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ASSESSMENT OF IMPACTS OF SOCIAL PROTECTION PROGRAMMES ON SUBSISTENCE FARMERS' LIVELIHOODS: The case of Dodota Woreda, Ethiopia.

BY

EZGIMELES TECLEAB GEBRUE

June 2011

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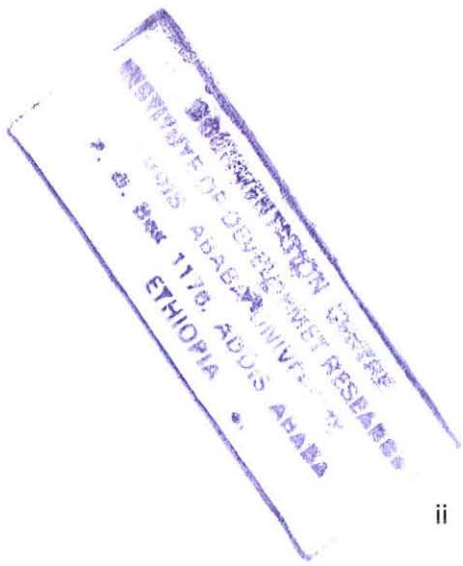
Advisor: WELDEAMLAKE BEWKETU (Ph.D)



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Title

Assessment of Impacts of Social Protection Programs on Subsistence Farmers' Livelihoods: Case Study of Dodota Woreda, Ethiopia.

By
Ezgimeles Tecleab

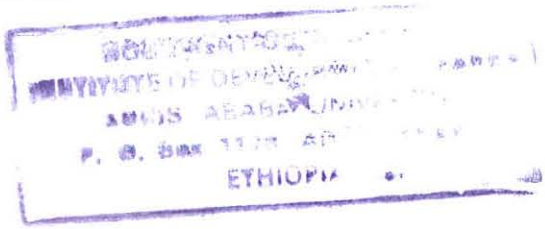
Food Security

APPROVED BY THE BOARD OF EXAMINERS: SIGNATURE

Dr. Ali Hassen _____
CENTER HEAD

Dr. Woldeamlak Bewket _____
ADVISOR

Dr. Terefe Degefa _____ 11/07/2011
INTERNAL EXAMINER



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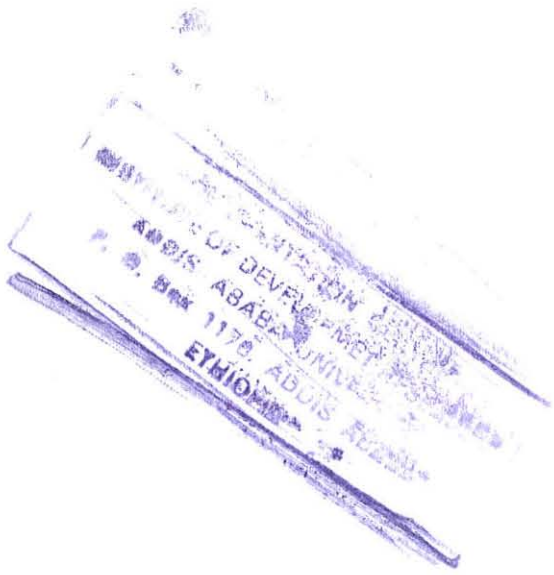


Acronyms

AU- SPF	African Union Social Protection Framework
a.s.l	Above Sea Level
CC	Climate Change
CCA	Climate Change Adaptation
CCFSF	Climate Change and Food Security Framework
CFI	Chronically Food Insecure
DA	Development Agent
DR	Disaster Risk
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
DRMFSS	Disaster Risk Management and Food Security Sector
FAO	Food and Agriculture Organization
FSCD	Food Security Coordination Directorate
FSP	Food Security Programme
FTC	Farmers Training Centre
FSPc	Food Security Pack
HABP	Household Asset Building Programme
HEP	Household Extension Programme
HH	Household
IDS	Institute of Development Studies
IGA	Income Generation Activities
JRIS	Joint Review and Implementation Support
LIA	Longitudinal Impact Assessment
MoARD	Ministry of Agriculture and Rural Development Programme
NAPA	Ethiopian Climate Change National Adaptation Programme of Action
OFSP	Other Food Security Programme
PIM	Programme Implementation Manual
PSNP	Productive Safety Net Programme
PW	Public Work
SP	Social Protection
SWC	Soil and Water Conservation
WB	World Bank
WFP	World Food Programme

Table of content

List of Tables

List of Figures

Abstract

Recently, social protection has received attention of policy makers and researchers to use it as an instrument to build the adaptive capacity of the vulnerable. As learned from a range of experiences of different developing countries, a number of social protection interventions have started to incorporate adaptive measures as a response to the impacts of climate change. This study was conducted with an objective to explore the impacts of both PSNP and OFSP, as social protection interventions, to build adaptive capacity of subsistence farmers by taking the situation in Dodota woreda of Oromia region. The result of the study would have a significance to provide an evidence based data for researchers as well as policy makers on the contribution of social protection to respond to the consequences of climate change. It employed the Longitudinal Impact Assessment (LIA) research methodology to measure the change on adaptive capacity of small holder subsistence farmers to the threats of climate change following the five years intervention of PSNP and OFSP.

The result of the study showed that "distress asset sales" to meet food needs have significantly reduced but "distress asset sales" to raise cash for emergency needs such as health expenditure showed no change as a result of five years PSNP intervention. Impacts of implemented PW activities to harness rainwater and improve farmland soil fertility were found encouraging. The result of the study also showed that PW component of PSNP have significant role to promote application of irrigation for crop production. On the other hand, findings of the study have shown that implemented PW have little impact to reduce direct dependence of household livelihood on the sensitive climate related factors, particularly rainfall. Because of the programme design limitations and implementation challenges, OFSP impact to promote climate change adaption through livelihood diversification and income enhancement was found poor.

The study showed that the combined efforts of PSNP and OFSP have started to show promising and encouraging result to improve the resilience of the smallholder subsistence farmers to cope or adapt impacts of moderate shocks (eg failure of rainfall) but brought hardly to change resilience to cope with impacts of extreme shocks, especially drought. Generally, PSNP and OFSP intervention have made significant progress to build the adaptive capacity of subsistence farmers to respond to the current vulnerability. But in relation to building the adaptive capacity to respond to the medium and long term trends of climate change impacts, the progrmmes have yet to bring a change and needs to improve the intervention quality and standards.

In order to mainstream climate change adaptation into the existing social protection interventions (PSNP and OFSP), two important points must be critically seen by policy makers. Firstly, selection, design and implementation of activities through PSNP and OFSP/HABP must be conducted with the view of their significance to reduce the direct dependence of livelihood strategy to the climate related factors, mainly the unreliable and erratic rainfall. Secondly, both PSNP and OFSP need to focus on and give priority to activities that can enhance and promote livelihood diversification, both within and outside agriculture sector. While selecting of PW activities, priorities should be given to technologies which can promote ground water recharge and irrigation. As HABP documents seemed to properly answer the weaknesses of OFSP to diversify household income, the government needs to speed up implementation of HABP by establishing sufficient rural micro-credit service providers and allocation of adequate budget.

Chapter I

Introduction

1.1. Background of the study

Poor developing countries like Ethiopia are especially vulnerable to climate change because of their geographic exposure, low incomes and greater reliance on climate sensitive sectors. People exposed to the most severe climate-related hazards are often those least able to cope with the associated impacts. This is mostly due to their limited adaptive capacity to climate related hazards. This in turn poses multiple threats to economic growth, wider poverty reduction, and the achievement of the Millennium Development Goals (ADB *et al* 2003; Stern *et al* 2006). Within this context, there is growing recognition of the potential role of social protection as a response to multiple risks and short and long-term shocks and stresses associated with climate change. Stern (2008) argues that social protection could become one of the priority sectors for adaptation in developing countries.

Social protection originates from the mere thought of the state as a provider and protector of citizens, enjoying a rich history in Western Europe in the post-World War II period (GSDRC, 2008). Traditionally, social protection has focused on short-term protective safety nets: mechanisms to protect people from the impact of shocks such as flood, drought, unemployment or the death of a breadwinner, as well as insurance interventions linked to formal employment. This focus on short-term poverty mitigation has been criticized as an expensive, welfares intervention and a disincentive for individual self-reliance. As a result social protection evolved in the last two decades to include longer-term preventive and promotive perspective. According to Davis *et al* (2009), in the last years social protection has demonstrated growth in the development policy agenda and experience, coupled with improved evidence, that it can play a significant role in poverty reduction and move people in to productive livelihoods. Many of the social protection interventions have targeted and contributed to reducing vulnerability related to the variations and extremes in climate and their impact on rural livelihoods.

As presented in different literatures, the set of social protection interventions- that aim to reduce social and economic risks, vulnerabilities and deprivations for all people- are broadly classified into four but interrelated interventions (Hailu, 2010). These are categorized as transformative, protective, preventive and promotive interventions. *Transformative* interventions aim to protect the rights and interests of people exposed to social risks and vulnerabilities by addressing power imbalances and structural causes that perpetuate economic inequality and social exclusion. *Protective* interventions aim to provide relief from economic deprivation, abolish barriers, such as user fees, that prevent vulnerable groups from having access to basic social services to provide alternative care to vulnerable populations who need special care. *Preventive interventions* are formal or informal systems of pension, health insurance, maternity benefit, child benefits and unemployment benefits aimed to preventing risks and consequences of livelihood shocks. *Promotive* interventions are those that have

income stabilization or consumption smoothening at least as one objective. Reflected in Arnall *et al* (2010), social protection interventions within the agriculture sector that could build resilience to climate change include: weather-indexed insurance, asset restocking (including direct livestock provision), and cash transfers. Other literatures like Hailu (2010) showed that rural skill development and micro-finance service is considered as instrument of the social protection that builds the adaptive capacity of people to climate change.

Social protection holds significant promises for protecting poor people against current disaster risks, and future (climate change adaptation) weather extremes and tackles increasing levels of risk and vulnerability (IDS, 2009). Recently there is recognition among researchers and policy makers that social protection has a role to play in helping people withstand short-term livelihood threats from climate change and in facilitating long term adaptation to climate change (Raworth, 2007). Stirbu (2010) looks the role of social protection in terms of building climate resilience and enhancing the adaptive capacity of vulnerable groups in Cambodia. After assessing the social protection strategies of the country, she concluded that there are benefits to be gained from adapting social protection strategies and instruments to climate change, notably:

- direct contribution to poverty and inequality reduction and enhancement of socio-economic security.
- the strengthening of adaptive capacities of communities and therefore further contribution to reducing poverty, insecurity and vulnerability.
- additional opportunities for communities and individuals to engage in risk-taking and exploring new livelihoods and new sources of income.
- opportunities for empowering communities to address their own risks and vulnerabilities in a coordinated manner and influence the use of resources including of natural resources and collective goods to everyone's advantage.

As presented in Table 1, Davies *et al* (2009) demonstrate how the different social protection interventions can enhance climate change adaptation.

Table 1. Promoting adaptation through social protections.

Social protection category	Social protection instruments	Adaptation and DRR benefits
Provision (coping strategies)	- social service provision - Basic social transfers (food/cash) - Pension schemes - Public works programmes	- Protection of those most vulnerable to climate risks, with low levels of adaptive capacity
Preventive (coping strategies)	- Social transfers - Livelihood diversification - Weather-indexed crop insurance	- Prevents damaging coping strategies as a result of risks to weather-

		dependent livelihoods
Promotive (building adaptive capacity)	- Social transfers - Access to credit - Asset transfers/protection - Starter packs (drought/flood resistant) - Access to common property resources - Public works programmes	- Promotes resilience through livelihood diversification and security to withstand climate related shocks. - Promotes opportunities arising from climate change.
Transformative (building adaptive capacity)	- Promotion of minority rights - Anti-discrimination campaigns - Social funds	- transforms social relations to combine discrimination underlying social and political vulnerability.

Source: Davies *et al* (2009)

The 2005 Agricultural policy of DFID (cited in Davies et al 2009) discusses how social protection can complement agricultural growth. It states that well-targeted and timed social protection programmes can support agricultural growth prospects by promoting risk-taking activities and allowing households to cope with unexpected shocks and stresses.

Davies *et al* (2008) developed Adaptive Social Protection concept as an approach that combines key elements of social protection, DRR and climate change adaptation as a means to increase the livelihoods resilience of the poorest and most vulnerable people. In doing so, it aims to simultaneously tackle unsafe living conditions, counter the underlying causes of vulnerability, and promote people's ability to adapt to a changing climate.

Although Ethiopia lacks a comprehensive and integrated social protection (SP) system, it nonetheless has a range of polices, legislations, strategies, programmes, projects that serve a variety of social protection (Hailu, 2010). A number of Social Protection interventions are currently implemented in the country through the government budget (national treasury) and the international development partners fund (donors, UN agencies, NGOs and other Civil Society Associations). Among the several social protection intervention currently implemented in Ethiopia, Productive Safety Net Programme (PSNP), and the Rural Skill Building and Micro-Credit Services (OFSP/HABP) are the two main social protection programmes enjoying budgets in hundreds millions of dollars per year for implementation in the rural areas of the country. PSNP is one of the four components of the Ethiopian Government's five years Food Security Programme (FSP) aimed to assure food consumption and prevent asset depletion for food insecure households in chronically food insecure woredas, while stimulating markets, improving access to services and natural resources, and rehabilitating and enhancing the natural environment (MoARD, 2009). There are different skill building and micro-credit services in the country. But in rural areas of the country HABP/OFSP is the main social protection intervention,

through which micro-credit service and technical support provided to the small holder subsistence farmers with an objective to increase and diversify the income of food insecure households in chronically food insecure woredas. During the government's FSP of 2005 to 2009, the programme was named as Other Food Security Progamme (OFSP). Recently, this programme is redesigned and renamed as Household Asset Building Programme (HABP) and is part of the four components of the 2010-2014 FSP.

Both PSNP, the second largest social protection programme in sub-Saharan Africa next to South Africa, and HABP/HEP are believed to respond to climate change in various ways in parallel to achieving their objectives. Notably they foster Climate Change Adaptation (CCA) since they contribute to environmental restoration and diversifying livelihoods, which are key measures of adaptation in rural communities of the country (World Bank, 2010).

1.2. Statement of the problem

Ethiopia's Productive Safety Net Programme (PSNP), one of the largest social protection programs in Africa, has been implemented since 2005 in chronically food insecure woredas of the country. The objective of the PSNP is to ensure food consumptions and prevent asset depletion for rural food insecure households in the way that stimulates markets, improves access to services and natural resources and rehabilitates and enhances the natural environment (MoARD, 2009). The Household Extension Programme (HEP) is a type of rural skill development and micro-credit service included under the OFSP component in the first phase of the Ethiopian Government's Food Security Programme (2005 – 2009) and redesigned as Household Asset Building Programme (HABP) in the new 2010 – 2014 FSP. Alongside of PSNP, HABP is one of the four components of FSP aimed to diversify the source of income and increase the productive asset of the chronically food insecure households. Both PSNP and HABP are complimentary to each other to enable the targeted beneficiaries to become food secure after years of implementation of the programme (MoARD, 2009). The beneficiaries of both programmes are vulnerable to the adverse impacts of climate change mainly for two reasons. Firstly their livelihood strategy is highly dependent on the climate related factors, especially rainfall. Secondly, they practice their livelihood strategy in marginal lands and have few/limited assets (Siedenburg and G/micheal, 2010)

Parallel to achieving the objectives, both programmes are believed to contribute in building the capacity of the targeted community to adapt to the possible threats of climate change. But to date, studies made to assess the impact of these two social protection interventions are limited in their scope to measure achievements in relation to whether the targeted households were able to graduate from the programme (to measure whether the beneficiaries are reaching to the level of food security). Hence, this study was intended to assess the contribution of the aforementioned programmes towards minimizing the vulnerability/susceptibility and building adaptive capacity of the community to cope with the threats of climate variability and change.

Both PSNP and OFSP/HABP, as a social protection intervention, have a great potential to protect the rural poor from adverse impacts of climate change. But there are still significant knowledge

gaps among the several actors on the contribution of these two complementary programmes to climate change adaptation. Even the notion of climate change adaptation is not reflected in the programme documents and implementation manuals. Therefore, conducting case studies on the impact of the programmes in relation to contribution to climate change adaptation can narrow the knowledge gap among the policy makers and practitioners alike.

The Joint Review and Implementation Supervision (JRIS) mission, conducted by the government and development partners in November 2010 noted that the PSNP is the largest Climate Change Adaptation (CCA) programme in Africa though it is not widely understood. Such a conclusion calls for the need to conduct study on the role of the PSNP as well as OFSP/HABP to climate change adaptation.

IDS (2008) developed a new conceptual framework known as Adaptive Social Protection (ASP) that refers to a series of measures which aims to build resilience of the poorest and most vulnerable people to climate change by combining elements of Social Protection (SP), Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) in programmes and projects. While these approaches have much in common, because they have evolved separately over the last decades, they are not likely to be sufficient in the long run if they continued to be applied in isolation from one other. The Ethiopian PSNP and OFSP/HABP do not reflect the issues of climate change in their programme documents and at the same time the Ethiopian Climate Change National Adaptation Programme of Action (NAPA, 2007) missed in its document to incorporate the social protection elements as an option among the several listed and suggested climate change adaptation strategies. Therefore, a study is needed to identify the elements common to both the climate change and social protection in order to provide ideas on how to combine the two components in designing policy and implementation.

1.3. Objectives

General Objective

- Explore the potential contributions of social protection – PSNP and OFSP- to adapt the changing climate.

Specific objectives

I. Examine the contribution of PSNP and OFSP/HABP, as social protection, to reduce the direct dependency of the livelihood of the small holder subsistence farmers to the adverse impacts of climate change.

II. Assess the impacts of PSNP/OFSP to minimize the vulnerability (sensitivity) of the rain fed subsistence farmer's livelihood to climate induced shocks.

III. Explore the role of PSNP and OFSP to build resilience of the small holder subsistence farmers, through livelihood diversification, to impacts of climate change.

1.4. Research Questions

- To what extent are the subsistence farmers aware on the occurrence of climate change, particularly in relation to changing the trends of rainfall?
- How does the climate change (mainly in relation to changing the rainfall pattern) affect the subsistent farmers' lives and livelihoods?
- How does the weather information forecast utilized by the subsistent farmers when they decide their farming system?
- To what extent did the PSNP food or cash transfer meet the household food gap and prevent damaging coping strategies?
- What are the community assets created through the public work component of the PSNP?
- What are the contributions of the implemented PSNP public work activities to harness the rainfall?
- What are the roles of the implemented PSNP public work activities to improve soil fertility of the farmland?
- To what level did PSNP intervention prevent the susceptibility of properties such as homestead and farmlands against the flood hazard?
- What are the impacts of implemented PW activities to promote application of irrigation for crop production?
- Does the implemented PSNP public works have brought about a change on the subsistent farmers' livelihood vulnerability to climate variability and change?
- What is the role of PSNP public work activities to improve and diversify incomes of subsistent farmers?
- What are the supports provided to chronically food insecure households through the OFSP and how was the OFSP implemented?
- What was the contribution of OFSP support to improve the subsistent farmer's income?
- How does OFSP affect to diversify the livelihoods and sources of incomes of the subsistent farmers'?
- What is the resilience status of subsistence farmers to cope impacts of moderate and extreme shocks following the five years of PSNP and OFSP interventions?

1.5. Significance of the study

The researcher believed that this study, which attempted to investigate the impacts of PSNP and OFSP (HABP) on building the adaptive capacity of the small holder subsistence farmers to the adverse impacts of climate change has significant importance. Firstly, it provides some highlight to the current vague perception and discourses in the academic and policy world about the possible role of social protection in climate change adaptation. Therefore, the result of this study would give an evidence based data whether the ongoing PSNP and OFSP, as social protection instruments, have a potential to respond the threats of climate change.

Secondly, social protection and climate change adaptation have much in common, but have developed as separate disciplines over the last two decades. They all seek to mitigate risks faced by the poor people, they tackle the impacts of, and builds reliance against shocks and stresses on livelihood and they are all in relatively formative stages of development testing, rather than established components of development and poverty reduction. However, to date, despite ongoing efforts to link disasters and climate change communities, there has been little cross-fertilization with social protection policies and practices. Hence, the study would provide a recommendation for the social scientist as well as the natural societies on how to integrate the two components –social protection and Climate Change Adaption- for optimal achievement of their common goal.

Thirdly, although they did not contribute much to the causes of climate change, subsistence farmers in developing countries are the most hit by the impacts of the climate change. Therefore, in order to compensate the impacts of climate change, a global climate fund has been established to provide financial assistance to developing countries that are expected to respond to the adverse impact of climate change. These finance sources are planned to provide funds to a range of programme intervention in developing countries which have an impact on climate change adaption and mitigation. But social protection intervention programmes are not meant to receive financial assistance from the global climate adaption fund, as the contributions to climate change adaption were overlooked by the policy makers. This study would, therefore, provide evidence about the actual contribution of social protection to climate change adaption and thus help in the dialogue to include social protection as part of adaptive option for the entitlement to climate funds.

1.6 Organization of the thesis

The remaining part of the thesis is organized into five chapters. The second Chapter deals with a review of the literature giving emphasis to practice of social protection in building adaptive capacity to climate change impacts and the conceptual framework of adaptive social protection developed by IDS researchers to assess the relationship of social protection and climate change adaptation. Chapter three highlights the research methodology employed to conduct the study. In Chapter four, a brief description of the study area is presented. Survey results are discussed in Chapter five. Finally, Chapter six gives concluding remarks and recommendations.

