

# Determinants of Households' Food Security in Resettlement Areas: A Case of Resettlement Schemes in Dawuro Zone, Ethiopia

TEREFE ZELEKE (PhD)

Assistant Professor in Institute of Public Management and Development Studies, Ethiopia Civil Service University

## Abstract

This study assesses the execution of current resettlement program and the food security status of settlers in selected resettlement areas in Essera district of Dawuro Zone in SNNPR. One hundred thirty eight (13%) sample household heads in three kebeles were selected for survey by using simple random sampling technique. In addition, focus group discussions with representatives of settlers and direct observations have been employed to this study.

The study results show that the consultation about the program was made with majority of settlers prior to the implementation of the program and the movement of settlers to the new area was voluntarily based. In addition, the minimum standards of basic infrastructure and social service facilities were not well established in the area prior to the execution of a program and have not yet been improved. It was also noticed that household heads in resettlement areas are exhaustively depleting forest for different purposes and they have not been advised to plant new trees and to use alternative options for fuel sources and construction to reduce their reliance on natural resources like forest. Food availability and food access to household heads through on-farm activities such as crop production, livestock rearing, and their income status have been improved in resettlement areas. But some household heads are yet food insecure due to their inability to meet the daily calorie requirement for healthy and moderately active life. The logistic regression model was used to examine the probability of the food security status of household heads. Accordingly, the numbers of livestock owned in TLU and use of fertilizer have high probability to influence the food security status of households in the study area. Thus, the intervention of all concerned bodies is indispensable to enhance the food security status of households mainly by improving the livestock rearing strategies and enhancing the use of fertilizer in resettlement area. Besides, giving attention to environment conservation, improvement of infrastructure and social service facilities as well as supporting settlers to diversify their income sources are key areas of interventions to be made to enhance food security status of household heads in resettlement areas.

**Keywords:** Food security, resettlement, environment, settlers, on-farm activities, income diversification.

## 1. Introduction

Food insecurity in Ethiopia derives mainly from dependence on undiversified livelihoods based on low input and low output rain fed agriculture. As a result, most Ethiopian farmers do not produce enough to meet their consumption requirement (Devereux, 2000). Besides, long term factors such as population growth, environmental degradation, diminished land holdings, lack of on-farm technological innovations, and lack of off-farm income sources have led to a decline in productivity per household in the country (Workneh, 2008).

In order to find long-term solutions to chronic food insecurity in four largely populated regions such as Amahara, Tigray, Oromia and Southern Nations, Nationalities and Peoples Region, the current Federal Democratic Government of Ethiopia launched the voluntary intra-regional resettlement program. The intra-regional resettlement program was launched with an objective to resettle 440 household heads (2.2 million chronically food insecure people). The implementation document of the program states that the current resettlement program is based on basic pillars and principles such as purely voluntarism, the availability of underutilized land in receiving areas, establishment of minimum infrastructure facilities, consultation with host communities, proper preparation, etc. among others to ensure sustainable food security in new areas where people have been relocated (New Coalition for Food Security in Ethiopia, 2003; PASDEP<sup>1</sup>, 2006).

Essera district in Dawuro Zone is one of the areas in the region where the intra-regional resettlement program has been undertaken in the SNNPR. Essera is one of the five Districts in Dawuro Zone which received and hosted 3357 households from other three Zones in the region such as Wolayita, Kambata and Hadiya during 2003-2008 (EWFSCD<sup>2</sup>, 2011). It is bounded in West by Konta special District, in South by Gamu Gofa Zone, in the East by Loma District and in the North and North East by Tocha and Mareka Districts respectively.

The total population of Essera District is 65,751 out of which 33,221 are male and 32,530 are female (CSA, 2007). The areas of District consist of mainly three agro-ecological climatic conditions such as "Kola" (500-1500m), "Woyina Dega" (1500-2500m) and "Dega" (>2500m). The resettlers were relocated in five low land kebeles in the district ("Kola" agro-climatic conditions) namely Manera, Boyina, Neda, Modi and Yucha

<sup>1</sup> Plan for Accelerated and Sustainable Development to End Poverty

<sup>2</sup> Essera Woreda Food Security Coordination Desk

which have not been occupied by host communities so far. All the areas selected for resettlement were savanna grassland and forest areas which have not been cultivated by local people prior to the relocation of resettlers (Essera District Agricultural & Rural Development Office, 2011)

Concerning the execution of program, most of the studies undertaken at national level on different resettlement areas report seem to indicate poor social and physical infrastructure facilities in the resettlement areas, less consideration for environmental management, absence of feasibility study and minimal consultation with resettlers and host community all of which contribute for the successfulness of the program (Kassahun, 2005; Dessalegn, 2005; Gebre, 2005). Although the purpose of implementing the resettlement program is to ensure food security for food insecure households in the country, settlers in different resettlement areas of the country were unable to improve their livelihood through the current one hectare and below land holding which they have been given in new areas (Asfaw, 2005; Driba, 2005). In addition, there were some problems related to education, health, safe potable drinking water, road during implementation of the resettlement program in SNNPR (Wolde Sellasie, 2003; Mellese, 2005).

The intra-regional resettlement program which has been implemented in Dawuro Zone has shared some of the problems revealed in all these studies during its actual execution. These problems might be poor situation of infrastructure and social service facilities, the lack of market links, the depletion of natural resources, etc in the area. In addition, heads of households might suffer from lack of diversified income sources, absence of on-farm technological innovations and rain-fed farming system towards sustainable food security. Regardless of these challenges, the resettlement program might also help them to be graduated from their food insecurity situations. But none of all these conditions has been assessed by any researcher in the area so far. Thus, this study intended to address the resettlement program and its contribution to sustainable food security in selected resettlement and host kebeles in Dawuro Zone with use of the following basic research questions:

- a. *How do settlers perceive the implementation of resettlement program and their relationship with host communities?*
- b. *How is the environment managed to enhance the productivity of farm land in resettlement areas?*
- c. *To what extent settlers have improved crop production, livestock rearing and income status that contribute to food availability and access in new resettlement areas compared with their origin?*
- d. *What are the determinants of food security status of household heads in new resettlement areas?*

## 2. Research Methodology

This study utilizes case study to assess the achievements of resettlement program from the views of settlers in study area.

