Graduate School of Development Studies

NGO Approaches to Sustainable Food Security:
The Case of YFSSIFS Project in Konso Wpreda, Ethiopia

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List of Acronyms

ADLI	Agriculture Development Lead Industrialisation
BftW	Bread for the World
CP	Community participation
DC	Development Committee
EA	Entitlement Approach
EECMY	Ethiopian Evangelical Church Mekane Yesus
EECMY/ SWS/ DASSC	Evangelical Church Mekane Yesus Development and Social Service Commission
EED	Evangelischer Entwicklungsdienst
Eth.	Ethiopia
FADA	Food Availability Decline Approach
FDRE	Federal Democratic Republic of Ethiopia
GDP	Gross domestic product
HH	Household
ISS	Institute of Social Studies
KWARD	Konso woreda Agriculture and Rural Development
NGO	Non-Governmental Organization
NMA	National Meteorology Agency
RFO	Relief Food Outlet
SNNPRS	Southern Nations', Nationalities' and people Regional State
SPSS	Statistical Package for Social Sciences
WARD	Woreda Agriculture and Rural Development
WUCA	Water Users Cooperative Association
YF-HDPP	Yanda-Faro Hunger and Drought Prevention and Preparedness
YFSSIFSP	Yanda Faro Segen Sewate Integrated Food Security Project

Abstract

The paper explores the contribution of YFSSIFSP towards the households and community food security of Jarso Kebele. This community has lived over two decades under food shortage stress. The main causes for crop failure were lack of (and erratic) rainfall, soil degradation and crop infestation. The conventional approach to agriculture practised in the area for several years has failed to bring adequate improvement in crop production (supply side). I also argued the demand side elements which were not less important for ensuring household food security. The YFSSIFSP has embarked to reverse the ongoing food insecurity risks through the realisation of its major components like spate irrigation development and agricultural extension services. Six modern spate irrigation schemes were successfully constructed during the two phases of project intervention (2001-2005 and 2006-2008/.The project has adopted 'Community first, project second' intervention approach which ensured the participation of the community and proactive intervention over food insecurity. Besides successful construction of the spate irrigation schemes, input provision and training of farmers fostered the diversification of household income bases. The intervention of the project enhanced the food production for 2,200 households which are able to produce at least sufficient food for home consumption.

The paper concludes that the project has enabled households to secure food from own production. Nonetheless, the outputs of the project in terms of sustainability of food security are at their rudimentary stage. More is required to step the success forward and ensure the guarantee for not fall back.

Keywords

Food security, Availability of food, Access to food, Spate irrigation, Diversification, Sustainability, Community participation,

Chapter 1 Introduction

1.1 Study area background

Ethiopia faces the challenge of persistent food insecurity. Despite the fact that agriculture remains both the main stay of the people and contributor to National Domestic Product (GDP), it is dominated by subsistence peasant farming. Transforming it to modern farming has become the key challenge of agricultural sector of the country. Subsistence peasant agriculture is vulnerable to natural shocks in a number of woredas[1] including Konso and in combination with other factors impacting the food security situation of the community in general and that of households (HHs) in particular.

1.1.1. Woreda context

Konso Special Woreda is located in the Southern Nations, Nationalities and Peoples Regional State (SNNPRS) of Ethiopia. According to FDRE Census Commission (2008:79), population size is 234,987 out of which 95 percent dwells in rural areas and survive by subsistence farming. According to base line survey conducted by a consultant firm in 2006, the average family size was estimated 6.5, higher than the national average (4.8). The special woreda consists of 48 rural and 2 town 'kebeles'[2] (Nuri Kedir &Associates, 2006: viii& ix)[3]

Konso lies within the semi-arid belt of Southern Ethiopia. An attempt has been made to collect medium term (18 years) rainfall data from National Meteorology Agency (NMA). The rainfall in Konso area is bimodal; the main rainy season falls in the months of March, April and May, with short rains occurring from September to November. The higher altitudes (Karat area),

[1] Konso woreda is one among the seven woredas in SNNPRS having the 'special woreda' status based on the current administrative structural setting. This is to differentiate it from zonal structure which composed of two or more woredas of either the same or different ethnic groups.

[2] 'Kebele' denotes lowest administrative unit (Constitution of Tigray, article 83))

[3] Nuri Kedir and Associates is a private development consultant firm commissioned by Norwegian Church Aid to conduct base line survey in Konso special woreda.

usually receive the amount of annual rainfall that ranges from 450 to 1050 mms. Though, reliable information is not obtained for low land areas, it would be assumed that the low lands receive below 450mms of rainfall. The rains are erratic, with heavy and short rains followed by long dry seasons. The rainfall distribution across the years under consideration was highly variable. The average maximum and minimum temperature for the last ten years (1998-2007) were 28.3^{o}c and 17.4^{o}c respectively. The main economic base of the community is subsistence agriculture and the coverage of basic services such as health, potable water supply and primary education are low (27%, 34% and 35% respectively) (EECMY/DASSC[4] 2006: 8&9).

The average land holding for the households included in the sample is less than the national average of 1 - 1.5 hectares of land. About 82 percent of the households experience food shortage even in a normal production year so that food shortage appears to be prevalent in Konso Special woreda. Continuous losses in the productivity of soil, erratic rainfall and low productivity coupled with the rising population growth have been continuously accelerating the deterioration in the food security status of the community (Nuri Kedir &Associates, 2006: viii& ix).

Konso Special Woreda can be categorised among the woredas of Ethiopia that encounter persistent drought affects and in combination with other factors resulted in chronic food insecurity.

The Ethiopian Evangelical Church Mekane Yesus (EECMY), the implementer of YFSSIFSP[5] has been actively engaged in food aid support for the drought affected population of the woreda. Prior to the current project in effect, the aid rescued the lives of several thousands of people.

[4] EECMY is a faith based organization with development and social service (DASSC) wing in its organisational structure, commissioned for development work in the country.

[5] YFSSIFS stands for Yanda Faro Segen Sewate Integrated Food Security Project: the title of the project studied.

1.1.2. Project area

Jarso kebele is the largest and most populous in the woreda composed of 16 villages. Concerning the total figures of HH and population, consistent and reliable information was not obtained. All the assessed secondary sources have presented different figures. Due to such controversies, I decided to use figures reported by the project office for this study. Accordingly, the total numbers of households and population are 5,000 and 32,500 respectively. According to HH survey conducted for this research, only 35.5 percent of the respondents reported that they read and write where as the majority (64.5 percent) are illiterate. The average HH size is 6.9, slightly higher than the woreda average (6.5). Out of the total population of sample HHs, 49.8 percent is found in the age category of 1-14 years, 47.2 percent in 15-64 years and 3 percent is found in the age category of 65 years and above. This reflects the typical demographic structure of developing countries where the old age population size is very limited and the child age population is higher.

The main means of livelihood for Jarso community was/is mixed farming through subsistence agriculture. Off-farm activities such as traditional beekeeping and weaving have been carried out to augment HH income. The later is more common in Etikle, Geldime and Kube villages. Prior to the project, the community had been under serious food stress and survived mainly by external food aid. In spite of the fatal food insecurity problems in the area, Jarso has endowed with huge potential of irrigable fertile land in the Yanda-Segen valley and two seasonal flooding rivers crossing the land. As common to other inhabitants of the woreda, Jarso community dwell on the highland villages and used to walk over 30kms to work on their farm plots in the low land plain.

YFSSIFSP implementation was commenced in 2001 at a pilot level by the financial backing from international NGO, 'Bread for the World' (BftW).The pilot phase was successfully implemented and achieved promising results that motivated the donor to extend its support for next project phase.

The title of the project is 'Integrated Food Security Project' as it is composed of diverse components. The main activities include irrigation scheme development, potable water supply, on-farm and off-farm income

generation activities, preventive health services, capacity building training and maintenance and management of natural resources. The interventions have aimed at promoting sustainable agricultural production, generation of income, access to markets and basic social services as well as the improvement of nutrition. The total spate irrigation beneficiary HHs is 2200. Though, the main focus is on Spate irrigation infrastructure development and agricultural extensions, other activities stated above also have vital importance towards the intended outputs and outcomes. (EECMY/SWS/DASSC 2008: 9-12)

1.2 Problem statement

Poverty alleviation and food security have been worsening over time and located among the ongoing development challenge of the government (Diao & Nin Pratt 2007:206). Three decades back, the drought was happened to occur with an interval of nearly ten years, but since the early 1980s, the country has experienced seven major droughts, five of which resulted in famine and thereby perished thousands of people. Recently, drought incidences are within short intervals of time and are becoming common in many localities.

'Chronic food insecurity' (continuous inadequacy of diet resulting from lack of resources to produce or acquire food) and 'transitory food insecurity' (a temporary decline in a household's access to enough food) were mainly prevalent in northern and eastern parts of the country. But recently, food insecurity has expanded to other parts causing the drought related famine to increase in frequency, intensity and number of affected population. The factors that have contributed to such deteriorating situation may vary from region to region or from one locality to another. Lack of rainfall, fragmented landholdings, dominance of subsistence production units, low adoption of improved production inputs and techniques, incidence of pests and diseases, dependence on rainfall (low irrigation development) and inappropriate policies are among the major threats of the country's agricultural development and food security both at national and local levels (Adnew 2003: 14, Webb & Von Braun 1994)

The current economic policy of Ethiopia has aimed at two main issues: rapid and sustainable development and fair distribution of development

benefits among citizens. The main strategy adopted to realize this policy is Agriculture Development Led Industrialisation (ADLI). Agricultural growth is accepted as guarantee against food insecurity in the country. Food security strategy is also in place focusing on three important aspects: increasing food and agricultural production, improving food entitlement and strengthening the capacity to manage risks (Ramakrishna & Demeke, 2002: 128).

As Morss et al. argued, "the principal objective of development initiatives is to generate self-sustaining improvements in human well-being'' (1985:217). Despite the fact that, a number of NGOs involved in humanitarian aid and development activities in Konso special woreda, the livelihood situation of the residents did not show any improvement. Lack of rainfall for a season may result in a profound disorder of people's way of life. The Ethiopian Evangelical Church Mekane Yesus has implemented Integrated Food security project in Jarso kebele (one of the badly drought hit 'kebeles' of the woreda) for the last seven years. The money invested by the project was very significant an amount over Eth. Birr 12 million (US$1.2 million). The project performance reports indicate progressive and remarkable achievements of the implementation. The question is has the project intervention really brought an effect in breaking up the deep-rooted food in-security? Is it worth scaled up as 'a success story'? Is the improvements brought by the project intervention in Jarso area sustainable? What is needed to reverse the structural food deficit of the community and the persistent drought affects on the jarso community?

These paradoxes have excited me to conduct a research to answer the questions and develop my argument with sound facts from the ground. The study has focused on the assessment of inputs, out-puts and the outcomes of the project in terms of food production (availability) and access to food indicators at community and HH levels. The question how sustainable the project out puts and outcomes is also a key issue addressed in this research. The key *dependent variables* explained are *improvement in HH food production* and *access to food and the sustainability of project out puts.* Endowments (availability, quality and size of farm land), rainfall, irrigation scheme and their management,

supply of modern agricultural inputs, and asset building (livestock, income, food crop) were assessed as factors affecting the key variables.

1.3 Relevance and Justification of the study

In spite of a number of national and international NGOs intervention, food insecurity remained among the major concerns of Konso Special Woreda. There are ample literature on food security concepts, definitions and measurements. Empirical studies are also available in the role of NGOs in the development process as one of the development actors. Nonetheless, there are limited literatures on NGOs approaches and contribution towards sustainable food security at specific community level. This research is important to learn lessons from the ground, to replicate or enable development practitioners to pay attention while designing and implementing development projects/programmes. The research can also be basis for further research on the project's all encompassing impacts.

In remote localities like Konso, where development resources are scarce and food insecurity persisted for long, empirical findings and recommendations on the subject will have practical importance for the stakeholders of the project. Related projects in the Special woreda and even beyond can also make use of. There are two main reasons for selecting this topic for research. First: I had easy access to information which has saved time and cost. Second: I had personal interest and commitment to conduct empirical study.

1.4 Research objectives and questions

1.4.1 Research objectives

General objective

The general objective of the research is: to assess the extent to which the project contributed to the improvement of sustainable food security in terms of domestic food production and access to food of Jarso community in general and households in particular.

Specific objectives

- To examine whether the project has improved or not the food security situation of the target community and households;
- To identify the physical, social, economic and institutional factors that positively or adversely affect the sustainability of project out puts;
- To examine the extent and effectiveness of the community participation in the project process;
- To assess the extent to which the planned activities are accomplished and identify the challenges and lessons learned in the course of process;

1.4.2 Research questions

Main question

The main question of the research is stated as: How did the project contribute to food security of the target community in general and households in particular and how sustainable are the out puts?

Sub questions

- Did the project intervention on spate irrigation development improve the community and households food production?
- What factors have impacted the food production of the community before and after the project?
- To what extent has the project achieved its intended results?
- What are the major assets built due to the project intervention?
- How effective is the project in terms of community participation?
- To what extent has the project built the capacity of community towards sustainable management of its out puts?

1.5 Research Methodology

Konso woreda in general and Jarso kebele in particular which hosted the project under consideration as study area was purposively selected. The issues considered for purposive selection were the following. First: konso woreda is one among the woredas severely affected by food insecurity in the country whereas, Jarso is among the four top kebeles (Jarso, Aba roba, Gasargeo and Doha) badly affected by food shortage in Konsso woreda. Second: there was time and financial constraint to consider more others. In fact several factors

might have affected the realization of food security in the project area such as availability, size and quality of land, dependence on rainfall, human capital, infrastructure, agricultural inputs supply, agricultural extension services and stock/asset building including money. Nevertheless, certain explanatory variables such as farm land, rainfall, irrigation scheme development, irrigation scheme management, agricultural inputs and extension services and stock/asset building were selected due to time and resource constraints. I believe the data and the analysis from those data served the objective and answered the research questions.

1.5.1 Sampling procedure

HH was designed as an important unit of analysis so that HH survey was employed to collect data of before and after project intervention. The information was collected on the amount of production, land holding size, and assets like livestock. As indicated earlier, Jarso kebele is composed of sixteen villages out of which eight are direct beneficiaries of spate irrigation. The total HHs of direct spate irrigation beneficiaries are 2,200. Out of eight spate irrigation beneficiary villages, one is located very far from others so that only seven villages were considered and the total number of the HHs of these villages (1459) was taken as a sampling frame. The researcher determined the sample size of only 93 households with confidence level of 95 percent and confidence interval of 10[6] due to time and resource constraints. Out of the seven villages, the samples were drawn from each village depending on the proportion of HHs each village had in relation to total HHs. Finally, HHs were selected through systematic random sampling method for semi-structured questionnaire.

In this survey, two stages sampling was used. First, purposive sampling was applied to select the study woreda and kebele as well as villages. Second, systematic sampling was applied to pick up the 93 sample HHs.

