Global Journal of human-social science: H
Interdisciplinary
Volume 16 Issue 2 Version 1.0 Year 2016
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-460X & Print ISSN: 0975-587X

Household Food Security Situation in Central Oromia, Ethiopia: A Case Study from Becho Wereda in Southwest Shewa Zone

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GJHSS-H Classification: *FOR Code: 920406*

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I. Introduction

Food Security is one of the urgent and emerging development challenges of the 21st century (Jonathan, 2010). Since its first articulation in official discourse in 1974, it has become the primary cognitive lens through which the prevalence and complexity of global hunger are viewed (Rupert, 2009). Today, after about four decades of its recognition as a basic mankind scourge, food insecurity problem has still remained a growing issue of global discourse, national policy as well as public concern and the problem seems more pressing in sub-Saharan Africa (Sara 2011; Mesay 2011). As understood from FAO annual reports (2014), though world hunger has generally showed significant improvements, sub Saharan Africa has still remained with sizable food gap.

As of IFPRI (2002) and Degefa (2002 and 2005) explanations, the reasons why sub-Saharan Africa has failed to feed its population have mostly associated with both natural and man-made factors such as climate shocks, recurrent drought, prevalence of epidemic diseases, resource degradation, conflict, bad governance, inefficient policies, deep-rooted poverty and poor access to modern agricultural technologies. Similarly, as indicated in Devereux (2000) and Mesay (2011), the food insecurity problems of this region (emphasizing Ethiopian case) are the resultant effects of the interplay between natural and human factors that encompass recurrent drought, fragmented and unevenly distributed land holding system, population pressure which further exacerbated the fragile natural resource bases, poor soil fertility coupled with limited application of agricultural production enhancing inputs, inappropriate storage facilities, and limited off-farm employment opportunities.

As a part and parcel of sub-Saharan region emblematic to this problem is Ethiopia in which a sizable portion of the population is categorized as food insecure (Zerihun and Getachew, 2013). As of Degefa (2005), since food security is a multi-faceted phenomenon, it can be better understood by exploring the situations at community and household levels especially in countries like Ethiopia which is much diversified in its physical environment and socioeconomic characteristics of the people.

Despite the fact that achieving food security in its totality continues to be a challenge for Ethiopia, multifaceted efforts are taking place among which boosting up smallholder agricultural production has been taken as a strategic tool to improve food security status of the country. The efforts are also found optimistic at macro levels of the country both in terms of agricultural production and food security. As of Global Food Security Index report (2013), for instance, among the developing countries that made the greatest progress in food security achievement Ethiopia showed the biggest increases. While the country is once again back to the international attention in the same year (2015) for drought-induced food crisis, FAO et al (2015)

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report has also put Ethiopia in the short list of sub Sahara African countries who have significantly reduced the number of hungry people. However, improvements at national and regional levels are neither necessarily true reflection of the existing situations at micro levels nor are still there sufficient empirical researches from which a clear picture of different pocket areas of the country could be drawn for the effective food security policy formulation, planning and interventions.

II. Problem Statement and Objectives

Unless it is a matter of variation in its severity, many developing countries experience food insecurity for different environmental, socio-economic and many other reasons. On the other hand, since food security is a multi-faceted phenomenon, it can be better understood by exploring the situations at community and household levels especially in countries like Ethiopia, which is much diversified in its physical environment and socioeconomic characteristics of the people which in turn directly results in the variation in vulnerability to food shortage (Degefa, 2002; 2005). However, though a number of research findings are produced on different aspects of Ethiopian food security issues, there is still a paucity of information on how food security situation looks like in different pocket areas in the country at grass root levels. This study is thus an attempt to fill the existing gap in this regard and thereby add a brick to the food insecurity reduction endeavor.

Being one of the agriculturally potential Weredas in Central Oromia, there existed a long held perception that Becho Wereda is a surplus food producer pocket area in the region. As a result, the people over there are also perceived as highly better off segment of the society in light of food security policy formulation, planning and interventions from the government side. However, no empirical study has so far tried to look into the reality of this long held perception. On the other hand, there exist certain households severely and chronically suffering from food shortage due to such a groundless long held perception that made the area invisible to food security policy makers, planners and intervention themes. Therefore, the central intention of this study was to empirically look into the reality of this perception in a way that helps the government re-focus the area and make an evidence-based and informed decision on food security planning and intervention in the area. To this end, the study has tried to answer the following leading questions:

- Is Becho really as better off in food security status as perceived over years?
- What food security constraining factors are there in the area?
- What are the major coping strategies used in times of food shortage?

III. Literature Review and Theoretical Framework

a) *Concepts and Definitions of Food Security*

Famine and malnutrition has been a mankind scourge for a long time. However, the concept of food security became a prominent issue on the development debate in 1970s. Since then, its definition has considerably evolved over time and its concern has also rarely been out of scene (Devereux and Maxwell, 2001).

Though food security is conventionally defined as, "access by all people at all times to enough food for an active and healthy life" (World Bank, 1986), the comprehensively accepted version of definition is the one formulated in the First World Food Summit. It is defined as the situation when all people at all times have physical, economic and social access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO,1996).

The definition is still evolving and thus the contextual definition for this study is drawn from Getachew (1995) and Degefa (2002) which defines food security as the ability to establish access to production resources such as land, livestock, agricultural inputs and family labor combined to produce food or cash. This definition in other word states that food security analysis at the household level is determined by a household's own production and members' ability to purchase food of the right quality. It best defines food security in the context of subsistence farmers which this study particularly deals with.

b) *Food Security Situation in Ethiopia*

As noted in Webb and von Braun, (1994) and Degefa, (2005), Ethiopia is listed among those countries in Sub-Saharan Africa with the most perilous long term food situations. Various historical records have also revealed that Ethiopia has faced some 45 severe famine catastrophes with a series of rain failures and substantial livestock loss. As stated in Dessalegn (1991), the history of Ethiopia is highly linked with severe recurring food shortages and famine. Failure in agricultural productivity and the resultant humanitarian crises of 1958, 1973, 1984-86 and 2002 (Degefa, 2006), for instance, are among most grievous recent cases in point though Ethiopia has a long history of famine. Also as of Mesay (2011), the food security situation in Ethiopia is not better than the general picture of the region; rather the appalling environmental and climatic conditions in Ethiopia in conjunction with the consequential failure in agricultural productivity have been afflicting millions of Ethiopians over years. For the last three and half decades (1974-2012), on average about 4.72 million people has been suffering from food shortage crises per annum.