### 2.1. Sampling Technique

Random sampling technique among probability sampling techniques has been employed to this study to select representative household heads to survey. Accordingly, the Essera Resettlement Scheme consists of five resettlement sites (kebeles) such as Boyina, Manera, Yucha, Neda and Modi which are bounded by three kebeles of the host communities. From these resettlement sites, three resettlement kebeles such as Boyina, Manera and Neda kebeles with their 13% respective household respondents were selected as a representative sample by using simple random sampling technique. Table 2.1 illustrates the size of total population of the study areas and the sample size selected from the entire population.

**Table 2.1: Sample frame and size**

Selected resettlement kebeles	Total household heads	Sample size
Boyina	203	27
Manera	313	41
Neda	539	70
Total	1055	138

**Source: Essera District Food Security Coordination Desk, 2011**

From non-probability sampling technique, a purposive method was applied to select 8-10 members from each selected resettlement kebele for focus group discussion.

### 2.2. Data Gathering Instruments

The primary data required for this study have been gathered by employing methods such as survey, focus group discussion and direct observation. Secondary data about the program are also retrieved from different official documents from Dawuro Zone Agriculture & Rural Development Department, Essera Woreda Agriculture & Rural Development Office and published and unpublished references to support the reliability of primary data.

### 2.3. Data Analysis

The quantitative data were analyzed using descriptive statistics by the help of Statistics Package for Social Science

(SPSS). As a result, the percentage, frequency table, line and bar graphs were generated to analyze and describe data that facilitate discussions of cases. Besides, to examine the average difference in livestock production in terms of TLU of household heads before and after resettlement program, t-test from the parametric tests was used. The multiple regression models were also applied to evaluate whether the farmland size, land fertility and means of production affect the level of agricultural outputs. Furthermore, Wilcoxon signed ranks test from non-parametric tests was employed to examine the average difference in annual crop production and income status of household heads before and after resettlement program. In parametric and non-parametric tests, and multiple regression models, 5 percent of significance level was considered while examining statistical results. The qualitative data collected through focus group discussion and direct observation administered with use of tape records and diary are summarized and analyzed thematically.

Furthermore, in order to determine the dependent variable “household food security status” (HFS), a Household Food Balance Model (HFBM), which was applied by Haile *et al* (2005), Shiferaw *et al* (2004) was adopted in this study. The HFBM was used to quantify the net available grain food by each of the 138 sampled household heads in selected resettlement kebeles of Essera district. All variables considered by the HFBM model were then converted from the local grain measurement units (quintals) into the corresponding equivalent kilogram and gram grain.

The HFBM model was expressed as follows:

$$Q_i = [p_i + b_i + f_i + r_i] - [l_i + h_i + k_i + v_i + g_i + t_i]$$

The index  $i$  runs from 1, 2, ..., 138 and  $Q_i$  represents net grain food available for household  $i$ ;  $p_i$  total grain produced by household head  $i$ ;  $b_i$  is total grain purchased by household head  $i$ ;  $f_i$  is total grain obtained through food-for-work by household head  $i$ ;  $r_i$  is total relief grain food received by household head  $i$ ;  $l_i$  is post-harvest crop losses to household head  $i$  (10% estimated average value made by district agriculture office during the harvesting period for the total harvest of each crop);  $h_i$  total crop used for re-harvesting by household head  $i$ ;  $k_i$  is total marketed output by household head  $i$ ;  $v_i$  grain used for social events by household head  $i$ ;  $g_i$  grains given out to relatives by household head  $i$ ; and  $t_i$  repayment of grain borrowed by household  $i$  during the last year harvesting year.

After determining the food security status of household heads with the use of HFBM model, the logistic regression model was adopted to examine the probability of food security status of household heads to be caused by education level, family size, perception of settlers to stay in new area, use of oxen for farming, farm land size, crop outputs produced, livestock owned, access to credit, use of fertilizers, use of improved seeds.

### 3. Literature Review

#### 3.1. Concepts on Resettlement

Recently, resettlement has been defined by different scholars in different ways although the basic idea is the same. National Resettlement Conference (1995), defined resettlement as a planned supported process of change in an accommodation context. In addition, resettlement is defined as the process by which people are enabled to live as full life as possible within an appropriate form of housing (Simon Community of Ireland, 1994).

United Nations High Commissioner for Refugees /UNCHR/ (2006) has also defined resettlement as the process which commences with the selection and transportation of people and continues through to their reception and integration in the host community due to various factors. Besides, resettlement has been defined as the phenomenon of population redistribution either in planned or spontaneous manner; relocating people in areas other than their own for the purpose of converting transient populations, nomadic pastoralists, transhumant or shifting cultivators to a new way of life based on sedentary forms of agricultural production (Dessalegn, 2003). These two definitions are adopted in this study in which the current government sponsored resettlement program that designed to relocate chronically food insecure people is discussed in detail.

#### 3.2. Ethiopian Experience in Planned Resettlement Program

##### 3.2.1. Resettlement during Imperial Regime

The planned resettlement was started in Ethiopia for the first time during imperial regime in the 1958. During this period, the project involved a combination of spontaneous and planned settlement programs which accommodated 700 farmers from the populated upland areas of the country and were settled in western Ethiopia and the Rift valley areas (Dessalegn, 2003). At that time state-sponsored-resettlement was largely undertaken to promote two objectives. The first of these was to rationalize land use on government “owned” land and thus raise state revenue. The second was to provide additional resources for the hard pressed northern peasantry by relocating them to the southern regions (where most government land was located) and which was mainly inhabited by “subordinate populations” Pankhurst (1992), cited in Asrat (2006). However, the resettlement program of the imperial regime failed to meet its intended objectives because of the high costs of the program, low rate of success, and the less viability of a number of schemes in the Rift valley, Kaffa and Gamo Goffa (Dessalegn, 2003).