Chapter II

Review of related literature

2.1. Definition of terminology

Climate and climate change

The WMO (2005) defines climate change as a significant change (i.e., a change with important economic, environmental and social effects) in the mean values of metrological element (particularly temperature or amount of precipitation) in the course of a certain period, where the means are taken over periods of a decade or longer. The IPPCC (1995) defines climate change for the UNFCCC usage as a change of climate that is attributed, directly or indirectly, to human activity, alters the composition of the global atmosphere and is in the addition to the natural climate variability observed over comparable period.

Climate Change Adaptation

Gina *et al* (2008) described climate change adaptation as strategies/activities aimed to mitigate and develop appropriate coping measures to address the negative impacts of climate change on lives and means of livelihood.

Social Protection (SP)

Cited in Hailu (2010), AU- SPF defines SP as "a set of responses by the state and society to protect citizens from risks, vulnerabilities and deprivations" as well as "strategies and programms aimed at ensuring a minimum standard of livelihood for all people in the given country, which 'entails measures to secure education and health care, social welfare, livelihood, access to stable income, as well as employment. According to Devereuxe and Sabates-Wheeler, 2004 (cited in IDS, 2006), *Social protection is* described as all initiatives that transfer income or assets to the poor, protect the vulnerable against livelihood risks, and enhance the social status and rights of the marginalized.

2.2. Climate change and food security

Climate change is a complex biophysical process. It is not possible to precisely predict future climate conditions, but the scientific consensus is that global land and sea temperatures are warming under the influence of greenhouse gases, and will continue to warm regardless of human intervention for at least the next two decades (IPCC 2007). The same report by IPCC continues to show the long term changes in other elements of climate. Precipitation trends from 1900 to 2005 shows significant increase in eastern parts of North and South America, North Europe and northern and central Asia whereas precipitation declined in the Sahel, the Mediterranean, southern Africa and parts of southern Asia. Globally, the areas affected by droughts have likely increased since the 1970s. According to the same report, observation evidence from all continents and most oceans shows that many natural systems are being affected by regional climate change. Reflected by Ziervogeal, *et al*, (2008), in many parts of

Africa it seems that warmer climate and changes in precipitation will destabilize agricultural production.

As reflected in FAO (2008) paper on climate change and food security, the climate change effect is becoming evident across the globe in several ways that can affect food security.

1. CO2 Fertilization Effect: Increase in availability of atmospheric carbon dioxide for plant growth.
2. Increase in global mean temperatures: Reflects an increase in maximum temperature on hot days; increase in minimum temperature on cold days; increase in annual occurrence of hot days; increase in frequency, duration and intensity of heat waves;
3. Gradual changes in precipitation: which can be manifested in increase in frequency, duration and intensity of dry spells and droughts; changes in timing, location and amounts of rain and snowfall.
4. Increase in frequency and Intensity of extreme weather events: Increase in annual occurrence of high winds, heavy rains, storm surges and flash floods associated with tropical storms and tornadoes.
5. Greater weather variability: Greater instability in seasonal weather patterns; change in start and end of growing seasons.

According to FAO (2008) climate change and food security (CCFS) framework, climate change broadly affects all the four pillar of the food security – food availability, food accessibility, food utilization and food system stability. Similarly Josef and Francisco (2007) presented how climate changes can affect food security. According to their paper, climate change affects food production directly through changes in agro-ecological conditions and indirectly by affecting growth and distribution of incomes, and thus demand for agricultural produce. As cited in the same report, recent studies have estimated the likely changes in land suitability, potential yields and agricultural production on the current suite of crops and cultivars available today. These studies forecast a decline of potential cropland in the developing countries (lowland latitudes) up to 111 million ha. Besides, more pronounced shift within the quality of cropland is predicated in developing countries. The report also shows how climate change impact on the stability of food supplies. Due to extreme events, it brings greater fluctuation in crop yields and local food supplies and higher risks of landslides and erosion damage, they can adversely affect the stability of food supplies and thus food security. The report also presents that climate change affects food utilization, in which it affects ability of individuals to use food effectively by altering the conditions for food safety and changing the disease pressure from vector, water, and food-borne disease. Besides, the report show how the food access will be disproportionally affected between the sub Saharan country and the rest of the world

A range of studies conducted in Africa, particularly the sub-Saharan Africa indicated high correlation between the historical climate change and crop yields. A study by Ziervogal *et al* (2008) found a significant correlation between higher historical temperature and reduced dryad staple production in South Africa. The study found small- scale farmers to be worst affected by the decrease.

IPCC (2007) notes climate change impacts across different continent and sector in the near and long term under different scenarios. According to the report, climate change will have impact to the continent of Africa as follows:

- By 2020, between 75 million and 250 million people are projected to be exposed to increased water stress due to climate change.
- By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition.
- By 2080, an increase of 5 to 8% in arid and semi-arid land in Africa is projected under a range of climate scenarios.

2.3. Climate change and its impact in Ethiopia

As reflected by a number of studies, climate change has been already appearing in Ethiopia. According to the Ethiopian National Metrology Agency (NMA, 2001), in the last 50 years, the annual minimum temperature over the country has been increasing by about 0.2 ^{o}C every decade. The same report also said the country experienced frequent and extensive droughts in recent decades which caused food shortages and famine. The spread of malaria in to highland areas which have never experienced it before, loss of biodiversity and a decline in wildlife numbers have been observed. The study made by Adame and Kinfe (1998), using the 1961 to 1990 temperature and climate data, indicated that future temperatures would increase by 0.8 to 3.3 ^{o}C in Kiremt, 0.5 -3.4 ^{o}C in Belg and 0.9 – 3 ^{o}C in Bega seasons. The same study also reveals the country would experience decrease in rainfall. Mainly the decrease in rainfall was estimated by the study while general increase in rainfall is projected in Bega season. Another field study conducted in northern Ethiopia by Meze-Hausken (2004) found that climate change is occurring. According to local farmers and pastoralists contacted during the study, they perceived regional climate to have changed during the last few decades. Compelled by climate change, farmers explained that they have been changing their farming strategies by shifting to more drought-resistant crops as well as to a shorter agricultural calendar. They attributed this to a loss of the spring rains since 'their father's time' (20 – 30 years ago) as well as a shorter main summer wet periods. Furthermore statistical study in Tigray (northern Ethiopia) made by REST (2008) shows increasing average temperature and declining precipitation. Based on the assessment of 20 – 30 years of historic rainfall and temperature data, Daniel's (2009) study in Central Rift Valley showed the occurrence of climate change in the study area. Increase in temperature and variability of rainfall, which started to negatively affect the small holder agricultural practices, were identified. The finding of the study indicated that predictability of climate parameters reduced and farmers' confusion on farming calendar increased. The occurrence of climate extremes increased and economic loses during such years increased in relation to normal years. Crop and livestock yield reduced and disease infestations started to increase.

Based on the survey conducted in two districts in Oromia region by Million (2009), more than 90 % of the respondent felt that temperature increased and precipitation has declined in their

areas. They felt the frequency of early rain events in April-May decreased with rain occurring in June and not long lasting. The farmers indicated that they have experienced higher temperatures and the climate has become hotter and drier. The damaging effects observed and assessed of the current climate events are drought and heat stress that adversely affect crop productivity and supply of fodder to livestock.

Through stakeholder's consultation and assessments made by NMA (2007), there is a general consensus that ecologically arid, semi-arid and dry sub-humid parts of Ethiopia are the most vulnerable to the adverse climate change impacts. Sectoraly, agriculture is the most vulnerable to climate variability and change. In terms of livelihood, small scale rain-fed subsistence farmers and pastoralists are the most vulnerable.

Study conducted by Temsgen (2006) to measure the economic impact of climate change shows the degree of damage on agriculture. According to the findings of the study, a unit increase in temperature during summer and winter would reduce net revenue per hectare by US$ 177.62 and US$ 464.71, while reducing precipitation by 14% reduced net revenue by 40%. Study made by Aklilu and Alebachew (2009) on climate change impacts in southern lowlands of Ethiopia shows that climate change poses particular risk to poor farmers and pastoralists who have an immediate daily dependence on climate sensitive livelihoods and natural resources. The impact ranges from recurrent drought and loss of biodiversity, rangelands and soil nutrients, to catastrophic floods and declining livestock and food production. Local and scientific observation by SC-UK (2009) in Borena and Somali pastoral areas show that the region's climate change manifested increasing temperatures and drought frequency, as well as unpredictable rains that fall in shorter but more intense episodes. The magnitude and rate of current climate change, combined with additional environmental, social and political issues, are making many traditional coping strategies ineffective and/or unsustainable, amplifying environmental degradation and food insecurity, and forcing communities to rapidly find new livelihood strategies.

2.4. Climate change adaptation

According to Neil and Agrawala (2007), adaptation practices can be differentiated along several dimensions: by spatial scale (local, regional, national); by sectoral (water resource, agriculture, tourism, public health, and so on); by type of action (physical, technological, investment, regulatory...); by actor (local government, international donors, private sector, NGOs, local communities and individuals); or by some combination of these and other categories.

From a temporal perspective the same paper described adaptation in to three level, including response to current vulnerability (which also reflects learning from past adaptation to historical climates); observation medium and long term trends in climate; and anticipatory planning response to model-based scenarios of long term climate change. The response across the three levels is often intertwined, and indeed might form a continuum.

Some of the adaptation practices presented in different literature with regard to agriculture sector broadly encompasses:

- Technical innovations, such as improved germplasm for climate related stresses,
- Integrated natural resource management practices,
- Diversification of production system,
- Enhanced biodiversity at landscape level and improved institutional settings.
- Providing timely weather information for all actors in the food system.
- Improved infrastructure for small-scale water capture, storage and use.
- Adjusting consumption and responding to new health risks (FAO, 2008)
- Intensifying food and agriculture production (FAO, 2008)
- Social protection

2.5. Climate change adaptation in Ethiopia

A study made by Meze-Hausken *et al* (2009) presents different adaptation strategies used by farmers in Ethiopia to minimize the adverse impacts of the prevailing climate change. Based on the findings of the study, the most common adaptation strategies include: use of different crops or crop varieties, planting trees, soil conservation, changing planting date, and irrigation. According to the report of the study, however, despite having perceived changes in temperature and rainfall, a large percentage of farmers did not make any adjustment to their farming practices. The main barriers to adaptation cited by farmers were lack of access to land, information and credit. Food aid was also found to facilitate adaptation among the poorest farmers.

Based on Jan, *et al* (2009) comparison study of the sepia photograph, taken in 1868 during the Great Britain military expedition to Ethiopia, against to Arial photograph taken in 2008 (after 145 years), significant vegetation coverage improvement were observed in the northern parts of the country. Despite a ten-fold increase in population density, land rehabilitation has been accomplished over an extensive area as the result of large-scale implementation of reforestation and soil and water conservation activities, especially in the last two decades. Environmental recovery programmes could not heal all scares, but this study shows that overall there has been a remarkable recovery of vegetation and also improved soil protection over the last 140 years, thereby invalidating hypothesis of the irreversibility of land degradation in semi-arid areas.

According to the study conducted by Catholic Relief Service study (2009) in its project area in Eastern Hararghe (Eastern Ethiopia), the social protection intervention implemented in the areas builds the capacity of the targeted beneficiaries to cope the impact of climate change. As of the study, prior to the implementation of the joint CRS in 1997, due to climate change and poor resource management, ground water availability in the area had significantly reduced, forcing residents to rely on wells. However, the provision of diesel-operated water pumps enables rural households to access water for household use and to irrigation. As a result the food production was improved through small-scale irrigation, better health and sanitation conditions and the ability to generate income through small rural enterprises. The case study further reports that as a result of the introduction of a range of soil and water conservation activities and reforestation programmes in the area, households were encouraged to plant trees, bushes and grasses on the terraces to improve soil stability, reduce soil erosion, and

provide new sources of firewood and livestock feed. The report further claims, after years of the programme intervention, the areas ground water increased and natural springs that had dried up for many years came back to life.

As reflected in Kelbessa (2007) report, people across the world use a number of indigenous strategies to respond and adapt to climate change. This indigenous adaptive strategies include: diversified resource base (to minimize the risk due to harvest failure, they grow many different crops and varieties, and they also hunt, fish, and gather wild food plants); change in crop varieties and species; change in the timing of activities (crop harvest, wild plan gathering, hunting and fishing); change of techniques; change of location; changes in resources and/or life style (resorting to wild foods in the case of emergency situations such as droughts and floods); exchange (obtaining food and other necessities from external sources through exchange, reciprocity, barter, or markets in times of crises); and resource management (enhancing scarce and climate-sensitive resources management). According to the same report, the knowledge and experiences of peasant farmers in Ethiopia practices these types of adaptation strategies during climate related shocks.

2.6. Lessons from social protection practices

A number of case studies were conducted to review lessons of different social protection aimed at agriculture sector. As referred in Davis, et al (2009), experiences in different countries show how social protection enhance the resilience of vulnerable communities and points to ways in which social protection measures could be more resilient to current and future climate related shocks.

2.6.1. Starter packs and seed fairs

It becomes popular to provide inputs to smallholder farmers in Africa under different mode of distribution. Three lessons on provision of input from Malawi are presented in FAO (2008). The government of Malawi with the support of DFID implemented a "universal starter pack" that provided maize seeds and fertilizer for 0.1 ha for small holder farmers. Accompanied with good weather, the programme contributed to a 67% increase in maize output. In addition the country also implemented a target input subsidy, delivered in the form of vouchers that could be redeemed at agriculture parastatals for fertilizer and maize seed at one-third of normal retail price. The country enjoyed a bumper harvest in 2006 due to a combination of favorable weather and the input subsidy. Malawi also implemented the "inputs-for-work" programme, in its public works programmes, where participants were paid with agricultural inputs (fertilizer), rather than with food rations (FFW) or cash (cash-for-work). Evaluation of the programme concluded that the project was more popular with participants than either FFW or CFW because it was implemented before planting time when fertilizer prices were extremely high; it yielded a favorable return in terms of the value of incremental maize production. Further, it provided a means of forced savings, protecting recipients from "dissipating' their earning on short term requirement or on claims from relatives and neighbors.

Cited in Davis *et al* (2009), DFID supported a programme in Kenya's semi-arid regions that implement a seed voucher as a response to a prolonged drought. The progamme allowed the farmers to bring their surplus seeds to fair sites where voucher holders were able to select seeds of their choice. In contrast to the package of inputs approach which risks undermining biological diversity and leads to mono-cropping, seed vouchers and fairs have encouraged farmers to maintain crop diversity on their farms, contributing socio-ecological resilience.

Another example is the practice of Food Security Pack (FSP) in Zambia (RHVP, 2007). The programme covers all the 72 district of the country. FSP has three complementary objectives: to provide a basic level of farm inputs to households that have lost the ability to source such inputs themselves, to encourage crop diversification in farmers' field, and to promote conservation farming practices. The input pack received by beneficiaries constitute 0.25 ha cereal seed, 0.25 ha pulses seed, and 0.25 ha cassava/sweet potato tubers, as well as the correct fertilizer type and amount for cereal, and lime for areas with acidic soils.

Other examples include a Practical Action supported pilot in post-tsunami areas of Sri Lanka to trail 10 traditional saline-resistant varieties which had been present before the introduction of higher yielding varieties. These help increase resilience in light of sea-level rises in low lying areas.

2.6.2. Asset restocking

Productive asset selling is one of the negative coping strategies that small holder farmers usually practice as a response to stresses. Asset restocking has been getting recognition among different actors as an intervention to reduce the vulnerability and risk, and smooth the impacts of shocks. Such programme has been implemented in a number of countries with varying forms. Three lessons on asset restocking were presented by Davis *et al* (2009). In Bangladish, the ultra-poor households were provided with productive assets that are feasible for income-generating activities. A programme named as The Chars Livelihood Programme (CLP) in Bangladish provide asset, include more climate-resilient activities to poor households. The programme achieved remarkable success in average returns on assets and contributing to income diversification. Another project in Bangladesh named as Reducing Vulnerability to climate change (RVCC) included alternative livelihoods promotion and asset transfer such as promoting livestock and birds that are more suited to the changing environmental conditions, particularly those that consume a low amount of fresh water and are capable of absorbing heat and temperature. These lessons demonstrate that asset transfer can contributes to reducing vulnerability to climate shocks, buffering climate related shocks at the household level by providing liquidity and alternative sources of income.

Small livestock project in Zimbabwe transfers livestock such as goats and chickens to vulnerable families in selected rural districts (RHVP, 2007). The purpose of the project is to stabilize food security and protect the livelihoods of vulnerable households in the selected districts of the country. The project played significant role in building asset ownership of the targeted group and confers resilience in the face of livelihood shocks.

2.6.3. Cash or food transfers

Several countries implement cash transfer as a response to emergency need and as a component of the broader disaster risk reduction programme. Conditional and unconditional cash transfer is implemented in Ghana, aimed to provide beneficiaries with basic livelihood security, thereby increasing their ability to plan for the future and freeing them "to engage in productive activities to support themselves and ultimately contribute to national development, including adopting more risk taking livelihood strategies. Ultimately, it is believed that the programme beneficiaries will become micro-credit clients, so as to further develop their livelihood strategies.

Based on the lessons of different countries, Devereux and Sabates (2004) argued that cash transfer helps raise incomes and smooth the consumption of the poor, allowing them to engage in moderate risk-taking, and to protect rather than erode their asset holding when confronted by livelihood shocks.

Cited in RHVP (2007), Under the Malawi Social Action Fund (MASAF), public works programme has been implemented in Malawi since 1995 with funds from donors. The programme aimed to underpin the livelihoods of the poor and vulnerable by providing employment at a low wage during critical months of the year. The programme addresses generalized problems of poverty and vulnerability by providing social safety nets when and where people are considered to be most prone to insufficient access to food. In addition the programme helps to build public or community assets and this is often considered as strength in their favor. The other good example of cash transfer is the case of Productive Safety net Progamme in Ethiopia, which will be presented below.

2.6.4. Rural skill building and micro-credit services

A range of rural skill building and micro-credit service programmes are attempted in different developing countries with various types of modalities. The objective of these micro-credit services is mainly to provide credit service to the rural smallholder farmers to increase or diversify their income. In Zimbabwe, CARE through local partners introduced microfinance scheme with the objective to protect and promote the livelihood security of rural communities where the scheme operates (RHVP, 2007). Through the scheme, beneficiaries purchase productive assets (livestock, sewing machine and the like) that enable them to diversify their means of livelihood. Evaluation made in 2005 revealed that the welfare and well-being of many households benefited from the credit service had improved.

2.7. Social protection practice in Ethiopia

Though Ethiopia is undergoing to design a comprehensive social protection programme, there are several types of social protection intervention in the country implemented by the government both through the government budget and fund from the development partners (donors). Table 2, adopted from Hailu (2010) summarizes some of the most important social protection interventions in the country.

Table 2: Summary of transformative, Protective, Preventive and Promotive Social Protection interventions in Ethiopia.

Category of intervention	Intervention	Managing agency
I. Transformative	Revised family code	Parliament
	The revised civil code	Parliament
	The revised lab our Proclamation and its three directives	Parliament
	Decent Work Country Programme (DWCP)	MoLSA
	Gender mainstreaming and establishing CRC committees	MoYS
	Creating and strengthening civic organization	Parliament
II. Protective		
a. Transfer	Emergency Humanitarian relief	DRMFSS- MoARD
Conditional	FSP- PSNP (public work	DRMFSS
Unconditional	FSP- PSNP (unconditional transfer)	DRMFSS
	Urban Social transfers programme	MoLSA, MoWA
	Therapeutic Feeding Progamme	MoW
	Targeted supplementary Feeding programme	MoW
b. Services		
Education	School fee wavier	MoE
Health	Waver of medical fee	MoH
Water	Water subsidy	MoWR
Grains	The urban grain subsidy	
Housing	Low cost urban housing	
Alternative care	Alternative care services to unaccompanied children, the elderly and the disabled	MoLSA
III. Preventive		
a. contributory	Social Security Programme to public sector employees	SSA
b. Non-contributory		
IV. Promotive	FSP- HABP	MoARD
	FSP- Resettlement Programme	MoARD
	The Youth and Women Development Package	MoWA, MoLSA, MoYS, MoISB

Source: Hailu (2010)

This thesis, however, discusses the two social protection programmes implemented in the rural areas of the country: Productive Safety Net Programme (PSNP), and Other Food Security Programme (OFSP) or Household Asset Building Programme (HABP).

2.7.1. PSNP and HABP programmes in Ethiopia

As cited in the FSP guideline (MoARD, 2005), In 2003 the Government of Ethiopia launched a large scale consultation process called the New Coalition for Food Security. Key stakeholders interested in the development of Ethiopia were invited to share views and support the

definition of new strategies to address increasing persistent food insecurity. The significant political commitment to this process was reflected in the participation of the Prime Minister and other high level decision-makers in the platform that delivered the New Coalition work.

As a result of this process the government made significant changes to its Food Security Programme (FSP), by scaling up its level of intervention and incorporating a large 'Productive Safety Net Programme' (PSNP). Consequently, the 2005-2009 FSP was designed to help chronically food insecure households reach a level of food security necessary for an active and healthy life. There were three components planned under the FSP (2005- 2009): Resetlment, Productive Safety Net Progamme(PSNP), and Other Food Security Progamme (OFSP/HEP). Resettled households were expected to achieve food security status solely as a result of that component's package of interventions. Safety net beneficiaries, however, would require the complementary of other food security interventions (mainly the HEP/HABP) in order for sustainable impact to be achieved. The first phase of five year FSP was implemented from 2005 through 2009.