c) Causes of Food Insecurity in Ethiopia

The causes of Ethiopian food insecurity are multifaceted and complex in their nature. As noted in FDRE (2002), for instance, adverse climate changes combined with high population pressure, environmental degradation, technological and institutional factors have led to a decline in the size of per capita landholding causing a severe food insecurity problem in the country. Furthermore, Degefa (2002) and Hussein (2006) have also indicated that though the causes of household food insecurity vary from household to household, the major causes of food insecurity in Ethiopia are closely related to environmental, demographic, economic, social, infrastructural and political factors. In sum, the nature of the main causes of Ethiopian food insecurity directly or indirectly laid their root in environmental, demographic, economic, social, technological, infrastructural, and/or political aspects of the country. On top of that, it is important to consider that as Ethiopia is heavily an agrarian country, whatever challenges its production directly manifests itself through food insecurity situation of the country.

d) Coping Strategies in Times of Food Shortage

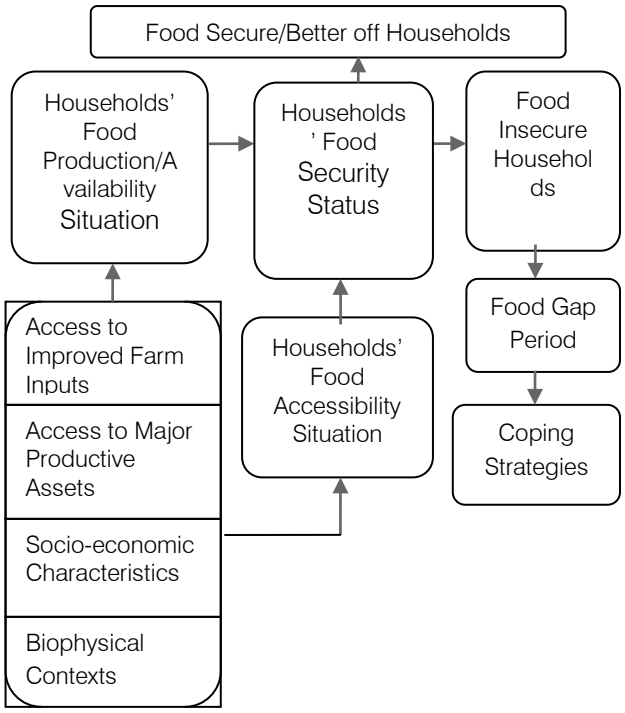
As there are seasons of plenty, there are also seasons of food shortage. However, rural households in Ethiopia are not passive victims of food shortfalls; they have inherited various behavioral and material responses to balance and maintain their food requirements that help them cope up with the adverse situation of food shortage period (Yared, 1999; Debebe, 1995; Davies and Maxwell, 1996; Degefa, 2005; Ejiga, 2006 and Tagel, 2008). These include, among the others, sale of livestock and fire woods, agricultural tools rental, alteration of consumption patterns, reduction of food portion, cash for work, gifts and/or borrowing cash and/or grain from well-off relatives and/or neighbors, sale off or mortgaging land, collection of wild foods, relief assistance and spontaneous migration.

e) Theoretical Underpinning

There are many theoretical orientations for food security situation analysis which have progressively developed and expanded overtime (Debebe, 1995). Accordingly, Hussein (2006) also revealed that it is impossible to employ a single theory to best analyze the whole aspect of food security as each and every theory has its own weakness in light of multi-disciplinary nature of food security. With this view in mind, the study employed the two most commonly used theoretical approaches, in context of as subsistent farm households as in case of this study, in such a way that they could support each other to reflect a reliable food security picture of the study households.

The first approach is the 'General Explanation'. In this regard, a number of environmental and socio-economic attributes are concerned. The principal ones include: ecological degradation, climatic elements, government mismanagement, and unequal access to resources, unequal exchange, socio-economic factors, and political unrests. The argument here is that one or a combination of these can disrupt food production. The second approach is through food security models of which only Food Availability Decline (FAD) and Food Entitlement Decline (FED) models are considered. As of Devereux (1988), the central argument of FAD model is that anything which disrupts food production can cause food insecurity. The model basically demonstrates a situation of subsistence farmers, like those this study has concerned with. However, since the model is criticized for overemphasizing food supply and undermining the demand for available food, FED model is pioneered by Amartya Sen (1981) as an alternative method for food insecurity analysis which suggests that food availability in the economy does not necessarily entitle a person to consume it, and famine can occur without aggregate food availability decline. This means access to food plays a crucial role in securing command over food which is, in turn, determined by production among the other factors.

Therefore, this study is generally framed by the complimentary point of the above approaches. However, since the study area is basically considered to have a surplus food situation for its aggregate production while there exist socio-economic variations across the households to command over the available food, FED model is more stressed than FAD. As framed in Figure 1, a number of interlocked biophysical and socio-economic factors determine households' food availability and accessibility depending on which households finally end up either as food secure or food insecure. As households are rarely passive victims of food shortage, those who have ended up with food gap finally respond in any possible coping strategies.



Source: Authors' Own Construction

Figure 1 : Conceptual Framework of the Study

f) The Study Area

Astronomically, *Becho Wereda* is located between 8031'N-8045'N and 3807.5'E-38024.5'E in Central Oromia. It shares borders with *Ilu* in East, *Weliso* in West, Dawo in North, *Seden Soddo* and *Tole Weredas* in South (Figure 2). *Becho wereda* has estimated total area of about 446.8 km^2 or 44,680 hectares (ha) of which about 29,928 ha is cultivated land and 1,731ha is grazing land, among the others. The *wereda* is mainly characterized by slightly flat landscape and the dominant soil type is vertisol. The *wereda's* altitude ranges between 2100 and 2600m a.s.l. With insignificant pockets of *dega* (3%), nearly all areas of the *wereda* fall under *woina-dega* (97%) agro-climatic condition. Becho receives an annual rainfall 900-1100mm and temperature ranging between 12 and 26°c.

