivated forest or shrub land and bringing grassland under cultivation. Regarding the former, a 35-year-old farmer (male) from Bacho Kidanemihiret *kebele* said:

I have one hectare of land with 7 household members. Some proportion of this land was used to serve for pasture that I formerly sell for highland farmers who settle here every summer. My farm size is extremely inadequate to support my household. The fertility level of the soil in our area is poor, mine is not an exception. If I get a good production of sorghum in one year, the next year I need not expect

³ All sources of living that are not related to crop production, livestock keeping or labor employment in agriculture.

'that' because it depletes. I cannot afford fertilizer. As a result, I started to cultivate my unreachable hills side pastureland after making charcoal from shrubs thereof. I produce crop over there mostly through hoe. Now, only small parcel is left for pasture. If I could not find new areas as such, producing crops and feeding my family would have been impossible.

District agricultural and rural development chairperson stated that farmers in midland and lowland *kebeles* of the study area cultivate beyond the recommended slope of 25-30%. Farmers cultivate land as steep as 35%, which shows the severity of land shortage in the area. This created a vicious circle of low production and farming marginal land.

Irrigation and vegetable gardening are also important methods of substantiating annual cereal crop production. From the sample, 51 household heads indicated that they own the land suitable for traditional irrigation, while 32 household heads use their land for irrigation. The majority of those practicing irrigation were farmers from lowland agro-ecology due to the suitability of water charge. Maize, onion, pepper, banana, sugar cane and cabbage are among important crop types grown through irrigation in the study area. Irrigation practices have two rounds. The first one is operated initially and deliberately for getting annual production from irrigation. The second is practiced for coping with crop failure, which is a serious concern for the majority of the lowland respondents. Irrigation was, thus found to play both as accumulation strategy to increase household income and stock of assets and as coping strategies, which are aimed at minimizing the impact of livelihood, shocks.

Since vegetables were sold regularly for local markets, some farmers in Handa Woizero persistently produce vegetables. Frequent production also enabled farmers to get regular cash that they could deploy to further improvement in farm and non-farm livelihood activities. A 48-year-old woman model farmer, who pursues multiple livelihood activities, explained the role of irrigation as follows.

It is now six years since I started working on irrigation as a supplementary livelihood activity. However, it has become my main living after the engagement of which I opened a small restaurant in Kenteri village. I sell cabbages and onion on a local market. This income covers all land rent and labor wage. Hence, production from maize, banana, and spices is my profit. I got 27 quintals of maize in the first round of 2016/17. Above all, irrigation addressed

my food preference. What would I get if I simply look for the bypassing blessed Mogor River?

Livestock husbandry is an integral part of mixed farming and it is an important sector for Sululta district farmers. The majority of households in the district raise local livestock. Milk and milk products are the major income source for farmers. Overall, sample household heads own 1116.8 TLU⁴. The minimum and maximum livestock possession was 0.24 TLU and 18.3 TLU respectively. On average, sample households keep 6.77 TLU. Female informants indicated that milk production is the most important source of cash, which they invest in household chores. Livestock is an exchangeable asset that can be sold in order to invest in land or small businesses (Ellis and Freeman 2005). From 165 households raising livestock, 97 (58.8%) had sold at least one livestock in 2016/17. Farmers who sold livestock stated that food purchase, farm input purchase, medical expenses, saving and business engagement serve as their main reasons for selling.

Non-farm livelihood activities

Farming, as a basic source of livelihood, absorbs the largest rural labor in SSA, and non-farm income plays a key role in strengthening smallholder farming as a pathway out of poverty (Loison, 2015). Engagement of rural households in non-farm sectors is conceptualized in the literature as a way of diversification. Yet, as noted above, there are households who entirely rely on non-farm activities to generate their living in the study area. Of the 215 household heads, 113 (52.5%) pursue at least one type of non-farm livelihood activity whatever the pattern of engagement might be. These were self-employment⁵ activities. Table 1 presents the various non-farm livelihood activities pursued by sample households.