As an extension to the first phase of the FSP, the government again prepared a five year FSP strategies that goes from year 2010 to 2014. The current FSP consist four components. These are:

- Productive Safety Net Programme (PSNP),
- Household Asst Building Programme (HABP),
- Complementary Community Investment Programme (CCI), and
- Resettlement Programme

Productive Safety Net Programme

As indicated in the PSNP guidline (MoARD, 2009), the objectives of the Productive Safety Net Programme (PSNP) are:

1. **Smoothing food consumption** of chronically food insecure smallholder households, by transferring food or cash to buy food during the 'hunger gap' months (as protection intervention)
2. **Protecting household assets** by avoiding damaging coping strategies such as selling productive assets or taking on high-interest loans to buy food(as Prevention intervention);
3. **Building community assets** by selecting public works activities that create infrastructure with development potential (as promotion intervention).

Other Food Security Programme/Household Asset Building Component

The Household Asset Building programme is designed to replace the OFSP component of Ethiopian government's FSP that last from 2005 through 2009. As reflected in the project document, the old OFSP was criticized for its focus on supply. Thus, HABP is expected to provide credit as well as technical support based on the demand of the targeted household. It is designed to assist participants in PSNP to increase their assets and income through the provision of skill development and micro credit service. The expected outcome

of the Household Asset Building Programme (HABP) is 'household income and assets diversified and raised for food insecure households in FSP woredas'.

However, HABP is not fully realized at the national level, though it was planned to be implemented as of the beginning of year 2010. Hence, HABP is not yet implemented in the study areas until the data collection period which was conducted between March 15 and April 30, 2011. Therefore, the OFSP is still implemented in the study woreda. In addition, with the fund obtained from USAID, the local NGO known as Wonji Catholic Church has been implementing PSNP – PLUS project since October 2008. The objective of the project is to improve livelihood asset and residence capacity of PSNP beneficiaries as a means towards achieving graduation.

As presented in Amha (2009), under the OFSP, the Ethiopian government developed different household food security packages at various level based on the specific agro-ecology of the areas. The FS package mainly consist crop production, Dairy production, livestock fattening, poultry, apiculture, homestead gardening, irrigation and off-farm activities. The beneficiaries of the programme are provided with credit which they should pay pack both the principal and interest. In addition, trainings, technical assistance and continues extension service is also provided to the targeted household. Based on the selected household package, a household is expected to design a business plan to ensure food security. The government has developed 29 packages which can serve a menu for household. After selecting and assessing the status of a household, a combination of package activities is proposed for a specific household to attain the food security benchmark, which is a minimum of 18,000 Ethiopian birr income per year.

2.7.2. Progress of PSNP and OFSP/HABP/ in ensuring food security

According to the MoARD (2009) report, there have been significant achievements to date in the Government's efforts to provide critical support to food insecure populations. More than seven million people have received PSNP transfers that enable them to meet consumption needs, reduce the risks they faced and provided them with alternative options to selling productive assets. In addition, 692,002 household (around 3.5 million people) received credit financed from the Government's Federal Food Security Budget Line between 2005 and 2007 (this was known as the 'Other Food Security Programme', OFSP) and a further 355,279 households received credit from the donor financed Food Security Project (between 2002 and 2007).

The PSNP is smoothing consumption and protecting assets and a growing number of PSNP clients are having growing access to household asset building efforts. Where the two programmes (PSNP and HABP/HEP) are combined, particularly in areas where programmes were well implemented (indicated by a high level of transfers) household asset holdings have increased and crop production appears to have improved. Despite this there has only been limited progress towards graduation. As of October 2008 18,538 households had graduated from the PSNP in three Regions.

Several studies were conducted to assess the achievement of the programme. A study conducted by Devereux and Bruce (2007) revealed that the PSNP have several successful

achievements. In terms of smoothing food consumption, Devereux and Bruce found that out of the total interviewed clients, 88 % of households that receive food from the PSNP consumed all their food, while 7 % sold some- often to buy other food- and consumed the rest, and few households gave some of their PSNP food to others (usually family members). Among recipients of cash from the PSNP, 88 % used some or all of this cash to buy staple food, and 11% bought other food. Three quarters of PSNP households reported consuming more food, or better quality food, since they were covered by the programme.

Devereux and Bruce (2009) show the impact of the programme on asset protection; 62% of PSNP beneficiary households reported being effectively protected against 'distress sales' of asset. The report also reveals the impact of the programme on promoting agricultural livelihoods. The public work (PW) component of the PSNP had played significant role to promote agriculture directly, by both raising or stabilizing crop yield and farmers' income, through small-scale irrigation, micro-dams, and soil and water conservation. Activities constructed by the PW component of the programme such as construction of rural access road and farmers training center, and improved water supply (spring cropping, ponds, shallow wells) enhanced agricultural incomes indirectly. The finding of the same study demonstrated that more than one in ten households purchased seeds while smaller percentage (3.5%) also purchased fertilizer from the PSNP cash transfer.

The PSNP programme implementation completion and result report of World Bank (2010) have showed a number of impacts of PSNP at household and community level, which is summarized as follows:

1. PSNP achieved consumption smoothing and asset protection even during times of crisis.

a) ***Improved household food security***. The 2008 impact evaluation found that participation in the PSNP improved household food security as measured by changes in the household food gap. The effect was strongest among those households that received regular, full-value transfers. Growth in caloric acquisition was 17 percent higher for PSNP households, but only when they received recent and regular transfers. The impact of the PSNP on food security was greatest among households affected by drought, with a 30 percent higher caloric acquisition than non-beneficiaries.

b) ***Household asset protection.*** The 2008 impact evaluation found that the distress sale of livestock actually decreased among PSNP households receiving predictable, high value transfers, while increasing among those that received unpredictable transfers. Indeed, among households affected by drought, distress sale of livestock was significantly lower among PSNP households receiving predictable support as compared with non-PSNP households. This suggests that, when implemented as designed, the PSNP protects household assets.

2. PSNP transfers also provided productive benefits to households, including increased asset holdings, productivity and accumulation of human capital:

a) ***Asset holdings grew*:** Participation in Public Works increased net growth in livestock holdings by 0.28 Tropical Livestock Units (TLU) over comparator households. Again, results were sensitive to program performance. When households that received low levels of

transfers were measured, they saw no net increase in holdings; whereas households receiving recent and regular transfers had an increase of 2.6 TLUs.

b) ***Combined program effects on agricultural production:*** Access solely to public works transfers had no effect on output, acreage, productivity or fertilizer use. Neither did access to OFSP's packages of inputs and technical assistance. However, there were large impacts on productivity – increases of more than 200 kg/ha – when households had access to both public works transfers and OFSP services.

c) ***Use of social services increased***: In 2008, 27 percent of households reported increased use of health facilities over 2007 and almost half attributed this increase to the PSNP. This information, together with reports that PSNP beneficiaries use some of their cash transfers on health and education, suggests that the PSNP has a positive impact on human capital.

d) ***Households' perceived well-being improved:*** Households participating in the PSNP perceived themselves to be better off in 2008 as compared with 2006 despite a period of drought in 2008. Notably, this change in perceived welfare status was even higher among those households that received regular, full-value transfers.

3. Significant community assets have been built. This includes the rehabilitation of over 167,000 hectares of land through area closures, 275,000 kilometers of stone and soil bund embankments, the planting of almost 900 million seedlings, 130,000 water supply projects, the construction and/or maintenance of 66,000 kilometers of rural roads, 2,000 classrooms and 200 health posts constructed or rehabilitated.

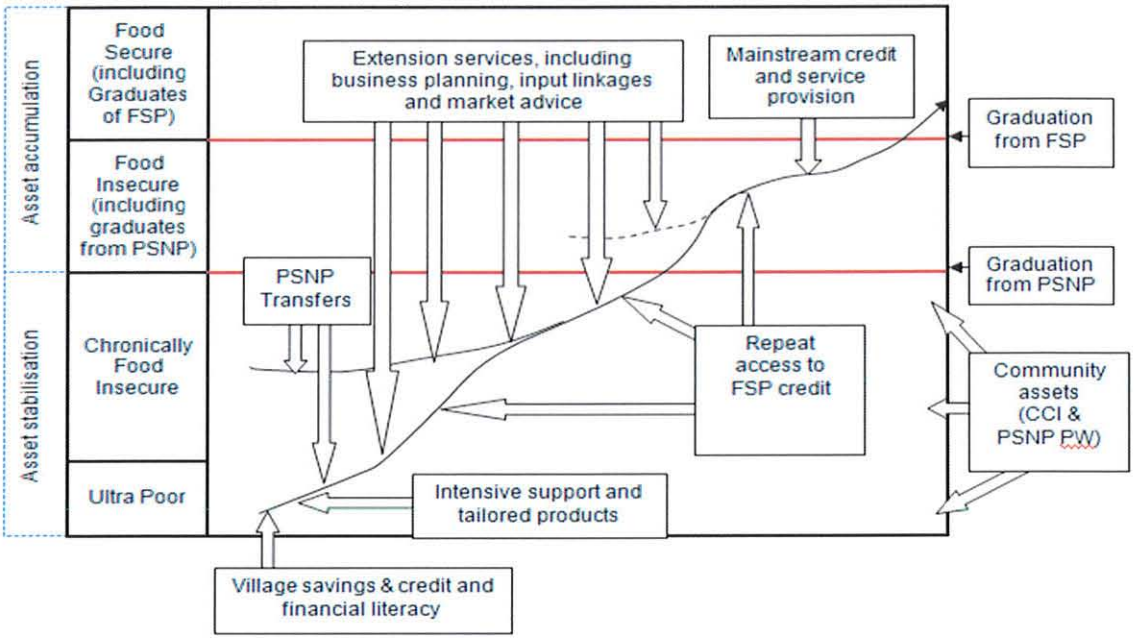
4. Public works are widely perceived to be beneficial to the community. In 2008, 92 percent of households indicated that their community benefited from the construction of roads, while 88 percent reported benefiting from SWC on communal lands. In addition, the perceived usefulness of the created assets increased between 2006 and 2008. Ex-post visits to SWC projects found significant increases in wood and herbaceous vegetation cover and a broader diversity of plant species. The increase in vegetation has already had a positive and visible impact on the increased supply of livestock feed, bee forage, and medicinal plants. Small-scale irrigation from water sources developed by the PSNP has helped to expand livestock for 4-12 percent of households and increase incomes by 4-25 percent, depending on the region. Other economic benefits are detailed below.

Graduation

Noted in FSP guideline (2010, another way to look at the programme objective is to think in terms of graduation. The programme aims to put CFI households on a trajectory of asset stabilization first, then asset accumulation. That is, as presented in Figure 1, a series of inputs from the programme and from other development interventions makes households become food sufficient first, then sustainably food secure. In this way they will graduate from the PSNP first, then from the FSP.

A household is expected to graduate when, in the absence of receiving PSNP transfers, it can meet its food needs for all 12 months and is able to withstand modest shocks. This state is described as being food sufficient.

Figure 1: Vision for graduation



Source: MoARD (2009)

But as reported by the government, progress toward graduation has been slow because of many factors. As indicated in the FSCD nine month progress report of 2011, until May 2011, totally 76,638 households have graduated from the programme. Of which 16,476 households were graduated from Tigray region, 41,204 were from Amhara region, and the remaining 18,958 household from SNNPR. In dodota woreda, no graduation happened until the end of 2010. But the same government report indicated that graduation is expected to happen in Oromia though it would be reported in June 2011, completion of the FY calendar of the Ethiopian government.

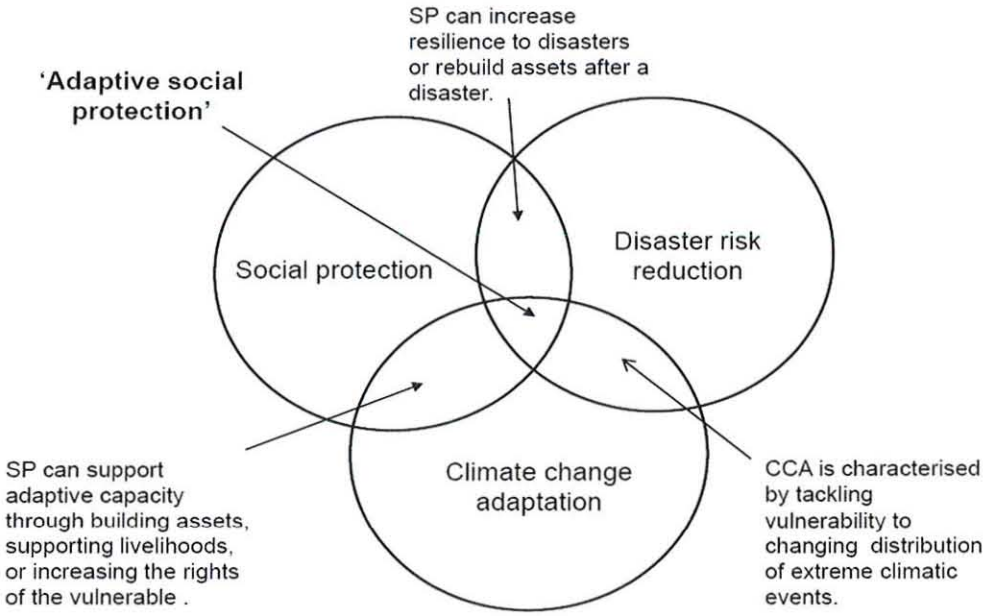
2.8. Conceptual Framework

The Adaptive Social Protection developed by IDS has been used as a conceptual framework to conduct the research. As illustrated below in Figure 2, to strengthen social protection and climate change adaptation approaches, IDS researchers have developed an 'adaptive social protection' framework. This framework characterizes social protection measures that acknowledge the changing nature of climate-related impacts, including the future existence of conditions that have not been experienced before. Features of this framework include:

• An emphasis on promotion that aims to transform productive livelihoods as well as protect, and adapt to changing climate conditions rather than simply reinforcing coping mechanisms.
• An understanding of the structural root causes of poverty in a particular region or sector, permitting more effective targeting of vulnerability to multiple shocks and stresses.
• Incorporation of a rights-based rationale for action, stressing equity and justice dimensions of chronic poverty and climate change adaptation in addition to instrumentalist rationale based primarily on economic efficiency.

• An enhanced role for research from both the natural and social sciences to inform the development and targeting of social protection policies and measures in the context of the burden of both geophysical hazards and changing climate-related hazards.
• A long-term perspective for social protection policies that takes into account the changing nature of shocks and stresses.

Figure 2: Conceptual framework for Adaptive Social Protection (Adopted from *Davis et al, 2009*)



Source: Davies *et al* (2009)

The study was conducted with the understanding that Social Protection, which targets the rural smallholder subsistence farmers, can enhance the adaptive capacity to climate variability and change in two ways: either through minimizing the dependency of the livelihood strategy to climate factors (mainly rainfall); increase the income and source of income, or a combination of both. The timely and predicted cash/food transfers, PSNP smooth the food consumption of households and allow them to take moderate risk adaptive measures and investment. In addition cash/food transfers protect household asset by avoiding damaging coping strategies such as selling of productive asset. The Public Work component of PSNP on the other hand plays remarkable role in minimizing the adverse impacts of climate change in different ways ranging from providing alternative water sources in addition to rainfall and efficient utilization of the erratic and variable rainfall to enhance the source of income. As revealed in the programme design, the OFSP/HABP, through which rural skill development and micro-credit service is provided, is expected to build the resilience of the vulnerable to climate change through increasing the income and diversifying of production system both within and outside the farming/agricultural sector.

Chapter III

Research Methodology

3.1 Research design

According to Watsaon (2008) cited in Burns and Bogale (2010), definitions of impact in the humanitarian and development literature involve the concept of change and attribution, and the project level impact assessment essentially tries to answer the following three questions:

i. What changes have occurred in the project area since the start of the project?
ii. Which of these changes can be attributed to the project?
iii. What differences have these changes made to the lives of the project participants?

In line with this concept of change and attribution, the researcher mainly employed the Longitudinal Impact Assessment (LIA) method/model to measure the change in the adaptive capacity of smallholder subsistence farmers to the threats of climate change after the intervention of PSNP and OFSP. Accordingly, the study used a before and after approach across two points: status of sampled households before start of PSNP and OFSP (in the year 2005), and status of the same households after six years intervention of both programmes (in end of 2010).

The before and after approach basically uses two alternative approaches to assess the change in status of households adaptive capacity. The first approach is to use a comparison group or control group, which are similar in nature with the treatment group (targeted group). However, this approach was found irrelevant by the researcher to conduct the study mainly for two reasons. Firstly, as indicated from the targeting principles of PSNP, we can understand that the control groups were not in the same conduction to the groups targeted by PSNP and OFSP. Both programmes targeted households which are chronically food insecure which have a minimum of three months food gaps in a year even in a good season. The comparison groups, on the other hand, were excluded from the programme support because they were in a better off situation. Secondly, analysis of the impact by comparing these two different groups could lead to wrong conclusion since households not targeted by PSNP had a better adaptive capacity in the first place.

The second approach compares the adaptive capacity status of households before they were targeted by PSNP and OFSP and the after situation of the same households. This approach assumes the net change between the two periods is the attribution of the intervention (PSNP and OFSP). The researcher adopted this approach to measure the impacts of five year PSNP and OFSP intervention on the adaptive capacity of household to adverse impacts of climate change. The challenges with application of this approach were: the need for baseline survey which was lacking for PSNP and discrimination of contribution of other programmes that might have contributed to the change in the sampled household status. The study well recognized these limitations and employed a mechanisms (mentioned below) to avoid their effect on the result of the study.

To avoid the problem of absence of baseline survey, simple and generic questions were used so that the respondents can easily recall the situation and respond. For instance, whether they use irrigation for their crop production before the start of PSNP PW and after PSNP PW intervention, which is as proxy indictors for measuring change in vulnerability to climate induced hazards (failure of rainfall). Another example is also, households were asked whether the source of income was increased and diversified following the intervention of PSNP and OFSP. Similarly, to confirm whether the change were happen mainly due to PSNP and OFSP, or not due to other programme implemented in the area or other support, a control questions were used for each questions that answer change in the indicator. The activities and outputs of the PSNP and OFSP are clearly stipulated in the progarmme document. The households response on the status and the types of activities contributed to that were compared and cross checked with list of activities and outputs reported by the woreda and kebelle level implementer. For instance, households were asked whether the farmland soil fertility is improved. If they confirmed that there was improvement, then a question was followed to mention the type of intervention and reason for change on soil fertility status of their farmland. Their response was then compared with accomplished type of PSNP PW activities and achieved outputs found from secondary data reported by the woreda and Kebelle.

3.2. Sources of data and methods of data collection

3.2.1. Source of data

Both primary and secondary data ware employed to conduct the study. Primary data were collected from the sampled households, focus group discussion and key informants. Furthermore, primary data was collected through the visual observation of accomplished PW activities at field level. While secondary data were collected from Dodota woreda sector offices' records, progarmme documents, programme evaluations reports, and the government annual PSNP implementation reports, published and unpublished literatures.

3.2.2. Sampling and sample size

Sampling method

A mixture of random, convenience and purposive sampling was used. Convenience sampling was used to select the woreda among the 301 chronically food insecure woredas in the nation where PSNP was implemented. Dodota woreda was selected basically because of two main reasons. Firstly, both PSNP and OFSP have been implemented in the woreda since 2005. Secondly, given the time and finance constraints, the woreda was selected because of its geographical convenience for the researcher work station which is located 125 Km from the study woreda. Dodota woreda is divided into 12 rural and 3 urban administrative Kebelles. PSNP and OFSP were implemented in 12 rural Kebelles. Following the exploratory survey to the woreda and discussion with woreda key informants, two rural Kebelles - Qoro Dekako and Dire Kiltu- were selected purposely mainly because both PSNP and OFSP have been implemented in these two Kebeblles since the start of the first phase of the Ethiopian FSP back in 2005 and their road accessibility.

4	Role of PSNP in smoothening food consumption, as a protective and preventive social protection (coping strategy	- Coping strategies used prior to the PSNP support - Impact of PSNP transfer in meeting the food deficit - Utilization of the PSNP transfer (for consumption, partial for investment in productive asset...) - Before and After PSN, practice of selling productive assets (distress asset sales) in order to meet food needs and raise cash for emergency needs (health expenditure)	Used to assess the adaptive role through protection of those most vulnerable to climate risks, with low level of adaptive capacity, and prevent damaging coping strategies as a result of risks to weather dependent livelihoods
5	PSNP impact in a range of areas that have linkage to climate change adaption	- Enhancing household skill on a number of PW activities and application of them in private land. - Impact of PW activities in harvesting and conserving water, - Impact of PW in improving moisture holding capacity of farmland, - Impact of PW on soil fertility - Before and after PSNP PW, susceptibility of properties (farmland, homestead ...) for flood. - Use of irrigation before and after PW intervention - Rating household income increase and diversification - Impact on reducing the livelihood dependence on rainfall - Created asset - Before and after, rating the livelihood vulnerability to climate related hazards (eg flood ...)	Used to examine the impact on promoting resilience through livelihood diversification and security to with stand climate related shocks
6	OFSP support	- Source of OFSP support, amount, of the credit, types of the credit (cash Vs in kind) interest rate, provided other support (training, technical assistance, extension service, - Type of the in –kind credit, and investment of the cash credit - Loan repayment status	
7	Impact of OFSP on income and livelihood diversification	- Before and after OFSP support, sources of income and quantifying the income increase as result of OFSP support. - Change on livelihood diversification - Before and after OFSP support, engagement in off – farm income generating activities - Before and after, rating the livelihood	Used to examine the impact on promoting resilience through livelihood diversification and security to with stand climate related shocks

		vulnerability to climate related hazards (eg flood ...)	
8	Resilience	- Before and after both PSNP and OFSP intervention, rating the resilience of livelihood to cope or adopt for impacts of moderate (eg failure of rainfall) and extreme shocks (eg drought, flood)	Indicator for change of adaptive capacity of households.