[6] In relation to the size of the sample (6.4%), the confidence interval adopted from sample size calculator is relatively small. http://www.surveysystem.com/sscalc.htm

1.5.2 Data collection methods and tools

To minimize the problem of lack and reliability of information, different methods (triangulation) of data collection were employed. Accordingly, semi-structured questionnaire was designed and implemented to collect HH information on food production, stock/asset building, farm land size, irrigation water use, supply of improved agricultural inputs and agricultural extension services. Two focus group discussions, one at community level and the other at woreda level were organized. At community level, 16 HH heads were participated. At woreda level, 9 experts represented from different woreda government and project offices have participated. Key informants are selected from the community (12 people), project staff (3 people) and woreda government staff (3 people) for in-depth interview on before and after project food security situation, project results and sustainability. Observation was also an integral part of data collection particularly for irrigation schemes, how they are managed for their sustainable function. I also observed farm plots and demonstration/nursery stations.

Secondary data on quantity of food production and rainfall (time series) and agricultural inputs supply was collected. Food security literatures are numerous, so that this study is adequately supported by literature review. Different books and academic journals related to this research from ISS library and others sources were reviewed.

1.5.3 Data analysis

The information collected through HH survey were coded and entered in to a computer for analysis using computer software SPSS and Microsoft Excel 2007 windows. The research has focused on community and HHs as units of analysis and both quantitative and qualitative approaches are broadly used in the analysis of data. Data obtained from secondary sources like rainfall, construction related and those data generated from HHs' survey are quantitatively analysed using simple statistical tools such as tables and charts. As the main focus of the research is to identify the contribution made by the project towards the improvement of food security situation of HHs, certain

categories like 'before' and 'after' project intervention, location, education status and sex of HH heads were established and analysed.

1.5.4 Some essential characteristics of the sample villages and households

Out of the seven sample villages surveyed, four are located close to diversion weirs where as the rest three are situated relatively at distance from the diversion points.[7] Therefore, four villages located close to diversion weirs are labelled as 'location 1' (Etikle, Geldaha, Orshale and Kondo) where as the remaining three are labelled as 'location 2' (Geldime, Kube and Baya' ea). Out of 93 households, 89 are male headed where as only 4 are female headed.

1.6 Scope and limitation

The scope of this paper is confined to the assessment of the contribution of the project towards the improvement of food security at community and HHs levels. Food security is a broad concept encompassing three main themes: availability, access and utilization. Nevertheless, the focus of this study is the availability and access dimensions of food security. In this regard, selected factors affecting food security such as farm land, improved agricultural inputs, extension services, institutional capacity (irrigation schemes management and irrigation water use) were focused. The main achievements (outputs) of the project (domestic production, stock/asset building and owner ship building) were examined.

The main limitation of the study is the problem of availability and reliability of both primary and secondary data. As to the research design, the required data was collected from primary (sample households, focus group discussants and key informants) and secondary (activity and assessment reports) sources. However, some respondents were not interested to avail the real information on landholding, annual amount of production and livestock possession as they relate it to government taxes and related expenses. In certain cases some respondents were unable to remember about past events. In

[7] 'Closeness' here refers to direct access of the main canals to diversion weirs where as 'distance' indicates those villages whose main canals cross the farms of other villagers.

both cases it took time to convince and get appropriate information. Some figures stated in annual reports of government and project offices contradicted each other so that it required additional time to further discuss and filter in formation. Though a number of explanatory variables may affect domestic food production and access to food, only few selected variables were focussed due to lack of reliable data and time constraint. This may limit the criticality of arguments. In order to minimize the effects of such constraints on the results and generalisation of the research, the data are collected from diverse sources and triangulation of methods was employed.

1.7 Organization of the paper

The paper has a range of preliminaries appeared before the structure of chapters. References and appendices are affixed at the end of the paper. The rest parts situated amid the aforementioned ones are organized into five chapters.

Chapter one introduces the background of the study area, problem statement, research questions and how the research is conducted. Chapter two briefly reviews the theories and brings all basic concepts which are used as a basis for discussions in following chapters. Chapter three analyses the major areas of project intervention (input elements). Chapter four thoroughly analyses the project achievement in terms of food availability, access and sustainability. The last chapter discusses the summary of findings there by presenting the concluding remarks and policy implications.

Chapter 2 Theoretical and Analytical Framework

2.1 Approaches towards food security

There are two contradicting approaches developed before and during 1980s as causes to food insecurity but remained controversial until today. The first one is Food Availability Decline Approach (FADA) which was an accepted theory before the influential work of Sen (1981). The first devisers of FADA were Adam Smith and Malthus who argued that famines are primarily caused by a sudden decline in food availability. They emphasise food availability at local levels in contrast to Entitlement Approach (EA) which examines food availability at aggregate or macro levels. They argued that the crop failures due to natural calamities often result in high food prices, increased demand to deal with uncertainty and sales of possessions to obtain food. The decline in purchasing power impacts the poor and those who are negatively affected by bad weather to become famine victims (Lin and Yang 2000: 136). For the proponents of FADA, the best way to understand famine is to look at what happens to food availability.

The second is EA first launched by Sen who argued against failure in food supply as the only factor causing hunger/starvation or malnutrition. He argued that famines can happen in places where there is food available at national or local levels. He brought empirical evidences from Wollo, north Ethiopia, when there were famines perishing thousands of people while food was traded out from that specific province. He then brought the concept of the lack of entitlements or access to food as a main cause for starvation. EA concentrates on the ability of people to command food through the legal means available in the society. The means could be production possibilities, trade opportunities, entitlement vis-a-vis state and other methods of acquiring food. It focuses on the alternative bundles of commodities a person can command using his/her endowments such as land, animals, labour power, and knowledge where as failure to these entitlements cause starvation. Sen identifies endowment of a person and the exchange entitlement mapping as two essential factors on

which his/her entitlements depend. Exchange entitlement mapping also depends on legal, political, economic and social characteristics of the society in question and a person's position in it. Some examples worth to mention is legal rights, social conventions and social security (1981: 45).

Complementing EA, Haile et al. (2005:3) argued that though food security as a problem at a national level was felt in Ethiopia in the 1960s, it only started influencing policy in the 1980s. The 1983/84 drought and famine had posed pressure on government so that the government placed food self sufficiency among the major objectives of the Ten-Year Perspective Plan. The government has exerted tremendous effort to ensure adequate food supplies at national level, but this was not guarantee to ensure food availability at HH and individual levels. EA argues against FADA for its inability to explain satisfactorily why certain group of people suffer from hunger while others are not affected.

In spite of growing tendency of literature towards focusing on demand side equation (access to food), EA couldn't escape criticisms in academic circles. One among the main areas of critique is the EA's under estimation of the importance of supply factors. Academicians have criticized Sen's EA by reviewing and refuting some of his studies. Accordingly, they were convinced that famines have proceeded by a failure of food availability, supply factors such as poor infrastructure, poorly integrated food markets and high transport and other transaction costs have constrained to trade or deliver food in famine prone zones. Moreover, they criticized it from the angle of policy implication that the distorted diagnosis may lead to fallacious conclusion and thereby distorted remedies (Bow brick 1986: 107, Sijm 1997:90-91).

In spite of contradicting on some aspects of the causes of famine and food shortage both approaches are closely linked. They don't have fundamental difference apart from prioritizing one over the other. It is important to note that rigorous empirical examination is quite essential to recognise the usefulness of each approach.

In this research, I don't situate myself in entirely favouring one approach over the other. In countries like Ethiopia where natural shocks have strong repressive effects, physical endowments are much degraded and many local

communities are excluded from various social services and infrastructures, government capacity is much limited and misuse of scarce resources/ corruption and policy constraints are rampant, it may not sound to examine the two approaches in isolation. In the research area, domestic food production is the most important dimension of livelihood of the community. Failure of food production might trigger people to suffer from famine. The two approaches are thus complementary to each other to reflect on the situations in Ethiopia in general and in research locality in particular. The revisionist view of Devereux (1988:282) and the prepositions of Nichola (2006:321) have a significant reflection towards this argument. The project intervention is intended to address both aspects of food security and the underpinning assumptions of both approaches have vital importance for the analysis of food security at community and HH levels.

2.2 Conceptualising basic terms

2.2.1 Food security

As discussed by Sijm (1997: 9), there has been two important and overlapping paradigm shifts in the literature on the analysis of food security concepts. First: from national and global food security concern to HH and individual levels. The basic reason for this shift of attention is that the higher/macro levels (global, national or regional) food supply achievements have not necessarily prevented wide spread food insecurity problems at HH and individual levels. So that the academic literatures have been more focussing on food security condition at HH and individual levels. Second: from availability to access focus or to put it in another way, from inadequate supply of food to in adequate access to food. These shifts have led to the adoption of range of food security definitions. Nonetheless, World Bank's definition of food security has been widely accepted by many researchers and development practitioners as it captured a number of issues. Accordingly, food security is defined as access by all people at all times to lead health and productive life (World Bank 1986a). A number of authors either adopted directly or with minor modification in their studies of food security (Maxwell 2001: 15&16, Webb & Von Braun 1994:12).

When looking into the themes of the definition, we can find four important concepts. First: it involves the essential determinants of food security, i.e. the availability of food and the ability to acquire food. Availability as determinant of food security consists domestic production, storage and/or imports whereas the ability to acquire food comprises subsistence production, market activities, food and/or income transfers. Second: 'all people' which emphasises the assessment of food security mainly at levels of individuals, HHs and/or vulnerable groups. Third: time factor that demands assessment of food security for both short and long term. Fourth: 'enough food for an active, healthy life' emphasises the quantity (the amount of calorie consumed) and quality (the composition of the required nutrients in the diet) (Sijm 1997: 8&9).

More recently, the risk that may disrupt any one of the first three aspects has increasingly become as a fourth concept. It represents a cross cutting issue that affects all components of food security (Webb & Rogers 2003:5). In order to ensure access to basic food required by all people at all time, FAO identifies three objectives: ensuring production of adequate food supplies, maximizing stability in the flow of supplies and securing access to available supplies (Maxwell 1990: 3).

In this research I adopted the definition of food security provided by the World Bank with some modification to refer as a working definition. Accordingly, food security could be defined as *availability of and access to food by households at all times*. Therefore, the basic concepts on which the research is built are the *availability of food* which refers domestic food crop production and storage and *access to food* which implies stock/asset building and capital. In this research HH level analysis is the concern. *All time* reflects the sustainability dimension of the study. The consumption dimension and individual level analysis of food security are not the scope of this research.

2.2.2. Sustainability

The concept of *sustainability* in the analysis of food security is a crucial issue as it implies the time dimension. The community or household may achieve food availability at one time but fall back into food insecurity the other time. In this regard Swaminathan defines sustainable food security as "Physical,

economic, social and ecological access to balanced diet and safe drinking water, so as to enable every individual to lead productive and health life in perpetuity''(2001: 949). Sustainability of food security in this context is the effect of the synergy of many factors portrayed by the writer. In countries like Ethiopia, where agriculture is dominant in the national economy, ensuring sustainability in the sector's production has a paramount importance. According to Adnew (2003:49) the domestic food availability can be affected by factors such as weather, quality and availability of land and labour, availability of capital, foreign exchange earnings, foreign exchange reserve and international market condition.

The development intervention in an area, a region or a country may less likely achieve its objective if it fails to give due consideration to these factors depending up on where the development program is situated. In this study sustainability refers to continuous availability and access dimension of food security.

2.2.3. Community participation (CP)

Many projects are known for involving different stakeholders in one or the other form. It is obvious that the project under consideration has also had its stakeholders participating in various forms. CP is expected to be crucial so that its conceptualisation is essentially discussed in this section. In spite of being widely used, the definition of 'participation' is under considerable disagreement among development scholars and practitioners. It varies depending up on the context and background. For example politicians and economists look at it from different angles. The prevailing diverse perspectives reflect the differences in the objective for which participation stands for.

According to Paul, CP is defined as follows:

> *An active process by which beneficiary/client groups influence the direction and execution of a development project with a view of enhancing their wellbeing in terms of income, personal growth, self- reliance or other values they cherish.* (1987:2)

Some important themes possibly be drawn from this definition are: that beneficiaries are the object of development who direct the execution of the

project; collaborative involvement of beneficiaries as an essential feature of community participation. Group involvement enables commitment creation, learning/building up capacity, confidence building, and cost sharing. CP is also a necessary condition for project sustainability. As argued by Awortwi (1999:8) CP goes beyond seen only as a management tool for the efficient execution of specific projects. Initiative taking, action and key decision making are among the most important issues that the community should involve in. Such involvement steps up the community from passively waiting for technicians and politicians for problem solving towards proactive participation to address their problems.

Generally CP serves the following objectives (Paul1987:3&4).

- *Instrument of empowerment*: the community involvement in development projects empower them to enable to initiate actions in their own to influence the process and outcomes of development.
- *Capacity building*: may generate two advantages. First, the beneficiary engagement in taking operational responsibility of parts of projects through which they learn more. And secondly, it contributes to the sustainability of the project out puts and out comes beyond the project period.
- *Effectiveness:* the beneficiary involvement in different project cycles activities may lead to better results that matches with the beneficiary needs and constraints.
- *Cost sharing:* the beneficiaries contribute labour, money and material that strengthen collective effort and there by develops sense of owner ship.
- *Efficiency:* the community participation beginning from the initial phase results effective coordination and interaction among the beneficiaries and between them and implementing agency. The ultimate effects will be reduction in delays, smoother flow of project services and overall costs reduction.

Despite the fact that CP has such tremendous advantages in the process of development projects, there are various barriers towards *full* participation. As pinpointed by Plummer (2000) (cited in Dorsner 2008: 414) skills and knowledge, cultural beliefs and practice, gender, social and political marginalization are factors affecting the level of participation. Kappor (2002) has taken similar position in his argument (cited in Dorsner 2008: 415) that participation in community development projects has multi-dimensional and complex contexts. The way people respond to external intervention depends on the social, economic, cultural, religious and other aspects of social life

Paul (1987: 4&5) has identified four levels of CP in development projects what he termed as 'intensity' of participation. These are information sharing, consultation, decision making and initiating action, in such a way that the intensity grows up reaching the peak at the level of initiating action. In this regard, the problem often faces is that during planning projects, donors and government bodies tend to pre-empt the role of beneficiaries at decision making and initiating action levels of participation which limits the beneficiaries to play a reactive rather than proactive role.

In general, in light of this review, the research on YFSSIFSP has examined the type and level of CP and its effect on project performance and sustainability of results.

2.3 Analytical framework

In this piece of work the main determinants of sustainable food security explained are sustainable food availability through domestic production and access to food through on-farm and off-farm income generation activities.

The factors affecting sustainable food security of the community and households under consideration may emanate from the broader economic, social, political and institutional and natural spectra. Economic factors may consist domestic food production, asset/stock building, income and agricultural inputs. Social factors may include education (functional adult literacy), health (malaria epidemic) and traditional experience (local skill). Political and institutional factors can be land management, irrigation water management (as independent variable affecting sustainability of production).

Natural factors may constitute land and rainfall. However, due to the reasons stated earlier, I used to consider certain variables as indicated hereunder.