### 3.2.2. Resettlement Program during Derge Regime

After the 1974 revolution, the military government of Ethiopia started to use policy for accelerating resettlement under the auspices of the Relief and Rehabilitation Commission (RRC) and the Ministry of Agriculture. Subsequently, the government announced its intention and resettled people from the drought-affected northern regions to the south and southwest of the country where arable land was plentiful (Library of Congress Country Studies, 2004).

However, according to Dessalegn (2003), at the end of the period of Derg regime, the cost in human lives and resources was immense as reported as follows:

*Some 33,000 settlers lost their lives due to disease, hunger, and exhaustion. In addition, untold number of families was destroyed and for many years after, a number of NGOs were still engaged in attempting to reunite thousands of children who had been separated from their parents at the time of settlers' relocation.*

### 3.2.3. The Current (Post 1991) Resettlement Program

The EPRDF government of Ethiopia also launched the resettlement program for the third time in 2003 to mitigate chronic food insecurity problem in the country. Accordingly, the government prepared the implementation manual to safeguard failure in program. This official resettlement program document stated that the program is based on basic pillars and principles such as voluntarism, consultation with host communities, establishment of minimum infrastructure facilities and others to guide the implementation of a program that makes it unique when compared with resettlement program undertaken during Imperial and Derg regimes (The New Coalition for Food Security in Ethiopia, 2003). Table 3.1 clearly indicates the regional resettlement program and its total cost estimated at the beginning of the program.

**Table 3.1: Resettlement and Its Cost in Ethiopia (2003-2006)**

Region	Household heads	Family	Total	Total cost (in Br)
Tigray	40,000	160,000	200,000	192,389,000
Amhara	200,000	800,000	1,000,000	800,625,000
Oromiya	100,000	400,000	500,000	417,397,500
SNNPR	100,000	400,000	500,000	422,397,500
Contingency				34,720,000
Total	440,000	1,760,000	2,200,000	1,867,529,000

**Source: The New Coalition for Food Security, 2003**

However, various researchers who conducted their study on various situations of current resettlement program argue that some of the pillars lack clarity and the implementation of a program was highly spontaneous when compared to the experience of other countries which are successful in implementing the resettlement programs. For instance, some argue that the pure voluntary option principle of resettlement would be linked to involuntary resettlement because if some forces like poverty and absence of any choice in their life were not imposed on the people, they would not want to leave their place of birth and separate from kin groups and relatives (Mellese, 2005; Gebre, 2005). This is naturally true because in the absence of push factors no one wants to be separated from his place of origin, families and kin groups where he/ she lived to long period.

### 3.3. Food Insecurity in Ethiopia

According to Devereux (2000), food insecurity incorporates low food intake, variable access to food, and vulnerability in which a livelihood strategy that generates adequate food in good times but is not resilient against shocks. The same source also indicated that there are three forms of food insecurity which are endemic in Ethiopia such as chronic, cyclical and transitory food insecurity. Chronic food insecurity is caused by structural factors such as poverty, the fragile natural resource base, weak institutions (notably markets and land tenure) and unhelpful or inconsistent government policies. The main triggers of transitory food insecurity in Ethiopia are drought and war. Seasonality in crop production is a major cause of cyclical food insecurity. From these three types of food security pertinent to Ethiopia, this study operationalizes the cyclical/seasonal food security with assumption that households in resettlement areas may face food insecurity due to rain-fed crop production system.

Ethiopia is the world's most food aid dependent country. Although food aid is a standard response to transitory food insecurity like for drought and emergencies, in Ethiopia it has become an institutionalized response to chronic food insecurity. During the past decade, more than five million people on average have required food aid each year even during years of seemingly normal weather and market conditions. For instance, over the past fifteen years, an average of 700,000 metric tons of food aid per annum have been imported to meet food needs in Ethiopia (New Coalition for Food Security, 2003). Moreover, a weak belg harvest in Ethiopia caused a significant increase in the number of individuals that are in need of emergency food assistance from 4.9 million individuals at the beginning of 2009 to 6.2 million individuals at the end of the year. As the result, the Ethiopian government has procured 66,060 million tons of maize, pulses and vegetable oil directly and through World Food Program



(WFP) existing in Ethiopia and distributed to 1,000,000 people in the country over a six month period to reverse the problem (International Federation of Red Cross and Red Crescent Societies, 2009).

This is because of the lowest agricultural productivity in Ethiopia among others in the world i.e, around 1.2 tons per hectare because of the dependence on unreliable and low-productivity rain fed agriculture (World Bank, 1999). In this regard, the primary determinant of household food insecurity in Ethiopia were intended to be managed by enhancing access to agricultural inputs such as fertilizers, draught oxen with implicit assumption that household food security can be achieved by increasing food production on individual farms (MOFED, 2002). However, increase in food production highly related with farm land size and family members. Because it might be possible to make yields higher through agricultural intensification but the “average land holdings” would be insufficient to feed a family of 5 members even if production could be successfully increased three times with the use of improved technology (Masefield, 2001). Accordingly, in the same report it was proposed that the estimation for minimum land size required by a family of five in relatively low potential area must be at least greater than two and a half hectares.