Focus group discussions

In order to complement quantitative data obtained through the structured questionnaire, four focus group discussions were conducted. The focus groups were structured around a checklist, which included a set of standardized participatory exercises. This discussion was preliminary geared towards collecting descriptive contextual information on climate change, impacts brought through the interview of PSNP PW and OFSP. This included exercise to collect information on the occurrence and frequency of extreme shocks in the area and their trends during their life time, types and relevance of implemented PW activities to address the root cause of food insecurity in the area, impact of PSNP on ground water recharge and change of stream flow, impact of PW in rehabilitating and restoration of the environment and some others, targeting of PSNP and OFSP, weakness and strengths of the programme and way forward.

Key informant interview

Key informant interviews were conducted with staff of Dodota woreda BoARD, Wonji Catholic Church and DAs in order to get their impression on the change brought as a result of implementation of both progamme. A checklist was used to interview the key informants to guide the interview.

3.3 Methods of data analysis

Ordinarily, as described in the project documents, PSNP and OFSP are aimed to enable the targeted households to become food secure and gradually graduate from the FSP support. The indicator for the achievement of the progamme objectives was, therefore, geared around food security. As described in the Project document, PSNP has three objectives at outcome level: Food consumption assured and asset depletion prevented for food insecure households, Market stimulated and access to services and natural resources enhanced for PSNP and other households, and natural environment rehabilitated and enhanced. To measure the achievement of these objectives, a number of verifiable indicators are listed in the log frame of the PSNP and OFSP documents. To mention some, percentage change of PSNP participants achieved 12 months food access from all sources including PSNP, percentage of households reporting no distress sales of assets to meet food needs, increase in number of traders and retailers in local markets, percentage of PSNP participants and non-participants report the local vegetation coverage of hillside has improved and some others.

Therefore, it was difficult to get indicators to measure the impact of the programme on changing the adaptive capacity of targeted households to extreme climate related shocks as climate change was not properly mainstreamed during the progarmme design. Of course some of the indicators mentioned in

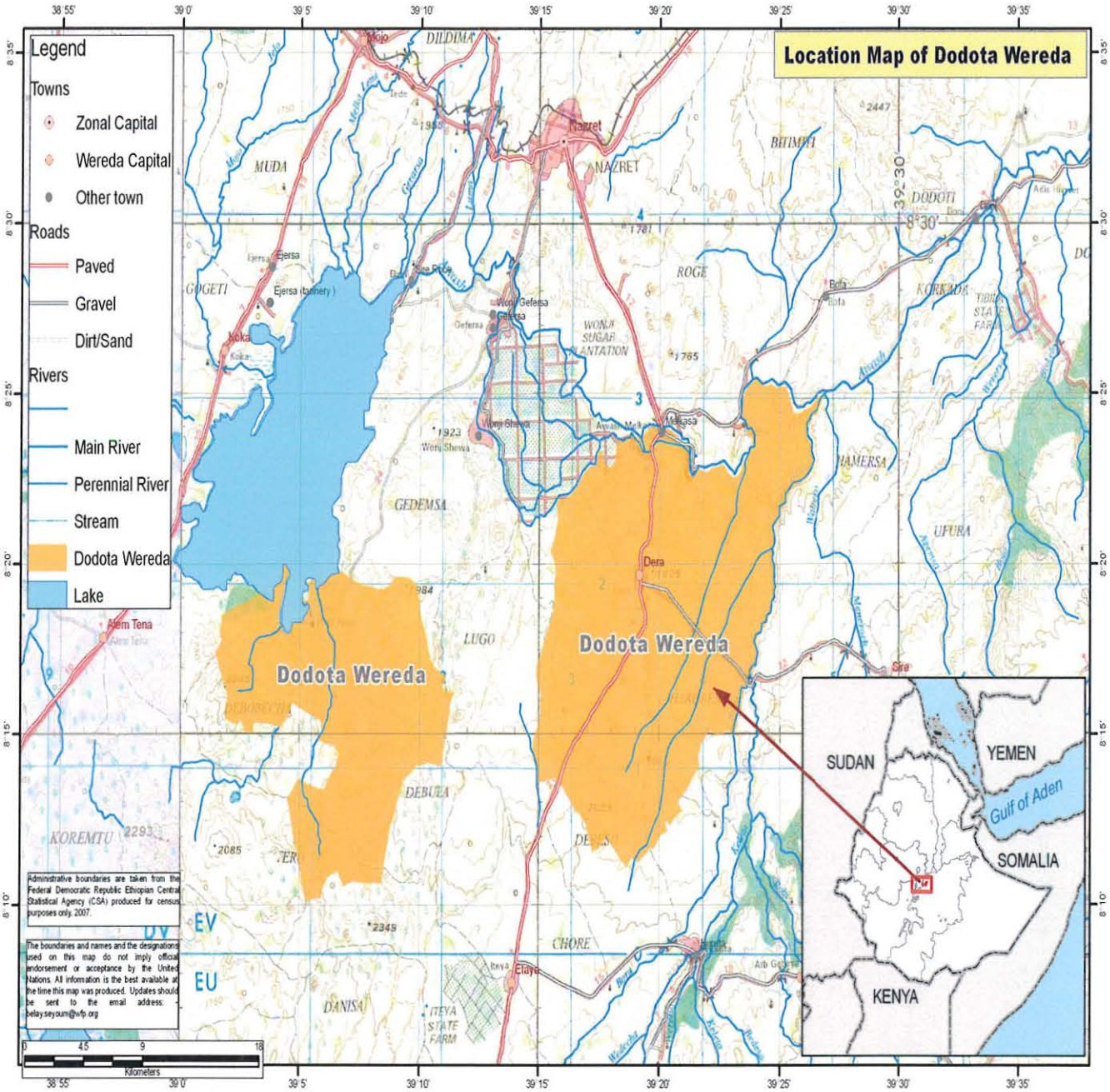
the progamme documents can use to interpret the result of the study in relation to existing climate variability but not to the long term impacts of climate change. Hence, a number of proxy indicators were used to assess impact of these two programmes to enhance the adaptive capacity of small holding farmers to the adverse impacts of climate change.

Basically the Adaptive Social Protection (ASP) conceptual framework developed by Davies et al (2009) was used to analyze the data collected by this study.

> *By placing social protection in the context of the impacts of natural phenomena- particularly climate- on agricultural productivity and related livelihood, the ASP framework measures that are resilient to disaster risks and that acknowledged the changing nature of climate related impacts including the future existence of conditions that have not been experienced before. This adaptive social protection is characterized by a number of features that include:*
>
> 1. *An emphasis on transforming productive livelihoods as well as protecting, and adapting to changing climate conditions rather than simply reinforcing coping mechanisms.*
> 2. *Grounding in an understanding of the structural root courses of poverty in a particular region or sector, permitting more effective targeting of vulnerability to multiple shocks and stress.*
> 3. *Incorporation of rights-based rational for action that address social exclusion, stressing equity and justice dimensions of poverty and climate change adaption in addition to instrumentalist rational based primarily on economic efficiency. (Davies et al, 2009, page 27.)*

Following the completion of data collection, data were cleaned, coded and entered in SPSS software version 17 for analysis. Although the analysis was intended to conduct with a sample size of 82, four questionnaires were rejected as they were found less credible and the responses to some of related variables were contradicting to each other. Hence the analysis was made based on 78 households. Results were presented in figures and tables through SPSS 17 and Microsoft office Excel 2007.

To assess the impacts of the two programmes under study on the adaptive capacity of the targeted group, it was considered how reducing dependence on climate sensitive livelihood strategy used for years. All the proxy indicators incorporated in the household survey questionnaire were interpreted in relation to this concept.



Source: Ethiopian Mapping Authority

Chapter IV

Background of the study area

4.1. Description of the study area

4.1.1. Location and agro-ecology of Dodota woreda

Dodota woreda is one of the 24 woredas in Arisi zone of Oromia region. It is found at a distance of 125 Km from Addis Ababa toward the South East located between $39^0 1' 19''$ -$39^0 27' 14''$ east longitude and $8^0 10' 30''$ – $8^0 25' 26''$ north latitude. Its altitude ranges from 1,360 – 2,600 m.a.s.l with an average daily temperature ranging from 18 – 30 °c and an annual rainfall of 500 – 900 mm. Its rainfall mainly characterized as bimodal pattern which are named as Meher and belg season. The former is main rain season which starts in July and ends in the last week of September and is used for crop production. The later rain season commonly starts in mid-March and ends first week of May with small amount of shower which are useful mainly for pasture regeneration and water replenish for livestock production. The woreda is located in the Ethiopian rift valley which is dominated by lowland agro-ecology. The woreda consist three agro-ecology that are classified as Kolla (lowland), Woinadega (midland) and Dega (highland).

4.1.2. Area coverage

The woreda has an estimated area of 44,561 ha, out of which 25,339 are cultivated land, 8,800 forest and bush land, 1,225 ha grazing land and the remaining 9,196 ha are marginal land (include water body, bed rock, homestead, ...). The woreda is divided in to 15 administrative Kebelles, of which 12 Kebelles are located in rural areas and the remaining three kebelles are urban Kebelles located in Dera woereda capital town.

4.1.3. Soil, vegetation and wildlife

The major types of soil in the woreda are Cambisol and Andosol from Volcanic ash and Lithosol. They have good potential for agriculture. However, they are highly vulnerable to rainfall and wind erosion. The vegetation type in the woreda includes forest, woodland, bush and shrubs. Greater Kudu, Hyena, Rabit, Monkey, Wild pig, Fox and Minilike Bush buck are the major wildlife in the woreda.

4.1.4. Population

Based on the 2007 CSA census result, the woreda population is projected to be 70,645 in the year 2011 with sex composition of 35,545 male (50.3%) and 35,100 female (49.7%). Of the total population, 21,314 (10,479 male and 10,835 female) people live in urban areas and 49,311 people (25,065 male and 24,266 female) live in rural areas of the woreda. However, the woreda administration believed that the woreda population size is above the projected figure.

4.2. Socio-economy of the study area

4.2.1. Agricultural calendar

The time of performing a number of agricultural activates varies depending on a number of factors. The season of cultivation (Meher and Belg), type of agro-climatic zone and types of crops cultivation are some of the factors that determine the agricultural calendar in the rural area of the country. Agricultural calendar of the woreda is presented in the following table.

Table: Agricultural calendar of Dodota woreda.

s/N	Types of activities	Meher Season	Belg Season
1	Land preparation	February to June	October, February to March
2	Planting	Mid June to August	May
3	Weeding	August to Mid-September	May
4	Harvesting	Mid December to January	August to November

Source: Dodota woreda Agriculture and Rural Development office.

4.2.2. Livelihood system and socio-economic conditions

The livelihood of the majority of the woreda people is mainly small holding subsistence farming system, with main source of income from rain fed crop production with small supplement of livestock production mainly cattle and shots. The rain fed crop production is conducted once in year with high risk of failure due to the frequent shortage of rainfall during the main rainy season leading crops during out or at the worst to drought. The main crops produced in the woreda are Teff, maize, wheat, sorghum, barley and haricot bean. Teff and haricot bean are mainly produced for market sale while maize and sorghum for self-consumption. In addition to the crop production, the poorer wealth groups in the woreda supplement their income through firewood and charcoal sale, casual employment in construction, land preparation, weeding and harvesting. According to the Arisi zone Agricultural office, the woreda produces on average 27,000 tons of staple cereals per annum since the year 2006. The total livestock of the woreda are estimated 37,325 cattle, 21,829 sheep, 22,561 goats 10,166 pack animals, 105 camels and 28,683 poultry in the year 2010.

The woreda has totally two health clinics, 12 health posts, five veterinary clinics, 12 Farmers Training Center, 34 schools (one high school and one preparatory, 16 schools grade 1-4th, 16 schools grade 1-8th) with optimal geographical distribution across all kebelles. Almost all Kebelles are connected with rural feeder road to Dera, which serve as woreda capital. Telephone service has been improved in the last years. Most of the Kebelle centers have a land line telephone service and are reachable with cellular phone. Market access of the woreda is very good mainly because of good road accessibility and its close geographical proximity to Adama which serve as large trading center.

The woreda is one of the most food insecure and drought prone woredas in Oromia regional state. The household crop production is so minimal that very few families are self-sufficient in food from

agricultural production and can only fed themselves for four to six months in a normal year without the support of PSNP transfer. Although drought is the main trigger for food insecurity, there are a number of factors that contributed to the high vulnerability of the woreda population. These factors include, but not only, Rapid population growth, land degradation, diminishing of land holding size and land fragmentation, use age-old traditional cultural practice, limited use of appropriate agricultural technology, lack of effective rural credit schemes , limited household assets, lack of employment opportunities and other policy-related.

According to the Woreda Agriculture and Rural Development Office (WARDO), the major crop pests in the woreda are Army worm, stalk borer and cut worm while the major diseases are leaf blotch, Chocolate spot, Rust and smut. Furthermore, several animal diseases are identified by WARDO. Of which, Black leg, Lumpy skin, Pasteurolosis, New castle, Chronic Respiratory disease, External and internal parasites, Lymphatic disease and Anthrax are the major livestock and poultry disease.

4.2.3. Social protection intervention in the woreda

Since the year 2005, like more than 300 woredas in the country, Dodota is considered as chronically food insecure woreda and different social protection intervention, mainly PSNP, OFSP and Resettlement under the FSP, are implemented in the woreda by the government with the financial and technical support from donors. Out of the 70,645 population in the woreda 17,350 chronically food insecure people (5,991 households) in the rural areas of the woreda are covered by PSNP. On top of that, 920 households, which are targeted by PSNP, also received rural credit and technical support through the government's OFSP in order to become food self-sufficient, and to graduate from PSNP and finally from the FSP. A total of 1787.918 mt food (1562 mt cereal, 156 mt pulses and 70 mt oil) was distributed in six rounds to PSNP beneficiaries in the woreda per a year since 2005 to date. In addition, Targeting Supplementary feeding promgrmme has been implemented since 2006 in the woreda to reach moderately malnourished children under five years of age, pregnant and lactating women. The programme for instance has provided Corn Soya Blended food and vegetable oils to 1,299 children, lactating and pregnant women in the year 2010. Furthermore, relief assistance was provided in the woreda on ad hoc bases to address the transitory food needs faced following to failure in rainfall.

Chapter V

Results and discussions

5.1. Background characteristics of the study population

5.1.1. Demographic characteristics of sample households

a. Age-sex composition of the sampled household head

The age of the household heads range between 20 and 62 with average and median age of 35.91 and 35 respectively. As presented in Table 4, out of the total 78 sampled household heads, 46.1% were youth aged between 20 and 34 while 52.6% were aged between 35 and 60, whereas, the remaining 1.3% were aged above 60, which are considered to be economically inactive according to the Ethiopian Labour policy. Of the total sampled households, 85.9 % households were found to be male headed households, whereas, the rest 14.1% were women headed households.

Table 4: Age-Sex composition of the sample household

Age group	Sex of the household head					
	Male		Female		Total	
	N	Percent	N	Percent	N	Percent
20-24	6	7.7	4	5.1	10	12.8
25-29	14	17.9	0	0.0	14	17.9
30-34	12	15.4	0	0.0	12	15.4
35-39	9	11.5	3	3.8	12	15.4
40-44	12	15.4	3	3.8	15	19.2
45-49	6	7.7	1	1.3	7	9.0
50-54	5	6.4	0	0.0	5	6.4
55-59	2	2.6	0	0.0	2	2.6
60-65	1	1.3	0	0.0	1	1.3
Total	67	85.9	11	14.1	78	100

b. Marital status of the sampled household

Variation in marital status has an important bearing on the size and structure of households. Table 5 presents data on marital status of sample population. As indicated in Table 5, 88.5 % of head of the sampled households are married, whereas, 5.1 % and 6.4 % are divorced and widow/widower respectively.

Table 5: Marital status of sample households

Marital status	Respondents	
	Number	Percent
Married	69	88.5
Divorced	4	5.1
Widow/widower	5	6.4
Total	78	100

c. Household size of sampled household

The household size of the study population ranges between two and nine. The mean and median of the size were computed to be five each. Household size of the study population is summarized in Table 6. Household sizes with six were found 23 % of the total sampled households, which made up the largest proportion of all other size. As indicated in Table 6, 43.6% of the sampled households had more than five family sizes, which is almost above the average of the Ethiopian household family size.

Table 6: Household size

Household family size	Respondents	
	Number	Percent
2	6	7.69
3	9	11.54
4	15	19.23
5	14	17.95
6	18	23.08
7	10	12.82
8	5	6.41
9	1	1.28
Total	78	100

d. Labour force size

Household labour is the main source of labour for a range of farming activities, participation in public work activities and to engage in OFSP/HABP or IGA. Household labour force refers to a number of household member aged 14 years and above. As indicted in Table 7, of the total 78 interviewed, households with labour force of 1-2, 3-4, 5-6, and greater 6 were accounted 39.7%, 43.6%, 14.1% and 2.6% respectively.

Table 7: Labour force size of the sample households

Labore force size	Respondents	
	Number	Percent
1-2	31	39.7
3-4	34	43.6
5-6	11	14.1
Greater than 6	2	2.6
Total	78	100

5.1.2. Socio-economic characteristics

Educational background, farmland ownership, livestock ownership, livelihood strategies, engagement in off-farm activities and social protection support are the main socio-economic characteristics of households, which were the researcher believed to have direct linkage to household's adaptive capacity.

a. Educational background

Education helps to access information on new technologies, research findings, global climate change and other pertinent information, and to make wise and informed decision on every livelihood strategies of the rural community. As presented in Table 8, 17.9% of head of the sampled households were illiterate, while 17.9% have attended the adult education. Surprisingly, 35.9 % of the sampled household heads reported to reach between 1st and 4th grade of regular education. Whereas, 24.3 % of household heads have completed between 5th and 8th grades and 3.8% have reached secondary school.

Table 8: Household head highest grade

Educational background	Respondent	
	Number	Percent
Illiterate	14	17.9
Adult education	14	17.9
1st - 4th grade	28	35.9
5th - 6th grade	9	11.5
7th - 8th grade	10	12.8
8th - 10th grade	3	3.8
Total	78	100

b. Main source of income

Depending on the available productive assets, households engaged in different livelihood strategies. As illustrated in Table 9, out of the total sampled households, 74.4 % households practiced mixed farming system, whereas, the remaining 25.6 % households reported that crop production as main source of their income. But none of the interviewed households were involved in off-farm activities as main source of income.

Table 9: household main source of income

Livelihood strategy	Respondents	
	Number	Percent
Crop production	20	25.64
Mixed agriculture	58	74.36
Total	78	100

c. Farm land ownership

Farmland is the main productive asset that the rural community own. The size and quality of farmland ownership really determines the level of agricultural production in Ethiopia as there is limited application of improved technologies in the rural subsistence farming practice. The average land holding size among the sampled households was found to be around 1.79 ha. As showed in Table 10, 21.8 % of the sampled households owned less than a hectare farm land, whereas, 41% of the sampled households possessed a farmland size between 1 and 1.99 ha and 29.5 % households acquired 2 to 2.99 ha of farmland. And the rest 7.6 % have more than 3 ha farmland size.

Table 10: household land holding size

Farmland holding size	Respondents	
	Number	Percent
0.25 - 0.49 ha (one - two TIMAD)	1	1.3
0.50 - 0.74 ha (two - three TIMAD)	13	16.7
0.75 – 0.99 ha (three - four TIMAD)	3	3.8
1.00 - 1.24 ha (four - five TIMAD)	12	15.4
1.25 - 1.49 ha (five - six TIMAD)	1	1.3
1.50 - 1.74 ha (six - seven TIMAD)	14	17.9
1.75 – 1.99 ha (seven - eight TIMAD)	5	6.4
2.00 – 2.99 ha (8 - 12 TIMADE)	23	29.5
3.00 - 5.00 ha (15 - 20 TIMADE)	3	3.8
More than 5 ha (more than 20 TIMADE)	3	3.8
Total	78	100.0

d. Livestock ownership

Livestock ownership is essential asset in the rural subsistence farming system as a production capital, as an area of investment and insurance for crises time. As illustrated in Table 11, of the total sampled households, 48.7 % have reported to own at a minimum one goat and/or one sheep. About 15.4% of the sample household reported to have no livestock. Whereas 23.1% of the sampled households possessed at least one ox and 7.7% hold at a minimum one ox and one cow.

Table 11: Household livestock ownership

Livestock ownership	Respondents	
	Number	Percent
None	12	15.4
Oxen	18	23.1
Local cows	3	3.8
Poultry farm	1	1.3
sheep and/or goat	38	48.7
Oxen and local cows	6	7.7
	78	100.0

e. Social protection support

All the sampled households were targeted by both PSNP and OFSP. As indicted in PSNP Targeting guideline (2008), PSNP targets chronically food insecure households. For the purpose of targeting, a household is considered chronically food insecure in the guideline which has characteristics of:

- household faced continuous food shortages (usually 3 months of food gap or more) in the last 3 years and received food assistance;
- households that suddenly become more vulnerable as a result of a severe loss of assets and are unable to support themselves (last 1-2 years);
- Any household without family support and other means of social protection and support.

Therefore, these targeting parameters indicated that the food security situation of the sampled households prior to targeting by PSNP. Hence, 100% of the sampled households were chronically food insecure prior to PSNP intervention, which had a food shortage for a minimum of three months. As presented in Table 12, 80.8% of the sampled households have been targeted by PSNP since 2006, whereas, 3.8% were covered by the progamme since 2010. About 10% of the sampled households were targeted by the programme since 2008 following the highest drought shock occurred in the woreda.