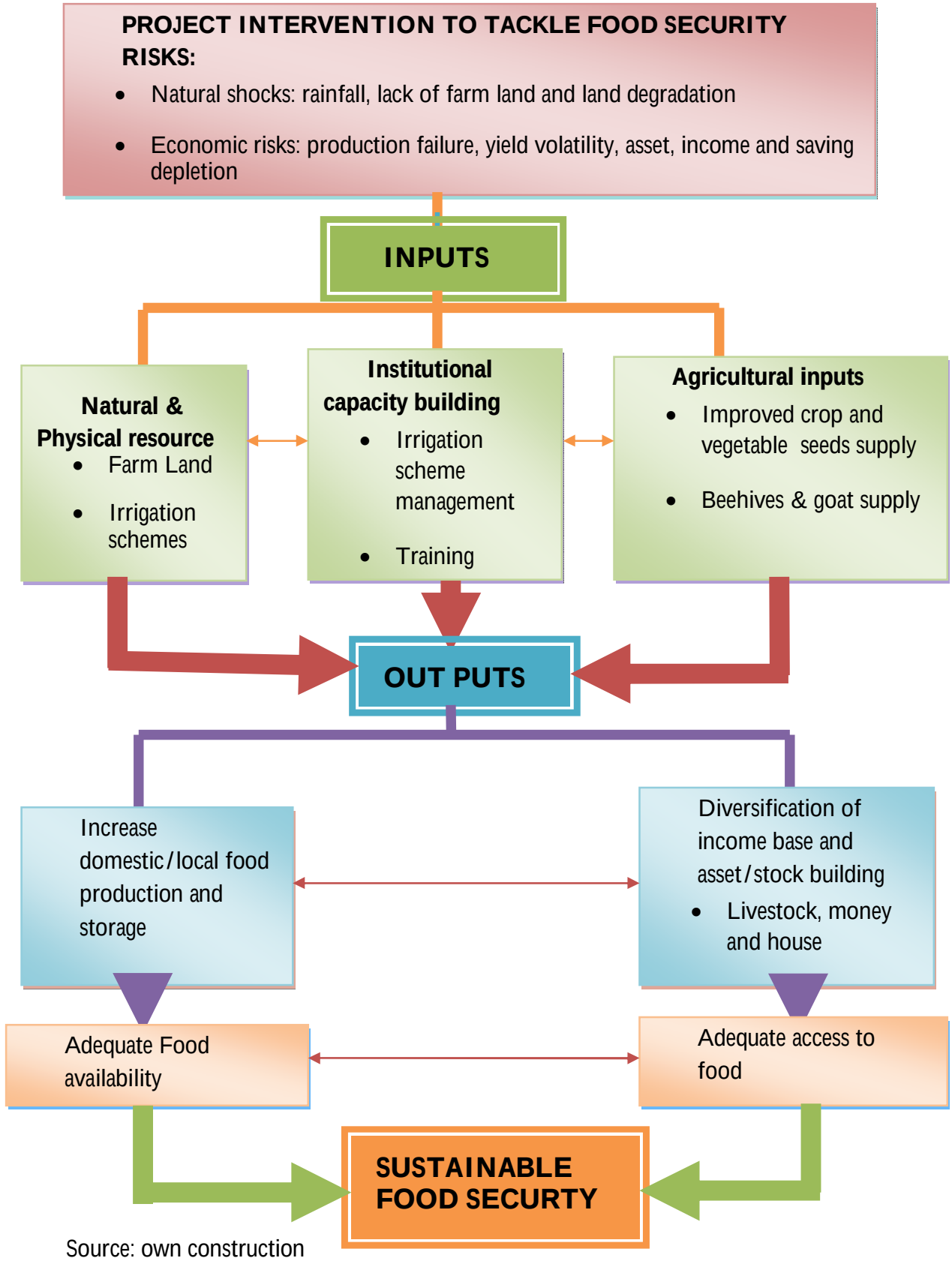
The analytical framework of this paper is developed on the theoretical concepts discussed in previous section. (Fig. 2.1)

Causal relationship

- Spate irrigation schemes as a factor for domestic production and its sustainability (production and sustainability as dependent variable).
- Availability, quality and size of farm land as a factor for food production (food production as dependent variable).
- Modern agricultural inputs (tools, improved seed, and extension service) are independent variables explaining domestic production/ dependent variable.
- Asset/stock building and income are factors for access to food and there by affect food security.
- Irrigation schemes management as a factor for sustainability of food production/dependent variable
- Rainfall/independent variable but a factor for food production/dependent variable.
- Training and related capacity building activities as factors for domestic food production and off-farm income generation activities.

The causal relationships of dependent and independent variables are analysed and discussed in chapter four.

Figure 2.1: Schematic representation of analytical framework



Source: own construction

Chapter 3 Project Intervention and Food Security Risks

3.1 Introduction

In this section, the pre-project and after project food security status of the community is discussed based on the data collected from various sources. The sources are household survey, focus group discussion, key informants interview, assessment reports, project documents and activity reports. As project intervention is core to this research, the researcher found it imperative to locate the intervention as a turning point to answer the main research question.

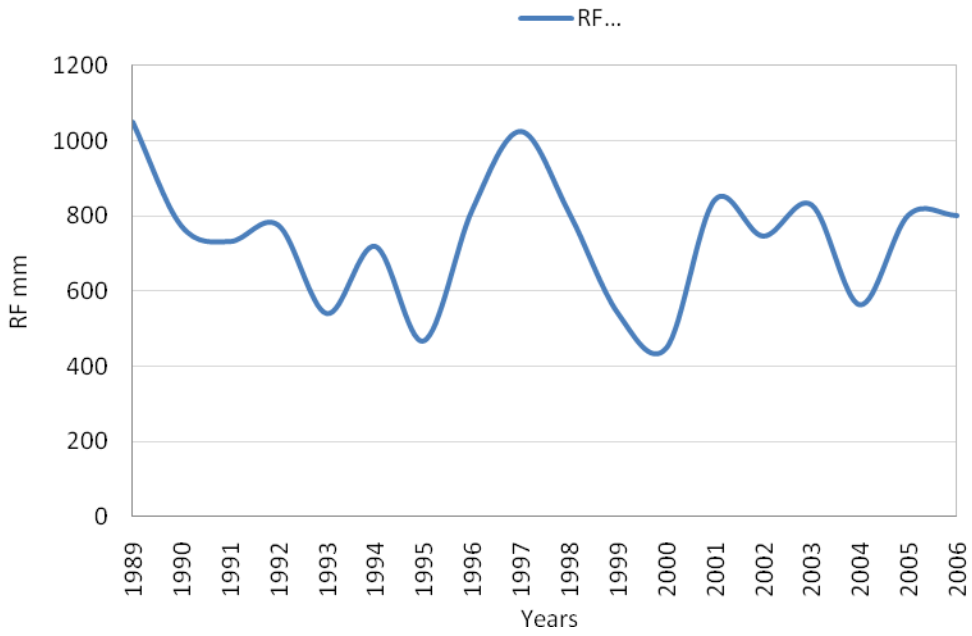
3.2 Why food insecurity?

Webb & Rogers (2003:7) argued that food supply can be affected by climatic fluctuations, soil fertility depletion and/or the loss of a HHs productive assets whereas, food access can be negatively influenced by factors like collapse of safety net institutions, loss of copying strategies and depletion of resources Based on the assessed information, the following are identified as the major factors affecting HH food security of Jarso.

Rainfall:

Konso area gets less rainfall, encounters erratic and uneven distribution within the major and minor rainfall seasons and substantial annual variability (Fig. 3.1). Drought was reported to be a frequent phenomenon. Out of the total sample HHs, about 62.4 percent reported lack of rainfall as the major factor where as 23.7 percent reported lack of rainfall in combination with other factors like lack of seeds and crop pests for mono harvest and production decline. The respondents have spelled out severe crop failure years as (1985&1991 (23.7%), 1985&1995 (20.4%), 1985 (18.3%), 1985&1988 (11.8%)) due to mainly recurrent drought (Appendix Table 3.2 & 3.3). The reports of Disaster Prevention and Preparedness Agency also show these years as drought years. Therefore, lack of rain is among the main constraints of agricultural activity in the study area.

Figure 3.1: Rainfall distribution (1989-2006)



Source: NMA

Rampant depletion of asset bases:

Despite the fact that livestock production is the main source of income and social security for Jarso community, HH survey indicates that 35.5 percent of the total respondents reported they have not possessed any kind of livestock mainly due to lack of income to purchase. About 64.5 percent of the respondents stated that they owned residential houses together with small number of ruminants (Appendix Table 3.4). They relate the lack to the forced sell of livestock to rescue their lives during drought induced famines. A livestock death due to pasture and diseases was also common phenomenon that aggravated depletion of livestock possession.

Land size and quality:

> *Land is considered as the primary means for generating the livelihood for most of the poor living in rural areas. It is generally argued that access to land will affect not only productive outcomes but also the ability of the poor to access credits, make investments, and benefit from the law in general. WBI 2003, (cited in Adal 2006: 21)*

Before project intervention, the average landholding size of sample HHs was 0.8 hectare, which is slightly higher than the estimated average landholding size of konso special woreda farmers (0.5 hectare). Basically, with the absence

of modern agricultural inputs, the smaller the farm size the lesser the product. Concerning land fertility, out of the HHs surveyed, overwhelming majority (83.9 percent) reported that their lands are less fertile whereas 11.8 percent confirmed that their land is totally infertile (Appendix Table 3.5). Therefore, land size and quality not only impede crop production but also access to rent in, rent out and credits. Based on these facts, it could be argued that access to land as stated by WBI 2003 is necessary but not sufficient condition to ensure entitlement.

3.3 Effects of food insecurity and copying strategies

The recurrent droughts impeded the re-stocking of assets, access to food and improvement in food entitlement. Continuous depletion of resources due to recurrent crop failure and lack of recovery had brought about vicious circle of food insecurity. Food from own production was insufficient; credit facilities to purchase food were virtually non-existent and only marginal assets to exchange food. Therefore, vicious circle of food insecurity had long lasted over three decades among Jarso community during pre-project period.

Coping strategies:

Coping strategies against food insecurity over time may take stage wise forms that consists simple forms of adaptations in initial stage to most household life complicating forms of adaptations at higher stages. For instance, diet change to less preferred food, reducing quantity of food and meal frequency per day (rationing),eating wild foods, increasing petty commodity production and inter household borrowing and transfers of food and cash are simple forms of adaptations. But at higher forms of adaptations, the households exhaust assets/resources at their disposal and forced to migrate permanently, begging for food/resources and complete dependence on external aid. Generally, the pattern of households' responses to food crises involves a succession of stages along a continuum of coping that runs from long term risk minimization to the extreme instance of household collapse (Webb et al. 1992:30). But these steps are not even or uniform throughout HHs and individuals.

Due to the lack of data on adaptation strategies that indicates time orientation, the available data set on HHs coping strategies is categorised in to three based on by whom it is initiated and realised.

Intra-community based coping strategy:

Konso community in general and Jarso in particular have their own way of coping during drought induced hazards. Intra-community based strategy is an established tradition of Jarso community that has been coordinated and facilitated by nominated village leaders and elders. This tradition is considered as a first step to rescue the victims before external intervention starts. Very important point to make here is that food security is not only material but also societal. The deep rooted tradition of Jarso community is a power full societal asset that is used as an instrument to identify locally available food resources under individuals' disposal and distributes it to severely affected households. This could be termed as community social security and a local capability to offset risks over individuals in the community.

Individual strategies:

HHs have adopted various strategies as security to access food. The overwhelming majority (82.2 percent) of respondents have reported that they adopted combination of different categories of coping strategies. The main categories are sales of livestock, wood/grass/charcoal, eat wild fruits, kin and/or community directed transfers of food/cash through borrowing/gift (44.1 percent); sales of household valuables, wood/grass/charcoal, food for work and migration (22.6 percent); sales of household valuables, wood/grass/charcoal, food for work and food rationing (16.1 percent). Only 2.2 to 5.4 percent respondents reported for adopting a single coping strategy (Appendix Table 3.5).

External intervention:

Food aid in the form of free distribution and/or food for work is among the entitlements of the households. Unquestionably it has rescued the lives of many thousands of inhabitants. There are also negative aspects as reported in the interviews and from researcher's own experience. Firstly, it creates chronic dependency that erodes the existing strong culture of work. In the konso culture 'begging' is considered as 'taboo'; it was hardly possible to get a person when begging on the street or elsewhere. Some respondents reflected that now days, it has been growing parallel with external aid intervention. Secondly, food for work has little contribution to long term development because of lack of proper design, follow up and evaluation.

3.4 Approaches and processes of the project

3.4.1. Project initiation and planning

Constraints of land in combination with rapid population growth forced the farmers to descend down to fertile Yanda plain. During 1990s the farmers started spate irrigation as new invention through traditional ways. However, the diversion points and main canals were demolished by flood water at every step and this leads to the inception of the project idea in the minds of the farmers. After efforts of application to government and NGOs, they got positive responses from EECMY/SWS and BftW. Hence, it could be argued that community was the primary initiator of the project.

Figure3.2: Traditional versus modern methods of river diversion

The initial phase project entitled as Yanda Faro Hunger and Drought Prevention and Preparedness was implemented in 2001-2005. The very objective of the project at this phase was to reduce the vulnerability of the target community through building their existing capacity (EECMY/SWS/ DASSC 2001:14). Though the project has performed its intended activities, the key problem of spate irrigation was not solved at this phase. Hence, the beneficiaries of the project started seeking another solution for their long standing problem.

According to Torayto Kussia, the project manager, the banks of Yanda river were badly eroded and it was realised that the construction of diversion weir might cost huge amount of money so that the farmers used to access Segen river located 15kms away from Yanda river in the East direction and started traditional diversion, business as usual. Yanda has only temporary (but high) floods of few hours, while Segen with a larger catchment area has abundant flows that may last 4-6 months a year (Neuenroth et al 2008:11). In this regard, the project has supported only through technical skill and provision of sacks to fill soil/sand for diversion. For the first time, the farmers managed to produce 12,000 quintals of maize in 2004 that laid foundation for

transition to modern diversion weirs construction there by turning down the long history of food shortage (Fig.3.2).

3.4.2. 'Community first, projects second' intervention approach

The historical transition from highlands farming to yanda plain along Yanda river and then to Yanda/ Segen plain along Segen river were directed by the community itself. The project has provided its support following the footsteps of community's action. At this stage all the stakeholders were encouraged and the back donors and project implementer were much interested and committed to extend their support at larger scale in to next phases.

Community participation

From developmental perspective, CP can promote new values, attitudes, knowledge and skills among residents and build their capacity as agents of change. Therefore, genuine participation is a necessity in order to enable all constituent groups of local community involve at all stages of project/program from design to evaluation (Bown, 2008:76). 'Community first, project second' intervention approach is adopted by the project to make community participation more systematic and institutional. It is a guiding principle in which clear responsibility and task division is made between the community and project for labour intensive project activities. Moreover, the community takes the first step in discharging its responsibility and this is granted as a pre-condition for the project to launch its part.

The project manager and engineer have confirmed that apart from the first modern diversion weir constructed as a demonstration scheme, the rest five weirs were constructed through the application of the new intervention approach stated above. Accordingly, the excavation of main and secondary/tertiary canals as to the design and specification is the responsibility of the community and the completion of main canal is the precondition for commencing the weir work which is the responsibility of the project.