According to CSA (2011), *Becho wereda* has a total population of about 86,263 of which about 43,674 are males while the remaining 42,589 are females. The *Wereda* has 19 rural *kebeles* and mixed farming system is the main livelihood strategy in the area. The major crops grown in the *wereda* are tef, chickpea, wheat, lentil, barley and field pea, in order of their importance. Livestock (cattle, sheep, goats, donkey, horses, poultry, etc) rearing is also another livelihood activity in mix with crop production in which households are engaged as a source of food, cash income and draught power.

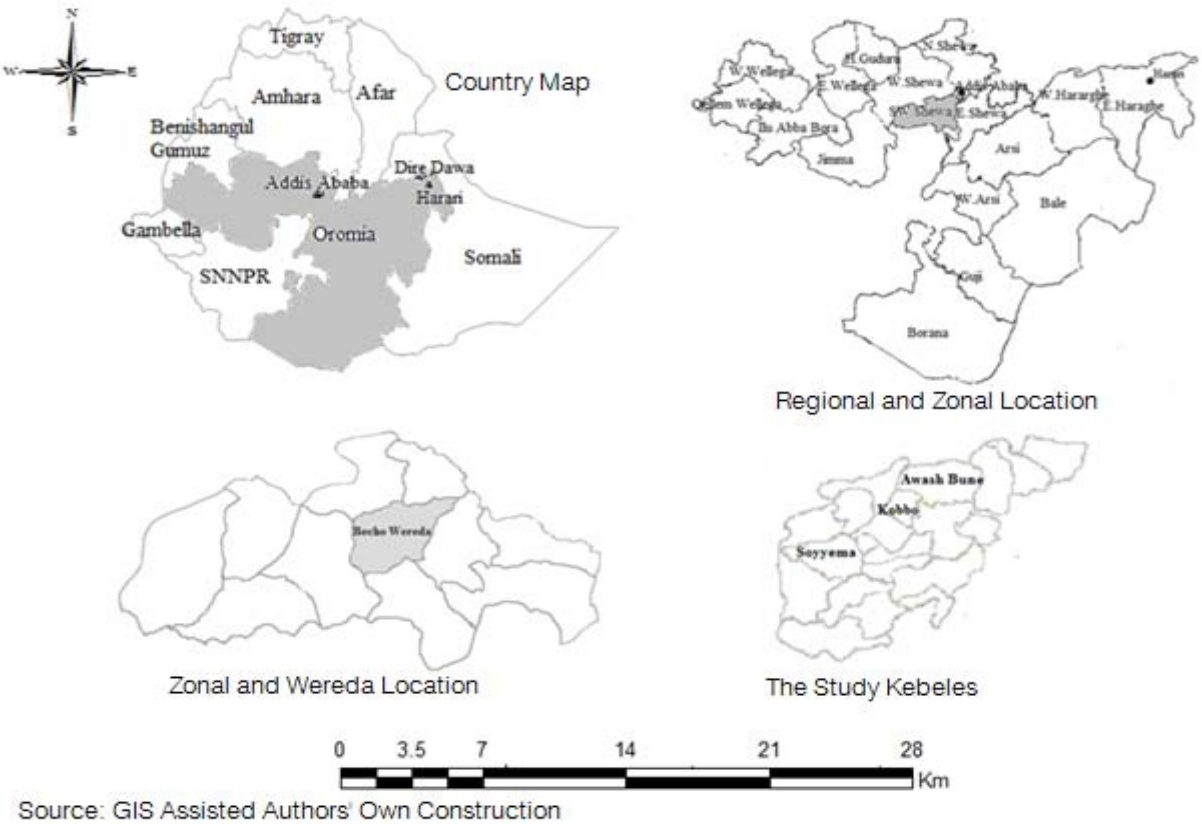


Figure 2 : Location of the Study Area in Central Oromia, Ethiopia

IV. Methodology

a) Method of Data Collection

The study employed mixed research approach blending some methods from qualitative and quantitative. As indicated in Figure 2, three rural *Kebeles*: *Awash Bune, Kobbo* and *Soyyema* were purposively selected from which a total of 145 household heads were statistically sampled. In light of the complex nature of analysis of household food security issues, no single method of data generating can satisfy the need for sufficient information on various aspects of the study in question to come up with a reliable finding. Therefore, different data generating tools were employed to generate adequate and reliable first hand data. These tools include: Household Survey Questionnaire, Focus Group Discussion, Key Informant Interview, Individual Case Studies and Field Observations. Three Focus Group Discussions were held, one in every study *Kebeles*. The groups consisted of seven members on average and involved both men and women. A total of nine Key Informant Interviews were conducted with Development Agents, Model Farmers, Elderly, Wereda and Kebele Administrators. Three Individual Case studies were conducted; two in Awash Bune and one in kobbo Kebele. Field Observations were also conducted both before and during the survey giving attention to the overall livelihood situation of the study households.

b) Method of Data Analysis

The net available food for the households was computed using a Mathematical Equation known as Household Food Balance Model, which is originally adapted by Degefa (1996) from FAO Regional Food Balance Model and thenceforth used by different researchers in this field to calculate the per capita food available. The conversion of the net available food into dietary calorie equivalent was based on Ethiopian Health and Nutrition Research Institute's food composition table. The calculated per capita calorie was finally compared against the recommended minimum daily caloric requirement for a moderately active adult (2100 kcal) to look into the dietary caloric status of the households in the area.

Household Food Balance Model:

$$NGA = (GP + GB + FA + GG) - (HL + GU + GS + GV)$$, Where,

NGA: Net grain available/year/household

GP: Total grain produced/year/household

GB: Total grain bought/year/household

FA: Quantity of food aid obtained/year/household

GG: Total grain obtained through gift/year/household

HL: Post harvest losses/year

GU: Quantity of grain reserved for seed/year/ household

GS: Amount of grain sold/year/household

GV: Grain given to others within a year

The study employed both quantitative and qualitative data analysis methods. Majority of the data were analyzed mainly using descriptive statistical techniques like frequency, mean and percentage by the use of statistical software known as Statistical Package for Social Scientists. The qualitative data analysis approach included paraphrasing and case narrations in substantiation of the quantitative findings.