Table 12: Household's PSNP targeting period

Targeting period by PSNP	Respondents	
	Number	Percent
For the last five years (since 1998 EC/2006 GC)	63	80.8
For the last four years (since 1999 EC/2007 GC)	1	1.3
For the last three years (since 2000 EC/ 2008 GC)	8	10.3
For the last two years (since 2001 EC/2009 GC)	3	3.8
For the last one year (since 2002 EC/2010 GC)	3	3.8
Total	78	100.0

As presented in Table 13, only 16.7 % of the sampled households were targeted their family member fully by PSNP. Whereas, 33.3 % have five family members targeted by the programme and 12.8% have two family members targeted by PSNP. The remaining 37.2 % have either two or three family member targeted by PSNP.

Table 13: Size of household family targeted by PSNP

Family size targeted by PSNP	Respondents	
	Number	Percent
2	10	12.8
3	18	23.1
4	11	14.1
5	26	33.3
Full Family	13	16.7
Total	78	100.0

Out of the total sampled households, 97 % households have at minimum one member of the household received PSNP transfer in exchange for participation in Public work activities, whereas, the remaining 3% received their monthly entitlement fully as direct support.

As reported in Table 14, 44.9% of the sampled households received OFSP support since 2006, whereas, 34.6 % were covered by OFSP since 2008.

Table 14: Period of household supported by OFSP

Targeting period by OFSP	Respondents	
	Number	Percent
For the last five years (since 1998 EC/2006 GC)	35	44.9
For the last four years (since 1999 EC/2007 GC)	6	7.7
For the last three years (since 2000 EC/ 2008 GC)	27	34.6
For the last two years (since 2001 EC/2009 GC)	1	1.3
For the last one year (since 2002 EC/2010 GC)	9	11.5
Total	78	100.0

5.2. Occurrence of climate change and its effects

In order to take possible adaptive measures, the impact of climate change need to be felt by the farmers. As presented above, different findings have revealed the occurrence of climate change in different parts of the country. Basically trends of rainfall and temperature variability are used as parameter to assess climate change. The study also assessed the perception of sampled households on climate change by considering the trends of rainfall performance in the study area during respondent's life time and in the last ten years. The result of the household survey clearly indicated that the rainfall performance was gradually deteriorated in the last decades. All of the 78 respondents (100%) reached through the survey as well as the contacted focus groups have explained that the climate was continuously in a process of changing in the area during the life time of the respondents as well as in the last ten years, with a negative consequence on the lives and livelihoods of the local community. When they were asked to rate the scale of the climate variation, the response varies from one to other respondent. Of the total 78 sampled households, 9 % rated the rainfall variation as very highly, whereas 35% of the respondents rated the variation as highly. And the remaining 56 % have rated the variation as slight.

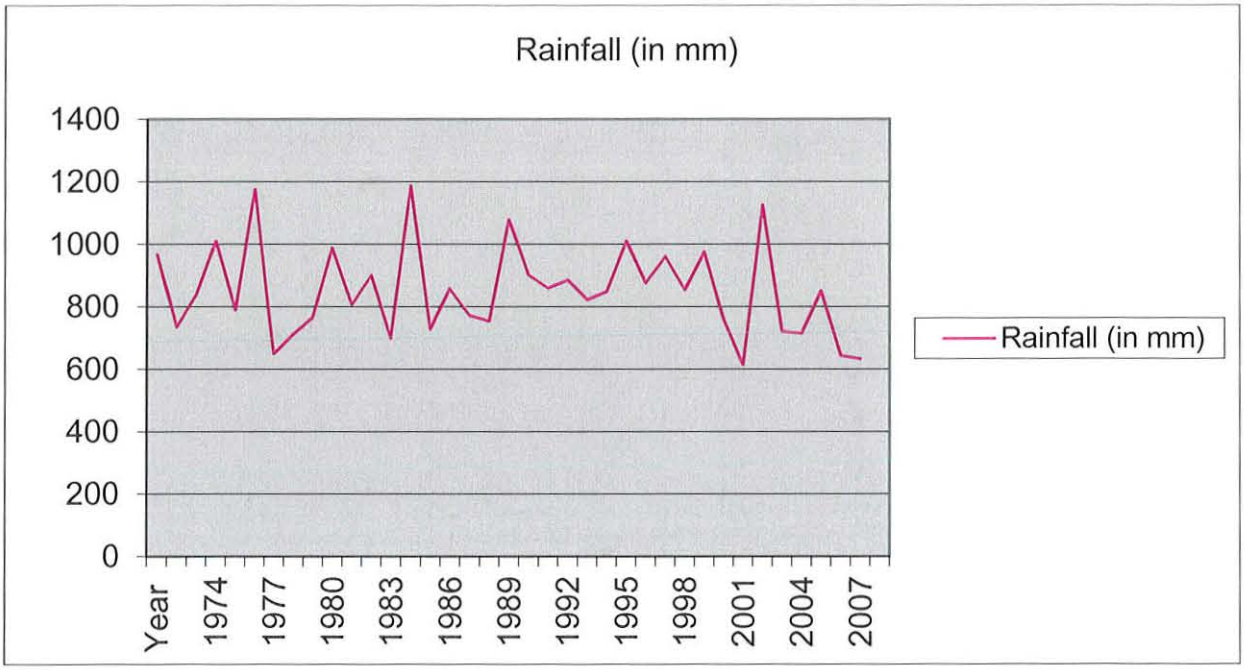
It was tried to collect the rainfall data in the study area for the last decades. However, the National Metrological Service Agency (NMSA) doesn't have station in Dodota woreda. Hence, the closer metrological station located in Nazareth (about 25 km from Dodota woreda capital city) was taken, for which a rainfall data for the thirty six years is available in the NMSA. As presented in below table 15 and figure 3, the annual rainfall in Nazareth station seemed above the crop needs. The annual rainfall recorded in all years is enough to meet the water requirement of the main crop types grown in the study areas (Teff, Maiza, Wheat, Sorghum and Barley). According to the Ethiopian Agricultural Research Organization (2004), all these crops need more than 500 mm annual rainfall to properly grow and reach for harvest. As indicated in below table 15, the total annual rainfall recorded in the station for thirty six years are more than the crop water need. However, as discussed with one of the key informant at the woreda office of agriculture and rural development, the climate variability and change are happening in the area mainly with changing the distribution of the rainfall along the time not in total annual rainfall. According to this key informant, the rainfall has increased during the *bega* season which has less economic impact apart from pasture regeneration. On the other hand the amount of rainfall during *kiremt* in the last years has been reduced with high variability. In addition the intensity of the rainfall has

been changing in the area. In a day up to 80 and 100 mm of rainwater can happen while extended dry spell are common in the area. Therefore, the climate change is reflected in the study area with uneven time distribution of rainfall and extended dry spells during the *Kiremt* season. On top of that as indicated in below figure 3, the amount of annual rainfall variability in the area becomes higher since 2000 as compared to the previous years.

Table 15: Annual rainfall data for Nazareth station for the year 1972 through 2008 (source, National Metrology Service, 2011)

Year	Rainfall (in mm)	Year	Rainfall (in mm)
1972	968.4	1991	902.3
1973	736.7	1992	860.0
1974	840.3	1993	885.9
1975	1010.5	1994	823.5
1976	790.6	1995	850.1
1977	1176.6	1996	1011.2
1978	651.1	1997	876.6
1979	712.8	1998	961.6
1980	767.1	1999	855.3
1981	988.5	2000	976.9
1982	807.3	2001	757.5
1983	901.2	2002	615.2
1984	700.1	2003	1126.7
1985	1188.3	2004	721.6
1986	729.2	2005	715.7
1987	857.9	2006	851.6
1988	772.5	2007	643.5
1989	754.9	2008	633.3
1990	1078.6		

Figure 3: Annual rainfall data for Nazareth station for the year 1972 through 2008 (source, National Metrology Service, 2011)



Climate change affected different localities differently. The effect of observed climate change varied across content, region, nation, and localities. Some of the effects of the climate change in tropical zone like Ethiopia presented in different literatures are:

- Permanent shift in the onset and off-set of the rain season.
- Frequent shortage of rainfall during rainy season leading corps drying out or livestock not having sufficient water.
- Frequent shortage of rainfall during the rainy season leading to drought.
- Frequently too heavy showers during rainfall leading to damage to crops, livestock and property.
- Frequent excess rainfall leading to floods.
- Extreme temperatures leading to scorched crops.

In line with this, sampled households were asked how the climate change has affected the community. The finding of the study revealed that, 61% of the total interviewed households reported climate change affected their livelihood through frequent shortage of rainfall during the rainy season leading to drought. Whereas, 39 % of the respondents thought that their lives and livelihoods have been affected negatively by climate variability and change mainly associated to frequent shortage of rainfall during the rainy season leading both for drying out of crops and drought. The findings of discussions with the focus group and key informants also complemented with the findings of the household survey. According to the discussion conducted with focus groups, they have stated that some 20 years back drought was happened in the areas once in 8 or 10 years. But since the last two decked, the frequency of drought

was increased. Drought was happening once in every three to five years, according to the same focus group.

5.3. Knowledge on climate change and use of weather information

FAO (2008) indicated that information on weather through early warning system need to be packed in ways that are accessible to vulnerable people, so it can assist them in making sound choices about how to adapt to climate change and other stressors. Presented in the NAPA (2007), improvement of the farmers' knowledge about the proper utilization of weather information in carrying out agricultural activities is listed as one adaptation option to avoid risks of climate change. In line with this point the researcher assessed the awareness of sampled households on the occurrence of the climate change and the use of weather forecast information in their livelihood strategy. The result of the survey indicated that 95 % of the respondents, reached by the household survey, were well aware on the global phenomena of the climate change. PSNP is presumably to have a role in raising the awareness of the subsistence farmers through the establishment of the Farmers Training Center (FTC). But the result of the study indicated that the existing FTCs constructed in the study area through PSNP have hardly raised the awareness of the interviewed sample households. According to the result of the study, awareness of 35% of the respondents on the occurrence of the climate change comes and rose through both mass media and extension agents, and 28 % of the respondents have reported that their awareness on climate change was raised due to their experience and feeling of the continuous change of rainfall and temperature in their locality. Whereas the remaining 37 % respondents have said that the awareness comes as a result of either lesson from life experience or mass media mainly the Ethiopian Radio Service.

However the findings from focus group discussion showed that awareness level of the community was limited to the general information that global climate is being changed. The awareness of the community on the trends of the climate change, potential threats as a consequence of climate change, and possible available adaptation strategies to the adverse impact of climate change was found very low.

Assessment of the provision of regular and timely weather information forecast was included as part of the study during the field survey, given the fact that the importance of the dissemination of weather information forecast particularly to rain fed agricultural livelihood is very significant. Out of the total interviewed sampled households, only 24.4% replied that they received weather information forecast on ad hoc bases from the Ethiopian Radio. Although there is one FTC in each Kebelles covered by the study, which was established through PSNP PW, none of the respondents mentioned the FTCs contribution in raising the awareness of the local people nor did they serve as a contact center to provide regular weather information forecast. Hence, the use of weather forecast information for the agricultural practice decision was found poor. Out of the 78 households covered by the field survey, only 16.6 % respondents have replied that they use the weather information forecast received from the Ethiopian Radio weather forces programme as input to some extent to decide farming practices.

It was clear from the findings of the field survey as well as the focus group discussions that the local communities were unable to access and incorporate the weather information forecast in their

adaptation strategies to respond to the frequent occurrence of climate variability. Furthermore, the PSNP together with other regular government programmes, mainly the early warning system, hardly contributed to raise the awareness of the rural subsistence farmers on the threats of climate change and dissemination of weather information forecast to the rural people whose livelihoods are greatly dependent on climate related factors.

5.4. Role of PSNP to smoothen food consumption and protect household assets

As presented in the Ethiopian government's PSNP project guideline (MoARD, 2009), the PSNP delivers social transfers either through 'public works' activities or as 'direct support' for household that are labour constrained, with three distinct objectives:

1. smoothing food consumption in chronically food insecure smallholder householders, by transferring food or cash to buy food during the 'hunger gap' months;
2. protecting household assets by avoiding damaging 'coping strategies' such as selling productive assets or taking on high-interest loans to buy food;
3. building community assets by selecting public works activities that create infrastructure with development potential.

The study explored the contribution of the PSNP food and cash transfer in meeting these objectives in the study area. The study posed multiple questions which were assumed to answer the role of PSNP in achieving its objectives especially the first two aforementioned objectives. As the study focused to examine the impact of PSNP on the beneficiaries along time, food security situation of the interviewed households pre and post programme intervention was assessed during the field survey.

5.4.1. Food deficit and coping strategies prior to PSNP

In order to get a general picture of household food security status, sampled households were interviewed to explain size of food deficit period they faced and alternative coping strategies they used to meet the food gap prior to implementation of PSNP. As summarized in Table 15, the result showed that of the total interviewed sampled households, 55.1 % have reported that they had food shortage on average for six months in a year in the pre-programme intervention of PSNP. About 31 % of the respondents reported that they had a food gap for more than six months and the remaining 14% respondents reported that they had food deficit between a month to five in a year.

Table 15: Average number of months of household food deficit pre-programme intervention in the study area

Number of months	Respondents	
	Number	Percent
Less than three months	3	3.8
Three months	2	2.6
Four months	3	3.8
Five months	3	3.8
Six months	43	55.1
More than six months	24	30.8
Total	**78**	**100**

In order to meet the food gaps, the sampled households practiced a number of coping strategies. As showed in Table 16, 100% of the interviewed sample households used either one or more coping strategies among the available options in the area. Moreover, the secondary data found in the woreda and discussions with key informants at woreda revealed that a number of FFW, EGS, emergency food assistance programmes were implemented in the woreda on ad hoc bases prior to the start of PSNP. These programmes have provided food transfers to the transitory food insecure households. As presented in Table 16, borrowing of grains from better off relatives, neighbors and others was a coping strategies frequently used by 21.8 % of the respondents. Similarly, 22 % of the respondents said they used to sell productive and non productive assets in order to buy food. Contracting out farm land was also practiced by 7.7 % of the interviewed households to raise cash for basic needs including food. Whereas for 12.8% households, off-farm casual labour was the main coping strategy to meet the food deficit.

Table 16: Household coping strategies to meet food deficit before targeted by PSNP

Coping strategies	Respondents	
	Number	Percent
Borrow grain from others	17	21.8
Contracting out farm land	6	7.7
Remittances	1	1.3
Casual labour	10	12.8
Selling of productive and nonproductive household asset	17	21.8
Selling of forest products	9	11.5
Petty trading	2	2.6
Combination of borrow of grains from others and casual labour	7	9.0
Borrow of grains from others+ casual labour + selling of forest products	1	1.3
Combination of Selling of forest products and petty trading	1	1.3
Selling of productive asset	5	6.4
Combination of borrow of grains from others, casual labour and selling of non productive asset	2	2.6
Total	**78**	**100**

5.4.2. PSNP transfer

All of the respondents have reported that they have received transfer through PSNP for the last six years with a ration size of 15 kg cereals, 1.5 kg pulses and 0.45 vegetable oils per person on monthly bases for six months in a year. Findings from the key informants and woreda report also indicated, PSNP beneficiaries in the woreda have been receiving either food or cash or a combination of both for six month in year since 2005 based on the national PSNP ration size norms.

However, the result of the household survey revealed that a number of households reported that the PSNP did not fully meet their food deficit. Although they have been targeted by PSNP for the last years, of the total 78 households reached through the field survey, 27 % household have a food gap still between one to three months in a year. As reflected during the focus group discussion, the ration size of PSNP covers only cereal, pulses and oils. While households need salt, sugar, spices and other food items and it was difficult for the household to meet all of these requirements throughout the year. In addition, although the PIM of PSNP noted to apply full family targeting, the result of the field survey revealed that only 16.7% of respondents were fully targeted with their family members by PSNP. Hence these factors are seems to be the reason for the 27% of the total responds for reporting to have still food gap even after the intervention of PSNP.

Different studies have showed that some beneficiaries used some proportion of PSNP transfer (either cash or food) to invest in other productive assets (Berhane *et al, 2011)*. In line with this, the sampled households were asked whether they used part of their entitlement to invest in other productive asset or not. Of the total 78 sampled households, 78 % used the transfer fully for consumption, whereas the remaining 22 % reported to have used part of the transfer for investment/purchase of productive asset. Of the later respondents (17 out of 78) who reported to invest part of their entitlement, 12.8 % used to purchase agricultural inputs (mainly fertilizer and seeds), 5.2 % purchased livestock mainly small ruminant animals and 2.6 % invested in farm tools and the remaining 1.3% used to invest in off-farm activities. Similar survey by Devereux and Guenther (2007) showed that 88 % of household received food from the PSNP consumed all their entitlement, whereas about 15 % household (11 out of 768 total sampled households from different regions of the country) used part of the food/cash transfer to purchase either seeds or fertilizer.

5.4.3. Provision and preventive role of PSNP

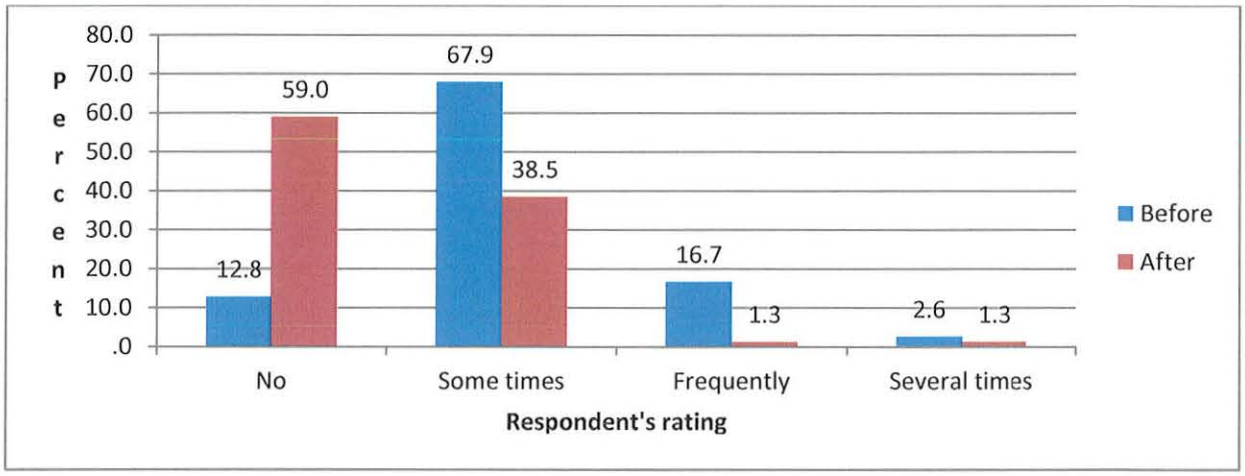
As a social protection, PSNP is believed to play provision and preventive role. Food or cash transfer as exchange to PW participation or direct support prevent damaging coping strategies as a result of risks to weather- dependent livelihood. A substantial number of small holder subsistence farmers in the country including those in the study areas forced to sell some of their assets, draw down their limited savings and even rent out farmlands, to survive the hunger season (Berhane *et al*, 2011). This study explored the impact of the PSNP in reducing the distress asset sales to meet either food needs or raise cash for emergency needs (such as health expenditure). Accordingly, households were asked how frequent they were compelled to sale productive assets before and after PSNP intervention.

As presented the result in Figure 3, distress asset sales to meet food needs were reduced on average by 46.1 % following the PSNP five year interventions. Out of the total household covered by the study, 87.2 % respondents reported to practice distress asset sales (67.9 % some times, 16.7 % frequently, and 2.6 % several times) prior to PSNP. Whereas following the five year PSNP intervention, only 41.1 % households were forced to sale their productive asset to meet food needs (38.5% sometimes, 16.7 % frequently and 1.3% several times). The findings of the 2010 PSNP evaluation conducted by joint government and development partners across the nation complements the findings of this study. According to the report, a PSNP PW beneficiary with an average fraction of 51% of households incurring distress sale of asset in 2006 has gone down steadily and reached 34 % in 2010. Similar study by

Devereux and Guenther (2007) revealed that 62% of PSNP households reported being effectively protected against 'distress sales' of assets, while 23 % even increased their asset ownership over the years. Davies *et al* (2009) has noted that the Ethiopian PSNP has successfully prevented the use of damaging coping strategies during the periods of increased stress based on the experience of the programme in four year implementation period.

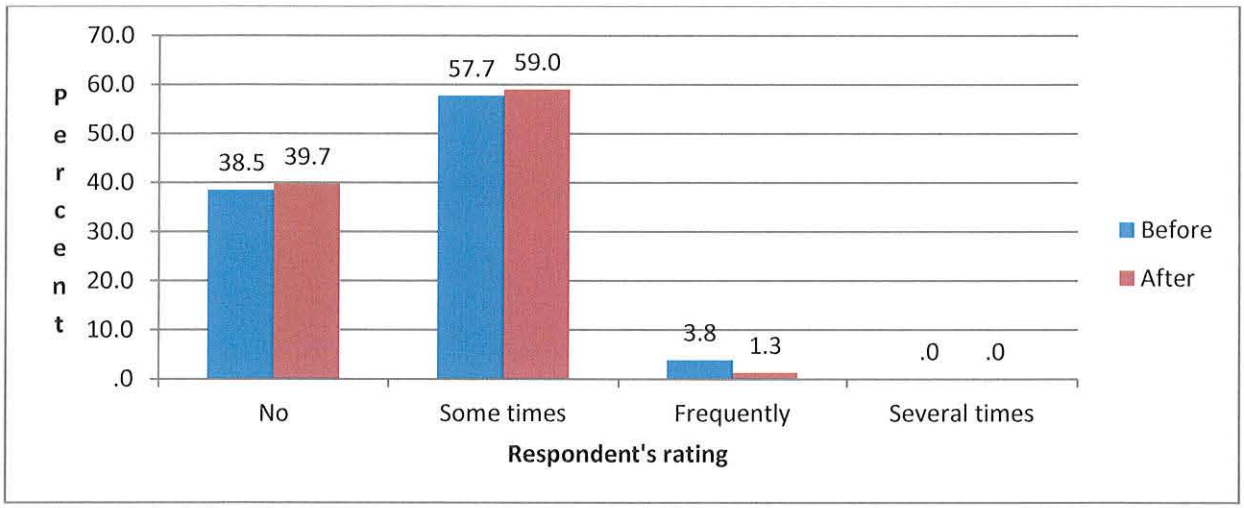
However, the discussion with the focus group and key informants have showed that although the predictable nature of PSNP transfer have helped to protect distress sales of assets, the frequent delay in transfer have challenged to achieve the objective of preventing asset depletion.