Table 3.1: Level of community participation at different project stages

Project stage/cycle	Number of HHs participated	Percent of HHs participated
Planning and implementation	8	8.6
Planning and evaluation	3	3.2
Implementation	23	24.7
Implementation and evaluation	20	21.5
Evaluation	5	5.4
At all stages	34	36.6
Total	93	100

Source: Computed from household survey 2009

From Table 3.1 it is clear that all HH heads included in the survey have participated in the project work in one or the other stage(s). Accordingly, 36.6 percent confirmed that they participated in all project stages. From the relative figures, one can infer that significant proportion of people have participated at all stages of the project that does likely contribute towards sustainability, better performance and efficiency. In terms of the type of participation, majority (59.1 percent) of the sample HHs confirmed that they have participated in labour and giving opinions from their past experience in the course of project work, whereas 32.3 percent reported for their participation in labour, in kind and opinion sharing. This indicates that the voice of community is heard and valued that lacks in many development projects. About 20.6 kms and 27.7 kms of main and secondary canals respectively were cleared and excavated mainly by the labour contributed by the community (Table 3.2).

3.4.3. Irrigation schemes construction

Six modern spate irrigation schemes were constructed along Segen river to the appropriate standard in the course of the first phase extension (2004/2005), second project phase (2006-2008) and second phase extension (the first half of 2009). Five schemes (Geldeha, Orshale, Itikle, Kondo and Macha) are located up stream of the confluence of Segen with Yanda river, whereas Mete scheme is located downstream of the confluence (Appendix 4.1). Table 3.2 depicts the details of the schemes including the number of beneficiaries and command area. According to the project office report, Eth. Birr 5,543,286 (US$ 503,935) or close to 50 percent of the total project budget was invested to realise these

schemes. As explained by project leaders, in most cases the community has contributed free labour and in kind (construction materials) towards the successful accomplishment of the construction work.

Table 3.2: Irrigation schemes, command area and number of beneficiaries

Scheme site	Year of construction	Type of weir	Canal length in km		Command area(ha)	No of beneficiary
			Main canal	Secondary canal		
Geldeha	2005	Broad crested	2.6	3.3	600	500
Orshale	2006	Full barrage	2.6	2.0	400	250
Itikle	2006/07	Weir + barrage	2.9	1.5	300	300
Kondo	2007/08	Weir + barrage	3.4	2.0	650	650
Mette	2007/08	River bed protection	3.0	5.3	900	650
Macha	2009	Full barrage	6.1	9.6	500	500
Total			20.6	27.7	3350	2850[8]

Source: EECMY/SWS/DASSC annual report 2008

The total command area of the diversion schemes is estimated 3350 hectares where as 3250 hectares (project office annual report 2008/09) of land is under cultivation through modern spate irrigation schemes. The total beneficiary number of households reached to 2850 in 2009(Table: 3.2).

3.4.4 Households' move towards possession of fertile land

The project intervention has enabled the farmers to obtain not only additional but also fertile farm land through distribution. Accordingly, the female headed households' average possession has increased from 0.4 ha to 0.8 ha whereas that of the male households increased from 0.9 ha to 1.5 ha after project intervention. The overall average has increased from 0.8ha (before project) to 1.5 ha (after project) (Table 3.3). At this point it is important to note that female households of the sample are less favoured.

[8] This number includes individuals who possessed land and paying land use tax in addition to HHs benefiting from modern spate irrigation.

According to the report generated by private assessment team and key informants, the Segen plain is basically owned by Birbirsa and Jarso kebeles. However, the major beneficiaries are Jarso farmers. Despite the fact that Birbirsa people own vast lowland plain along Segen river (upper course), most have not yet descended down because of relatively having better land at higher altitude. Nevertheless, few farmers started farming using spate irrigation and following them, there is an increasing move of farmers to this area because of its potential productivity.

Table 3.3: Average landholding size (ha) before and after project

HHhead sex	Before project	After project	Total
Female	0.4	0.4	0.8
Male	0.9	0.7	1.5
Total	0.8	0.7	1.5

Source: computed from HH survey 2009

3.4.5 Irrigation schemes management

According to Gizachew (project engineer), all the constructed schemes have head works (diversion weirs), off-take gates that allow farmers to have a control over the amount of flood flowing in to their farms in spite of lacking gauges at the gates. Besides, main and secondary canals were built as to the set design and some canals have got division boxes, drop and cross drainage structures. All head works are built out of masonry and reinforced concrete. Besides, gabion structures are also used for protecting walls. Based on the placed structural facilities, the project engineer believes that the schemes will function for nearly twenty years. Nonetheless, it could be argued that the life span of the schemes will depend on two main things: first, the type of institutions established and the extent of their capacities built and second, the extent of irrigation scheme users' capacities built to manage the irrigation structures. Establishment and capacity building of water users cooperative associations (WUCAs,) was considered as a key instrument for irrigation schemes management there by secure sustainability of production. To this end, it was planned to establish seven WUCAs out of which five associations with

289 members were established until the end of 2008(EECMY/SWS/DASSC 2008:12). The number of members registered compared to the total figure of users is considerably less (only 10.1percent).

The project annual report indicates that one medium size store was built and two maize threshers were supplied by the project in 2008 for the associations to equip and operationalise them. The maize threshers have the capacity to shell 10 quintals of maize per hour each and expected to ease the labour load of the farmers, save time and prevent harvest loss that occurred in traditional threshing. About 22 WUAs management members have been trained on cooperatives management, bookkeeping, credit and saving, business management and planning (EECMY/SWS/DASSC 2008:15&16). During the focus group discussion held at community level, it was stressed that the training was not sufficiently delivered. During field observation, it was realised that the associations have not yet started functioning.

3.4.6 Agricultural extension service, off-farm and on-farm income generation activities

As emphasised by Helmsing (2005:12), peasant farmers with better access to extension services have better chance of economic survival and growth than those who have no local extension support. In areas like Konso where traditional agricultural practices are predominant and climatic shocks are substantially high, the need for agricultural extension services cannot be doubted. It has been placed among the main components of the project. Despite the fact that almost all HHs in the project area during pr-project period were engaged in subsistence farming, some HHs undertook certain income generation activities. Apiculture, weaving, blacksmithing, charcoal production, and petty trade in mainly local drink (cheka) were few to mention. Charcoal production was/is environmentally unfriendly because it depletes natural vegetation there by adversely affecting the ecology. The project has planned and implemented improved varieties of cash crops, vegetable and fruits gardening, modern beekeeping and goat credit as important source of HH income and nutritional value.

3.4.6.1 Demonstration and introduction of improved varieties of cash crops, vegetables and fruit

As realised from reports and discussions, tremendous effort has been exerted by the project staff and project expatriate consultant to demonstrate and introduce improved varieties of cash crops, vegetables and fruit. To this end, 5 nursery and demonstration sites were established for seedling production, trial and demonstration. To diversify crop production, different types of crops like ground nut, cow/black eye pea, short cycle maize and sorghum varieties, sesame and cotton were planted on demonstration plots and model farmers fields. Vegetables and fruit package of intervention was also aimed at diversifying household income base and food habit. Accordingly, vegetables production has been introduced at demonstration sites and beneficiary farms. The main improved vegetable varieties distributed in this regard were Onion, Green Pepper, Chilli, Tomato and Pumpkin.

Thousands of fruit trees such as Mango, Papaya, Banana and Orange root stocks were distributed during the last 3-4 years. Training was given for selected farmers on fruit development and grafting. The extent to which the packages introduced was adopted by the HHs and its effect on production and income diversification is critically discussed in chapter four.

3.4.6.2 Modern beekeeping

As to the experts of the field, Yanda-Faro-Segen area is conducive for bee keeping and honey production. Hence, Jarso farmers are well known for their traditional beekeeping practice in the valley. The traditional rich experience of the community and availability of excess foliage in the area were the underlying factors to start modern beekeeping as a package to diversify household income generation. According to Wilson, (2008:28) traditional beekeeping has major problems like limited capacity and exposure of local producers to innovation, improved technology and upgrading opportunities. The beehives they used are own-self made from local materials, so that worn out within short period of time. The size of beehives is small. These constraints all together resulted in limited productivity and less quality production.

The constraints of traditional beekeeping of Jarso farmers are the direct reflections as spelled out above. The project has planned to upgrade the traditional beekeeping practice through providing modern beehives and appropriate training. As reported by the project office, out of the total plan (200 beehives) 115 (57.5 percent) modern beehives of German type with the necessary accessories were purchased and distributed for selected farmers after providing the necessary training (EECMY/SWS/DASSC 2007:11).

As stated by the project manager, from more than 30 traditional beehives of the trained volunteer farmers, the bee colonies were transferred to the modern beehives. However, the bee colonies have evacuated from newer beehives and this was a great loss for both the project and beneficiary farmers. The project now got stack as it is not simple to convince other farmers. The reason for failure is not clearly identified but there are speculations for the technicality of the problems. Beekeeping requires well trained entomologists and apiculturalists to realise both the adoption and spill over which is lacking in Konso woreda.

3.4.6.3 Goat credit package

The project document indicates that Goat Credit as a package has targeted on highly vulnerable (resource poor) households mainly those female headed households without productive assets. The project document further describes the strategy of implementation placing stocking committee to handle this issue. In this regard the main strategy was to pass the first born goat to the next selected beneficiary. Accordingly, out of the intended plan (600 goats) 432 (72 percent) goats were purchased and distributed to 216 households 2 goats for each. Though the achievement looks satisfactory, it was under performed. The main reason reported was the price escalation of goats (EECMY/SWS/ DASSC 2007: 3).

3.4.7 Overall project performance

Generally, the project has successfully accomplished the majority of its main physical plans such as irrigation schemes construction, agricultural inputs supply (improved crop and vegetable seeds, and fruit seedlings), beneficiary

capacity building trainings and impregnated mosquito nets provision. Nonetheless, it has underperformed targets like modern beekeeping and goat credit packages, and making water users' cooperative associations operational. The plan of reaching 550 HHs making access to potable water through two bore holes construction was completely failed. The main reasons as reported were underground rock formation for the first bore hole at the depth of 54 meters and underground cave and dry sand deposit for the others. The project has suffered from high staff turnover which affected mainly agricultural extension activities. To the contrary it has ensured maximum level of community participation that enabled it to reduce construction based expenses, so that most of the planned activities were accomplished within the total frame of the project budget.

Chapter 4 Towards Food security, Diversification and Sustainability

4.1 Introduction

This chapter analyses and presents the outputs and outcome of the project in terms of food availability and access dimensions of food security. The extent the project achieved towards diversification and sustainability of major outputs are thoroughly discussed. Based on the available information, the main factors either promoted or impeded production and income generation targets are discussed. Data obtained from different sources are analysed to sharpen the arguments.

4.2 Achievements towards food availability

Increasing the availability of food through domestic production is among the three pillars of food security adopted in the food security strategy of the Ethiopian government. Domestic production is the main source of food entitlement for most Ethiopian farming community in terms of direct consumption of food. It does not benefit only the farming community but also non-farming community through selling surplus produce (MOFED 2002: 66)

4.2.1 Household food production: food supply's primary pillar

Local food production is an indispensable source to ensure food availability at community and HH levels. According to the responses of the surveyed HHs, all have started producing twice in a year which was not the case before project intervention that only 14 percent reported for harvesting twice. About 54.8 percent of the sample HHs stated that use of spate irrigation is the main factor for twice harvesting whereas others reported the combination of factors like rainfall, malaria control and agricultural extension service in addition to spate irrigation in which still the use of spate irrigation is heavily underlined (Table: 4.1).

Table 4.1: Factors for twice harvesting

Factors enabling for twice growing/harvest	HHs responded	Percent of HHs responded
Use of spate irrigation	51	54.8
Sufficient rain and use of spate irrigation	22	23.6
Use of spate irrigation and malaria control	10	10.8
Use of spate irrigation and agricultural extension services	10	10.8
Total	93	100

Source: computed from field survey 2009

There should no doubt for the necessity of adequate rain fall for plant growth from its germination to maturity stages. Nonetheless, the rainfall data does not reveal significant difference in amount that favoured crop production during project intervention. Rainfall distribution was more variable during pre-project period. During the project period, specific to spate irrigation (2002-2006), average annual rainfall was 748 mms versus the pre-project 733 mms and ranging from 563 to 829 mms against 448 to 1049mms (Fig. 3.1&Appendix Table 3.1). The amount of rainfall at higher altitudes other than Konso can significantly affect the practice of spate irrigation in Yanda/Segen plain. Therefore, it could be reasonable to argue that practice of advanced spate irrigation is the main factor enabling farmers to grow and harvest twice in a year and is dependent on rainfall patterns at high altitudes.

As indicated earlier, malaria was among the main threats which have made Segen-Yanda plain hostile to human inhabitation. The project has managed to control malaria through mosquito net provision and awareness creation. The farmers now have got opportunity to stay on the farm site during peak agricultural and project activities calendar.

Table 4.2: Annual production before and after project intervention for sample households[9]

Type of crop (1)	Production before project (kg)(2)	Production after project (kg)			Difference (5) - (2)
		Location 1 (3)	Location 2 (4)	Total (5)	
Maize	28350	127825	38210	166035	137685
Sorghum	28210	16960	2125	19085	(-)9125
Beans	965	75	55	130	(-)835
Total	57525	144860	40390	185250	127725

Source: Computed from field survey 2009

Compared to pre-project period, the farmers have started harvesting more produce during the last five years. The total production was three folds higher than that of before project (Table 4.2). Another important feature of production portrayed by this table is that sorghum which was as important as maize during pre-project period among Jarso farmers and even more important at woreda level, has been marginalized after project intervention. Among the cereal crops sorghum is the most widely cultivated followed by maize in the Konso woreda. Its adaptability and drought resistant nature made it widely preferred and produced by farmers.

Prior to project intervention, quarter of the HHs surveyed responded that they grew only sorghum whereas 64.5 percent grew both crops in combination. After project intervention 63.4 percent of the HHs used to grow maize alone whereas 36.6 percent have managed to grow both crops (Table 4.3). According to farmers and extension agents, the maize domination in the project area is attributed to relatively better productivity and market value. Basically it is imperative to replace lower yielding crop varieties by those of superior and more adaptable ones. Nonetheless, at this juncture it should not be forgotten

[9] Annual production for before project period is estimated by respondents on average basis irrespective of any specific year where as for after project period, specific year has been indicated (2007/2008).

that the area is drought sensitive and any failure or shortage of rainfall at higher altitudes may very likely trigger either failure or decline in crop production in Yanda/Segen plain. It should be carefully assessed for the extent of guarantee secured towards unexpected crop failures and the susceptibility of maize to drought shock. Extension services must focus both on maize and sorghum. Sorghum is drought resistant and widely produced for years in Konso semi-arid climate.