The current government of Ethiopia has given due attention to tackle the problem of food insecurity in the country through various development strategies. Accordingly, the government has designed food security program with main objectives stated in its development document (PASDEP), issued by (MOFED, 2006: 93-94) as follows:

*The Food security program is designed to address problems of shortfalls in food production, vulnerability to falls in consumption and incomes and consequent hunger that the country has faced repeatedly, through adaptation of development alternatives to bring about lasting solution. The effort to reduce vulnerability is central to the five years plan strategy (2005/06- 2009/10): including measures to reduce the variability in crop production and overall food availability – through more irrigation and water control, diversification of crops, and better integration of markets, transport, and information links; maintenance of macroeconomic stability; expansion of off-farm employment and income-earning opportunities, and better functioning credit markets; provision of improved health services and nutrition; introduction of innovative measures, such as experiments with crop and weather-based insurance mechanisms.*

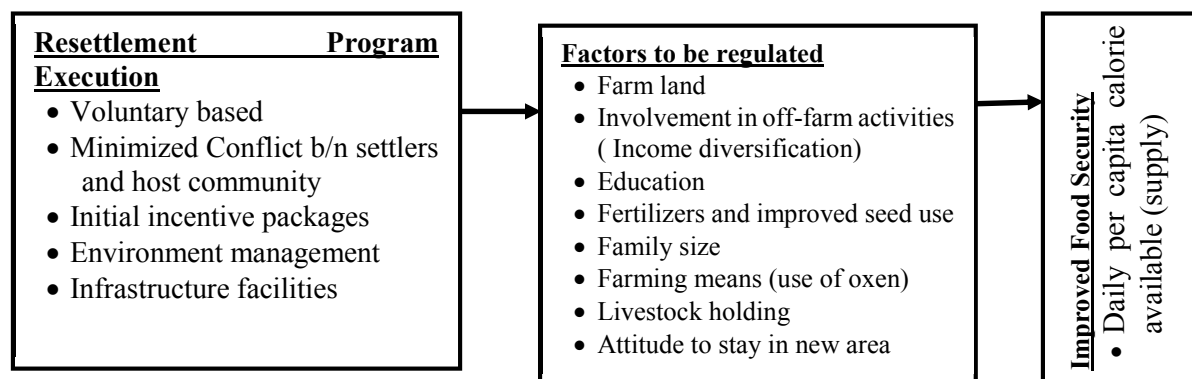
Moreover, the National Policy on Disaster Prevention and Management of 1992/93 in Ethiopia emphasized the need to give priority to disaster prevention programs in all development endeavors. The Federal Food Security Strategy (FDRE FSS, 1996 updated in 2002) rested on three pillars: increasing supply and availability of food, improving access and entitlement to food and strengthening emergency response capabilities. The New Coalition for Food and Livelihood Security in Ethiopia adopted in 2003 aimed at improving access to long-term food and livelihood security for chronically and seasonally food insecure citizens through its various food security programs. Among these programs, resettlement program is the one which has been launched by the Ethiopian government in 2002/2003 with the objective of mitigating food insecurity problem in the country by relocating people in fertile underutilized areas without depleting environment and assets at household level and creating assets at community level.

### **3.3.1. Determinants of Household Food Security Status**

Much of the literature on seasonal food insecurity analyzed factors that influence seasonal food insecurity of rural farm households using appropriate regression models. Fore instance, Wilma (2003) reported that the probability of a household being seasonally food insecure decreased, when the household has a vehicle, has many types of appliances, their toilet facility is water-sealed, has more bed rooms, the mother is employed and the educational attainment of the mother is high.

Ramakrishna and Demeke (2002) made an assessment on food insecurity situation in North Wello Zone of Ethiopia. Accordingly, cereal production, educational status of the household head, fertilizer use, household size, land size, and livestock rearing were found to be the most determining factors of household food security status. Along with food availability and entitlement factors, the study also suggested that attitudinal variables influence food insecurity. A study by Kidane *et al* (2005) reported the causes of household food insecurity in Koredegaga peasant association, of Oromia Zone. The study showed the determinants of households' food insecurity using a logistic regression procedure. As a result, farm land size, oxen ownership, fertilizer application, education level of household heads, family size, and per capita production were found to be significant predictors. The analysis of partial effects revealed that an introduction to fertilizer use and an improvement in the educational level of household head resulted in higher changes in the probably of food security. Simulations conducted on the basis of the reference category of farmers, representing food secure households, revealed that both educational levels of household heads and fertilizer applications by farmers have relatively high potential to more than double the number of food secure households (Kidane *et al*, 2005).

On the basis of the literature reviewed above, this study examines the most important factors that influence food security status of household head settlers in Essera District Resettlement scheme of Dawuro Zone in Southern nations National Peoples Region. In this regard, figure 3.1 clearly shows the conceptual framework for this study.



Source: Researcher's own construction  
 Figure 3.1: Conceptual Framework of the Study

#### 4. Results and Discussions

##### 4.1. Backgrounds of Respondents

Regarding the educational status of respondents, table 4.1 depicts that 42% of them are illiterate that constitute relatively majority of the respondents. None of the respondents in both categories have exceeded grade 12 in their educational status. This may indicate the absence of more qualified households' involvement in agricultural activities to easily adopt new systems of farming in order to increase productivity since those well educated will have better initiation to adopt new farming systems with which they can be easily familiarized. As it was reported during focus group discussions, those less educated mostly prepare to use the mechanisms of farming with which they were familiarized for the fear of difficulty to adopt the new systems. As a result, the productivity of such household heads might be limited to ensure food security unless they are able to use better ways of farming to increase their agricultural outputs from time to time.

**Table 4.1: Educational background and family size of respondents**

Attributes	Category	Settlers households	
		Frequency	%
Family size	1-4	21	15.2
	5-8	84	60.9
	9-12	32	23.2
	13-16	1	0.7
	Above 16	-	-
	Total	138	100
Educational status	Illiterate	58	42.0
	1-4	26	18.8
	5-8	44	31.9
	9-12	10	7.3
	11-12	-	-
	Above 12	-	-
Total	138	100	

Source: Household survey, 2012

As it can be seen from the table above, the family sizes of respondents are generally large in study area. Among respondents, 84.8% have five and above members. According to Masfield (2001), it might be difficult for household heads with five and above family members to cover their family consumption with current two hectare land holdings in study area in the absence of other off-farm activities from which they can generate additional income to fill the gaps.