Figure 3: Sale of Productive asset practice by HH to meet food needs before and after covered by PSNP



This study also tried to explore whether household sale of productive asset to raise emergency cash need changed as a result of PSNP intervention. The result of the survey is presented in Figure 4. The result of the study showed that almost no change in household sale of productive asset to raise emergency cash for emergency needs. Out of the total 78 interviewed households, 57.7% and 59.0% respondents have practiced distress asset sale sometimes to raise cash for emergency needs before and after the PSNP intervention, respectively. However, the percentage of respondents who reported that they practiced frequent asset sales has reduced from 3.8% prior to implementation of the programme to 1.3% after the programme intervention. Furthermore, the number of respondents who reported not practiced distress asset sale to raise cash for emergency needs have increased from 38.5 to 39.7% after PSNP intervention.

Figure 4: Sale of Productive Asset practice by HH to raise emergency cash needs before and after covered By PSNP



In summary, the result of the field survey indicated that distress asset sales to meet the food needs have been significantly reduced while practice of distress asset sales to raise cash for emergency needs (eg. to cover health expenditure) has showed very minimal change. Critical analysis of these two results provide clear message to decision makers in relation to the household savings. The former was reduced because the food needs were more or less fulfilled through the food or cash transfer of PSNP, whereas the later result justifies that household savings were still at minimal level or absent. This result can clearly indicate the programme has not improved the saving of the households to build their asset, which is the base for livelihood diversification. This would lead the researcher to argue that the adaptive capacity of the PSNP beneficiaries was not improved as a result of the PSNP transfer though it protects asset depletion to meet food needs.

5.5. Contribution of PSNP PW to minimize vulnerability to climate change

5.5.1. Implemented public work activities

Public work planning process

The PSNP Programme Implementation Manual (MoA, 2010) clearly illustrated step by step the planning and implementation approach for the Public Work (PW) sub-project component of PSNP. According to the manual, selection of the PW activities is left to communities in order to ensure the relevance and ownership of the created asset. The community participates in the planning process through the Community Based Participatory Watershed Development (CBPWD) planning tool, a guideline developed by the government with the support of WFP.

Cited in CBPD guideline (MoARD, 2005), the objective of CBPD is to improve the livelihood of communities and households in rural Ethiopian through comprehensive and integrated natural resource development. CBPWD optimizes the use of existing natural resources and untapped potential in all areas, even those that are already environmentally degraded. This is done by:

- Conserving soil, rainwater and vegetation effectively for productive use
- Harvesting surplus water to create water sources in addition to ground water recharge
- Promoting sustainable farming and stabilizing crop yields by adopting suitable soil, nutrient, and crop management practices
- Rehabilitating and reclaiming marginal lands through appropriate conservation measures and a mix of trees, shrubs and grasses, based on land potential; and
- Enhancing the income of individuals by the diversification of agricultural production and increasing employment opportunities and cottage enterprises, particularly for the most vulnerable, linked to the sustainable use of natural resources.

Discussion with the woreda key informants, DAs, and communities through focus group discussion confirmed that the PW planning process in the study area followed the procedure indicted in PSNP PIM. Based on above multiple principles, a number of potential public work sub-projects were identified in the study area through a community based watershed management planning process that prioritized and selected activities contributing to improved watershed management and infrastructure. Once the community has developed a shortlist of desired public works, design work was carried out by the DA with assistance as required from woreda technical staff. These designed public works were compiled into a communities PSNP public works plan, which was reviewed and approved at Kebelle level and accumulated along with other community PSNP public works plans into Kebelles PSNP public works plan. The Kebelles PSNP public works plans were then reviewed at woreda level to ensure the consistency and sustainability of the proposed sub-projects, and accumulated into a woreda PSNP public works plan.

However based on the same discussion, the proper use of water shed approach found to be limited because of several factors, particularly the limited experience and educational background of government technical personnel both at woreda and Kebelle (DAs) level. Furthermore, the quality of the annual work plan was found to be poor although an improvement was witnessed along time since 2005, based on the assessment of the plan documents found at woreda and Kebelle.

Implemented Public work activities

According to the PSNP PIM, public works need to be labour-intensive in order to transfer as much income (whether in food or cash payment) to recipients as possible because of the protective function of PSNP. All able bodied PSNP clients are expected to receive their entitlement as an exchange of participation in PW activities implementation. According to the secondary data found at woreda level, 15,355 (88.5%) people out of the total 17,350 PSNP beneficiaries were involved in public work implementation. However, of the total 78 interviewed households, 97.4 % reported that at least one member of the household has participated in the public work implementation activities. The rest 2.6 % are considered as direct support clients since they are found without the ability to supply labour for PW during the household targeting exercise.

Since 2005, the PSNP has built a large number of public work sub-projects across the nation. As PW activities are selected by the community, the types of PW varies across region, woreda and Kebelle depending on the agro-ecological zone, problems and priorities of community. The national PSNP annual work plan document for the year 2011 (FSCD, 2010) presented a list of 329 public work activities

planned to be implemented across 301 PSNP woredas in the country in the same year. These activities were further categorized in to 9 broad components.

1. Physical soil and water conservation (terracing, bunding ....)
2. Flood control and improved drainage (cut off drains, waterway construction, percolation trenches ....)
3. Community and micro-level water projects (hand dug well, pond construction, low cost micro ponds, farm pond, percolation pit and pond, farm dam, spring development and maintenance, roof water harvesting, dam construction ....)
4. Small Scale Irrigation (SSI) construction or expansion (diversion weir construction, irrigation canal construction, land clearance for SSI, ...)
5. Gully control (check dams, SS dam, Gabion construction, Gully treatment ....)
6. Community road construction and maintenance
7. Social infrastructure construction and rehabilitation (farmers training center construction, School rooms construction, basic alternative school construction, DA office construction, health post construction, vet post construction, Cattle trough construction ....)
8. Agro-forestry, forage development and forestry (area closure, seedling production and plantation, forage or grass seed production, seedling plantation ...)
9. Soil fertility management and biological soil conservation (compost making, grass stripping, mulching and crop residue management, fertilization and mulching..)

PW implementation through PSNP started in Dodota woreda in the year 2005. Since then, a number of public work activities were undertaken in 12 rural Kebelles of the woreda. Table 17 presented summary of six years (2005 – 2010) implemented PW activities in the woreda collected from Dodota BoARD.

Table 17: Six years summary of PSNP PW implemented in Dodota woreda (2005-2010)

S/N	PW Activates	Unit	Implementation status		
			Plan	Achievement	Percent
I	Community Road				
1	Road construction	Km	239	137	57
2	Road maintenance	Km	308	208	68
II	Physical soil and water conservation				
1	Soil bund construction	Km	2,052	2,135	104
2	Fanyaju construction	Km	1,582	1,975	125
3	Hill side terrace	Km	1,066	1,229	115
4	Micro basin	No	178,000	128,474	72
5	check dam construction	M^3	2,769	3,655	132
III	Forestry and agro-forestry				
1	Seeding production	No	3,754,000	1,049,350	28
2	Pitting	No	3,347,000	1,386,031	41
3	Seeding plantation	No	3,347,000	695,810	21
4	Area closure	Ha	2,346	4,583	195
5	Millennium plantation	No	3,297	3,297	100
III	Small scale Irrigation				

1	Spate Irrigation/canal excavation	M^2	132,300	99,484	75
1.1	Traditional Canal construction 234.6 Km	M^3	22,025	167,682	761
1.2	Flood Control construction 542.1 Km	M^3	24,400	62,456	256
1.3	Irrigation bund construction	M^3	6,000	0	0
1.4	Main canal construction 15.4 Km	M^3	20	0	0
1.5	Secondary canal construction 26 Km	M^3	7	0	0
1.6	Canal maintenance	M^3	26,491	64,861	245
	Canal clearing	M^3	32,665	43,241	132
	Silt removal	M^3	5,274	9,560	181
2	River diversion	Km	40	0	0
2.1	Diversion canal construction	Km	24,465	0	0
2.2	Canal construction	Km	27,724	9,653	35
2.3	Canal maintenance	Km	36,263	79,591	219
3	Rain water harvesting				
3.1	Level bund construction	Ha	7,752	2,374	31
3.2	Level bund maintenance	Ha	185	201	109
4	Hand dug well construction	M^3	535	14	3
5	Community pond excavation	M^3	33,465	5,938	18
6	Pond maintenance	M^3	7,673	0	0
VI	Community and micro-level water projects				
1	Pipe trench Excavation /& back fill 5 Km	M^3	97,952	36,209	37
2	Community pond excavation	M^3	101,849	16,745	16
3	Community pond maintenance	M^3	47,114	5,220	11
4	Pit latrine construction	M^3	5,946	338	6
5	Hand dug well construction	M^3	314	0	0
VII	Soil fertility management				
	Compost making	M^3	4582	25	1
VII	Social infrastructure construction	No			
1	School construction (1 - 4th grade)	No	0	1	
2	Health post construction	No	0	1	
3	FTC construction	No	0	5	
4	DA residence construction	No	0	10	
5	Seed storage construction	No	0	2	
6	Veterinary health post construction	No	0	3	

Source: Dodota woreda Agriculture and Rural Development Office (2010)

Considering the six years PW achievements, the woreda were found to perform good in implementing different physical soil and water conservation activities against the plan. As indicted in Table 17, the

achievement of soil bund, fanyaju and hillside terraces were more than the plan with 104%, 125%, and 115% of the plan respectively. Surprisingly the six year performance of the reforestation programme was found to be discouraging. The woreda key informants explained the quality of physical soil and water conservation activities improved over time. However the researcher's observation during the field work indicates that the implemented physical soil and water conservation activities were witnessed with some technical deficiencies.

As presented in the same Table, however, 28% of the planned different types of tree seedlings mainly acacia species were produced during the six operational years. Similarly, 21% of the planned tree seedlings plantation was accomplished in the woreda in six golden years. Although assessment of survival rate of planted seedlings data were not found during the study, it was reported by the community that the survival rate was not more than 40% of the planted seedlings because of several factors but mainly due to lack of follow up. However, findings from MERET project report of 2008 in Adama woreda of Oromia region showed that survival rate of planted tree seedlings was about 80%. While the researcher conducted transect walk through different areas; the vegetation coverage, particularly trees on PSNP watershed areas was found to be very scarce.

Hence, unless the physical soil and water conservation are complemented with tree seedling plantation and growth, rehabilitation and restoration of land is very difficult. But the findings of the study both from the secondary data and the field observation indicated that the role of PW component of PSNP in the study area is very limited in protecting the natural resource. Given the livelihood of the local community is highly dependent on the natural resource, the PSNP PW still needs further improvement to rehabilitate and protect the environment, with higher emphasis to reforestation programme.

As indicated in Table 17, the achievement of the implemented PW in relation to small scale irrigation scheme seems generally good. For instance the spat canal irrigation construction achievement was 75% of the plan. On top of that, achievement of traditional canal and flood control construction was astonishing with 761 % and 256 % of the plan respectively. However, the result indicated that the achievement of river diversion and water harvesting is generally poor. For instance, the woreda achieved nothing though it planned to construct 40 km of canal diversion. Similarly the woreda constructed 14 m^3 (3%) hand dug well against the plan of 535 m^3 and nothing though the woreda planned 7673 m^3 pond maintenance. Application of irrigation is one of the crucial strategies to minimize the vulnerability and direct dependence of the rural small holder farmer livelihood strategy to adverse impacts of climate variability and change. The woreda's PW activities achievement illustrated in Table 15 under the component of small scale irrigation showed to what extent the woreda gave priority over other activities and the achievement was also encouraging.

It can be concluded from Table 17 that the woreda poorly performed when it comes to the soil fertility management mainly because of two reasons. Firstly the woreda planned only one activity out of a range of alternative actives in the menu though the woreda has potential to apply a range of soil fertility management. Secondly, out of the planned 4,582 m^3 compost making, only 25 m^3 (1%) was achieved in six years' time.

Training of farmers was integral part of all the agricultural extension system promoted in the country. With this view, the government planned to establish a total of 15,000 Farmers Training Center (FTC), one in each Kebelle (MoARD, 2003). The FTCs are designed to serve as local level focal points for farmers to receive information, trainings, demonstrations and advice, and to include both classrooms and demonstration fields. Hence, to complete the government plan, PSNP also included construction of FTCs as one PW activity. As presented in Table 17, Dodote woreda constructed five FTCs in five Kebelles through PSNP though not in the original plan. According to the report by WB (2010), access to Farmers Training Centers has improved at national level due to PSNP PW sub project. The same report indicated that around 10% of the 8,489 FTCs existed in Ethiopia have been built by PSNP. Therefore, the intervention of PSNP in constructing FTCs is really commendable by itself though the issue still remains on the use of these FTCs as intended. As indicated in above, although FTCs were constructed in two of the Kebelles where the study conducted, they were not used properly to transfer knowledge on different information to raise awareness of the local community on climate change and climate change adaptation.

Discussion with the focus group discussion confirmed that the implemented public work activates were really relevant to address the root cause of the community as it focus mainly on natural resource and water management. However, they criticized for less focus on the biological treatments; particularly the reforestation programme was poor.

5.5.2. Household skill and application of PW activities

In order to get a picture on contribution of PSNP PW activities to improve the knowledge of farmers on different PW technologies, the sampled households were interviewed during the field survey. Out of the 78 interviewed households, 93.6 % respondents have reported that their skill on PW were enhanced either from participation in PW or due to the training received from the FTC constructed through PSNP. Whereas, the remaining 3% have confirmed that their skill remains unchanged as they were hardly involved in PW implementation. Almost 66% of farmers, interviewed during the governments PW impact assessment conducted in 2009, said they had attended trainings in the FTS in various agricultural fields in recent years.

The sampled households were also interviewed about the type of PW technology skill they gained. Table 18 below presents the types of PW technologies skill transferred to the sampled households. Out of the 73 respondents who said yes, about 20.5% has improved their knowledge on a range of physical Soil and Water Conservation (SWC) technologies while 30.1% said that they gained skill both on physical and biological SWC, and Soil Fertility Management (SFM). The other 30.1% of the respondents said their knowledge on a number of technologies in the areas of physical SWC, biological SC, SFM and agro-forestry has improved.

Table 18: Skill on PW technologies gained as a result of PSNP PW

PW technologies	Respondents	
	Number	Percent
Physical Soil and Water Conservation (PSWC)	15	20.5
Flood Control and Improved Drainage (FCID)	2	2.7
Gully control (GC)	3	4.1
Soil Fertility Management (SFM) and Biological Soil Conservation (BSC)	3	4.1
PSWC, BSC and SFM	22	30.1
PSWC,BSC, FCID and SFM	6	8.2
PSWC,BSC, FCID and SFM and Agro-forestry technologies	22	30.1
Total	**73**	**100**

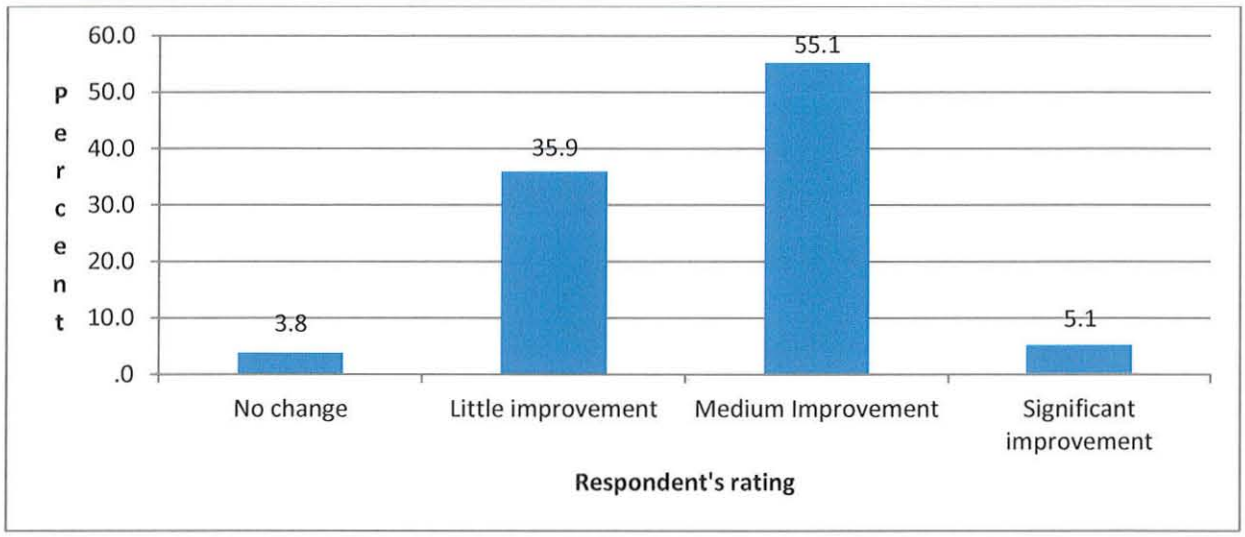
Out of the 73 households who acquired knowledge on a number of PW technologies, 61.5 % indicated that they partially applied on their private farm land whereas 7.7% applied the knowledge fully. The remaining 30.8 % have reported that not yet applied the acquired skills on their farm land. The finding of the study is slightly different from the finding of the government PW impact assessment conducted in eight woredas in Amhara, Tigray, SNNP and Oromia regions that showed out of the households trained in the FTC, 36 % and 65% have fully and partially implemented the acquired knowledge on their private farmland.

5.5.3. Improvement on soil moisture holding capacity and soil fertility

Efficient use of water is considered as one option for adaptation of the climate variability and change in different literatures. The Ethiopian Action for Adaptation for Climate change (NAPA, 2007) underlines the wise use of the existing water resources for both agricultural as well as human consumption purpose. Like in other parts of the country, data from the woreda indicated that the livelihood of the rural people is too dependent on rainfall. Only 546 ha (2%) of land was irrigated out of the total 25,339 ha cultivated land in the woreda. In order to obtain a highlight, the study examines the impact of PSNP PW intervention on rainfall harvesting and improvement of the soil moisture holding capacity of the farmland from the view of the interviewed household. In addition, the contacted households were also asked their view on the contribution of the implemented PW activities to enhance soil fertility. Result of the household survey is presented in Figure 5 and 6 for the response of the interviewed households on their perception of the positive impact of PW on water harvesting and soil moisture holding capacity, and farmland soil fertility respectively.

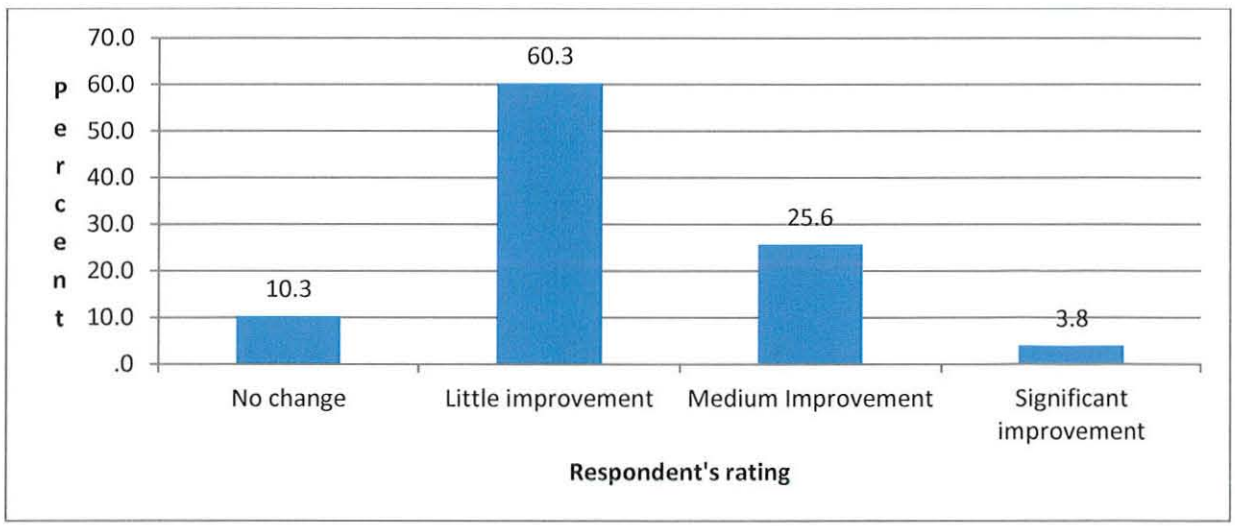
As noted in Figure 5, of the total 78 respondents interviewed, 55.1 % have rated medium improvement on the rain water harvesting and soil moisture holding capacity of their farm land as a result of PSNP PW intervention, whereas 35.9 % rated the change as little improvement. About 3.8 % of the respondents have indicated that the implemented PW technologies have no significance to bring a change on rain water harvesting and soil moisture retention capacity of their farm land.

Figure 5: PW impact on rain water harvesting and soil moisture holding capacity.