Wage employment was the most frequently stated non-agricultural livelihood activity of the study households. Table 1 indicates that 57 (50.4) households derive their living from unskilled wage. Wage activities include casual labor employment in constructions, in village and employment on privately owned business like fixing houses and fences. The Derba Cement factory was found to be the main absorber of farmers' labor in the study area. In addition, Derba Mogor Gypsum factory is an important non-farm employment source for households. Wage-based activities include working as guard, loading, assisting in construction, gardening,

⁴ 1Cow/ Ox/Bull= 1TLU, 1 Calf=0.4 TLU, 1Heifer=1TLU, 1 Sheep/Goat=0.10, 1Donkey=0.50 TLU, 1Horse/Mule= 0.80 TLU, and 1Chicken= 0.013 TLU (Freeman, *et al.* (1996)

⁵ Self-employment denotes the undertaking of supplementary rural-based livelihood activities in the form of, for instance, trade, brewing or other self-managed activities

Table 1

Non-farm livelihood activities

Non-farm livelihood activities	N= 113 ^y	Percentage (%)
Trading activities (retailing, small ruminants, grain, shop)	32	28.3
Unskilled wage employment (laborer in construction, guards)	57	50.4
Skilled non-farm work like masonry, carpentry, mill operator	33	29.2
Formal employment (kebele manager)	5	4.4
Renting properties (pack animals, house in urban areas, land)	36	31.9
Transfers from parents/children /relatives (remittance, pension)	11	9.7
Brewing/selling local alcohols	45	39.8
Handicraft activities (weaving, pottery, blacksmith, traditional hairdressing, tailoring)	28	24.8
Fuelwood/charcoal/dung cake and straw selling	16	14.2

^yHouseholds pursuing non-farm livelihood (multiple responses) *Source:* Survey, 2016

cleaning, digging ditches and chiseling. Skilled wage employment like masonry, carpentry, and machine operation supports 29.2% of the respondents.

Traditional brewing is crucial home-based non-farm livelihood activity absorbing mainly women's labor. Observation of market days in Derba town showed that women sell local drinks (e.g *Arekie, tella*). Though most of the drinks are produced at home, there are important beginnings in Bacho Kidanemihiret *kebele* where retailing different drinks is undertaken by purchasing it from towns. Such activity was noted by a 49-year-old woman.

I started traditional brewing under a constraint of labor to work in agriculture. My husband is critically sick. We have no child who can farm. As a result, I rented out all plots and engaged in brewing as the main livelihood activity. My donkey transports water for the purpose. I prepare at least six to ten liters of arekie (local liquor) within two weeks given that I am healthy and crop prices are stable. I sell one liter of arekie for 35 ETB for outside house use, and 40 ETB if it is retailed at home. Depending on the profit I get, I sometimes also buy arekie from others for 30 ETB and retail for 40 from which I secure 10 birr per liter. I have three benefits when I brew areke at home: good income, consistent market, and byproducts serving as a fodder to my cattle and donkey. At least once per month, I buy a box of beer from Derba town and transport it by donkey without paying transport cost. I get a minimum of 60 birr per box of beer. Special opportunity for my market is the existence of farmers training center aside of my home.

According to informants, beyond meeting the cash needs, selling of homemade drinks encourages saving which could be invested on productive

resources. In addition, it supplements consumption needs of households. From the sample, 40% of them are engaged in selling local drinks. Households in the study area are also engaged in making different materials from locally available products. The most widely observed handicraft activities are hand-woven traditional materials prepared in the form of, for instance, round container for holding food, locally called *Mesob* and plates like *lemet*. Weaving, tailoring, and hairdressing are also additional sources of income for households with 28 (24.8%) households undertaking different handicraft activities.

Charcoal production, as indicated by the head of the District Agricultural and Rural Development Office, is also a major livelihood activity of farmers residing in lowland and midland *kebeles*. Some households produce charcoal from trees that have been cleared from their land as a process of expanding the agricultural land. There are also households, which depend mainly on charcoal production for their livelihood. These groups are the main users of 'Kebele land' owned. They also cut trees for fuelwood. According to extension workers, charcoal production is used as a means of generating cash income for farm households.