V. Results and Discussions

a) Households Access To Key Productive Assets

i. *Households Landholding Status*

The size of land holding is strongly linked to a farm household food security status. A household with enough cultivable land most likely yields more produce. Moreover, this can indicate the degree of the household dependability on its land as a main source of livelihood in general and determining its food security status in particular. As shown in Table 1, the land holding size considerably varies among the investigated households. Of the total respondents, 2.76% were found to be landless at all, whereas households with less than 1 hectare of holding size make up 22.76%. The holding size of the majority of the respondent households (31.72%) concentrates within the holding range of 1 to 2 hectares of land whereas those respondents with holding size of 2.1 to 3, 3.1 to 4 and greater than 4 hectares make up 25.52%, 10.34% and 6.90% respectively. The maximum land size held among the respondents is 12 hectares and the mean of overall land held among the study households is 2.15 hectare with 1.56 hectare of standard deviation (Table 1).

Table 1 : Landholding distribution of the study households in hectares

Landholding categories	No of households	Percent of households
Landless	4	2.76
<1	33	22.76
1 - 2	46	31.72
2.1 - 3	37	25.52
3.1 - 4	15	10.34
> 4	10	6.90
Total	145	100

Min	Max	Range	Mean	Std
0.25	12	11.75	2.15	1.56

Different studies indicated that farmland size positively affects the food security status of households. This is because food production can increase extensively through expansion of areas under cultivation. Therefore, under subsistence agriculture, landholding size plays significant role in

influencing farm households' food security. The sample households plough fragmented plots with different sizes. As indicated in Table 2, the highest average farm land holding among the study *kebeles* was observed in *Kobbo* (2.6 hectare) followed by Awash Bune (2.1 hectare) whereas the lowest average holding size was observed in *Soyyema* (1.85). Except in *Kobbo*, the number of landless households was observed both in *Awash Bune* and *Soyyema* with equal percentage of 1.38% separately.

Table 2 : Summary of farm land holding status of sample households by their kebeles

List of Study *Kebeles*	Minimum farmland held in hectare	Maximum farmland held in hectare	Average farmland held in hectare
Awash Bune	0.25	12	2.1
Kobbo	1	6.5	2.6
Soyyema	0.25	5	1.85
Overall average farm land holding status of all study *kebeles*			2.15

Source: Field Survey

Related to this, various studies have also witnessed that it is not only the size of farm land held that affects farm households' food production status, but also the fragmentation of the farm land into different plots located at different places. The very logic behind this is that the more a farmer's farm land is fragmented into different plots of distant locations, the less will be the farmer's effectiveness in farm activities. This is because the farmers' time and energy are wasted fruitlessly during their travel between different plots of farms. With this view, it was also attempted to see the number of plots held among the study households. As depicted in Table 3, the overall average number of plots holding among the whole study households was found to be 4 whereas the average number of plots holding in *Awash Bune* and *Soyyema* was found to be higher, 7 and 5 respectively, compared to their counterpart *kebele, Kobbo*. This could be presumably an indication for either the relatively higher land shortage problem or higher difference in holding size in the two *kebeles*, *Awash Bune* and *Soyyema*, though the reality of this informed guess could be another research question.

Table 3 : Number of plots holding status by study kebeles

List of Study *Kebeles*	Minimum number of plots held	Maximum number of plots held	Average number of plots
Awash Bune	1	15	7
Kobbo	2	6	3
Soyyema	1	12	5
Overall average number of plots held among the study households			4

Source, Field Survey

With regard to the diminished and fragmented plots holding problem, it is substantiated with an individual case study from *Awash Bune Kebele* (Box 1).

Box 1 : A case study on a challenging aspect of fragmented farms to different places

Obbo Robale is a 35 years old farmer living in Awash Bune Kebele. He is a father of four children. He is one of the young hardworking model farmers in the kebele. Before he married, he was a dependent on his parent, but after he married, he had to have his own life and for that he strongly considers land as the number one important resource. However, there was no way for him to be formally tenured land from government as there is no un-occupied land among his community. Therefore, though he shared a very insignificant size from his parent in the form of gift, the main way he could manage to access land is through renting and share cropping. However, the big problem on top of that is the fragmented number of plots he needed to plough from here and there. *"For me," says Obbo Robale, "having fragmented land is not as such a less problem when compared to the problem of land shortage. For instance, I did have about seven plots of farm land in the last cropping year located here and there at different distances from my home. Some of the plots take long time to be reached. I used to reach them too late and the worst is that as most of the time I need to carry my farm equipments over long distance, I get tired of by the time I reach my farm and I am not as such effective to plough the land whole the day as my energy is wasted on the way to farm land from my home. On top of that, I also need to leave the farm a bit earlier to reach my home safely. In short, as a model farmer you can imagine how more productive I would be had my productive time and energy not been wasted on travel between plots of farms carrying heavy farm equipments."*

b) Households Land Need

As it is obviously known, land is the very fundamental productive asset on which rural farm households depend for their sustainable livelihood. However, due to the population growth rural farm households' landholding size is getting seriously

diminished from time to time. This has become one of the limiting factors of agricultural production in the first place and food security as a consequence among many rural households where food is mainly accessed on production basis. In that view, the study households were asked whether the land they held is enough to satisfy their families' need with special focus on food production. Accordingly, from the overall sample households, as it is indicated in Table 4, only 33.10% of them responded to have sufficient landholding size so as to sufficiently meet their families' food and other needs whereas the larger remaining sample households making up 66.90% responded to have insufficient land in order to sufficiently meet their families' food and other needs.

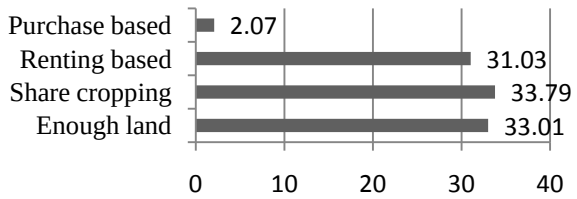
Table 4 : Land need situation of the investigated households

List of	Sufficient		Insufficient		Total	
kebeles	No	%	No	%	No	%
Awash Bune	21	14.48	63	43.45	84	57.93
Kobbo	11	7.57	10	6.90	21	14.48
Soyyema	6	4.14	34	23.45	40	27.59
Total	38	26.21	107	73.8	145	100

Source: Field Survey

c) Households Means of Access to Land

As far as means of access to land among the study households is concerned, 33.10% of the investigated households accessed land on formal land tenure system that is sufficient enough to satisfy their land need whereas the remaining 66.90% of the study households who had insufficient land under the formal land tenure system responded to have accessed additional land through different ways so as to satisfy their land need. These include, share cropping, land renting and illegal purchasing which make up 33.79%, 31.03% and 2.07% respectively (Fig.3).