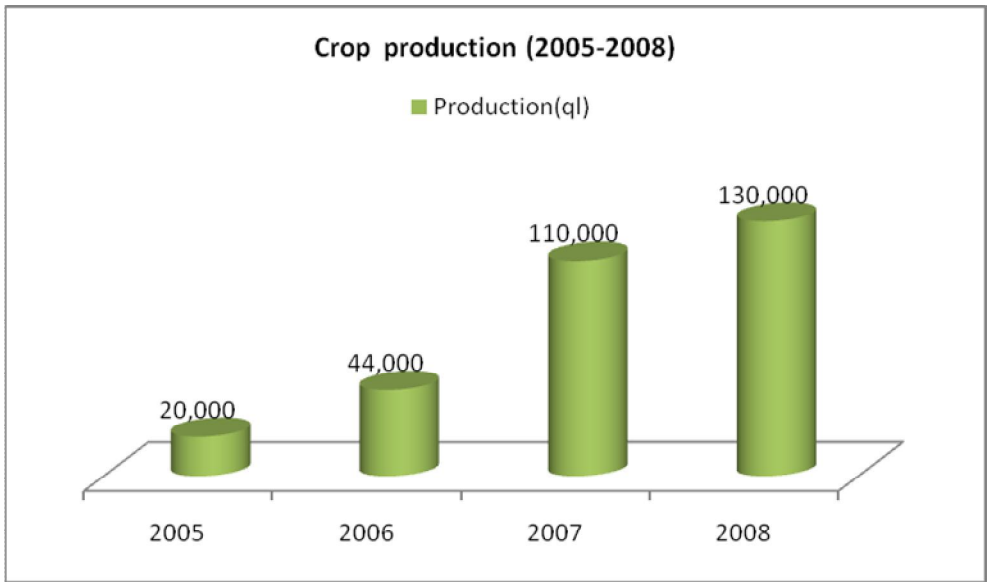
Table 4.3: % of HHS responded to the type of crop they grew before and after project

Type of crop	Before project	After project
Sorghum	25.8	0.0
Maize	9.7	63.4
Sorghum & Maize	64.5	36.6
Total	100	100

Source: Computed from HH survey 2009

According to EECMY/SWS/DASSC summary annual performance project reports (2006-2008), the cultivated area has revealed dramatic increase from 500 hectares in 2005 to 3250 hectares in 2008. Likewise the community level production (maize and sorghum) has substantially increased from 20,000 quintals in 2005 to 130,000 quintals in 2008 (Fig.4.1).

Figure 4.1 Performance of crop production (2005-2008)



Source: EECMY/ SWS /DASSC annual report 2008

Land size or land fertility?

As discussed in chapter three, the farmers possessed additional farm land which is naturally fertile at Segen/yanda plain. At the time of survey, the sample HHs on the average possessed 1.5 hectares of land at both higher altitude and low land. In principle, increment in the size of landholding may be held as a reputation for sufficiency of production. Nonetheless, it is realised that most of the farmers (spate irrigation beneficiaries) have given up their farm lands at higher altitudes for grazing of small ruminants (sheep and goats) and environment rehabilitation. The later practice could be taken as an important step towards ecological recovery that sustains the future use of natural resources. This is the right time for the WARD office to exert its effort to enable the community to rehabilitate the degraded areas in a scientific way.

Therefore, land productivity for after project intervention is assessed for their newer possession of land in the low land. Accordingly, the comparison portrayed in Table 4.4 for before and after project intervention shows a promising improvement in later case (an increase over four fold). Another important variation depicted by Table 4.4 is land productivity of female headed

HHs which is less compared to their male counter parts in both before and after project intervention.

Table 4.4: Land productivity before and after project

HH head sex	Land size (ha)	Before project		After project		
		Product-ion (kg)	Productivity (kg)	Land size(ha)	Producti-on (kg)	Productivity (kg)
Female	1.8	1235	686.1	1.5	3620	2413.3
Male	76	56290	740.7	59.8	181630	3037.3
Total	77.8	57525	739.4	61.3	185250	3022

Source: computed from household survey 2009

Based on the facts portrayed by the table and discussions made so far, it would be likely to generalize that fertility of the land is more important than size in combination with other factors that impacted the HH food production. On the other side, the farmers are still practicing a traditional farming system on their newer farm plots that possibly harms the natural fertility of the soil. Therefore, this needs correction through intensively expanding agricultural extension services putting in mind that sustainability of soil fertility means sustainability of harvest.

Table 4.5: % of HHs responded to average annual production (before and after project)

Average amount of harvest	Before project intervention	After project intervention	
		Location 1	Location 2
Below 1000kg	78.5	11.4	26.1
1000-2000kg	15.1	55.7	52.2
2000-3000kg	3.2	18.6	8.7
3000-4000kg	1.1	7.1	13.0
4000kg +	2.2	7.1	0.0
Total	100	100	100

Source: computed from HHs survey 2009

Table 4.5 presents differences in HH food production before and after project intervention at one hand and 'location one' and 'location two' after project intervention on the other hand. Accordingly, overwhelming majority (78.5 percent) of HHs reported that on the average they harvested below

1000kgs per year before project whereas only 11.4 percent HHs in location one and 26.1 percent HHs in location two harvested below 1000kgs after project intervention. From these results it could be generalised that there is a remarkable improvement of HH food production after project intervention.

There is also significant location and sex based differences of HH food production after project intervention. With the exception of the harvest category 3000-4000kgs, in all the rest categories, location 2 villages (Geldime, Baya' aea and Kube) were less benefited compared to location 1. The farms of these villages are located at certain distance from the off -take points. Moreover, three-fourth of the female headed HHs stated that they earned less than 1000kgs of harvest during the year under consideration (Table 4.6)

Table 4.6: Average annual production (kg) all crops 2007/2008 (% of HHs)

Location/ Sex	Below 1000	1000-2000	2000-3000	3000-4000	4000+	Total
Location 1	11.4	55.7	18.6	7.1	7.1	100
Location 2	26.1	52.2	8.7	13.0	0	100
Total	15.1	54.8	16.1	8.6	5.4	100
Female	75.0	25.0	0	0	0	100
Male	12.4	56.2	16.9	9.0	5.6	100
Total	15.1	54.8	16.1	8.6	5.4	100

Source: Computed from field survey 2009

4.2.2 Local and household food storage: food supply's secondary pillar

In areas where moisture is highly constraint, food production should be sufficiently augmented by food storage to ensure adequate availability. The government has owned adequate primary and secondary storage capacity at national level. This does not ensure easy access to the needy people in times of emergency.

> *... due to the scale and magnitude of operation as well as the large geographic coverage of the recurring disaster, the number of storage facilities or RFOs so far built is negligible. Moreover, most of the drought prone areas are off the main roads and are hardly accessible. As a result the majority of the beneficiaries are*

still travelling long distances to collect their food rations. To establish community level storage capacity, it requires massive resources, which the country cannot afford. Therefore during emergencies, it is a common practice to use schools and other public facilities for storing food as necessary. DPPC 2004:19&20

From this argument it could be realised that localised warehouses are very important and community based institutions may be the most appropriate organs to fill this gap. Umeh et al. (1996:269) underlined the importance of decentralisation of grain depots to lower levels to create easy access during emergencies. As discussed above, the project did not go further in making the established WUCAs operational to perform such activities. A good thing observed on the field is that the farmers used to keep storage until the next harvest. They store harvests in traditional ways which exposes crops to infestation and other natural and man-made damages that needs support in extension services.

Therefore, it could be generalized that food storage is not yet taken for granted as a serious issue for ensuring adequate food availability by the project and project co-signatories.

4.2.3 Sustainability of community and household food production

The project has provided access to two basic inputs of food production: fertile land and irrigation water. Sustainability of production comes out of long lasting fertile land and irrigation schemes. Without ensuring sustainability, today's remarkable achievement in terms of food production will not guarantee for future food production. Basically, spate irrigation is the most felt community need so that by implication there is no choice other than sustaining the schemes. There are also other potential grounds to achieve sustainability such as tested benefits of the project, the existence of traditional experience and indigenous knowledge which can possibly be integrated in to modern irrigation practice, adequate land and water resources though the later depends on the amount of rainfall at higher altitudes and availability of markets. This also depends on proper market study and adequate infrastructure.

For the question raised concerning the irrigation schemes management, 87.1 percent of the total respondents of the survey stated that the community

can manage the schemes after project termination. To this end, about 55 percent of respondents stated water users' cooperative associations as the main instrument whereas 19.4 percent underlined for the combination of actions taken in the course of project process like water users' cooperative associations established, capacity building trainings conducted and sense of ownership built. The focus group discussants and key informants have also given the same opinion. In this regard, it was reported that community ownership is strengthened through capacitating the 'development committees' and regulation for river bank, off-take points and canals management is in place.

It was observed on the walk in the project site that the regulation provided to protect forest along the river bank (15 meters) was breached. The farmers in some areas have cleared the forest up to the banks. Moreover, some of the diversion weirs were not properly cared as to the opinions provided by the respondents. Out of the six irrigation schemes established, three were constructed before 2008, but water users' cooperative associations were lately established. The beneficiaries registered for membership compared to total number of beneficiaries are insignificant and the money capital generated by the associations so far is limited. It is also realised that it took extended time to convince the people about the importance and objectives of the association as they relate it to former story of cooperative associations of socialist era in which farmers were forced to join membership and benefitted nothing.

It could be argued that the management of the established schemes is not as simple as to the opinions provided by respondents and discussants. In view of this, the researcher is sceptical to acknowledge the confidentiality of respondents. Quite big attention has to be given for sustainability of the schemes as it is an overriding issue for sustainable crop production.

Irrigation is accepted as an important practice to ensure security and improve rural welfare. Nonetheless, experiences indicate that there are associated environmental problems such as excessive water depletion, water quality reduction, water logging and salinization (Cai et al 2001:2). As the type of irrigation in the project area is spate irrigation through basin flooding (traditional) and yet the farming system is also traditional, water logging is the main problem facing the farmers. Experts of the field recommend furrow

irrigation or basin irrigation plots with ridges for spate irrigation (Spohn 2006:3).

Table 4.7: Problem encountered as irrigation user (% of respondents)

Type of problem	villages		Total
	Location 1	Location 2	
Water logging on farm lands	44.3	30.3	40.9
Un fair land distribution	21.4	13.0	19.4
Lack of participation in canal management	11.4	13.0	11.8
Water logging and unfair land distribution	4.3	17.4	7.5
In adequate access to irrigation water	17.1	21.7	18.3
No response	1.4	4.3	2.2
Total	100	100	100

Source: Computed from household survey 2009

As presented in the Table 4.7, about 40.9 percent of the sample HHs reported for water logging problem out of which 44.3 percent is from location 1 villages. Moreover, problems of land distribution and access to irrigation water are not less important while the later is more significant for location 2 HHs. Sand deposit on farm land is also a potential future problem as spelled out by focus group discussants. Agricultural extension service was underlined to tackle the continuous deposit of sand on the farm land that may lead to decline in moisture retaining capacity of the soil.

Therefore, sustainable food production is the function of many factors yet not adequately addressed by the project intervention. The next phase project should give more attention to sustainability of production.

4.3 Diversification of households' income bases and asset building

Food security literature has given a growing emphasis to access dimension of food security as it is for granted that food availability is not a sufficient condition for household food security. In chronically food insecure areas like Konso/Jarso, where severe moisture stress, soil degradation and farm land scarcity is rampant, ensuring HH access to food only through self production would be a difficult task. After every drought period, assets are depleted.

Hence, as a prerequisite to increasing production, a comprehensive asset building mechanism must be in place. This would broaden the production based entitlement. In line with this preposition, 'increased HH income' is one of the expected project outputs intended to ensure HH access to food.

4.3.1 Livestock as an asset to ensure adequate access to food

Jarso farmers were/are known for their livestock rearing and livestock is considered as an important asset to offset the prevailing food shortage. Livestock sale is one among the most important coping strategies to escape during drought induced starvation. The HH survey indicates that 33.3 percent of the total HHs failed to possess any type of livestock before project intervention whereas only 9.7 percent of the HHs are without livestock after project intervention. When looking at the size of possession of livestock before and after project, it could be realised that there is significant improvement.

Table 4.8: Livestock possession before and after project

Type	Before project		After project	
	Amount	**Percent**	**Amount**	**Percent**
Ox	36	6.1	69	6.4
Cow	108	18.4	199	18.5
Sheep	134	22.8	216	20.1
goat	290	49.3	466	43.3
Heifer	4	0.7	45	4.2
Calf	0	0.0	71	6.6
Bull	0	0.0	10	0.9
Donkey	16	2.7	0	0.0
Total	588	100	1076[10]	100

Source: Computed from household survey 2009

Table 4.8 portrays that the number of livestock purchased and/or possessed through any other means during the project period is nearly twice of that of the pre-project period. From the Table 4.8 it could be realised that goat

[10] The total number indicated here is only those purchased/or obtained through other means during project intervention.

is the most commonly possessed followed by sheep in both pre and after project periods. Out of the total livestock possession, over 60 percent is small ruminants in both periods.

Nevertheless, there is an increasing possession of larger ruminants after project intervention (36.6 percent versus 27.9 percent). In this case one can argue that inability to possess larger ruminants is due to high costs. However, the grass- roots reality is different. Not only larger ruminants but also large number livestock population is risky and unmanageable in harsh climates with limited pasture and grazing land. Thus, from the farmers point of view, focus on sheep and goat is rational, as their management is economically feasible. Moreover, goat is drought resistant animal. After project the HHs started diversifying their livestock possession as they have been earning better income.

It could be argued that the 'after project period' is the time of recovery for livestock asset building. In this juncture, it is important to note that the current animal husbandry is practiced in a traditional way that limits the productivity of livestock. Policy support to improve quality is the missing link. Proper assessment on the existing potential of grazing land, livestock productivity and the prevailing problems should be conducted. Corrective measures should be taken to secure the expected contribution from livestock resources towards ensuring adequate access to food based on the assessment results.

4.3.2 Practice of improved varieties of cash crops, vegetables and fruit

As discussed earlier, the farmers seem specialising in maize after project intervention. In areas where yield volatility is crucial and ensuring food security is a primary agenda, emphasis should be given to diversification rather than specialization. Demonstration and introduction of high value crops like sesame and groundnuts have paramount importance in rapidly strengthening the HH income. Nonetheless, the farmers are yet not convinced to grow these crops in their farm plots.

Concerning vegetables and fruit, the project office reports indicate that over ten improved varieties were demonstrated and introduced during the last

three to four years. Still the farmers hesitate to cultivate the newly introduced varieties and only few have reported that they have started benefiting. Though the respondents were not interested to disclose the amount of production and the corresponding money income they earned, the project office has reported that model farmers have started each earning Eth. Birr 1200 to 3000(US$ 100 to 250) per season (EECMY/SWS/DASSC 2008:17). Despite the fact that the extent of adoption is less, during field observation it was realised that fruit trees like papaya, banana and mango are visible and at better stage of maturity.

At this point it is essential to raise a question about why the farmers were not adequately motivated to adopt new and improved varieties of crops, vegetables and fruit. From the discussions made at community and woreda levels and field observation, there are three issues requiring due consideration. Firstly, the farmers were curious to see their families get sufficient meal that they were unable to get for the last several years. Therefore, at initial years of intervention, the farmers did not have spare time and mentality to think for long term. Secondly, the less performance of agricultural extension activities through which the beneficiaries did not get sufficient training, lack of follow up and evaluation by pertinent bodies. Thirdly, even for those who started the cultivation of improved and newer varieties, lack of markets in geographic proximity and road are other challenging disincentives hindering the proper adoption.