##### 4.2. Information Exchange and Participation of Respondents

The current voluntary government sponsored intra-regional resettlement program document highlights the importance of information exchange with people in sending District and consultation with host community to enable participants to make their own choices regarding the program. In this regard, table 4.2 shows the extent to which information was shared with settler household heads prior to their movement in to new resettlement.

**Table 4.2: Respondents' perception on information exchange**

The information exchange about the resettlement program prior to its implementation.		Settler household	
		Frequency	%
Response	Yes	136	98.6
	No	2	1.4
	<b>Total</b>	<b>138</b>	<b>100</b>

*Source: Household survey, 2012*

Almost all respondents from resettlement areas have been involved in information sharing about the program. But 1.4% of the total respondents responded that they have not been informed about the program in which they were involved in the area. This may indicate that information sharing on resettlement program with participants is significant though some respondents have missed it. This opposes the study undertaken by Gebre (2005) which reported as the information provision to settlers on resettlement program is not complete, nominal and minimal in some other areas.

Regarding the conflict occurrence, table 4.3 indicates that majority or 98.6% of the total respondents have not faced any conflict with host community after they have been relocated in new resettlement area. But insignificant number of settlers (1.4%) reported as they faced conflict because of using host communities' grazing land.

**Table 4.3: Response of respondents to conflict occurrence**

Conflict faced by households after resettlement program in the area.		Settler household heads	
		Frequency	%
	Yes	2	1.4
	No	136	98.6
	<b>Total</b>	<b>138</b>	<b>100</b>

*Source: Household survey, 2012*

The representatives of settlers reported in focus group discussion that the current resettlement program is generally based on consensus of settlers. On whether they moved to the new area voluntarily, 99.3% of respondents said that they moved to the new area voluntarily while only 0.7% of total respondents reported that the movement as involuntarily. This shows that the movement of most settlers to the new area is mainly voluntarily based.

**Table 4.4: Respondents' response on nature of resettlement program, their interest to stay and convenience of new area**

Items	Settler Household heads		
	Frequency	%	
Voluntarily movement to the new area.	Yes	137	99.3
	No	1	0.7
	<b>Total</b>	<b>138</b>	<b>100</b>
Interest of returning back to the origin.	Yes	5	3.6
	No	133	96.4
	<b>Total</b>	<b>138</b>	<b>100</b>
Convenience of new area for living compared to origin.	High	134	97.1
	Medium	-	-
	Lower	4	2.9
	<b>Total</b>	<b>138</b>	<b>100</b>

*Source: Household survey, 2012*

Table 4.4 also shows that majority or 96.4% of the respondents do not want to return to their origin. Only 3.6% showed interest to return because of their cattle death by trypanosomiasis/livestock disease/ and inability to feed their families through crop production in the area. Concerning the convenience of new area compared to the area of origin, the majority of respondents reported that new area is convenient for living except few (2.9%) who indicated that the new area where they have been relocated is not convenient to them. The reason for those not satisfied with the new area is due to the absence of adequate social services like health facilities, safe potable water, market etc.

#### 4.3. Benefit Packages Received and Infrastructure/ Social Service Facilities

The voluntary resettlement program document states that settlers shall receive some benefit packages that will help them to start living in new areas. Accordingly, all settlers have received these benefit packages such as one oxen, agricultural hand tools, utensils, cloth, food ration until their first harvest period, agricultural lands, constructed shelter during their initial relocation period.

The proper establishment of infrastructure facilities and social services in new resettlement area can make the environment conducive for living and attract the attention of settlers to be stable in new areas. It will also increase the acceptance to the program by the host communities since they can share these facilities with settlers. The establishment of infrastructure facilities and social services such as health institutions, veterinary, potable drinking water, road, schools, etc will contribute positively in promoting the health of households, improving livestock production, creating market links, etc. As a result, households might attempt to wards food security in sustainable manner.

Among other social service institutions and infrastructure facilities, only health post services, primary schools (1-8), grain mill commonly exist in observed resettlement kebeles. Other infrastructure and social facilities like safe potable drinking water, veterinary services, road that can serve during all seasons, telephone services, etc have not yet been well established.

As it was ensured through direct observation, one of the primary schools which has been constructed by the government in one resettlement kebele (Boyina) is poor equipped with teaching materials and its construction work has not yet been finalized. The director of this primary school who is the participant of focus group discussion had this to say:

*Due to the absence of other options, the kids of settlers are learning in this school which has not been finalized in construction and poorly equipped with class room furniture and other teaching materials.*

*But students are learning in this dusty room which generates some insects that can hurt their feet.*

In addition, participants of focus group discussions from inter-zonal resettlement kebeles reported the problem related with safe potable drinking water. This is what one of them had to say.

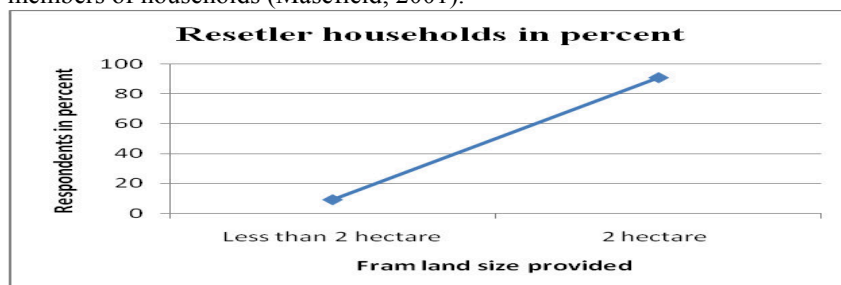
*Our spouses walk on foot about 4 hours distance of double trip to fetch drinking water from unprotected river because the water pump established at time of our relocation broken down after giving service for some time and no repairs have been undertaken yet.*

The current government has considered the importance of prior establishment of infrastructure and social services in resettlement areas and has prepared the implementation manual. This manual in principle states that the minimum social services and infrastructure facilities such as health post, school, safe potable water, road, rural credit services, agricultural extension services, etc. should be established before moving people to new areas (New Coalition for Food Security in Ethiopia, 2003).