As mentioned by the interviewed households and focus groups, the implemented physical soil and water conservation measures in the watershed have impact on conserving the rain water and recharge ground water. In recent years, it was allowed to implement PW activities on private farm land as far as it has impact to the broader watershed management. This change in approach has given an opportunity to undertake several water harvesting, and agro forestry activities in the private farm lands, according to the woreda key informants contacted during the field survey. In addition, based on the skill they gained by participating in PW and through trainings from the FTCs, farmers took the initiative by themselves to construct some physical and biological SWC measures to harvest the rain water and to protect their farm land against soil erosion. During the focus group discussion, communities have commended the constructed fanya juu structures followed by check dams and some agro-forestry interventions in harvesting the rain water on their farmland and the soil as well.

Figure 6: Public Work impact on soil fertility



On the other hand, as presented on Figure 6, 60.3% of the respondents have rated little improvement on soil fertility brought about by the implemented PW. Whereas, 10.3% of the interviewed households said the PW brings no change on the soil fertility of their farmland. Surprisingly, this result tells us one clear message. As presented in the Table 17, the woreda planned only one soil fertility management activity (compost making) though there is a significant potential to apply a number of soil fertility management in the woreda. On top of that, the achievement of the compost making was only 1% (25 m^3 against the plan of 4582 m^3) in six year implementation period. Therefore comparing to rain water harvesting (55% respondents rate medium improvement), 60.3% of the interviewed households rate change in soil fertility little improvement.

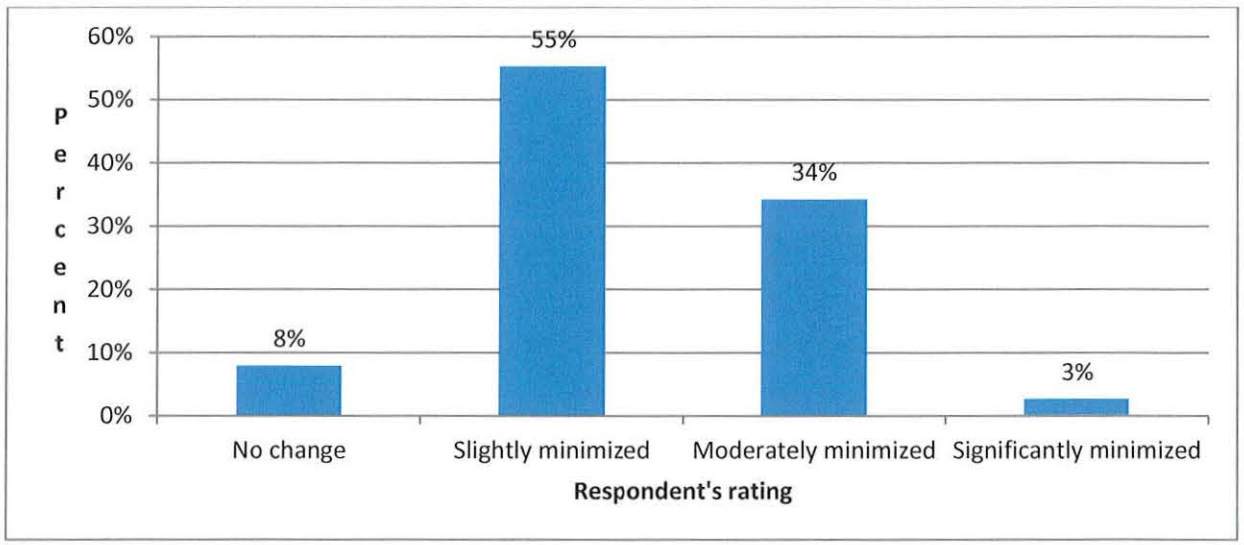
However, these above two results have to be finally measured by their effect on changing productivity and production of farmlands although both results seemed encouraging. Findings from key informants interview and discussion with focus group discussion revealed that there was no as such change on productivity as well as production of the farmland although they confirmed the implemented PW have brought a change on retaining the rain fall on farmland and improvement of soil fertility. Of course, the impact of PW to improve the production and productivity through changing soil fertility would need longer time. But improvement in rain water harvesting on farmland is expected to show an impact on production and productivity, which in the contrary either not felt or happened in the study area, as explored during the field survey.

5.5.4. Impacts of PW to minimize property susceptibility to flood

Different literatures noted that climate change has been increasing the frequency and intensity of extreme weather events such as heavy rains, flash floods, occurrence of high winds and so on forth (IPCC, 2007). Some of these extreme events in turn have a potential threat on properties such as farmland and homestead. Flood can be taken as an example which is one of the hazardous events occurred frequently in some parts of Ethiopia. So as to get some picture, sampled households were asked the role PW played on minimizing susceptibility of farms lands, homestead or/and other household properties to flood hazard.

Before asked on the impact of PW, sampled households were asked whether any of their property was susceptible to flash flood hazard during pre- PSNP intervention. Of the total 78 sampled households, 47% have said yes.

Figure 7: Rating the role of PW on preventing property susceptibility to flood.



As presented in figure 7, of the 37 households who indicated that their property was exposed to flood hazard, 92 % confirmed the implemented PW interventions have protected the susceptibility of their property (with rating of 55% slightly, 34% moderately and the rest 3% significantly). Whereas the rest 8% have reported that their property was still exposed to flood hazard.

5.5.5. Contribution of PW component on the use of irrigation

Most of the food crops in Ethiopia come from rain fed agriculture with the irrigation sub-sector accounting for only about 3 % of the food crops (WB, 2009). Ethiopia has an estimated total of 2.7 million ha potential lands for irrigation, according to the MoARD data. Of which only 290,000 ha (11%) is currently irrigated. This gives us a clear picture that the agriculture sector, on which more than 85% of the country people are dependent for their livelihood, is too dependent and vulnerable to climate variability and change. In order to minimize and eventually avert the vulnerability of agriculture sector to the threats of climate change, irrigation is irreplaceable alternative and strategy.

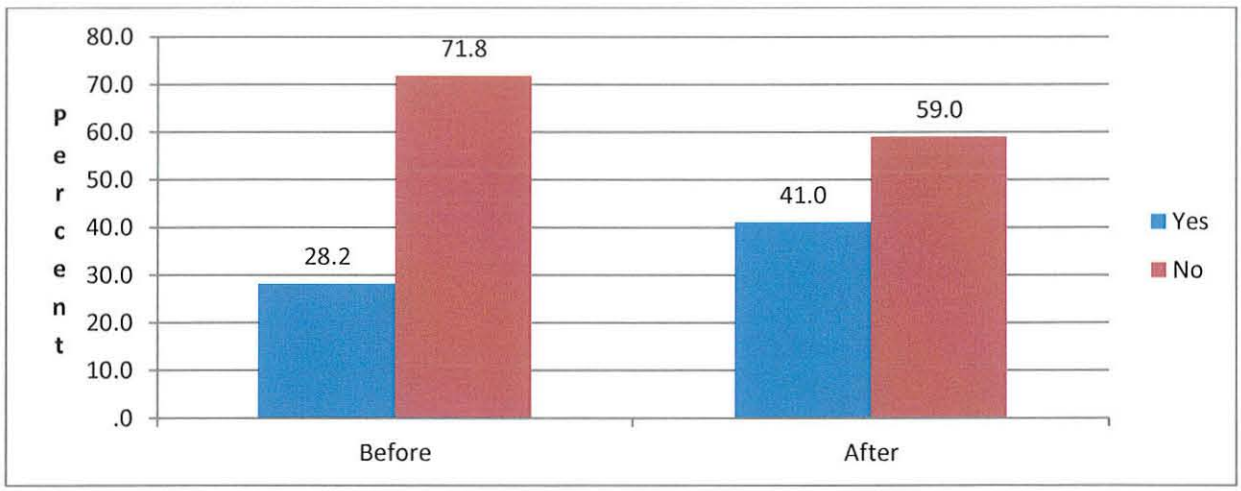
The PSNP PW sub project aim, among others, to enhance irrigation scheme through Small Scale Irrigation (SSI) sub component, and rehabilitating and restoring environment, and thereby, improve the adaptive capacity of PSNP clients. It has been reported and witnessed that the PW component enabled a number of communities to practice irrigation. The government PW impact assessment conducted in 2008 (MoARD, 2009) showed that, 50% of the sampled community watershed had developed small-scale irrigation. This had helped to expand livestock for 4-12% of the households depending on the area surveyed.

Dodota woreda is recurrently affected by shortage of rainfall and drought. The findings of this study also confirmed (under sub topic 5.2) that the local people are already affected by the climate change manifested through frequent shortage of rainfall which leads to drought. Therefore, with in the agricultural livelihood strategy, it is evident that irrigation is one of the best options to escape the climate change threat for the rain fed subsistence farmers in the woreda. If this is the case, the study intended to assess impact of PW on promoting irrigation practice following six years implementation

period. As learnt from Table 17, a number of activities were accomplished in the woreda which have impact to augment irrigation practice. Therefore, in order to assess the impact of the PW, the sample households were asked whether they use irrigation before and after the PSNP intervention. As summarized the result in Figure 8, of the total interviewed 78 households, only 28.2 % of respondents have reported to use irrigation for crop production before the commencement of PSNP PW, whereas 71.8 % said no. On the other hand, 41% of the same interviewed sampled households have confirmed that they have applied irrigation for their crop production at least as supplementary, whereas the rest 59% still entirely dependent on rainfall. By employing simple mathematical calculation the difference of irrigation users before and after PSNP intervention becomes 10 households (13%) of the total respondents. Of these 10 new irrigation users, only 6 (7.6% of the total sample) households confirmed that they able to use irrigation directly as a result of PW intervention. Whereas the remaining four respondents use irrigation because of the use of water pump purchased or leased either from the loan they received under OFSP or remittance. Stream diversion and flood diversions were the main water source of the irrigation which was developed through the PW interventions, mainly flood control and traditional canal construction.

Contacted focus group and key informants have agreed that the implemented PW activities under PSNP have a cumulative effect to improve the ground water recharge and consequently stream flow. Stream which have been dried up immediately following the rain season have been now stayed a bit longer. This has given an opportunity for the local community to use irrigation to supplement the rain fed crop production.

Figure 8: Application of irrigation for crop production before and after PSNP in the study area



The concept and suggestion of Davies *et al* (2008); stated that for social protection to be resilient to adverse impact of climate change, it needs to be contribute to reduce the livelihood direct dependence on climate related factors; comes here to interpret above result. Within small holder rain fed farming system, irrigation comes in to first place to play and fulfill this role among the different adaptive strategies. Although the change on use of irrigation (7.6%) seems small, the researcher believed that the impact of PW to promote irrigation use is really commendable and encouraging. The issue here is scaling

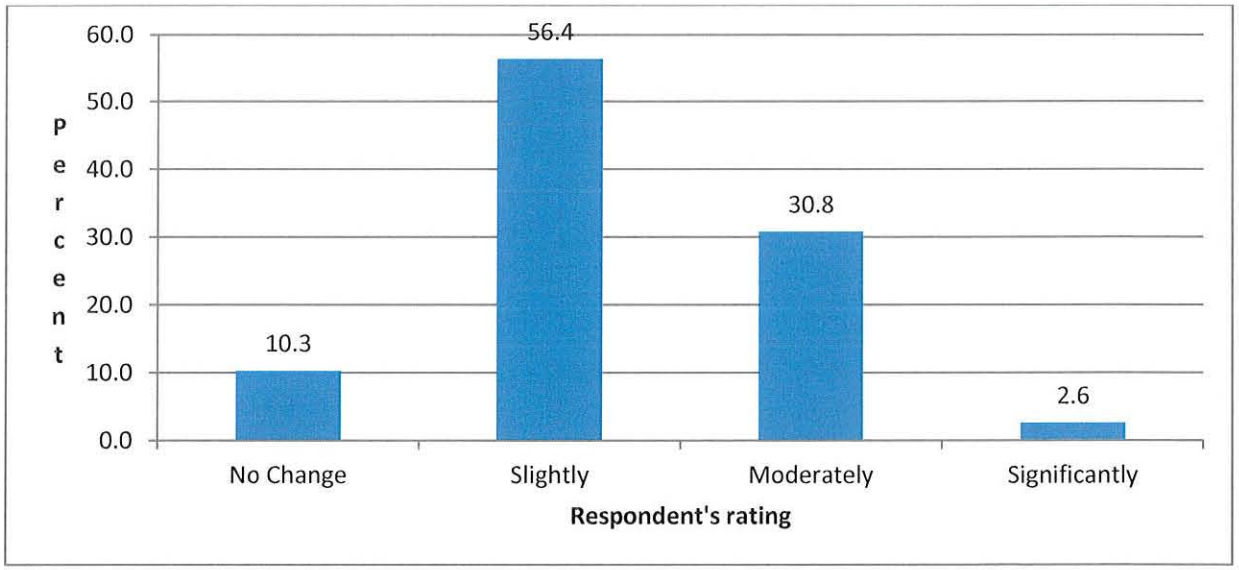
up the best technologies that have an impact on irrigation practice in order to reach more areas and households.

5.5.6. Promotive role of public work programme

Noted by Davies *et al* (2009), Public work programmes have a promotive role. As a social protection instrument, public work progammes promotes resilience through livelihood diversification and security to withstand climate related shocks. In the long run, the public work component of PSNP is expected to have cumulative effect to increase and diversify income of households. Based on their study findings, Devereux and Guenther (2009) have indicated that many of the PWs have the potential to promote agricultural production or marketing, directly or indirectly. Activities that benefit agriculture directly by either raising or stabilizing crop yields and farmers' incomes, include small scale irrigation, micro-dams, and soil and water conservation. Activities that could enhance agricultural incomes indirectly include construction of rural access roads and farmers' training centers, and improved water supplies (spring capping, ponds, shallow wells).

The sampled households were asked during the field survey to rate their perception of the overall income increase and diversification brought about after six years implementation of PW activities. The result of is shown in Figure 9 and it is really encouraging.

Figure 9: Overall contribution of PW on households' income change and diversification



As illustrated in Figure 9, out of the 78 sampled households, 89.7% respondents reported that their household income was increased or/and diversified as a result of PW intervention (56.4% rated the change as slightly, 30.8% rated the change as moderate and the remaining 2.6% rated the change as significant). The remaining 10.3% of the respondents have said that their income was not changed though intensive PW activates were implemented during the last six years. Sampled households, who confirmed that their income was positively changed, were asked how the implemented PW played a positive role in changing the household income which was also used as a control question to confirm whether brought changes were really due to the PW. Table 19 presents the result which surprisingly

tells us the change happened really because of the implemented PW. Of the total respondents, 11 % have confirmed that the application of irrigation had a role in changing their income. Similarly, 7% have reported that the improved access to market through the road construction has played a role to change their income. Whereas in contrary to above finding (topic 5.5.4), 7% of the respondents reported that the change was mainly due to the implemented physical soil and water conservation activities which had an effect to enhance the productivity of farm land. About 4% of the respondents said that their income was changed due to the enhanced animal/forage productivity in the area closure and communal lands. More importantly half of the respondents have confirmed that a combination of two or more factors had positive impact on their income.

Table 19: Factors positively affecting the household income change

S/N	Factors positively affect household income	Respondents	
		Number	Percent
1	Irrigation practice (supplement to crop production, horticulture practice)	8	11
2	Creating opportunities to practice alternative income generating activities as a result of land rehabilitation (feeding for bee keeping, tree planting .....)	2	3
3	Enhance Livestock production as a result of animal feed/forage improvement in the area closure and communal land	3	4
4	Improved market access as a result of road construction.	5	7
5	Enhanced the skill of the household or household head through the training obtained from Farmers Training Center	12	17
6	Enhanced the productivity of land due to constructed physical and biological SWC activities	5	7
7	A combination of two or more of the above factor	35	50
	Total	70	100

Asset creation and accumulation is one of the aims of PSNP as indicted in the project document. Asset could be public or private. As described during the focus group discussion, a number of public assets were created due to the implemented PW activities. Created public assets include physical SWC, ponds, irrigation canals, feeder roads, shallow wells, micro-diversions, schools, FTCs, DA houses and many more. However, the question here is whether households were able to create productive assets by using these created public assets. Therefore, to answer the question, sampled households were interviewed whether they have created asset mainly because of the PSNP PW and transfer. Out of the total 78 sample households, 82% replied yes they created predictive asset whereas 18% reported that they did not create any asset as a result of the PSNP intervention apart from fulfilling the basic household consumption. As presented in Table 20, of those 64 (85% of the total) sampled households who said created household productive asset, 61% have reported they have created asset that can be categorized as agriculture production asset. Whereas 8 % of the respondents said they have owned livestock mainly shoots. About 5 % of the respondents reported that they owned assets categorized under consumer durables. Six percent of the respondents have confirmed that they have either owned

or maintained their houses, whereas, the remaining 20% of the respondents have reported to have owned a combination of two or more assets.

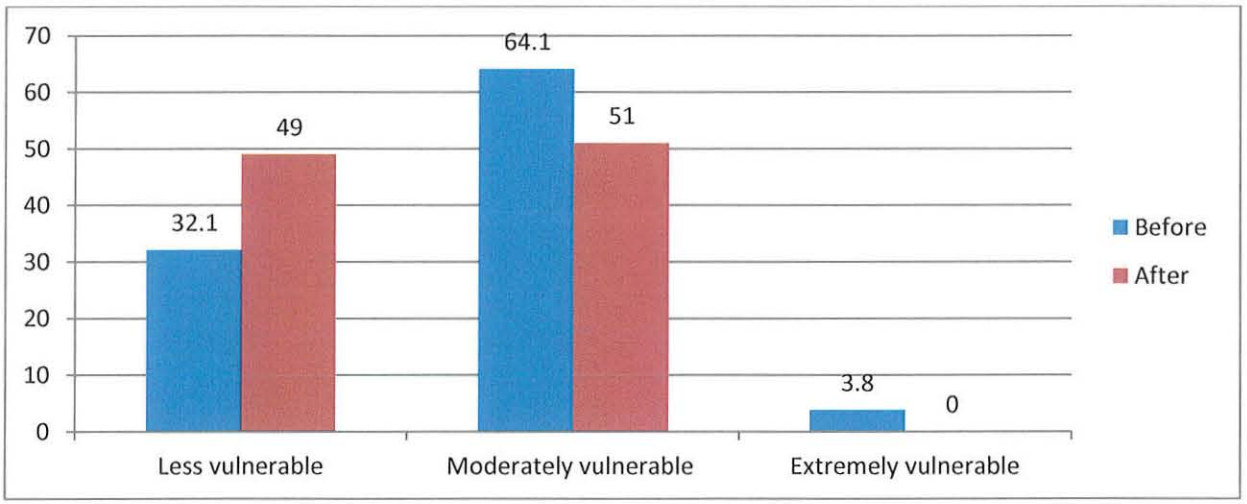
Table 20: Created household productive asset

Category of asset	Respondents	
	Number	Percent
Agricultural Production Asset (eg Plow yoke= maneko and kember, Maresh, Sickle, Pick axial, ...mechanical and motorized water pump, ...)	39	61
Livestock including traditional and modern bee hive	5	8
Consumer durable (Improved charcoal/wood stove, Kerosine stove, sofa, Leather bed, metal bed, modern chair, TV, Jewelry, cellular phone ...)	3	5
Construction and maintenance of house	4	6
A combination of the above two or more asset category	13	20
Total	64	100

5.6. *Impact of PSNP to reduce livelihood dependence to climate related factors*

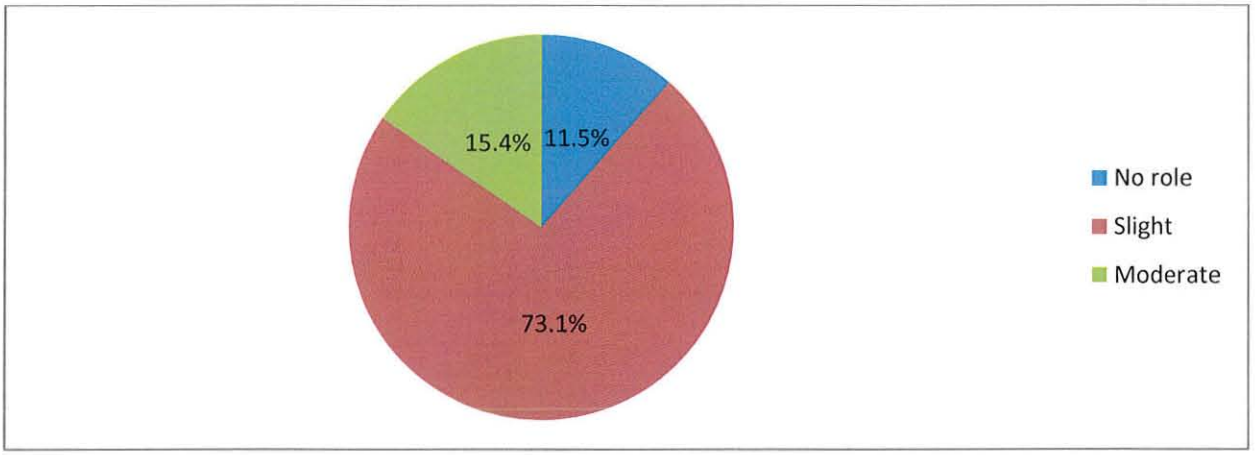
As explained above, rain fed farming practice is the main livelihood strategy of the rural people of the study area. For social protection to be resilient to climate change impacts, it would therefore need to consider how reducing dependence on climate sensitive livelihood activities can be part of adaptive strategies (Davies *et al*, 2008). Therefore, beyond achieving the stated objectives, if at all the impact of PSNP is assessed in addressing the threat of climate change; it needs to measure its effect on minimizing the dependence of the existing farming system which is too vulnerable to climate variability and change. In relation with this concept, the sampled households were asked two important questions that may give some picture on the impact of PSNP in reducing the dependence of household's livelihood on highly erratic and variable rainfall. Firstly they were asked to rate the status of their household livelihood vulnerability to climate related hazards (such as drought, flooding and extreme temperature) before and after five years of PSNP intervention. Secondly sample households were interviewed on the contribution of PW component to reduce the extreme dependence of their livelihood to climate related factor particularly rainfall. Later question was also used as control question to confirm whether the change is attributed to PW since the delivered outputs as a result of PW implementation were known in advance. The result of the responses were summarized and presented in Figure 10 and figure 11. It is worthy to define vulnerability for ease of understanding. Timmerman (1982), has defined vulnerability as "the degree to which a system or part of a system may react adversely to the occurrence of a hazardous event".