Despite the fact that the introduction of cash crops, vegetables and fruit has not made significant contribution towards HH food production and income, there is a great potential and possibility of future benefit from the improved varieties if the extension work is intensified, WUCAs strengthened and infrastructure is upgraded.

4.4 Distribution of benefits

The project has created favourable condition for the community to exploit land and water resources which were remained idle for several years. Hence, there is the proliferation of beneficiaries since the project intervention. The survey result discloses clear location, sex and education level based differences of HHs in realising project benefits. All the surveyed HHs confirmed that they

got irrigated land in the valley through distribution. In fact land (re)distribution has its own nation-wide regulation. According to KWARD office, Kebele land administration committee is the most responsible body to solve issues related to land use and administration under close supervision of the WARD office pertinent section. In this regard, the woreda officers have been complaining for the land distribution conducted in the valley without their knowledge.

According to the focus group discussion held at community level,[11] each HH has possessed plots of land ranging between one and five plots. Accordingly, about 18.3 percent of the sample HHs possessed only one plot whereas 29 percent possessed four plots of land. The rationale behind distribution of fragmented plots of land from the community point of view is that it redistributes the risk of crop failures. The land distribution is unfair and needs to be corrected. As it could be realised from the discussion with community leaders, HHs from location 1villages were the first in taking initiative and risks in penetrating the malaria infested valley of Segen. So that they possessed farm plots relatively closer to head points of diversion. It is important also to look genuinely in to this issue in order to compensate the gaps of HHs from location 2 villages with any available resources to improve their living condition and there by achieve better project results.

The 1995 Federal Constitution provides that women should have equal rights with men with respect to use, transfer, administration and control of land. Women shall enjoy equal treatment in the inheritance of property (Adal 2006: 20).

Nonetheless, women in general and female-headed households in particular are identified as disadvantaged groups in the community. These days it is common to read in the literature and development project documents that gender is considered as cross-cutting issue.

[11]Most of the discussants are members of development committee (DC). Each scheme has its own DC responsible for coordination and mobilisation of community labour, prepare schedules for individual water users and play all regulatory roles including penalising abusers. Traditional village leaders (kanta) are members of development committee.

Konso women shoulder multifaceted responsibilities both in the farm activities and household care. Nevertheless, in Konso tradition women do less likely have access to land independent from men. They can't inherit land and generally lack access to and control over resources. During its first phase, the project addressed the practical needs of women such as the provision of potable water. The second phase project document has spelled out goat provision on revolving credit basis, vegetable gardening and training as the major activities to address women's problems in general and that of the female headed HHs in particular. Nonetheless these are the least performed activities of the project. Women are neither gaining control over land nor access to the irrigation technology. Most of the trainings conducted were men oriented. Women are not represented in the DC and very few are elected in the WUCAs management committee. The reason stated during focus group discussion is the harshness of the lowland environment for women. This justification may not hold true because during field observation it was found that women were actively engaged in the farm activities.

Though the HH survey data at hand concerning the gender aspect is limited, generally the project has not yet addressed the strategic needs of women. Female headed HHs included in the sample have reported that they have not been equally treated as their male counter parts in the community so that less benefitted from the project. Therefore, the project needs to develop special and workable strategy to address the strategic needs of women.

It is well understood that education is among the most important aspects of development and should be considered as an instrument to achieve the intended development goal. Any development program/ project aiming at community, yet that fails to incorporate education as its integral part is very likely encounters the problem of discontinuity or sustainability of improvement. Education level of HH heads is another factor creating difference in ensuring the benefits of the project at HH level. The survey result reveals that 64.5 percent of the sample HH heads are illiterate (do not read and write) and out of these, three-fourth have harvested below 2000kgs in the year 2007/2008. Whereas out of the literate HH heads, 60.6 percent obtained bellow 2000kgs of harvest (Appendix Table 3.9). What worries much is that

many of the illiterate HH heads (43.3 percent) were unable to send their children to formal schooling program, whereas only 12.1 percent in case of literate HH heads (Appendix Table 3.8). This is an important issue which the project seems ignoring and may need to consider in the remaining phase(s) of the project.

4.5 Project out comes

In spite of certain pitfalls, the project has brought visible impacts in the target area. The focus group discussants and the research key informants have confirmed for positive changes achieved. Accordingly, people started having better diet so that physical appearance changed; also better clothing and housing. Some people started sending their children even to private colleges. There is continuously growing practice of owning assets like livestock, radios, mobiles and tape recorders. Migration (temporary and permanent) due to food insecurity has ceased and much impressing outcome is that permanently migrated people have started returning back due to the new opportunities made by the spate irrigation.

Table 4.9: HH responses towards general living condition (% of respondents)

Responses	Location 1	Location 2	Total
No response	4.3	0	4.3
Got enough food (secure food)	36.6	8.6	45.2
Improved living condition	22.6	8.6	31.2
Still need project support	11.8	7.5	19.4
Total	75.3	24.7	100

Source: computed from household survey 2009

As it could be seen from Table 4.9, nearly half of the surveyed HHs responded that they are food secure from own production whereas close to one-third households reported for stepping further and improved their living

condition. About 19.5 percent of the sample households stated that they still need the project support until they improve their living conditions like others did. Generally it would be plausible to infer that the quality of the lives of many people has improved and the family bond and intra-community relationships are getting stronger now.

Table 4.10: house improvement (CIS roofing) after project intervention

Name of village	Number of HHs	New houses with CIS roofing	Percent
Etikle	300	130	43.3
Geldeha	287	125	43.6
Orshale	247	50	20.2
Kondo	245	20	8.2
Baya' aea	100	25	25
Geldime	159	26	16.4
Kube	121	25	20.7
Total	1459	401	27.5

Source: Village leaders report 2009

During the focus group discussion held at community level, it was reported that over 50 percent of the HHs of Etikle and Geldaha villages have changed their houses from traditional setting to corrugated iron sheet roofing. For the rest villages it ranges from 8 to 25 percents. Some HHs have also reported that they managed to construct houses at Karat, the woreda town.

The project achievements did not end only with positive impacts. There are also certain negative outcomes. Firstly, there is practise of unselective cutting down and burning of bigger trees even along the river banks. If corrective measures are not taken, its impact on ecology of the area would be crucial there by posing its repercussion on agriculture and impacting food production. Secondly, resource based conflict was reported by considerable number of respondents and underlined in the focus group discussion forums. Accordingly, the major conflict has two dimensions. The first is the conflict between Borena pastoralists who live in Oromiya region and Jarso community that occur occasionally. In 2008, the conflict occurred between these communities has resulted in death of people and livestock loss through looting. The second dimension is the conflict between Dara and Jarso kebeles'

residents (neighbours). The study has identified that the scarcity of land is the root cause triggering the conflicts. The conflict in this regard was calmed down through the intervention of regional government. But there was no sustainable solution in place.

As indicated earlier, permanently migrated people have been returning back and other villages and kebeles are demanding to access this resourceful valley. Therefore, integrated approach and rigorous activity is expected from all actors to bring durable solution.

Chapter 5 Summary of Findings, Conclusion and Implications

5.1 Introduction

So far the inputs either generated by or shaped through the project intervention and the project outputs and outcome in terms of the broader aspects of food security were discussed. This chapter presents the main findings of the research and finally winds up with concluding remarks and major policy implications.

5.2 Recap of research issues

Development initiatives which do not basically aim at generating self sustaining improvements of the people are very likely face to shortfalls in their final results. The project under consideration has been implemented among the people who were under chronic food insecurity for over twenty years. The initiation for researching the intervention of this project has come out from its reports that indicated progressive achievement and remarkable change perhaps the first in the woreda since the last three decades.

This research was designed to answer the extent to which the project intervention contributed to community and household food security and its sustainability. FAD and Entitlement approaches were examined in terms of their prepositions towards the causes of famine/starvation as spelled out in chapter two. In this regard it was found that both are complementary in reflecting the real situation of the project community.

Finally, data analysis was carried out primarily by discussing the inputs generated or shaped by the project intervention to bring about the intended out puts. Outputs and outcomes analysis were made through making broad categories like before and after project intervention, location based category (Location one villages versus location two villages and also based on sex of the household heads). Accordingly, it has been realised that the explanatory variables stated in chapter two have impacted either positively or negatively on the food security situation of the HHs.

5.3 Summary of findings

The pre-project period (20-30 years) was a period Jarso people used to live in a worst food shortage. Land holding size was small and its fertility deteriorated. Land had less value towards social and economic security. Drought was frequently occurring natural hazard due to lack of and erratic rainfall. Production was meagre and hardly sustains the HHs until the upcoming harvest season. Assets were continuously depleted as there was no chance for recovery. As a result, vicious circle of food insecurity was the feature of pre-project Jarso community in general and the majority of HHs in particular.

Since the project intervention, the farmers have managed to grow and harvest twice in a year. About 93.5 percent of the respondents have confirmed that their average production obtained during the last three years (2006 –2008) has increased. Despite certain differences between male and female headed HHs, land productivity compared to pr-project period in general has shown significant improvement (four fold). Though, the total size of land possession of sample HHs increased since the project intervention, the land under cultivation was only the newly acquired land in the low land (Table 4.4). The volume of production has considerably increased; majority of the HHs started sufficient production at least for home consumption and the number of HHs escaped from food insecurity through own food production is incredibly high. The spate irrigation beneficiary people not only escaped from chronic food insecurity but also from chronic dependency on food aid that they were involved for the last several years. No one out of the sample HHs reported for severe crop failure since they started practicing spate irrigation.

It was expected that land size and its level of fertility, irrigation schemes, and agricultural extension support activities could impact the HH food production. The project has developed modern irrigation schemes which enabled the farmers to access to fertile land of the valley. Therefore, these two resources (land and irrigation schemes) are the main input factors enabled the HHs towards achieving food production (project output).

The irrigation component of the project has also enabled the farmers to build and possess assets like livestock, improved houses with corrugated iron sheet roofing, radios and mobiles. The survey result indicates that significant

number of livestock has been added to the existing flock through purchase. It is found that the main income source of the households is crop production specifically maize.

The establishment of irrigation schemes as to the appropriate standard and their management is not a simple task. With the exception of few, many schemes of such kind constructed at different localities in Konso woreda were either terminated without proper completion or used only for very short period of time. There are a number of factors contributing for such failure among which the lack of adequate plan and design is crucial. It happens that experts in the field used to produce irrigation development projects without careful feasibility study and consideration of local reality. Most often these people come from big towns and rush with time or less committed to sacrifice in the harsh local environment. Chambers expression of 'rural development tourism' may better explain such reality (1983: 10). YFSSIFSP has managed to construct all the planned schemes within the scheduled timeframe with only minor delay. Therefore, it is realised that the construction work was efficient and effective. The demand driven nature of the project, community participation which is ensured to the maximum level and 'community first, project second' intervention approach of the project were the major factors contributed for such success. In the course of implementation, the project has aware of the importance of involving the traditional leaders known as 'Kanta' in Konso. The traditional leaders were actively involved in the community coordination and mobilisation.

The research has also identified under achievements and failures of the project. Initially it was expected that different types of inputs like local capacity building trainings, demonstration and introduction of improved varieties of seeds and provision of modern beehives and small ruminants shall result in diversification of income and asset basis towards adequate access to food there by contribute to sustainable food security.

Despite the fact that effort was exerted by the project to diversify crop production (more focusing on cash crops) and HH income through the introduction of improved seeds (vegetables and fruit), the outcome is found below the expected. Over 30 volunteer farmers who accepted and practiced

modern beekeeping have gained nothing and lost even the benefit they usually get from their traditional beekeeping. In this regard the project has faced a big challenge to convince other farmers to step forward the modern beekeeping package. The adoption of new technological practices among non or less educated farmers requires patience, systematic approach and intensive follow up that the project missed to apply. Concerning fruit trees, the main problem is the absence of markets. As demonstrated by the project and some farmers, Yanda-Segen valley is conducive for fruit trees like mango, orange and banana, and these fruits are highly demanded at central markets of the country. The missing element in this package is to establish market linkages.

Another important finding is that the project benefit is not fairly distributed between female headed and male headed HHs and between village 1 and village 2 inhabitants. The survey result indicates that male HH heads better benefitted in terms of total harvest and land productivity. As the problems of Konso women are multifaceted, and the research guide questions did not sufficiently capture and disclose the extent of benefit the women in general and female headed households in particular accrued, further research is recommendable.

The research has also found resource-based conflict as a crucial issue that if not handled and resolved in sustainable way, may very likely trigger the project outputs to perish. The survey has indicated that 26.9 HHs reported conflict as a major problem during the last three years (2006-2008). The response on conflict is the highest among the responses for various expected problems (Appendix Table 3.7).

5.4 Conclusion

The paper entirely focuses on two broad aspects of food security: food availability and food access. Increasing food production is the necessary step towards food security. The additional burden of agriculture on soil and water loss together with changing climate urges us to think about the uncertainties in the future. Despite HH income affects food security directly by providing the major sources of entitlements for the food required by the household,

empirical studies indicate that the HH income is inadequate (Chen 1994: 200&2001)

On 5th July 2004, during the seminar on: Innovative Approaches to meeting the Millennium development goals in Africa which took place in Addis Ababa, Ethiopian prime Minister declared that Ethiopia would attain its objective of achieving food security within five years starting 2004 by allocating more than 40 percent of its revenue towards this goal (Ethiopia 7 Days Update, 2004:9). To the contrary, the Millennium development goals report disclosed by FAO (2005:6) indicates that in Sub-Saharan Africa including Ethiopia, the situation of poverty and famine has been deteriorating further. During the focus group discussion held at woreda level, the discussants stated that in Konso Special Woreda in spite of investing huge amount of money by government and NGOs, the food security situation of the people has been profoundly deteriorating. Basically**,** escaping from food insecurity in woredas like Konso which are structurally food deficit and prone to drought, is not as easy as the speeches made by politicians at conferences and at political centres in a country.

The spate irrigation beneficiaries of Jarso kebele have been making difference through the project intervention. The project has significantly contributed to the improvement of HH and community levels food security through constructing six modern spate irrigation structures and capacity building activities. About 2200 HHs or 14,300 people are currently food secure after the project intervention. Apart from production, about 65.6 percent of the surveyed HHs was benefitted from the temporary employment opportunity created by the project during construction. The project's output spill over effect has traversed in to the neighbouring kebeles and Karate town by stabilising the market prices of food crops.

Making the current food security status sustainable is a challenge ahead. Income diversification is not yet adequately flourished and food storage, the important food availability pillar is not only lacking but also its importance is less conceived among stakeholders. Therefore, the third phase project should devote its intervention on the sustainability of HH food security.