Effects of Derba Cement Factory on the livelihoods of surrounding residents

Rural livelihood options are complex and changing. Hence, they confront different risks. Risk factors that surround livelihoods are referred to as the vulnerability context. In this study, the investment in the cement factory affects livelihood by diverting farmland to the non-farm sector. Table 2 shows that 41.4% of the respondents were affected by the cement

Table 2

Effects of Derba Cement factory on farming households

	Kebeles			Total (N=215)
Are you affected by the cement factory?	Handa Woizero	Bacho Kidanemihiret	Derba Gulalle Baressa	
No	28(13.0)	45(20.9)	53(24.7)	126(58.6)
Yes	38(17.7)	33(15.3)	18(8.4)	89(41.4)
Effects of Derba Cement Factory ^a	Kebeles			Total (N=89) ^y
	Handa Woizero	Bacho Kidanemihiret	Derba Gulalle Baressa	
Took farmland	16	31	12	59(66.3)
Displacement	6	3	5	14(15.7)
Took water points	9	14	7	30(33.7)
Took pasture land	11	19	9	39(43.8)
Dynamite devastation	17	5	0	22(24.7)
Polluted water	9	7	3	19(21.3)
Flooding to farmland	15	6	14	35(31)
Total land lost (ha)				
Land taken by cement factory (in ha)	25	58	4.2	87.2

Note: Numbers in parenthesis represent % ages ^aMultiple response for households affected by Derba Cement, ^yHouseholds affected by factory
 Source: survey, 2016

factory while 58.6% of them reported that cement investment did not affect them. The majority of the respondents who are affected by the Derba Cement Factory are from Handa Woizero *Kebele*, a quarry site for the factory. This *kebele* is a quarry site for Derba Cement Factory where extensive land is used for gypsum extraction, and the factory is claiming more land from time to time according to FGD participants and observation at different times. The plant site is Bacho Kidanemihiret *kebele*, which used to be a farm and pasture land. Derba Gulalle *kebele* is a passage route from district town to the plant site.

MoFED (2005) recommends that agricultural development should be undertaken by private investors in lowland areas where abundant extensive land exists. This is based on the premise of fostering forward and backward linkage between the primary (agricultural sector) and the manufacturing sector.

However, the situation of the study area was somewhat odd. Farmers do not have any farm produce that may feed the factory except their labor. The factory, in turn, does not have outputs that could be used by farmers to enhance their productivity, though the factory made promises like the establishment

of milk cooperative, credit service and provision of electricity, with little of the promises have been fulfilled according to key informants who lost land. On the contrary, rather the factory is claimed to have critical consequences on the livelihood of farmers, mainly on those who cannot engage in non-farm businesses. Some of them are discussed below.

Farm Land Expropriation

Expropriating land is the most frequently stated effects of Derba cement factory on the surrounding farming communities, with 66.3% of the respondents indicating that they lost their land due to the factory. FGD participants and key informants in Bacho Kidanemihiret reported that more than 114 households lost their land. District report shows that Derba cement factory is the largest industry in the area. Changes in landholding affected not only the ability of the households to produce food but also disturbed the employment and livelihood activities of farmers. The consequence of losing land is more severe among those households whose entire holding was taken by the factory. This was stated by an elderly (77) from Bacho Kidanemihiret *kebele* when he says:

I had more than 22 timads⁶ of land ten years ago. I used to produce over 50 quintals of grains a year till I lost my land. I had more than 25 cattle and 5 equines. I used to employ labor on my farm and livestock. It was since 2007 that I had lost half of my land and the remaining in 2010. Now, I have no farmland to count on. As a result, I have gradually sold out my livestock and end up in contracting land with what I have been compensated. Above all is the psychological shame I am feeling while I am looking for my grain producing land. Some portion is simply fenced without any use. I am forced to wait for the hand of my grandson. All my statuses had been washed and I am restricted to looking after one cow, which supports my household with milk. I cannot engage in other livelihood activities. I am wrestling untold misery, which I never expected.

This excerpt shows that the situation is worse for elders who have no productive labor. Changes in the land holding of farmers not only affect the living situation of farming household but also labor employment in agriculture. Losing land accelerates labor withdrawal from agriculture and employment in low return non-farm activities. Beyond affecting the livelihood of households, frequent land expropriation invokes tenure insecurity, which further constrains the sustainable utilization of land. Discussion with key informants reveals that farmers lost their land in different rounds. The first was during the establishment of the factory where the majority of the Bacho Kidanemihiret and Derba Gulalle Baressa *kebele* residents lost their land. The second was during the expansion of the factory resulting in the construction of a conveyor belt to transport and the road from the factory to the quarry.