However, the study indicates that the establishment of infrastructure and social services prior to the implementation of resettlement program is below the minimum standard and the services have not yet been improved in the area. This reveals that the implementation of resettlement program in the area is very spontaneous. The finding of this study concurs to other studies by Asfaw (2005); Mellese (2005); Masresha (2008) in which the establishment of infrastructure and social services are reported below the expectation of settlers and the program implementation has been argued spontaneous.

#### 4.4. Household Heads' Farm Land Size

The output of agriculture that can cover the consumption of family may be determined by farmland size and fertility of soil among others. The size of farm land holding affects the level of output that can sufficiently feed the entire family members of households (Masfield, 2001).



**Figure 4.1: Farm Land Size of Household Heads**

Figure 4.1 shows that majority of respondents 90.6% in resettlement areas have had 2 hectares<sup>1</sup> of farm land which is stated in program implementation manual. However, the remaining 9.4% in resettlement area have been given below 2 hectares of farm land. Those who have been given below 2 hectares of farmland could face challenges to sustain their family consumption from own-farm production compared with others. According to Masfield (2001), household heads with above five family members and that tends to increase from time to time may suffer to sustain food security with two or below two hectares of farm land. As shown in table 4.5, the size of farm land has also statistically significant effect on the level of agricultural output at 5 percent significance level. Thus, it could be difficult to sustain food security with agricultural output of only two or less hectares of farm land

<sup>1</sup> Hectare equals area of 10,000 square meter land



size for households whose family size tends to increase.

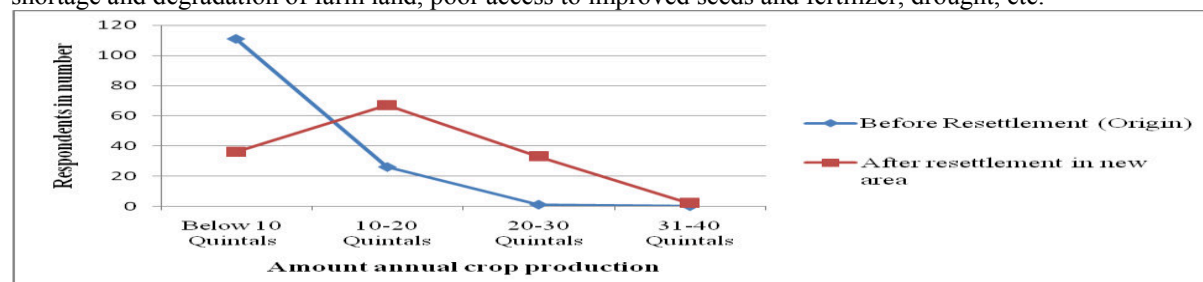
**Table 4.5: Summary of multiple regression results**

Model	Un standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	11.118	4.997		2.225	.028
Farm land fertility (1= better, 0= poor)	-7.533	1.642	-.420	-4.588	.000
Means of production ( 1= Oxen, 0= traditional hand tools)	6.550	4.921	.104	1.331	.185
Farm land size dummy1 (1= above 2 hectares, 0= others)	5.573	2.740	.219	2.034	.044
Farm land size dummy 2 (1= 2 hectares, 0=others)	5.856	1.978	.313	2.960	.004

a. Dependent Variable: Amount of crop production

#### 4.5. Crop Production before and after Resettlement Program

Figure 4.2 depicts that 111 (80.4%) and 26(18.8%) of the total respondents were producing below 10 quintals and 10-20 quintals annually in their origin prior to move to the new areas respectively. Only 1 (0.7%) was able to produce above 21-30 quintals annually prior to move to the new resettlement area. This may show that only few respondents were able to produce above 10 quintals in their origin prior to the implementation of resettlement program in the area. The factors contributed to the low agricultural outputs in origin of settlers are reported as shortage and degradation of farm land, poor access to improved seeds and fertilizer, drought, etc.



**Figure 4.2: The Amount of annual crop production before and after resettlement program**

As it can be also seen from the figure, after the implementation of resettlement program, majority or 102 (73.9%) of the respondents in new resettlement were able to produce above 10 quintals annually. This reveals that the program is helping household heads to increase crop production which is one of the core pillars of food security.

**Table 4.6: Non-parametric (Wilcoxon) test statistics on average difference of annual crop production before and after resettlement program**

Z	-7.104 <sup>a</sup>
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Table 4.6 depicts that the variation of average crop production after resettlement program is also statistically significant at 5 percent significance level compared with prior situation. Thus, it is possible to say that the availability of food crops, cash crops, fruits and vegetables relatively improved to household heads after the resettlement program has been implemented.

#### 4.6. Livestock Production

Livestock production is another factor that determines the availability of food to household heads. The production of livestock (cow, ox, sheep, goat and poultry in standard of Tropical Livestock Unit/TLU/ to household heads has shown appealing increment after resettlement program in study area (table 4.7).