Source: Field Survey

Figure 3 : Distribution of means of accessing land among the investigated households

Compared to the other two strategies of accessing land among the households with insufficient holding size, accessing land on purchase basis (though illegal according to the country's existing land policy) covered very insignificant proportion. This could be linked to the concept that land is the very key productive asset that determines the sustainability of rural farm households' livelihood. Therefore, almost all farm households do not tend to sell out even a very small portion of their land except in very rare cases as it could have long term negative implication and/ or even can cause a total disruption to their livelihood.

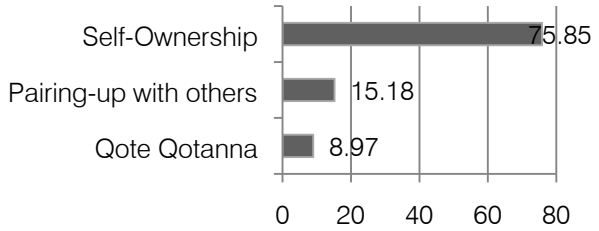
d) Households Oxen Ownership Status

The empirical reviews show that livestock production is an integral part of mixed farming systems. Livestock are sources of traction power, manure, and cash income. Animal traction has been in use for centuries in the Ethiopian agriculture and it still prevails in the country. A pair of oxen draws the traditional Ethiopian plough by which most commonly the livelihood of the majority of rural farm households in the country is led. But not all farm households own a pair of oxen. Accordingly, the investigated households were asked their oxen ownership status. As depicted in Table 5, out of the total of 145 households sampled, 13 households (8.97%) have responded not to have even a single ox while 22 (15.18%) of them had only single ox each. The majority of the study households, 71 (48.97%), had a pair of oxen whereas the number of households owning more than a pair of oxen was 39, (26.9%). No household with either no or single ox was found in *Kobbo* whereas the number of households with no ox was higher in *Awash Bune* (10) while only three households with no ox were found in *Soyyema*. The highest number of households with a pair of oxen and more was observed in *Awash Bune* followed by *Soyyema*.

Table 5 : Oxen ownership status of the sample households by their respective kebeles

List of *Kebeles*	Households with no ox		Households with a single ox		Households with a pair of oxen		Households with more than a pair of oxen	
	No	%	No	%	No	%	No	%
Awash Bune	10	6.90	12	8.28	38	26.21	24	16.55
Kobbo	-	-	-	-	13	8.97	8	5.52
Soyyema	3	2.07	10	6.90	20	13.79	7	4.83
Total	13	8.97	22	15.18	71	48.97	39	26.9

Source: Field Survey



Source: Field Survey

Figure 4 : Households' means of accessing oxen with respective percentage

As depicted in Figure 4, majority of the study households (75.85%) were found to have access to oxen fully from their own ownership while households who have no oxen (8.97%) get access to them in exchange for their labor through a traditional arrangement locally known as *Qote Qotanna*. Male farmers who have no draught animals provide labor for three days to those farmers who own a pair of oxen or more, but lack a fitting labor force that can plough land for them, and in exchange they get access to use the pair of oxen to plough their own land for the other two days, i.e., three man-days of labor exchanged for two-oxen days. Farmers with only a single ox would pair it up with other farmers (15.18%) who similarly own a single ox and each of them use the pair of oxen for an equal number of days to plough their own land by themselves. Pairing up oxen could also take place between farmers with single ox and those with un-paired extra single ox, the one having three oxen for instance.

A case study from Awash Bune Kebele substantiated the arrangement as follows:

> *"For farm household, having no ox is not less challenging than not having the farm land itself," the case man begins with. "I am a head of five individuals under my roof. I have about a hectare of farm land scattered here and there. My land holding size is not accommodating enough for my family, nor do I have even a single ox of my own to plough it. As a result, instead of renting out my land every year, I manage to get access to oxen through a Qote Qotanna arrangement with my neighbors who need labor force at the expense of their oxen's service. I work on their farm for three days so that I could get access to their oxen to plough my land for the other two days. Though it is a bi-lateral benefit arrangement, it puts me at a more loser position than it does to my counter party because almost half of my seasonal energy is lost off-farm which otherwise I could have used it on my own farm.*

VI. Households Food Security Status

a) Food Source and Supply Status

Though mixed farming system (Crop Production and Livestock Rearing) is the main livelihood strategy, the single most important source of food supply in the study area is subsistence crop farming. The top three most important crops produced in the area are tef, chickpea and wheat in order of their significance. Own production is the number one means of acquiring food for the majority of the investigated households. However, a sizable portion of the study households rely on grain purchase. This makes it the second most important source of food grain. Very small segment of the investigated households obtains food by borrowing from others whereas no food aid is observed in the area as a source of food grain.

As depicted in Table 6, food grain balance of the majority of the study households (49.67%) concentrates between six and twelve quintals of net food grains while the average of the overall net food grains available for all the investigated households was 12.29 quintals.

Table 6 : Distribution of sample households by net grain available

Net grain available (Qtls)	No of households	% of households	Average grain (Qtls)
<6	16	11.03	4.60
6-12	72	49.67	9.21
12.1 - 18	37	25.52	14.79
18.1-24	12	8.28	20.34
24.1 - 30	5	3.45	25.89
> 30	3	2.07	41.33
Total	145	100	12.29

Source: Field Survey Note: Qtls – Quintals

b) Major Traditional Types of Foods Consumed in the Area

All food grains have naturally their own calorie content. However, the amount of calorie they supply changes with the way they are processed for consumption. In that view, it is important to have a brief look at of the types of grains mainly consumed in the study area as well as in what form they are most commonly consumed in the study households. Accordingly, Table 7 is a summary of types of grains mainly consumed in the study area with their respective form of consumption and average dietary calorie supply whereas the conversion factors for dietary caloric analysis were referred from Ethiopian Health and Nutrition Research Institute's (EHNRI) food composition table based on the type of food stuffs consumed utmost in the study households.