5.5 Theoretical and policy reflection

The research findings realised that FAD and Entitlement approaches from the perspective of Jarso community are complementary in explaining the causes of starvation. The most important theoretical implication drawn from the discussion is that the existing traditional social system does not allow any body to suffer from starvation, having food available under the possession of someone in the village. So, the argument is that certain social traditions could serve as an extension of entitlement to access food. Another point for grants theoretical importance is the land size-production nexus. Variety of literature stress size of farm land as a factor either in impeding or promoting production and even access to food. This preposition is true in principle, but in case of pre-project Jarso community, the social and economic value of land is less compared to after project. What matters most is the productivity of land and the inputs that increase its productivity. Based on the research findings, the following recommendations are found worth to put forward.

First: Local capacity building through training was located among the most important activities carried out during the first and second phases of project. Nonetheless, the spill over effect is found not sturdy. The all encompassing observation shows 'formal and non-formal education programs' as a missing link that the project failed to consider. Without educating the people, it may be possible to achieve remarkable results from an intervention, but sustainable improvement requires educational backing. Education can step from social security mechanisms. In this respect, the current low level enrolment of children in formal schooling should be improved. Non-formal education on farming, storage and social security mechanisms should also be improved. To this end, appropriate strategies may require to be designed by pertinent stakeholders that fit the children and adults.

Second: To reinforce the supply side, the government has a clear national strategy of maintaining sufficient food reserve. The larger stores are found mostly in central zones so that remote areas like konso may less likely benefit at the onset of crop failure disasters. It would be recommendable to establish and strengthen local/ community based institutions to ensure local food storage there by enhance the availability of adequate food supply. The

realisation of such objective needs joint effort of the project and pertinent government bodies.

Third: The research has placed resource based conflict among the major problems that the community has encountered during the last three to four years. The conflicts occurred were very complicated due to the alliances established in supporting the frontiers. The efforts exerted so far by government and traditional leaders have not brought sustainable solution. The Dara people are still in need to access irrigable land in the valley. Permanently migrated people have been returning back home and they also need land. Non-spate irrigation beneficiary villagers of Jarso also expect the same thing. The project may address some of the practical needs of the people but the main issue is how to access the irrigable land along Yanda and Segen valleys which are located in the boundaries of Birbirsa and Jarso kebeles. For the woreda administration, it is the right time to assess the available potential, devise appropriate strategy for discussion and ensure the active participation of traditional village leaders (Kanta) and church elders to realise long lasting solution.

The number of spate irrigation beneficiaries compared to Jarso community at large is 44 percent and compared to woreda population is only 6.1 percent. Since the flood irrigation of the two rivers and land potentiality in the valley is high, it is imperative to think of how to exploit these resources to tackle the structural problem of food in the woreda.

Fourth: As discussed earlier, though the irrigation schemes are permanent structures built through appropriate design, the farmers still practice flood irrigation in basins. This may eventually cause salinity problem and force the beneficiaries to abandon their farm lands. The farming system is also traditional, demanding extensive labour. In line with growing income, it is likely to think beyond and plan for modern agriculture using machines like tractors. In this regard, the WUCAs may play substantial roles like providing farm tractors and link the producers to central markets.

Fifth: As already stated the project is highly relevant and brought remarkable changes in the lives of the spate irrigation beneficiary HHs. This may represent the best exemplary practice not only in Konso woreda but also

in the other parts of the country with similar geographic settings. 'Community first, project second' intervention approach designed and implemented by the project has made a profound contribution towards effective community mobilisation in general and traditional village leaders in particular. The project holder EECMY/SWS and government counterparts would take this opportunity to advocate and replicate these valuable experiences in other intervention areas.

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Appendices

Appendix 1: Household survey Questionnaire

This questionnaire is designed to collect data for academic research of M.A Degree in Development Studies, entitled: NGO Approaches to Sustainable Food security: The Case of YFSSIFSP in Konso Woreda, Ethiopia. The data generated through this questionnaire will be used for academic purposes only.

General information

a. Interviewer's name: _____

b. Respondents (household head's name including grand father's name): _____

c. Household head's sex: _____

d. Household heads sub-kebele/village _____

e. Date of interview _____Started time _____Completion time_____ Elapsed time_____

PART ONE

Demographic and socio-cultural characteristics of household

1. Total number of regular household members and their age composition:

Age category	Male	Female	Total
0-14	_____	_____	_____
15-64	_____	_____	_____
65+	_____	_____	_____
Total	_____	_____	_____

2. How many of your children have been attending formal schooling program

Age category	Male	Female	Total
0-14	_____	_____	_____
15-64	_____	_____	_____
Total	_____	_____	_____

3. If all or some of your children are not attending formal schooling program, what are the reasons?
   1. Lack of school around _____
   2. Lack of money for purchasing uniforms and education materials _____
   3. House work and farm labour occupation _____
   4. If other (specify)_____
4. What is your literacy status? Literate (read and write)_____ Illiterate_____

PART TWO

Private resources (endowments)

5. Have you had landholding since you started farming? Yes____ No_____
6. If yes, What is the total size of your landholding_____(in ha or timad)
7. Out of your total land holding:

1 wned _____)in ha or timad)
2 Rented in _____ (in ha or timad)
3 Rented out _____ (in ha or timad)
4 Why rented out or rented in?
_____
_____
5 If any other form (s) specify _____

8. Since 8 years (1994 EC) has your landholding size increased? _____ decreased? _____ no change? _____
9. If there is any change in your land holding size, mention the reason(s)
_____
_____
10. If you have had landholding before eight years, indicate its condition in terms of fertility and slope:

Fertility	**Slope**
1. Fertile (Lem) _____	1.Steep slope _____
2. Moderate fertile (Lem tef) _____	2. Moderate slope _____
3. Infertile (Tef)_____	3. Plain _____
	4. If other, specify _____

11. How did you obtain your land prior to YSSIFSP intervention?
1. through inheritance _____
2. through land redistribution during Dergue Regime_____
3. by cash rental_____
4. by permanent purchase_____
5. if other(s), specify_____
12. What was the size of your landholding prior to project intervention?
_____(in ha or timad)
Was it sufficient? Yes_____ No_____
13. How did you obtain your land after project intervention?
1. by distribution_____
2. by cash rental_____
3 if other(s), specify_____
14. How did you recognize the level of erosion on your farm land prior to project intervention? 1. Severe _____ 2. Minor _____ 3. No erosion 4. If other, specify_____

PART THREE

Crop production and other assets

A. Before project intervention

15. How many times did you grow/harvest within a year? 1. Ones _____ 2. Twice _____
16. If you grew only ones what is/are the reason(s)?
1. Lack of rain _____
2. Lack of agricultural inputs (seed, fertiliser) _____
3. Lack of land _____
4. Lack of money to buy agricultural inputs _____
5. Other(s), specify _____

17. What was the average amount of harvest you obtain per year from the crops you grow?

Crop type	Harvest in ql
1. Maize	_____
2. Sorghum	_____
3. Teff	_____
4. Other(s), specify	_____
Total =	_____

18. Were there years of crop failure on your farm land? Yes _____ No _____
19. If yes, mention at least three years in which crop failures encountered: 1 _____ 2. _____ 3. _____
20. How do you recognise the level of crop failures in those years?
    1. Complete failure in _____ year(s)
    2. Maximum failure in _____ year(s)
    3. Partial failure in _____ year(s)
    4 Minimum failure in_____ year(s)
21. What were the main reasons for crop failures in those years?
    1. Lack/insufficient use of agricultural inputs _____
    2. Drought _____
    3. Erratic rain (excessive or insufficient and/or untimely____
    4. Crop pests/insects _____
    5. Other(s), specify_____
22. Before project intervention what major assets other than land did you own?
    1. Livestock (ox, cow, sheep, goat, donkey, chicken) _____
    2. House _____
    3. Other(s) _____

23. What were the major problems that your household has faced before project intervention?
    1. Lack of farm implements ____2. Lack of adequate land _____3. No farm land at all 4. Labour constraints _____ 5. Lack of credit facilities _____ 6. Money constraints ____7. Lack of oxen _____8. Lack of grazing land _____ 9. Other agricultural problem(s), specify _____ 10. Other non agricultural, social problem(s) specify _____
24. What were the major undesirable consequences that your household has encountered due to the above problems?
    1. Famine ___2. Epidemic/mortality ____3. Forced migration/displacement _____4. In appropriate exploitation ____6. Poverty ___7. Household conflict/violence ____ 8. No undesirable consequences _____
25. Mention the amount of livestock you owned before project intervention:

Type of livestock	Amount owned
1. Ox	_____
2. Cow	_____
3. Sheep	_____
4. Goat	_____
5. Donkey	_____

6. Chicken _____

26. During crop failure years/seasons how did you cope? (Coping strategies against food insecurity)
    1. Sale of livestock _____
    2. Reducing quantity of foods and number of meals _____
    3. Eating wild food _____
    4. Household members seeking work within and vicinal Pas _____
    5. Sale of fire wood/ charcoal/grass _____
    6. Increase of their petty trade (sale of local drinks) _____
    7. Participate in food for work or cash for work programs _____
    8. Inter households/relatives transfers and borrowing of food and cash _____
    9. Temporary migration _____
    10. Permanent migration _____
    11. Sale of personal household valuables _____
    12. Withdraw children from schools _____
    13. Renting land_____
    14. Redistribution of children _____

29. How did you pay land use tax and other expenditure like medical, school, etc.?
    1. By loan _____ 2. Land renting_____ 3. From food/cash for work _____ 4. Other(s), specify _____

B. <u>After project intervention</u>

30. When did you start benefiting from spate irrigation scheme, developed by the support of project?
31. How many times do you grow/ harvest since the project intervention? 1. Ones ____ 2. Twice _____
32. If only ones, what is/are the reasons?
    1. Lack of rain ____2. Not accessed to irrigation ____3. Lack of oxen ____4. Lack of money to buy seeds _____ 5. Other(s) specify_____
33. If you used to grow twice, what factors promoted you to do so? 1. Sufficient rain _____2. Use of irrigation _____ 3. Provision of agricultural extension services _____4. Other(s), specify_____
34. What was the average amount of your harvest in kg/quintal/kesha in 2000/1(2007/8)

Crop type	**Amount harvested**
1. Maize	_____
2. Sorghum	_____
3. Others, specify	_____
Total	_____

35. How do you recognise the average harvest obtained each year?
    1. Was surplus (more than home consumption) _____
    2. was sufficient for home consumption _____
    3. was not sufficient even for home consumption _____
36. If the harvest was not sufficient, what is/are the reason(s)?
    1. Lack of land _____ 2. Lack of rain _____ 3. Not fully access to

irrigation _____4. Lack of oxen _____5. Less provision of agricultural ex, services _____6. Lack of agricultural inputs____7. Other(s), specify_____

37. What were the major problems that your household has faced during the last five years?
    1. Lack of farm implements _____2. Lack of adequate land ____3. No farm land at all 4. Labour constraints _____5. Lack of credit facilities ____6.Money constraints ____7. Lack of oxen _____8. Epidemics of human and live stock_____ 9.Other agricultural problem(s), specify _____ 10. Other non agricultural, social problem(s) specify _____
38. What were the major undesirable consequences that your household has en countered due to the above problems?
    1. Famine _____2. Epidemic/mortality ___3. Forced migration/displacement_____4. Poverty _____5. Household conflict/violence ____6. No undesirable consequences _____
39. Did you possess live stock within the last five years (1996/7-2000/1 or 2004/5-2007/8)? 1. Yes ___ 2. No ____
40. If yes, mention the type and amount of the livestock you possessed:

Type	**Amount**
1. Ox	_____
2. Cow	_____
3. Goat	_____
4. Sheep	_____
5. Heifer	_____
6. Young bull	_____
7. Chicken	_____

41. How did you possess these animals? 1. through buying ____2. Gift Provision from somebody _____ 3. Government provision _____4. Other(s), specify _____
42. If you did not possess livestock, what is/are the reason(s)? 1. Lack of money_____
    2. No surplus harvest_____3. Animal diseases ____4. Lack of grazing land _____ 5. Other(s), specify _____

PART FOUR

Sustainability related questionnaire

43. If you are the beneficiary of irrigation, what problems have you recognised/ faced so far?
    1. Water logging on the farm land _____
    2. Inequality in distribution leading to conflict _____
    3. No equal participation in canal clearing and maintenance ____
    4. Other(s), specify_____
44. Do you think the community will effectively manage the irrigation scheme after project termination? 1. yes _____ 2. No ____
45. If yes how will it manage effectively?
    1. Through its water user association _____
    2. Through institutionalized contribution of users _____

3. Through government support _____
4. Adequate management training is already provided ____
5. Other(s) specify _____

46. If your response for qn 44 is no, what is/are the reasons behind?
    1. Maintenance may require much money ____
    2. Water users association is not strong enough ____
    3. The capacity training provided is not sufficient ___
    4. There are no strong rule and regulations ____
    5. Other(s), specify _____
47. What have you contributed so far for up keeping of irrigation schemes after project termination?
    1. Money contribution____ 2. Nothing _____
48. Have you ever participated in any kind of training or workshop since project intervention? 1. Yes ____ 2. No _____
49. If yes, what kind of training or workshop?
    1. on irrigation scheme use and management _____
    2. on land use and management _____
    3. on different agricultural practices_____
    4. on conflict management and resolution _____
    5. on off-farm and non-farm income generation activities _____
    6. other(s)_____
50. What benefits did you get from the training/workshops you Participated in?

    _____
    _____

PART FIVE

Community participation

51. How did this project come in to being or initiated? 1. through our request _____ 2. through woreda government request _____ 3. By the church's interest _____4. I don't know_____
52. If it is through your request, how did you organize yourselves to apply for external intervention? 1. through kebele administration _____ 2. Through traditional institution _____ 3. Other(s) specify _____
53. Have you ever been participated in the project work? 1. Yes ____ 2. No _____
54. If yes, in what forms?

Participation / contribution	Project phases		
	Planning	implementation	evaluation
1. Idea/opinion	_____	_____	_____
2. In kind	_____	_____	_____
3. In cash	_____	_____	_____
4. Labour	_____	_____	_____
5. Other(s), specify	_____	_____	_____

55. If you have participated in labour, was it free or with payment? 1. Free

_____ 2. With payment _____

56. Have you faced any problem(s) in community participation? Yes_____ No _____

57. If yes, what are these problems? 1. Biasness _____2. Commitment _____3. Lack of coordination _____ 4. Other(s), specify _____

58. What do you think are the benefits of community participation in the project?

    1. It helps to develop sense of ownership _____2. Enhances sustainability of project out puts and outcomes _____3. Improves project's implementation performance _____4. Other(s), specify _____

PART SIX

Applied for only female headed HHs

59. Have you got any kind of support from the project and the community for being female headed HH? 1. Yes _____ 2. No_____

60. If your answer for qn. No 59 is yes, what are these supports?

    1. Give priority for use of irrigation water _____
    2. Exemption from community labour campaign_____
    3. Give priority during the provision of agricultural inputs_____
    4. If other, specify_____

61. Have you ever faced any problem(s) for being female headed HH? 1. Yes _____ 2. No_____

62. If your answer for qn. No. 60 is yes, what are these problems?

    1. No equal treatment like males _____2. Undermine _____3. If other, specify _____

These were the questions I wanted to ask you and thank you very much for your cooperation.