Frequent land acquisition by the factory was found to negatively affect farmers ability to invest in the land they own since they are not sure if the land is going to be theirs tomorrow. There were respondents who mentioned that their land was surveyed, at a time of fieldwork for this study, to be taken for expanding the quarry area. This indeed was the case with a widowed woman “my land has been surveyed. *I do not know when the factory plans to take the remaining land. Therefore, exerting labor and finance is not necessary. I simply planted tree of low value over there than crop.*” This shows that insecure land tenure rights affect incentives to make long-term investments in land management.

On average, sample households lost 1.3 hectares with a maximum of 5.5 ha in Bacho Kidanemihiret *kebele*. The amount of land lost by all the respondents was 87.2 ha, with 25, 58 and 4 ha in Handa Woizero,

Bacho Kidanemihiret, and Derba Gulalle Baressa *kebeles* respectively. The total hectare of land lost by the sample respondents was 28% of the total land size that the factory proposed to take, 310.4 ha (DMC 2008).

Impact of quarry on water points and forests

Extraction of raw materials (e.g. stone) for the factory is having the effect of degrading the natural base and destroying water points that would support a large number of household. It was noted from observations that two main water streams of Bacho Kidanemihiret *kebele* were fenced by the factory as part of the expansion. Farmers indicated that these water points were used to be the main sources of water for their household consumption and livestock. Moreover, small streams were devastated by road development and stone extraction. Swampy areas, which used to be sources of water, are now filled with sand sediments. This forced livestock to travel long distances to get water from rivers. In addition, dust and grease from quarry area were observed to become the most critical polluting factors of the water sources.

For those who are forest-dependent for the production of charcoal, timber, fuelwood, and hay, dynamite explosion makes access difficult. Forests have been destroyed by the expansion of the quarry and road development for the factory. As Table 2 shows, of the respondents who were affected by the cement factory, 24.7% argued in terms of its impact on natural resources. Dynamite explosion at quarry area created massive stone and soil sediments, which flow to the field of farmers every rainy season and destroy crops annually. The quarry is also causing flooding to farmland. Households who are working on irrigation in Handa Woizero reported that land for irrigation is decreasing over time due to flooding caused by the quarry. Quarry area creates gully that leads flood to the irrigation fields, taking soils to Muger River.

Displacement

Declining landholding size due to the expansion of the quarry area is indicated as the main factor for the migration of Handa Woizero *kebele* households to Derba town and Bacho Kidanemihiret *kebele*. As shown in Table 2, 15.7% of the respondents were displaced. Though the impact assessment done by the factory (DMC 2008) does not indicate the number of households who lost all their land, there have been households who lost their land and left the area. A 43-year-old woman who was displaced from Handa Woizero and settled in Bacho Kidanemihiret

⁶ local unit used to measure land size (one *timad* of land is equivalent to a quarter of ha)

described the process of displacement, livelihood adjustment and consequences on her households as follows:

We lost 3.5 ha of land and compensated 450,000 ETB in 2007. Since we had no adequate farmland left, my husband started to farm rented land. Yet after two years, we were again told that our land is needed for the quarry area. It was during this time we chose Bacho as our destiny. All our living depended on compensation for three years until we established a flourmill. However, we could not manage it properly and thus failed to get profit. We sold it. The compensation money is finished now and my husband is working on casual labor. Even, we have no neighbors to count on here. Maintaining consumption becomes hard and always reminds me of the past life at my place of origin, Handa Woizero.

Displaced households were facing challenges in three main fronts according to FGD participants. The first one is losing productive land. Discussants opined that land lost for cement investment was formerly fertile and used for teff, which is the most expensive cereal on the market at a time this data was collected. Secondly, farmers faced livelihood maladjustment once they left their farming activity. Employment in factories demands education or experience in non-farm sectors which farmers in the study area never had. Once they have lost land, they strive to try different means to, at least hired in the factory. Finally, farmers end up in less remunerative livelihood activities. Since most of the farmers who have lost land do not have the necessary qualifications to be employed as skilled persons, they are hired as guards and daily laborers, which is less paying. Hence, joining non-farm activities for such farmers, with no prior exposure is not a positive thing, according to FGD participants.