Table 7 : Major kinds of traditional foods stuffs consumed in the study area

Food grains	Description of major food kinds in the area	Kcal/100gram
Tef	- Tef flour + maize flour (*Buddena)* - Pure tef flour+ water (*Buddena)* - Tef flour + sorghum flour *(Buddena)*	161.20
Wheat	- Boiled wheat *(Mullu/shumo)* - Wheat flour +maize flour + water *(Buddena)* - Wheat bread - Wheat flour + water (*Buddena),* - Porridge*(Marqa)*	170.18
Chickpea	- Sauce: split chick pea + shallot chili + oil + garlic + salt *(Itto)* - Roasted chick pea + salt*(Akawwi)* - Chickpea flour + wheat flour + tef flour *(Buddena)*	227.00
Maize	- Cooked maize flour with salt and water (Porridge) - Cooked maize flour with milk, salt and water (Porridge) - Split boiled maize with salt *(Qinche)* - Cooked maize flour with meagre saltand water (Bread) - Cooked maize flour, fermented *(Buddena)*	127.83
Lentil	- Split lentil + butter + shallot + chili + salt *(Itto)* - Sauce: split lentil + chili + shallot + oil +salt*(Itto)*	93.50

Source: Survey Data and EHNRI's Food Composition Table

c) Households Daily Per Capita Dietary Caloric Status

Dietary energy analysis is an important indicator of food adequacy level of a household. It is the per capita dietary energy supply measured in calorie. It provides the average daily food available for each person in a country or region (FAO, 1998) and used to comprehend the average dietary calorie in a given area. In fact, it should be noted that this technique fails to make out the intra-household variations in food security. This is because the analysis of the available dietary energy depends on the average value though the amount of calorie a person requires depends on his or her sex, age, body weight, health condition and physical activity. The average value helps to simplify the complexity that arises while analyzing the available daily dietary energy supply of a household.

Accordingly, the available grain supply was converted into its equivalent calorie using EHNRI's food composition table. This was done after computing the balance for each kind of grains using a Mathematical Equation known as Household Food Balance Model which originally adapted by Degefa (1996) from FAO Regional Food Balance Model and thenceforth used by different researchers in this field.

The average calorie value per 100 gram of each type of food grain was computed based on the kind of food that the community consumes utmost. This is because the calorie equivalent of the grains varies by the kind of the end product prepared for consumption. For instance, a 100 gram of tef grain (white) produces a dietary energy equivalent to 240.30 kcal when prepared in the form of bread and 145.00 kcal when it is consumed in the form of Injera. Therefore, the average value of the major end product of each crop for the conversion processes was taken based on EHNRI's food composition table. Accordingly, based on the result obtained from the dietary energy computation from all kinds of net food grains for all sample households the daily per capita dietary energy available is generally categorized as presented in Table 8. The daily per capita calorie level of the majority of the investigated households (90) satisfies the minimum daily per capita dietary energy recommended for healthy and active adult individuals, which is 2100 Kcal, whereas the daily per capita dietary energy level of the remaining 55 of the investigated households failed to satisfy the minimum daily per capita dietary energy recommendation. Furthermore, as it is observed in Table 8, the minimum, maximum, mean and standard deviation of the daily per capita dietary energy levels of the study households are 342.91, 17522.47, 2357.52 and 1551.50 Kcal respectively.

Table 8 : Distribution of daily per capita dietary energy categories

Food security status categories	Level of daily per capita dietary Kcal available	Number of households falling in the respective category	Percent of Households falling in the respective category
Food secure	≥2100	90	62.07
Mildly food insecure	≥1750 - < 2100	19	13.1
Moderately food insecure	≥1500 - < 1750	14	9.66
Highly food insecure	≥1000 - < 1500	12	8.28
Severely food insecure	<1000	10	6.9
Total		145	100

Min. (Kcal)	Max. (Kcal)	Mean (Kcal)	Std (Kcal)
342.91	17522.47	2357.52	1551.50

Source: Field Survey

The study area was thought as surplus food producer and as a result people over there were assumed to be highly food secure. However, unlike the long existed assumption, as it is observed from Table 8, though the majority of the investigated households making up 62.07% were found to be food secure, the remaining 37.93% of the investigated households were found to be food insecure. In order to see the intensity of food insecurity situation, the food insecure segment of the investigated households were further categorized into different groups based on their daily per capita dietary energy level. From the total food insecure group of the investigated households, 13.10%, 9.66%, 8.28% and 6.90% fell in mildly, moderately, highly and severely food insecurity categories respectively.

This result has, therefore, come to reflect the idea of Amartyan Sen (1981) with regard to the disparities of food security status among the study households, which generally states that: in a certain community where food is in surplus production there may be households or individuals at risk of food shortage.

As it is indicated in Table 9, an attempt was also made to see how the distribution of food insecurity situation looks like by the study kebeles. Hence, *Awash Bune* tended to have mild and moderate food insecurity level whereas food insecurity situation in *Kobbo* and *Soyyema Kebeles* was found tending towards high and severe food insecurity levels.

Table 9 : Distribution of sample households' food security status by the study kebeles

List of Sample *Kebeles*	Number of food secure households	Number of mildly food insecure households	Number of moderately food insecure households	Number of highly food insecure households	Number of severely food insecure households	Total
A/Bune	51	16	12	5	0	84
Kobbo	14	0	1	3	3	21
Soyyema	25	3	1	4	7	40
Total	90	19	14	12	10	145

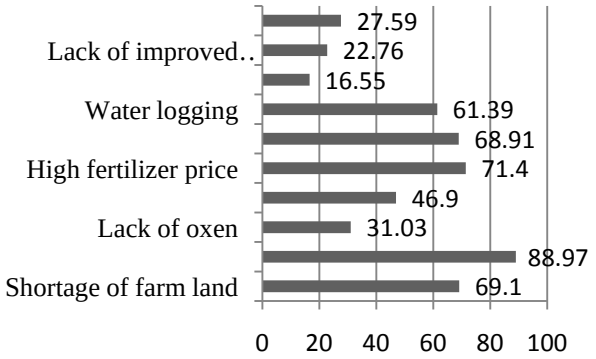
Source: Field Survey

Thus, it is revealed that compared to its counterparts, *Kobbo* and *Soyyema*, *Awash Bune* had a relatively better food security status. As of the explanations given by some key informants, the reason why *Awash Bune Kebele* takes the better status was that they had strong linkage with agricultural development agents. They had also relatively more awareness on technological oriented agricultural practices. On top of that, the presence of relatively more organized and attractive Farmers Training Center for different trainings and demonstrations of different improved agricultural practices and technologies plays influential role in improving their food production.