**Table 4.7: Livestock rearing before and after resettlement program in TLU.**

Number of Livestock in TLU	Before resettlement	After resettlement
0.1-1.0	40	6
1.1-2.0	36	4
2.1-3.0	40	21
3.1-4.0	6	33
4.1-5.0	7	27
5.1-6.0	5	18
6.1-7.0	1	15
7.1-8.0	-	6
8.1-9.0	-	1
9.1-10.0	-	-
Above 10	3	7

Source: Survey, 2012

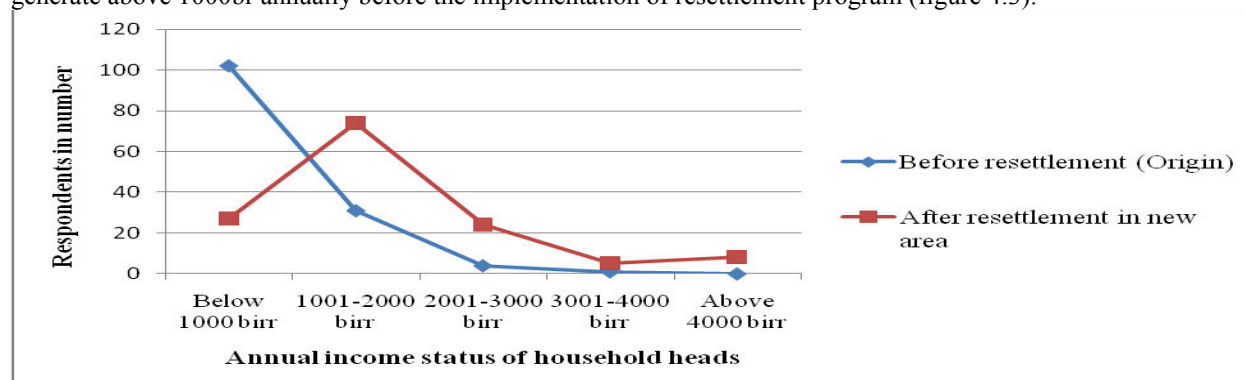
The t- test result on the average difference in livestock production in TLU has shown statistically significant increment at 5 percent significance level to all respondents in study area (table 4.8). This ensures the appealing state of food availability to household heads from livestock.

**Table 4.8: T-test on average difference of livestock before and after resettlement**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair Total number of cattle before resettlement in TLU - Total number of cattle after resettlement in TLU	-3.2891	5.5707	.4742	-4.2268	-2.3514	-6.936	137	.000

#### 4.7. Annual Income Status of Household Heads before and after Resettlement Program

Income is a main variable to examine the ability of household heads to food access- one of the pillars of food security. In this regard, the annual income level to majority respondents is below 1000br in origin prior to the implementation of resettlement program. In other words, only 36 (26.1%) of the total respondents were able to generate above 1000br annually before the implementation of resettlement program (figure 4.3).



**Figure 4.3: Household heads' annual income before and after resettlement program**

As it can be seen from figure 4.3, majority of the respondents or 111 (80.4%) were able to ward above 1000br level of annual income after the resettlement program in new areas. Only 27 (19.6%) of the respondents indicated that their annual income is below 1000br. The reasons for the low income status of respondents in resettlement areas are mainly reported as the lateness in their relocation and the demolition of their crop production by wild animals and insects. In general, the study reveals that the annual income level to most respondents in resettlement areas has risen after resettlement program compared with prior to resettlement program implementation. The statistical test at 5 percent significance level as indicated in table 4.9 also shows that the variation in average annual income of households after resettlement program compared with prior situation is statistically significant.

**Table 4.9: Non-parametric test ( Wilcoxon) Test Statistics on average difference on annual income of household heads before and after resettlement**

Z	-7.281 <sup>a</sup>
Asymp. Sig. (2-tailed)	.000

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

As a result, household heads might have better access to food since the improvement in access to food is associated with improvement in income level of households (FAO, 2008). However, the sustainable increment in households' income level is suspicious because of its reliance mainly on farming activities which are highly vulnerable to different forms of shocks.

#### 4.8. Environmental Management and Rehabilitation

Concerning the sources of fuel, all respondents are entirely using forest wood as the source of fuel in their home (table 4.10). The study shows that those in resettlement areas do not have experiences of using other alternatives such as crop residue and animal dung as a source of fuel at home. This study also shows that the entire respondents are using trees from forest for their shelter and other constructions which will increase their reliance on forest. In general, the study shows that the attention given to the management of forest depletion is low in the area while implementing the resettlement program.

**Table 4.10: Household Heads' Reaction to Their Dependence on Forest**

Items	Settlers	
	Fr	%
Source of fuel to household heads at home.		
Forest wood	138	100
Animal dung	-	-
Crop residual	-	-
Forest wood& kerosene	-	-
<b>Total</b>	<b>138</b>	<b>100</b>
Source to get construction materials.		
Forest	138	100
Trees planted on own land	-	-
Forest & trees from own land	-	-
Others <sup>1</sup>	-	-
<b>Total</b>	<b>138</b>	<b>100</b>

*Source: Household survey, 2012*

The resettlement document of current government stated that due attention would be given to the natural resource management during implementation of the resettlement program, but the care given to the management of natural resources in the study area is poor which concurs with the study by Assefa (2005) in different resettlement sites in Ethiopia, reported as forest and wild life resources were not protected as what has been set out in the resettlement program manual.

In addition, the current practices of sample household heads oppose the Environmental policy designed at national level with the following goals:

*To improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs (Environmental Protection Authority/EPA/ and Ministry of Economic Development and Coordination/MOEDC/, 1997).*

Consequently, if the reliance of household heads on forest and management practices continue in this way, it might be possible to argue that the environment gradually led to degradation and affects the fertility of lands and agricultural productivity to household heads which can expose them to chronic food security as what happened in their origin.

#### 4.9. Food Security Situation of Household Heads

The average amount of calorie intake per day is mostly used as a measure of calories required (i.e., demand) to enable an adult to live a healthy and moderately active life. Then in this study, a comparison between the available (supply) and required (demand) for grain food was made to distinguish food secured and in secured households in

<sup>1</sup> Others include buying trees for construction of shelter from other individuals in the area

the study area.