Respondents' food security situation: Implications of livelihood strategies

Household food security

Household food security was measured by household food (in) security access scale (HFIAS). Based on the experience, anxiety, and uncertainty about food supply, limited variety of food, and insufficient food intake households were classified as food secure, mildly food insecure, moderately food insecure and severely food insecure.

Food secure households are those, which experience none of the food insecurity (access) conditions described above, or just experiences 'worry', but rarely. Table 4 shows that 41% of the sample households were food secure; of which 23.3% of them combine agricultural and non-farm livelihood activities. Only 2.3% of the food secure households pursue non-farm livelihood activities. Households, which worry about the inadequacy of food in the household, and tend to consume the same type of food most of the time are regarded as mildly food insecure. Such households do not get food of their preference, eat a limited variety of food and where exists, the same type of food over and over. Key informants indicated that food preference was not a priority for the majority of rural households. FGD participants indicated that food types beyond local grains are not common, even among the well-to-do families. This is confirmed by results of the pre-test data, which found that food preference like meat is associated with "betterment".

Table 4 shows that mildly food insecurity is the second largest category of food insecurity accounting for 26.5% of the household heads covered by this study. Some of these households (about, 14%) are farming households. Hence, the result of the household survey supports the qualitative evidence

Table 4

Level of household food insecurity (HFIAS)

Level of household food insecurity	Livelihood strategies of the respondent			Total (N=215)	x ²
	Agricultural activities only	Non-farm activities	Both agricultural and non-farm		
Severely food insecure	8(3.7)	16(7.4)	4(1.9)	28(13.0)	68.8*
Moderately food insecure	31(14.4)	6(2.8)	5(2.3)	42(19.5)	
Mildly food insecure	30(14.0)	6(2.8)	21(9.8)	57(26.5)	
Food secure	33(15.3)	5(2.3)	50(23.3)	88(41)	
Average HFIAS Score					
Mean HFIAS score	Agricultural activities	Non-farm activities	Both agricultural and non-farm	Grand mean	F
	6.4	9.5	3.4	6.4	30.2*

Source: Sample survey, 2016

that agrarian households could not consume preferred food due to lack of resources to acquire them. Lack of cash and other physical resources (e.g. livestock) to acquire food are the major constraints facing farm households in the study area. In addition to worrying about food availability and compromising food preference, households in the study area also cut back on the quantity of food: size and frequency of meals served. According to the views of female household head interviewed for this study, during lean seasons, cutting meals is one of the mechanisms used to reduce expenditure. These households are moderately food insecure and their severity of food insecurity is somewhat higher than moderately food insecure but less than severely food insecure. This category constitutes 19.5% of the respondents.

Severely food insecure households are those who experience inadequate food intake due to lack of resources that enable them to command food they need to maintain an acceptable level of consumption. Of the total sample, 28 (13%) households reported that they experienced severe food insecurity situation during the reference period of the survey, 2016. The majority of the severely food insecure households pursue only non-farm livelihood activities. These households have no food supply from own production and their food entitlements fluctuate based on the availability of non-farm activities from which they secure cash to buy food. Similarly, Patel *et al.* (2015) found that rural households, which were primarily engaged in non-farm labor have the lowest wellbeing index among all household types despite their higher cash as compared to farmers.

Interviews conducted with farmers also revealed that severely food insecure households spend much of their income on food purchase. However, since their income was not adequate to purchase food of the needed quantity, cutting food consumption was noticed from their responses to scale questions. The proportion of severely food insecure farm respondents was 3.7% while households who combine both agricultural and non-farm livelihood activities were only 1.9%. A male FGD participant (31) noted the necessity of combining livelihood options when he says:

I am a father of three. My main livelihood activity is the production of charcoal and fuel wood. I also derive my living from labor employment where I farm for wealthier farmers. I purchase food from the income I get from charcoal production. Getting regular income that I invest in food is hardly possible. I always worry about what will happen the next day. When I fail to produce adequate charcoal for good price or when the charcoal is confiscated, affording the surging market price of food is unthinkable. Have I had regular cash source this would not have been the case.