d) Households Food Security Constraints

In light of food security, the nature of the problem a household encounters in the course of its food production is an important indicator of the likelihood of a household's vulnerability to food shortage sooner or later. With this view in mind, the sample households were asked to identify the major factors constraining their food production, mainly food grains. As depicted in Figure 6, high fertilizer price, shortage of farm land, lack of grazing land, erratic rainfall pattern, water logging, poor soil fertility, lack of oxen, crop disease and insect pests, lack of improved seed supply, lack of improved farm machineries are identified as the major constraining factors to food crop production among the investigated farm households making up the percentage coverage of the confronted responses of 71.4%, 69.1%, 68.97%, 61.38%, 46.9%, 31.03%, 27.59%, 22.76%, 16.55%, 14.48% and 6.21% respectively in order of their importance. This finding therefore strongly

proves the previous works and explanations given by Devereux (2000), Degefa (2002, 2005), and Mesay (2011) towards why sub Sahara African farm households repeatedly failed to sufficiently feed their population.



Source: Field Survey

Figure 5 : Major Constraints of Food Production in the Study Area

Though it needs further work to know the extent to which these constraints affect crop production, as it is observed from Figure 5, the proportion of the households responded to the problems is taken as an indicator of the relatively serious nature of each constraint. Likewise, shortage of grazing land takes the lead respectively followed by high fertilizer price, shortage of farm land, erratic rainfall pattern, water logging and poor soil fertility problem in order of their seriousness in affecting crop production among the study farm households while the remaining four constraining factors: lack of oxen, crop disease and pests, and lack of improved seed and farm machineries were found neither as such serious nor constraints of less weight in challenging crop production.

The problems of livestock production were also identified in a similar way to crop production problems. Livestock in the study area is reared with insufficient and low quality feed under low management conditions. The common problems identified are shortage of grazing land and improved animal feeds, lack of improved animal breeds, animal disease, water shortage, and capital shortage. However, the severely constraining factors in this sub-sector revolve around feed and shortage of pasture land. Feed and pasture shortage definitely cause the most severe and widespread problems in the area. Likewise, out of the total of 145 sample households 129 of them which make about 88.97% of the investigated households strongly confronted that compared to crop production livestock rearing is really unlucky in the area most importantly due to problems related to feed and pasture shortage. The severity of the problem is related to stocking rate of animals since grazing land is very limited in the study area. Moreover, feeds obtained from the cultivated areas such as crop leaves and residues of cereals are not enough for animals in both seasons. Shortage of water is also another problem in the area as long distances have to be covered to take animals to water ponds during the dry season. Furthermore, a Key Informant's expression quoted in Box 2 illustrates different inter-woven challenging factors of agricultural production in the area.

Box 2 : Case based illustration of agricultural production challenges in the study area

Obbo Waqwayya is an inhabitant of Kobbo kebele. He is 49 years old and a father of five children. He lives on mixed farming system. When asked about his agricultural production performance, *"relatively speaking, Becho is good in agriculture but it is not as a surplus producer as it is externally assumed because we have a number of interlocked problems that challenge our agricultural production," says Obbo Waqwayya.* Some of the problems had not been as such boldly existed some years before and Waqwayya takes land shortage for instance. As he states, most of the inhabitants of the community had sufficient holding size that could accommodate their families' need for food and others. But these days, the number of young generation is rapidly increasing whereas the worst is unavailability of non-farm economic activities that can absorb them.

Not only is the holding size failing to accommodate the holders, but also the limited land they have has also characteristics of holding excess water (i.e. water logging) which is a big problem to their crop production especially during the months of July and August. To reduce the problem, Broad Bed Maker technology was introduced to the community some years before. However, since it was too heavy to be pulled by draught power, it was not as such effective even at least with average farmers. It has also counted some years since the situation of rainfall pattern has become a big problem in the Wereda. Sometimes it starts late in a season and ceases too early. Sometimes it falls with poor intensity whereas excessive rainfall happens other times. The worst is when it comes at a critical crop harvesting time. The soil is also losing its nutritional status. On top of that, the price of fertilizer is getting worst. Shortage of improved seed supply, lack of pasture for the animals and crop pests and diseases are also other challenges. *"In short,"* says Obbo Waqwayya, *"our agricultural problems are too numerous to tell you in exhaustive list."*

e) *Households Coping Strategies in Times of Food Shortage*

In many rural settings it is not uncommon to observe both the months of plenty and shortfall in food

availability. However, though the coping mechanisms may differ across different households may be depending upon the cultural values of the community they live in and the degree of the problems, households are not passive victims of food shortage as stated in Yared (1999), Debebe (1995), Davies and Maxwell (1996), Degefa (2005) Ejiga, (2006) and Tagel (2008). Due to the fact that achieving food security in its totality is impossible, it is something inevitable that certain households living in a certain community encounter food shortage with varying intensity and the households act back their way to cope with the food shortage period. Therefore, coping strategies are the very integral part of food security issue and thus they are rarely left out when it comes to the assessment of food security situation of certain households or communities. This section therefore tries to analyze the seasonality of food shortage in the area and the major coping mechanisms used among the investigated households in times of food shortfall.

Accordingly, the investigated households were asked whether they encountered seasonal food shortage and as it is indicated in Table 10, some 57.93% of the investigated households responded not to have encountered seasonal food shortage whereas the remaining 42.07% responded to have encountered seasonal food shortage. From the investigated households encountering seasonal food shortage, 24.83% of them encountered food shortage from mid of July to mid of September while the remaining 10.34% and 6.90% encountered it during mid of July to late September and from early July to mid October respectively.

Table 10 : Seasonal food shortage situation by the study kebeles

Food shortfall duration	*Awash Bune*		*Kobbo*		*Soyyema*		Sub-total	
	No	%	No	%	No	%	No	%
No period of food shortfall	41	28.28	27	18.62	16	11.03	84	57.93
Mid. July – Mid. Sept.	10	6.90	9	6.21	17	11.72	36	24.83
Mid. July – Late Sept	3	2.07	5	3.45	7	4.83	15	10.34
Early July – Mid Oct.	1	0.69	4	2.76	5	3.45	10	6.90
Total							145	100

Source: Field Survey

However, no single studied household was found irresponsive to the problem; rather they all have reacted both behaviorally and materially as a means of getting through the food gap period and this has strongly reflected, but not limited to, the previous works and ideas of Yared (1999), Debebe (1995), Davies and Maxwell (1996) and Degefa (2005). "As far as the coping strategies are concerned" the study showed that households in the study area have been responding to the problem in different ways. These include, consuming less preferred foods, selling out small animals, borrowing grains on double repayment, reducing food portion at every meal times, reducing daily meal rate, purchasing food on credit, engaging in wage laboring and petty trade, and renting out their land.