The response variable (Food security status of households) was determined first by converting net grain available (supply) for each household in quintal into equivalent total calorie using conversion factors used for Ethiopia (Agren, 1968). Though calorie intake per day varies from person to person depending up on several factors like age, body composition and level of physical activity on daily basis, according to FAO (2008), the general recommendation for men is about 2700 calories per day while women require 2000 calories per day. But FAO in general recommends 2200 calorie per day for healthy life of human beings. By taking this level of calorie intake per day as a threshold, comparison between calories available and calories demanded by a household was used to determine the food security status of a household heads. A household head whose daily per capita caloric available (supply) is less than his/her daily requirement (demand) was regarded as food insecure, and coded as 1, while a household head who did not experience a calorie deficit during the year under study was regarded as food secured and was assigned a code of 0. In view of this, the dependent variable (food security status of the household head/HFS/ was measured as a dichotomous variable:

$$HFS_i = \{0: Y_i \geq R \text{ (Food secure)}; 1: Y_i < R \text{ (Food insecure)}\}$$

Where  $Y_i$  daily per capita calorie available (supply);  $R$  is the minimum recommended threshold of calories per person per day, which is 2,200 calorie (demand) and  $HFS_i$  food security status of the  $i^{th}$  household,  $i = 1, 2, 3, \dots, 138$ .

From the household heads surveyed, 14.5% are those whose daily per capita caloric available (supply) is less than their demand/requirement of daily calorie (table 4.11).

**Table 4. 11: Food Security Status of Household Heads**

Food security status	Frequency	Percent
Food secured ( Caloric availability $\geq 2200$ )	118	85.5
Food In secured (Caloric availability $< 2200$ )	20	14.5
Total	138	100

Source: Survey, 2012

As indicated in the table above, though majority of households are ensured their food security, status, there are some who are still food in secured in the area where they have been relocated. Thus, this study attempted to examine the potential determinants of food security status of household heads with use of *logistic regression* and found the following summary of result. The livestock in TLU and fertilizer use are statistically significant factors to affect the food security status of household heads in area. When others factors are constant, having one more livestock in TLU will have 1.27 times more possibilities to be food secure. Besides, by taking all other factors fixed, the household who uses fertilizer will have 4.269 more possibilities to be food secure than those who do not use it. Though they are not statistically significant, education, involvement in at least one off-farm activity has positive effect on food security status of household heads. One more year of education will give 1.015 more possibilities for household heads to be food secure, when other factors are fixed. A household who involves in at least one off-farm activity will have 11.843 more possibilities to be food secured than others who do not involve with unchanged other factors. Interest of household to return to his/her origin by leaving the new area has a negative effect on his/ her food security status though it is not statistically significant.

**Table 4. 12: Summary of Logistic Regression Result**

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a) Education	.015	.082	.034	1	.854	1.015
Livestock in TLU	.239	.150	2.557	1	.045	1.270
Involvement in off-farm activities	19.143	13574.098	.000	1	.999	11.843
Fertilizer use(1)	1.451	.617	5.530	1	.019	4.269
Interest to leave new area (1)	-1.794	1.091	2.705	1	.100	.166
Constant	.179	.791	.051	1	.821	1.196

A Variable(s) entered on step 1: Education, Total livestock, involvement in off-farm activity, fertilizer use, interest to leave new area.

## 5. Conclusion

Resettlement program is a development project that the Ethiopian government has launched to overcome the problem of chronic food insecurity in the country. On top of this, the program has been implemented in Essera district of Dawuro Zone in SNNPR. The study shows that the resettlement program has been implemented on voluntarily basis after consultation has been carried out with resettlers and host community. This might be the reason that reduced the degree of social conflict occurrence between settlers and host community in the area.

It was also found that all settlers were received the initial benefit packages until their first year harvesting. However, different physical infrastructure and social service facilities have not yet been improved due to its spontaneous implementation. Settlers in new resettlement areas are also dependent on forest for fuel source use,

construction, etc due to absence of other alternative options in the area.

It was also found that after the resettlement program has been executed, crop production, livestock rearing, annual income status which contribute to the food availability and access have shown improvement to household heads in resettlement areas. However, some household heads are still food insecure since their caloric availability (supply) is below their daily requirement (demand) of calorie. Concerning the determinants of the food security status of household heads, the study reveals that the number of livestock and use of fertilizers are statistically significant factors to affect the food security status of household heads. Though statistically not significant, household head's educational status and his/her involvement in at least one off-farm activity will have positive effect on food security status of households. Household heads that need to go back to their origin by leaving the new area have negative effect on their food security status than those who did not need.

## 7. Recommendations

For enhancing the mitigation of problems identified in this study, the following points are forwarded as strategies to be employed:

- Prior to the actual relocation of people, the federal, regional and local government bodies should attempt in advance to establish the minimum standards of basic infrastructure and social services indicated in the program document.
- It is very important to encourage settlers to diversify their crop production, vegetation, and fruit plantation. In addition, the area of is suitable for enset plantation that has high resistance to drought and can help household heads to cope the adverse deficit in crop production. Therefore, settlers should be significantly advised by local government bodies to plant enset intensively in their garden.
- All household heads should be encouraged to use fertilizers in order to increase their agricultural productivity to ensure food security in the area.
- Livestock breeding, the veterinary services, animal forage, etc should improve to household heads to increase the number of livestock which significantly determines their food security status.
- The local government bodies should periodically train and advise household heads to involve in different off-farm activities that can diversify their income generation sources.
- It is very important to train household heads in resettlement areas to plant new trees around their farm lands that can be used for construction as well as fuel sources and to use crop residues and animal dung to reduce their reliance on forest. In addition, they should be trained by the agricultural professionals to plant trees used for animal forage to reduce the dependence of cattle on grazing land.

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