With increasing severity of food insecurity, the number of households engaged in only non-farm livelihood activities increases. Contrarily, the number of households who combine both agricultural and non-farm livelihood strategies is higher in food secure category and lower severely food insecure category. A Pearson chi-square test for association ($\chi^2=68.8$) indicates the interdependence of households' level of food security and their livelihood combinations. The association was significant at ($p < 0.01$).

The maximum HFIAS score was 17 and the minimum was 0. Average HFIAS was 6.4. Higher HFIAS score was recorded in the non-farm only categories while the minimum was in households whose livelihood portfolio involves both agricultural and non-farm activities. Higher HFIAS score denotes the increased level of food insecurity while a lower score represents a lesser degree of food insecurity situation. Stated differently, the smaller HFIAS score is an indicator of food security. A larger mean of HFIAS was observed in non-farm category households, while smaller mean was observed among households undertaking a combination of livelihood activities. Means of HFIAS score significantly differ with respect to the three livelihood portfolio at ($p=0.000$). This shows that livelihood strategies of the respondents were confirmed to underpin household food security.

Chi-square test also supports the existence of a significant association between different livelihood portfolio and household food security at $p=0.000$. Test of mean difference in HFIAS score was also significant at ($P < 0.01$). Multinomial logistic regression was used to further explain the relationship between the different types of livelihood portfolios and household food security situation, holding 'food secure' households as a base category in the regression analysis. In Table 5, the predicting variable is livelihood strategies having three categories: agricultural, non-farm, both agricultural and non-farm clusters. The model result shows that households whose livelihood was confined to the non-farm sector were more likely to be severely food insecure. Holding other categories constant, these households were 40 times more likely to be severely food insecure than households who diversified their livelihood across agricultural and non-farm activities.

Farming households were 9 times more likely to be moderately food insecure than households who combine their livelihood activities. However, farming households were relatively better on the level of food security as compared to those limited to non-farm livelihood. Households with diverse livelihood activities were more food secure than households in the two livelihood clusters. Informants who have land and at least one member of their household working in

Table 5

Livelihood strategies and household food security

Level of household food insecurity ^a		B	Std. Error	Wald	df	Sig.	Exp (B)
Severely food insecure	Intercept	-2.526	.520	23.627	1	.000	
	[Agriculture only=1.00]	1.109	.652	2.890	1	.089	3.030
	[Non-farm only =2.00]	3.689	.730	25.555	1	.000*	40.000
	[Both agriculture and non-farm=3.00]	0 ^b	.	.	0	.	.
Moderately food insecure	Intercept	-2.303	.469	24.100	1	.000*	
	[Agriculture only=1.00]	2.240	.532	17.759	1	.000*	9.394
	[Non-farm only =2.00]	2.485	.766	10.525	1	.001**	12.000
	[Both agriculture and non-farm=3.00]	0 ^b	.	.	0	.	.
Mildly food insecure	Intercept	-.868	.260	11.129	1	.001	
	[Agriculture only=1.00]	.772	.362	4.543	1	.033**	2.165
	[Non-farm only =2.00]	1.050	.659	2.538	1	.111	2.857
	[Both agriculture and non-farm=3.00]	0 ^b	.	.	0	.	.

^a. The reference category is: Food secure.

^b. This parameter is set to zero because it is redundant.

*significant at p<0.01, ** significant at p<0.05

non-farm sector reported good food self-sufficiency. The findings of this study support the view that participation in the rural nonfarm economy provides a pathway for upward mobility. Though opportunity-led diversification is biased in favor of the wealthier households, survival-led diversification has more contributions (Sosina *et al.*, 2012). Households who have properly invested the compensation obtained from the Derba cement factory on housing in urban areas and trading reported improvement in their livelihood. This corroborates the finding by Gemechu, Zemedu & Yousuf (2016) who attributed food insecurity in Ethiopia directly to dependence on undiversified livelihoods based on low-input, low-output rain-fed agriculture.