Appendix 2: Interview and focus group discussion guide questions

General information

1. Respondent's name :_____
2. Respondent's level of education:_____
3. Respondent's occupation/position: _____
4. Respondent's sex: _____

Before project intervention

5. How did you recognise the food security situation of Jarso community before project intervention?

6. What do you think were the major problems of food production in the area?
7. Would you please mention at least three years of acute food shortages in Jarso community?
8. If you remember, state severe crop failure years and explain the extent of the problem?
9. What were the measures taken by government, non-governmental organisations and the community and how effective were these measures?
10. If the measures taken by these bodies had not brought significant results, what were the main reasons?
11. How did the people survive in the years of crop failure?

After project intervention

12. How was YSSIFSP initiated? Who was/were the primary initiator(s) of this project?
13. Explain the roles played by community, government and the church in realising the project.
14. How do you recognise the situation of food production in relation to pre-project period?
15. If there is/are improvements in food security situation of the community, what are these improvements?
16. What were the major activities conducted to improve the food production of the community? How effective were these activities?
17. What were the major activities conducted to diversify household food production and income bases? How effective were they?
18. What were the major problems faced the households/community during the last five years (1996-2001/2004-2008)?
19. What were the major undesirable consequences/effects, the households/community faced due to the stated problems?
20. How do you recognise the sustainability irrigation schemes and food production?
21. What specific activities were conducted to sustain the project outputs? How effective were these activities?
22. If there is any doubt about the sustainability of the project, what do you thing are the problems? What do you suggest to be done?
23. How do you recognise the actors' relationship in the project implementation?
24. Your general opinion

Appendix 3: Tables

Appendix Table 3.1: Konso area annual and monthly rainfall distribution

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1989	38.6	94.6	121.1	158.7	218.0	22.7	34.6	32.9	105.8	108.1	17.5	96.2	1048.8
1990	11.5	150.9	178.4	197.9	64.8	10.4	10.0	11.9	41.1	50.8	28.2	16.9	772.8
1991	35.5	37.4	148.6	95.1	166.6	46.3	0.0	0.0	24.3	72.3	67.9	37.4	731.4
1992	0.2	23.3	59.7	159.5	138.3	67.4	42.6	4.9	92.4	112.4	39.0	35.4	775.1
1993	107.5	169.9	1.8	0.0	98.5	0.0	1.0	1.6	14.9	90.1	29.6	24.7	539.6
1994	2.5	4.2	81.8	171.1	137.0	16.7	29.7	69.3	15.7	109.3	64.6	16.7	718.6
1995	10.2	7.1	31.1	171.7	31.8	87.7	22.8	1.4	44.1	55.8	0.0	3.2	466.9
1996	32.7	24.0	161.1	205.4	74.0	76.7	19.8	35.8	94.9	80.6	10.1	0.0	815.1
1997	5.8	0.0	52.6	259.1	74.8	22.3	79.3	28.2	15.0	193.4	229.7	64.2	1024.4
1998	122.9	125.5	45.1	118.3	123.9	53.9	1.5	23.0	40.1	120.7	32.2	0.0	807.1
1999	7.6	3.5	148.5	106.0	4.9	12.4	31.5	41.8	38.3	68.3	11.6	66.9	541.3
2000	0.0	0.0	28.3	87.1	98.2	5.0	10.3	18.3	17.9	76.8	37.5	68.1	447.5
2001	33.2	4.1	98.4	352.0	0.0	0.0	19.8	63.1	50.3	137.8	81.2	1.9	841.8
2002	43.0	15.7	86.9	112.0	77.9	14.0	0.0	3.4	43.1	92.9	28.2	228.7	745.8
2003	3.8	14.2	80.2	231.6	210.4	25.7	27.2	85.0	30.1	41.4	44.0	35.3	828.9
2004	33.4	13.0	54.2	112.6	123.3	4.9	6.2	0.3	56.3	42.1	83.5	33.2	563.0
2005	25.0	2.4	81.8	145.0	273.4	9.5	19.4	16.2	61.8	109.9	57.6	0.0	802.0
2006	0.0	65.9	142.2	x	41.9	32.0	5.0	100.3	14.6	141.2	181.8	75.4	800.3
												Average	740.2

Source: NMA

Appendix Table 3.2: HH responses to years of severe crop failures

Years of severe crop failures	Frequency	Percent
0	1	1.1
1985	17	18.3
1985 & 1991	22	23.7
1992 & 1993	2	2.2
1988 & 1995	2	2.2
1977 & 1985	4	4.3
1993	2	2.2
1995	4	4.3
1999	1	1.1
2001	1	1.1
1985&1995	19	20.4
1985 & 1988	11	11.8
1985&1993	7	7.5
Total	93	100.0

Appendix Table 3.3: Reasons for crop failure

Factors for crop failure	Frequency	Percent
No response	1	1.1
Lack/insufficient use of agricultural inputs	8	8.6
Drought(lack/erratic rainfall)	57	61.3
Drought and crop pests	27	29.0
Total	93	100.0

Appendix Table 3.4: Possession of major assets other than land prior to project intervention

Asst type	Frequency	Percent
House	33	35.5
Livestock and house	60	64.5
Total	93	100.0

Appendix Table 3.5: HH responses towards the level their land fertility

Level of fertility	Frequency	Percent
Fertile	4	4.3
less fertile	78	83.9
Infertile	11	11.8
Total	93	100.0

Appendix Table 3.6: HH responses towards coping mechanisms during crop failure

Type	of coping mechanism	Frequency	Percent
	Sale of livestock	2	2.2
	Sales of livestock, wood/grass, eat wild fruits and kin and/or community directed transfer (gift/borrowing)	41	44.1
	Sales wood/grass/charcoal, wild fruit, food for work and reduce quantity of food and number of meals	15	16.1
	Sales of household valuables, wood/grass/charcoal , food for work and migration	21	22.6
	Ration food (reduce amount, reduce meals)	2	2.2
	Remittances (temporary and permanent migrant members)	2	2.2
	Diversify income (petty-trading)	3	3.2
	Kin and/or community transfers (borrow, gifts)	5	5.4
	Government transfers (relief aid)	2	2.2
	Total	93	100.0

Appendix Table 3.7: HH responses towards major problems encountered during the last three years (2006-2008)

Type of problem	Frequency	Percent
No response	3	3.2
Lack of farm implements	4	4.3
Lack of land and money constraint	7	7.5
Lack of land and less access to irrigation water	14	15.1
Labour constraints	6	6.5
Lack of credit facilities	8	8.6
Money constraints	11	11.8
Lack of oxen	12	12.9
Epidemics of human and livestock	3	3.2
Conflict	25	26.9
Total	93	100.0

Appendix Table 3.8: HH responses to their level of literacy * Number of children attending formal schooling program Cross tabulation

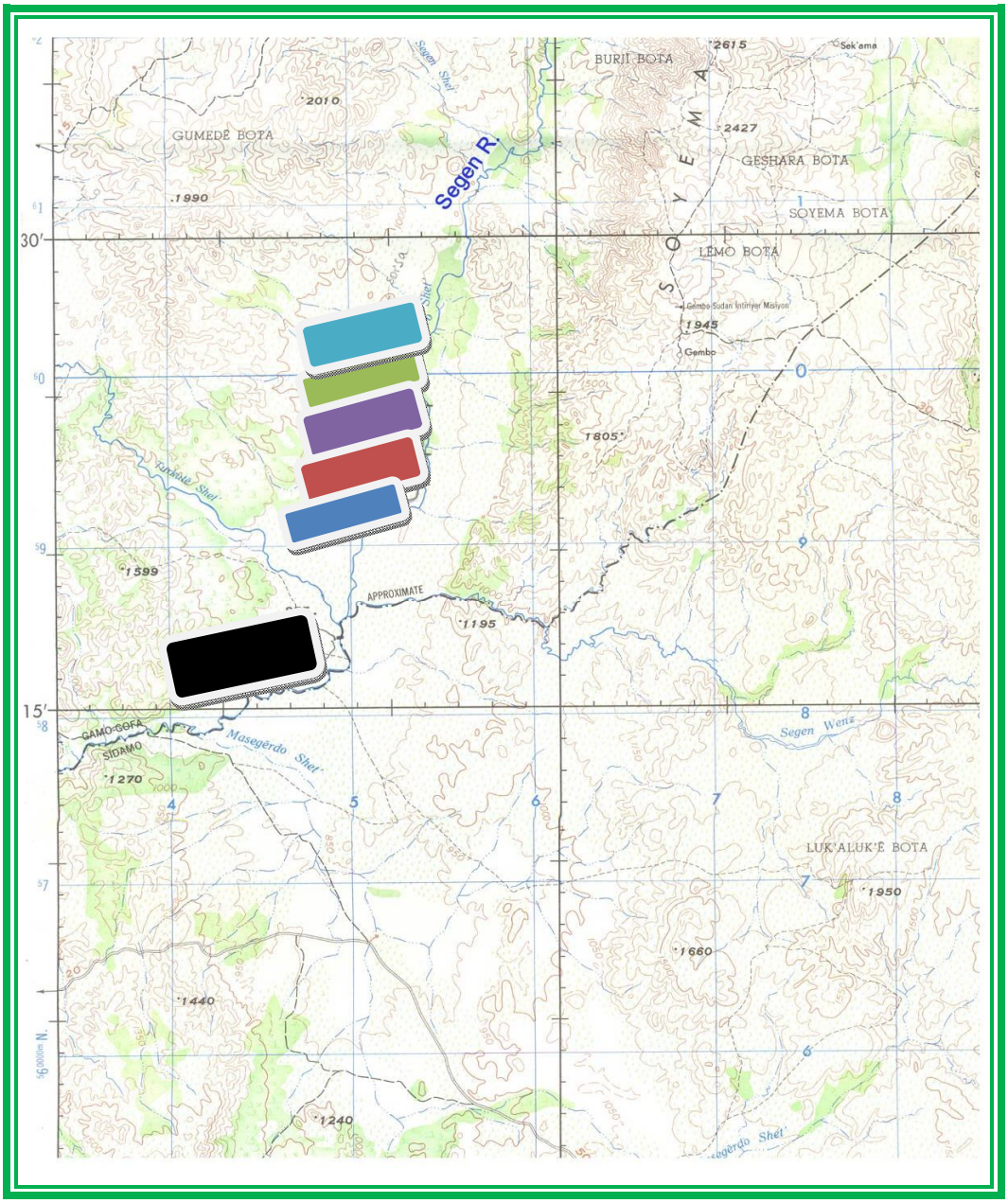
Level of literacy		Number of children attending formal schooling program			
		None	1-2	2+	Total
Literate (read and write)	Count	4	23	6	33
	% within Q7. What is your literacy level?	12.1%	69.7%	18.2%	100.0%
	% of Total	4.3%	24.7%	6.5%	35.5%
Illiterate (do not read and write)	Count	26	30	4	60
	% within Q7. What is your literacy level?	43.3%	50.0%	6.7%	100.0%
	% of Total	28.0%	32.3%	4.3%	64.5%
Total	Count	30	53	10	93
	% within Q7. What is your literacy level?	32.3%	57.0%	10.8%	100.0%
	% of Total	32.3%	57.0%	10.8%	100.0%

Appendix Table 3.9: H H responses to level of their of literacy * Average amount of your harvest in 2007/2008 from all crops Cross tabulation

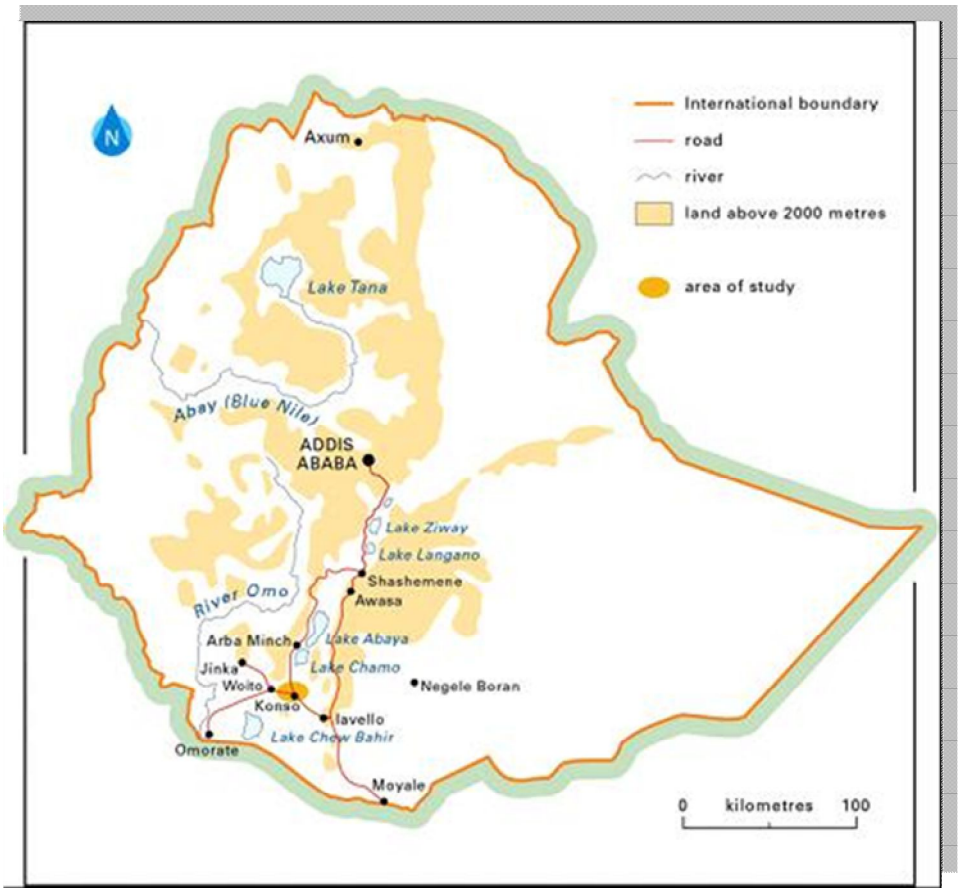
Level of literacy		Average amount of your harvest in 2007/2008 from all crops					Total
		Below 1000kg	1000 - 2000kg	2000 - 3000kg	3000 - 4000kg	4000kg +	
Literate (read and write)	Count	1	19	8	4	1	33
	% within Q7. What is your literacy level?	3.0%	57.6%	24.2%	12.1%	3.0%	100.0%
	% of Total	1.1%	20.4%	8.6%	4.3%	1.1%	35.5%
Illiterate (do not read and write)	Count	13	32	7	4	4	60
	% within Q7.What is your literacy level?	21.7%	53.3%	11.7%	6.7%	6.7%	100.0%
	% of Total	14.0%	34.4%	7.5%	4.3%	4.3%	64.5%
Total	Count	14	51	15	8	5	93
	% within Q7. What is your literacy level?	15.1%	54.8%	6.1%	8.6%	5.4%	100.0%
	% of Total	15.1%	54.8%	16.1%	8.6%	5.4%	100.0%

Appendix 4: Maps

Appendix 4.1: Approximate location of the project's spate irrigation systems



Appendix 4.2: Location of Konso, the research woreda



Source: http://www.geog.cam.ac.uk/research/projects/konsoethnography/