As depicted in Figure 6, out of the coping strategies used by the investigated households in the study area, maintaining household food availability through consuming locally less preferred foods (e.g. maize, vetch and cabbage) and selling small animals were practiced by the largest proportion of the study households facing food shortage, which is 90.16% and 65.57% respectively.

Source: Field Survey

Figure 6 : Major coping strategies of food shortage in the study area

Cash income generating ventures such as sell of small animals, borrowing money, engaging in casual labor wages and petty trade and renting out land were used to purchase food from markets. Furthermore, compared to cattle the area is better in ownership of simple animals like goats, sheep and poultry which are very important in light of food shortage coping strategies. Such animals serve as a buffering stock and highly lessen the vulnerability of farm households to serious food insecurity in times of food shortfall. Regarding reducing household food consumption related strategies, reducing consumption during each meal, and reducing the number of meals per day were the major ones.

As far as grain borrowing is concerned, key informants noted that some years back lending grains to the nearby household facing food shortage was one of the social supports in the study area and the borrowers used to repay only the unit of grains they had borrowed. However, these days, as everything is getting business, such a trend is changed and the borrowers are expected to repay a double unit of the grains they borrow, which they locally call it 'Araxa' which also applies for money, except when it happens between very close relatives, neighbors or friends. The repayment of the borrowed grains most commonly takes place during as early period of crop harvesting as possible. However, in case the borrowers sometimes fail to properly repay the borrowed grains for different reasons, it becomes a source of even serious conflict with the lenders and the borrowers are consequently mistrusted among the community. As a result, no matter how serious food shortage they may face, their chance of borrowing grains again among that community becomes very low and this sometimes may put them at a serious risk of food insecurity problem if they do not have some other buffering resources to sell off in order to purchase grains from market.

Compared to the other different coping strategies, land renting is rarely used as food shortfall coping strategy. The very reason behind is that renting out land is very much linked to the issue of sustainable livelihood. As it is obviously known, for farm households land is the number one and long lasting productive asset on which the farm households put their strong confidence compared to the other productive resources to sustain the livelihood of their family members. On top of that, as the majority of the study households have insufficient landholding, renting it out for a certain hard time could rather put them into a vicious cycle of food insecurity problem. Therefore, the farm households generally tend to use as many other coping strategies as possible so that they could secure their fundamental productive assets.

VII. Concluding Remarks

Unlike the long held food surplus perception towards the study area, the daily per capita energy analysis clearly showed that a sizable segment of the households, 37.93%, has been suffering from food insecurity problem. Though food is mainly accessed on production basis in the study area, the study has revealed that food production is highly constrained by various interlocked biophysical, socioeconomic and technological factors. Therefore, the findings of this study mainly lie at the interface position between 'General Explanation Theory' and 'FED Model' of food security by way of production and other means of entitlement respectively. From food production aspect, this finding is supported by the argument of 'General Explanation Theory' which puts one or a combination of the above mentioned factors as food production challenging forces. On the other hand, there are households having poor or no physical assets for sufficient food production. They have also poor or no other sufficient alternative incomes to command over food from market otherwise. In this regard, the study reflects Sen's entitlement argument, FED Model, of food security. This is because though Becho is, relatively speaking, better in agriculture, but not as a bread basket as the long existing perception, it has no food insurance for productive assets and /or alternative opportunity poor segments of the community out there.

The study has also revealed the seasonality of food shortage in the area, though there are households experiencing it year round, which generally extends from the month of July to October though this duration varies across the households. To cope with the food gap period households use both behavioral and material responses. Though it varies across different households, the coping strategies used revolve around increasing food availability and reducing consumption size and rate. Households generally employed short-term consumption coping strategies to mitigate the incidence of food shortages. Most of the coping strategies employed by households were effective in mitigating the food insecurity situation. The coping strategies employed were mostly not detrimental to their sustainable livelihoods and the future of their food security.

However, some of the coping strategies were not reversible, meaning that they were detrimental to the sustainable livelihoods and the future of food security situation of the households. For instance, a considerable number of households were found to cope with food shortfall period by selling out their land in partition though it is illegal according to the country's existing land policy. This is a potential danger to their sustainable livelihood in general and the future of their food security in particular as land is a fundamental livelihood asset for farm households.

For the inter-woven food production challenges in the area, it is generally recommendable to further work on best agricultural practices, technologies and innovations accordingly. More specifically speaking, issues like high fertilizer price and shortage of land remain the concern of broad policy, not just a specific pocket area. However, it is still recommendable to review the fertilizer subsidize and land tenure policy. Erratic rainfall pattern is also the local implication of the broadly and globally changing climate. It is thus better if seriously worked on different mitigation and adaptation strategies in line with the local contexts. For the prevailing water logging problem in the area, it is strongly recommendable to encourage and work on the indigenous innovation of the local people. This is

because through the course of this study there were key informants who told the story of, though not necessarily presented in this paper, how their own indigenous broad bed maker innovation outworked the one brought from somewhere else for adoption for instance. As far as shortage of grazing land is concerned, it is also highly recommendable to work on improved animal feeds as well as innovative and efficient use of local crop residues. Equally important, it also needs further work in area of improved crop varieties and other related production inputs.

Despite the fact that agriculture plays a lion's share in ensuring food security, the considerable food insecurity problem in *Becho Wereda* cannot be solved by promoting agriculture alone. This is because a considerable number of households neither have access to sufficient key productive assets for food production nor have they alternative income sources. Therefore, it is likely to yield better results in terms of employment for key productive asset poor households as well as further income generation for the better off ones to re-finance their farm if due attention is also given to the promotion of non-farming economic activities in the long run, particularly those that are associated with the smallholder agriculture. However, for households currently at a perilous food situation a sort of food security intervention is highly suggested as a short term solution.

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Global Journal of Human-Social Science (H) Volume XVI Issue II Version I Year 2016
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