Discussion

Livelihood strategies influence food access security of rural households. This study assessed the livelihood combination of households situated around Derba Cement factory and the implication of household livelihood portfolio on one of the livelihood outcome, household food security. Rural livelihoods are not homogenous. Though the majority of study households pursue to make their living from crop cultivation and livestock raising, a significant proportion of the sample engages in non-farm activities. Similarly, Gecho *et al* (2014) found that rural households are increasingly participating

in activities outside agriculture. Location-specific non-farm opportunity in the study is Derba Cement factory. Farmers generate income from non-farm employment that could be deployed to farm activities. However, pursuing the non-farm livelihood, for some, is the result of pushing factors such as small land size than promising non-farm employment. This is in line with the finding of Gebru, Ichoku and PhilEze (2018) which indicates that most Ethiopians are 'sub-subsistence farmers' who have been forced to diversify into off-farm incomes to bridge their annual consumption gap.

Attributed to entry barriers and the limited employment opportunity for local farmers, however, non-farm employment opportunity may not guarantee a sustainable livelihood for farmers. For farmers being largely illiterate and less competent in labor market employment in the factory and maximizing income portfolio is difficult. Hence, poor, uneducated, and women enjoy less access to remunerative non-farm livelihood strategies, which support the findings of Loison (2015). In the study area, Derba Cement factory partly affected the labor allocation and land use pattern of farmers and hence affected the livelihood adjustment. Beyond diverting farmland to non-farm investment, which hardly supported the life of farmers, the factory did not keep its promise of supporting the livelihood of those who lost all their land. Pushing reasons of this kind put the life of farmers at risk

and force them to adopt less remunerative livelihood activities. In agreement with his finding, Matsumoto, Kijima & Yamano (2006) found that the asset-poor households are likely to increase the supply of low-return artisan jobs to respond to household-specific shocks while relatively better households benefit from both farm and non-farm opportunity.

These livelihood dynamics affect household food security. Attributed to variations in resources and livelihood activities, rural households get food through different means. Resource-poor households whose land is taken by cement factors depend heavily on market. Yet, farmers could not secure regular income, which makes them vulnerable to food insecurity. The condition is severe for landless rural households who depend on non-farm livelihood. This group can neither produce adequate, as they have no land nor afford market price since they have no regular income source. If the livelihood activities of households are easily vulnerable or less adaptive to the changing situation, the ability of that household to produce for themselves or acquire food from other sources is quite challenged (Sasson, 2012).

Relatively, households with diverse livelihood strategies are food secure as they have different food entitlement options. In the study area, households which are farmers and workers in the non-farm activities (e.g. in cement factory) can support their consumption through own production and purchase. The extent to which these households worry about food shortage is also different. Likewise, the finding of Matshe (2009) confirmed that in settings where farming is unable to generate viable livelihoods, policy should promote non-covariate, non-agricultural livelihood options. Hence, diversification efforts, which do not erode the livelihood of farmers, are important in ensuring household food security.

Conclusion and Recommendations

This study assessed the livelihood strategies, challenges, and implication on household food security. Though agriculture continues to be the main source of living, engagement in non-farm activities is surging mainly to supplement vulnerable agriculture. Cement factory operating in the study area was identified as the main factor conditioning the livelihood of rural people. Beyond claiming land of farmers, who have no other way out, encroachment of water points and devastation of natural resources have hampered the livelihood of people. Livelihood strategies underpin the food security situation of households. Majority of the respondents indicated that their food stock is not adequate year round. Households who pursue only non-farm activities were more vulnerable to food shortage than agrarian. Food

security situation of households who support their agriculture with financial input from engagement in the non-farm sector was positive. Those who have lost their land could not afford food market price. In Ethiopia, where pressure on land is high due to population pressure, non-farm livelihood activities are reliefs. Consequently, rural poverty reduction strategies need to incorporate programs on enhancing rural non-farm enterprises that absorb the surging rural population. Therefore, improving the food security of rural people demands deliberate livelihood diversification. This calls for the development of non-farm activities that are tied to agriculture, so that farmers can easily maintain both agriculture and non-farm activities for a better living. In order to benefit from large non-farm investments and smallholder farming, win-win strategies are required. Hence, forward and backward linkages between agriculture and manufacturing sector need to be sensitized.

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