Figure 10: Household's livelihood vulnerability to climate related hazard



As showed in Figure 10, unanimously, all the total 78 sampled households interviewed during the field survey have confirmed that their livelihood is still vulnerable to extreme climate related hazards mainly drought. Comparing the scope of vulnerability before and after the PSNP intervention, the same respondents indicated that there was difference which of course implies positive impact. The percentage of interviewed households who rated their livelihood as extremely vulnerable after PSNP intervention has reduced from 3.8 % pre-PSNP intervention to zero percent. Similarly the degree of moderate livelihood vulnerability has reduced to 51% from 64% for five years ago. Summarizing the result, it implied that 3.8% of interviewed households who rated their livelihood as extremely vulnerable and 13.1 % of the total respondents who rated their livelihood as moderately vulnerable before five years ago has now rated as less vulnerable. From this result it is pretty evident that the PSNP has yet to meet the role in addressing the livelihood vulnerability of the small holder subsistence farmers to extreme climate hazards particularly drought which is one of the adverse effect of climate change in countries like Ethiopia.

Figure 11: Respondents rating on the role of PW to reduce livelihood direct dependence on rainfall.



Similarly, as showed in figure 11, of the total 78 respondents, 11.5 % have reported that the PW was unable to bring a change on the degree of dependence of households' livelihood to the highly variable and erratic nature of the rainfall, whereas 73.1 % have rated slightly change and the remaining 15.4% reported as moderate change on reducing livelihood dependence to rainfall as a result of the implemented PW activities. Households, who reported as there was a change, have been asked how the PSNP has contributed to reduce the direct dependence to rainfall and the result is a bit contradicting. About 80 % of the respondents have replied that they received food or cash transfer. They considered the predictable transfer as part of their income and security for their livelihood regardless the drought happen. From this, therefore, it can be concluded that role of PW in reducing the dependence of livelihood to the direct effect of climate change is still behind.

5.7. Impact of OFSP on household livelihood diversification and income

5.7.1. Summary of the OFSP intervention

As indicted in HABP guideline (MoARD, 2009), for much of the 1990s and early 2000s, the rural Extension Service was mobilized to implement a strategy based on supply-side constraints to agricultural growth, including the distribution of inputs and collection of credit at the end of the season. The strategy was implemented by a centralized promotion of technological packages mainly combining fertilizer, seed and technical advice. Whilst there was a modest growth in food supply, it was increasingly recognized there was a need for generating more diversified, efficient and sustainable baskets of farm investment and income generating opportunities, as well as a stronger focus on the demand side through rural markets.

After years of implementation, the OFSP was criticized mainly because of two reasons. Firstly it was supply driven that households were provided with a menu of different packages ranges from livestock asset through vegetable seeds to alternative livelihood packages such as bee hives or silk worm raising kit. Secondly, OFSP provides credit for only livelihoods within the agriculture sector.

The Household Asset Building Programme component of governments 2010 – 2014 FSP was built on the implementation experience of the World Bank-funded RCB, the CIDA-funded IPMS and the USAID supported PSNP PLUS projects and the lessons learnt from the implementation of OFSP. This experience clearly demonstrates the success of adopting a demand driven approach to extension that empowers and builds rural households' confidence to embark on investments and income generating enterprises appropriate to their needs and capacity.

Though HABP was planned to be realized as of beginning of 2010, it was not yet implemented in the study area during the field survey conducted in March, 2011. The OFSP was still ongoing during the survey. In addition, with the fund obtained from USAID, Wonji Catholic Church has been implementing PSNP PLUS project since October 2008 that can complement HABP (CRS, 2010). As presented in the project document, PSNP PLUS aims to improve the livelihood and resilience of PSNP beneficiaries as a means towards achieving graduation.

As data from Wonji Catholic Church indicted, the PSNP PLUS project supports four value chains: white pea beans, small ruminants, honey and cereals (wheat, sorghum, maize and teff). Since the beginning of 2009, the project provided improved seeds to 1,338 households, beehive to 47 households, and goats and sheep to 246 households of PSNP beneficiaries on loan basis. Under OFSP, most of the rural farmers received a range of loans from different loan providers such as cooperatives, women associations and other sources.

Type and size of the credit

The amount of loan provided through different sources ranges between 800 and 1000 Birr per household with an interest rate of 13 to 14 % per a year. The repayment period was also extended up to three years. Credits are usually provided either in cash or in Kind or a combination of both. The sampled households were asked the types of credit they received since they targeted by PSNP (in the last four years). The result indicted that of the total 78 surveyed households, 43.5 % received the credit in cash form, 25.7% in kind and the remaining 30.8 % received both cash and in kind forms.

Investment of the cash credit

Credits obtained in cash are meant to invest in purchasing productive assets or in activities which will generate additional income to improve the livelihood of households. From the total 78 interviewed sampled households, 58 households (34 cash only and 24 both cash and in-kind) have confirmed that they received cash at least once during the past four years. Households who received cash credit was interviewed how they used the cash as it would give the picture of investment areas. The result is reported in Table 21 that shows the borrowers invest the cash in different types of assets and services which can boost income within the agricultures sector. None of the interviewed household has used cash to invest in income generating activities outside the agricultural sector. As presented in Table 21, out of the 58 cash borrowers, 44.8% have used the loan to purchase agricultural inputs mainly fertilizer and seed, followed by purchasing of goats and sheep for fattening purpose which accounts 19% of the respondent. Furthermore, 10.3 % of the respondents have used the loan to lease farm land for cultivation in order to increase their income as they have extra labour forces in the household.

Table 21: Utilization/investment of the cash credit

Investment activities	Respondents	
	Number	Percent
Purchase agricultural inputs	26	44.8
Purchase pack animals for transportation	2	3.4
To lease farm land for cultivation	6	10.3
Purchase goats and sheep for fattening	11	19.0
To lease water pump	4	6.9
Purchase of livestock	8	13.8
To establish poultry farming	1	1.7
Total	58	100

Types of in-kind credit

As part of the food security package, credits were also provided in-kind to enhance the income of the households with in agricultural farming sector where the rural people master for years. As confirmed by the woreda key informants, unlike to urban areas, no credits were given to rural community who wanted to engage in non-agricultural income generating activities. As described above, of the 78 sampled household, 44 had received credit in-kind form (20 in-kind only and 24 a combination of cash and in-kind). As presented in Table 22, out of the 44 borrowers, about 47.7 % of the interviewed households have received crop seeds, 36.4% small ruminants and 9.1% vegetable seeds on loan basis. Three households (6.8%) also confirmed that they received cattle for fatting and dairy purpose.

Table 22: Types of credit obtained in-kind

Type of credit	Respondents	
	Number	Percent
Crop Seeds	21	47.7
Vegetable seeds	4	9.1
Cattle for fatting and dairy	3	6.8
Goats and sheep fattening	16	36.4
Total	44	100

Other support

Usually provision of credits are complemented with other supports that range from giving training on how to prepare a business plan, on specific IGAs, to technical support and consistence extension service. The sampled households were asked the types of support they acquired in addition to the credit. The result is presented in Table 23 which shows all except four households have received one or more support. As indicated in Table 23, 51.3 % confirmed they have received training by the credit provider and extension agents on various thematic areas, while 17.9 % of the respondents have reported that they received technical assistance. Besides, 19.2 % has replied that they received consistent regular extension service.

Table 23: Types of other support obtained

Type of support	Respondents	
	Number	Percent
Training	40	51.3
Technical Assistance	14	17.9
Regular Extension Service	15	19.2
All of the above	5	6.4
Not Received	4	5.1
Total	78	100

Business plan

Before starting a new business, it is advisable to develop a business plan. A plan can help households move forward, make decisions, and make their business successful. However, not all business plans are the same, nor every business needs the same level of detail. But the expected business plan under HABP/OFSP is fairly simple plan first as a start up in small business. Such kind of business plan could give a chance to OFSP/HABP clients to assess potential areas for investments in order to make appropriate selection of business areas. The planning process also helps clients to understand their business. The business plan help clients to define what they wants from the business, understand what their customers want, and decide how to optimize their business on their own terms. They might benefit from developing a simple sales and expense forecast, may be even a profit and loss, so they can plan how to use and develop their resources.

Given all these benefits and others, the sampled households were interviewed if they prepared a business plan before taking loans. And the result reveled that, out of the total interviewed households, 44.9% have reported to prepare business plan with the support of the extension agents, whereas, the rest 55.1% of the borrowers have responded unable to prepare a business plan.

Loan repayment status

In order to deliver financial service through the sustainable finance providers, loans must be repaid by the borrowers on timely basis. On top of that the loan repayment status also gives some highlights on the success of the credit scheme. Sampled households were asked whether they have repaid their loan. And the result is illustrated in Table 24 which shows 42.3% of the borrowers have fully repaid their loan. While the rest 57.7% have repaid only a proportion of their loan (3.8% repaid about $3/4^{th}$, 16.7% about half, 28% a quarter, and remaining 9% less than $1/4^{th}$ of the loan they received)

Table 24: Loan repayment status at the end of February 2011

Size of the loan repaid	Respondents	
	Number	Percent
Less than 1/4th repaid	7	9.0
1/4th repaid	22	28.2
2/4th repaid	13	16.7
3/4th repaid	3	3.8
Fully repaid	33	42.3
Total	78	100

5.7.2. Role of OFSP to increase and diversify income

As stipulated in the Ethiopian government's FSP documents, provision of credits and associated support to the subsistence farmers aims to improve the level and stability of their income by diversifying their income sources (both on –farm and off-farm) through adopting new and innovative production technologies and acquiring more productive resources. As noted by Davies *et al* (2009), access to credits and asset transfers as social protection instruments can play significant role in promoting the resilience

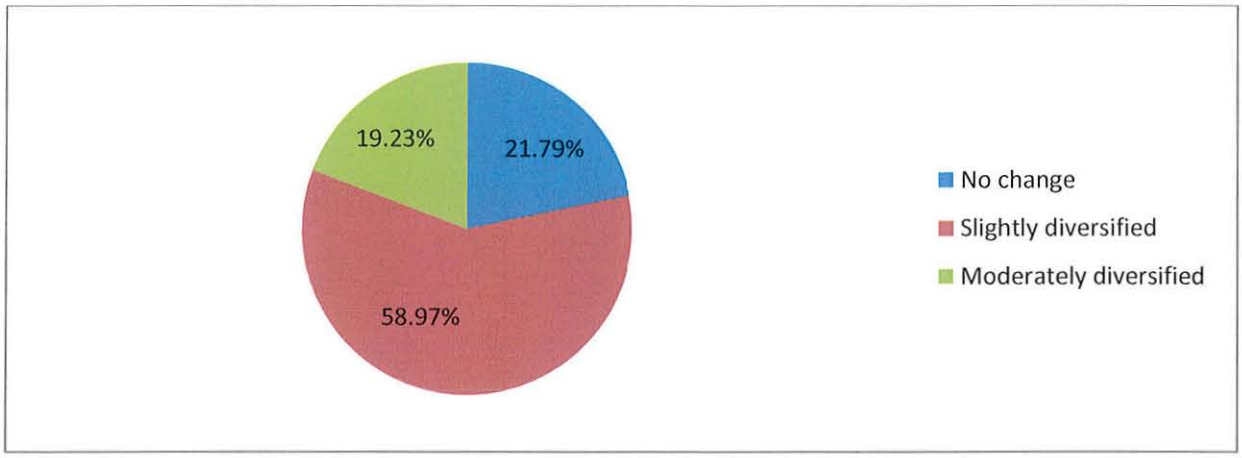
of households through livelihood diversification and security to withstand climate related shocks. The Ethiopian CC National Adaptation Programme of Action (NAPA, 2007) listed income diversification both within and outside agriculture as one way of adaptation strategies to cope with the threats of climate change.

Catholic Relief Service (CRS) has conducted midterm evaluation for its PSNP PLUS project implemented in Dodota woreda in mid of 2010. The evaluation assessed the impact of the project on asset creation and accumulation as a result of the credit and technical support provided by the project. The result showed no significant change in tools and productive assets, or household items since the project started in 2009. But the same study also reported that there was increase in income and asset for some households. But these changes were brought either given to the household in the form of a gift or purchased with income from livestock and crop sales, petty trade or credit.

This study explored the impact of the credit and other support provided under the OFSP on household income and livelihood diversification. In contrary to the result of impacts of the PSNP PLUS project conducted by CRS, the findings of the study presented in Table 25 showed that there was some positive change in the income of households as a result of range of OFSP support provided in the woreda. But with regard to livelihood diversification the result of household survey which is showed in Figure 12 is contradicting to the reality, given that the size of provided credit is very small and bounded in provision of seeds and small ruminants (as indicated in Table 21 and 22). A study conducted by Gilligan *et al* (2008) to assess the asset growth by PSNP and OFSP beneficiaries indicted that PSNP and OFSP beneficiaries had experienced asset growth.

Sampled households were asked to report whether the credit and other support they received through OFSP has changed source of their income. The result is presented in Figure 12 which shows about 22 % of the interviewed household reported that source of their income remains the same. While 59% reported that their livelihood is slightly diversified and the remaining 19 % have replied their source of income was moderately diversified. The provided Production credit through which they managed to use improved agricultural inputs and technologies, and engage in income generating activities mainly livestock fattening and dairy production. But surprisingly out of the 78 interviewed households, only 1 respondent (1.3%) has reported to engage in off-farm income generating activity (retail trade in non-agricultural goods).

Figure 12: Household report on income diversification



Furthermore, sampled households were also asked to estimate the amount of income generated as a result of OFSP support. The result as summarized in Table 25 shows income increase was reported by the interviewed households between 200 and 3600 birr per year, with a mean value of 1043.7 birr. As illustrated in Table 25, out of the total 78 interviewed households, 30.8% reported that their income was increased between 500 – 999 birr per year, while 24.4% reported an increase of 1000-1499 birr per year. While 2.6% of the respondents have reported to be increase their income between 2500 to 3500 birr. About 9% of the households reached during the field survey have explained that the programme did not brought any change on their income as the size of the loan is too small to bring any sort of change.

Table 25: Impacts of OFSP on household income increase.

Increase of household income per year as result of OFSP (in birr)	Respondents	
	Number	Percent
No change	7	9.0
1 - 499	12	15.4
500 - 999	24	30.8
1000-1499	19	24.4
1500-1999	12	15.4
2000-2499	2	2.6
2500-2999	1	1.3
3000-3499	1	1.3
Total	78	100

By critically analyzing the impacts of OFSP, it indicated that the programme hardly achieved its objective leave alone to contribute to climate change adaptation. OFSP meant to complement PSNP so that chronically food insecure households would graduate from assistance of PSNP. And the bench mark to graduate is set at a minimum of 18,000 birr income per a year. However, as presented in Table 25, the contribution of the OFSP to household income on average is reported as around 1000 birr per year. PSNP beneficiary is believed to have chronic food gap of 6 or more months. Therefore it is too difficult to

fill the food gap with the additional income obtained from OFSP support. Given the close geographical location of the woreda to urban areas such as Adama, which have an advantage to access the market, the support obtained from OFSP failed to give an opportunity for the chronically food insecure households to engage in a range of IGA (both on and off-farm). Even the provided credit through the programme are too bounded in their type and limited with in agriculture sector. Focus group discussions had also revealed that the support obtained through the OFSP has a lot of challenges to bring a change on the adaptive capacity of the beneficiaries. According to the focus groups reached through this study the amount of credit provided through the programme is too small to enable the beneficiaries to invest in feasible projectors which can generate higher income. On top of that given there are a number of off farm potentials in the area, the type of support provided through the programme are limited only in agriculture, according to the focus group. Without any further analysis, looking from its achievement, OFSP had played insignificant role when it comes to climate change adaptation.

Furthermore, looking from intervention and results of the study, OFSP hardly brings any change on minimizing the vulnerability of the households' livelihood to climate related hazards, particularly drought.

5.8. Change of household resilience

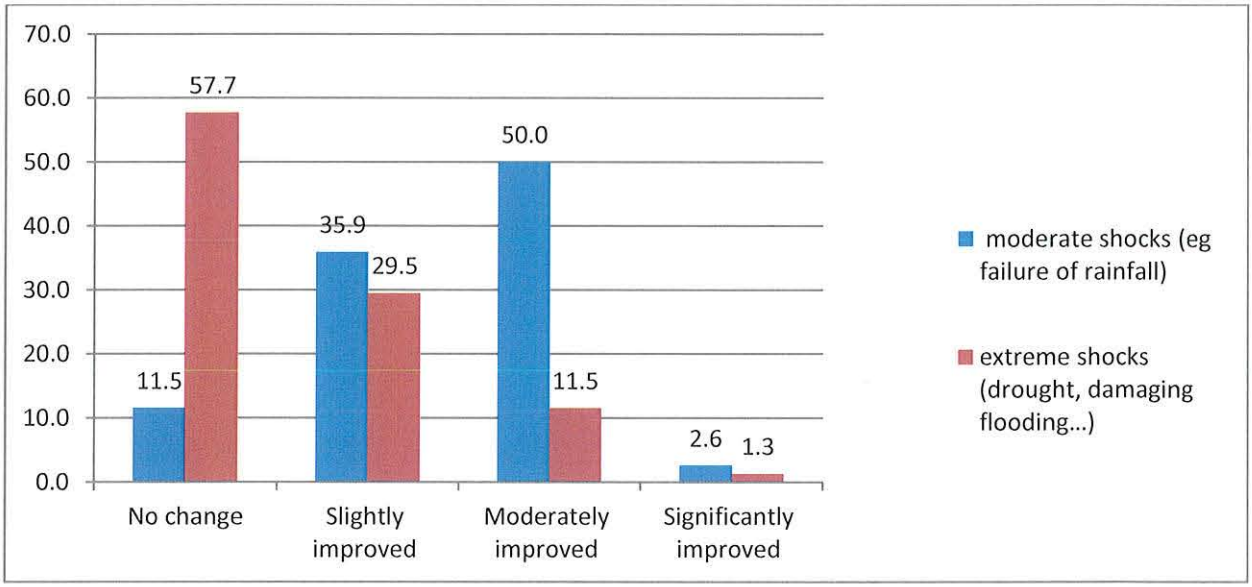
Examining the change of household resilience has an implication on the adaptive capacity to adverse impacts of climate change. Yamin *et al* (2005) defines resilience as "the capacity of a system, community or society potentially exposed to hazards to adapt by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. According to Timmerman (1981), resilience referrers to the measure of a system's or part of a system's capacity to absorb and recover from the occurrence of a hazardous event. Beyond ensuring the household food security, PSNP and OFSP/HABP can be measured their impact on building the resilience of targeted households both to moderate (eg poor rainfall performance, failure of rain fall) and extreme shocks (eg drought and damaging flooding).

The sampled households were asked their perception on the change of their resilience as a result of the combined effects of both PSNP (PW and transfer) and OFSP intervention. They were asked to compare the current status against to five years, prior to the implementation of these programmes. The result is presented in Figure 13 which gives some implication whether the programmes under question have really contribution to minimize the adverse impacts of climate change. As showed in Figure 13, of the total 78 interviewed sampled households, 88.5 % have responded that the resilience of their household to cope with moderate shocks (poor performance of rainfall) have improved mainly as a result of the programmes (50% respondent rated the change as moderate improvement, 36% slight improvement and the remaining 2.5% rated the change as significant improvement). Whereas, the rest 11.5% respondents have said no change.

On the other hand, as shown in Figure 13, of the 78 interviewed households, about 58% have replied that their household's resilience remained unchanged to cope with extreme shocks, particularly drought, which is mainly attributed to the consequence of climate change. Whereas 29% of the respondents have explained there was a change, and rated the change as slight. And only one

respondent, which makes up 1.3% of the total sampled households, has rated the change of his household's resilience to tolerate the consequence of extreme shock as significant.

Figure 13: Respondents rating to impacts of PSNP and OFSP on building household resilience to cope or adopt impacts of moderate and extreme shocks.



Thoroughly examining both results, change of resilience in relation to impacts of moderate and extreme shocks, it is possible to evaluate the role of PSNP and OFSP to augment the adaptive capacity of beneficiaries to threats of climate change. As presented above, 88.5 % of the respondents have confirmed the interventions have positively changed the resilience of their household to cope moderate shocks, which may cause reduction in crop production. On the contrary, 58% of the 78 interviewed household, have confirmed that resilience of their household still unable to cope impacts of extreme shocks particularly drought. The former result can be interpreted that the programmes have positive impact on the food security status of households. Whereas, the later result can be interpreted in relation to impacts of the programme in building the adaptive capacity of the sampled households to the adverse impact of climate change. The result implies that more than half of the sampled households were still vulnerable to the climate change induced threats, mainly drought which happens frequently in the area.

Chapter VI

Conclusions and Recommendations

6.1. Conclusions

Climate change is acting and will continue to act as a multiplier factor of the exiting threats of food security in the small holding subsistence farming system. As stipulated in several literatures, unless proper and multiple adaption strategies are timely introduced, impact of climate change will make natural disasters more frequent and intense, land and water more scarce and difficult to access, and increase in productivity even harder to achieve. The implications for people who are poor and already food insecure and malnourished are immense. The smallholder subsistence farmers in the developing world, like Ethiopia, have limited capability and capacity to adopt the threats of the climate change mainly for three reasons. Firstly, the main income source is generated from farming practice on land extremely degraded because of unwise exploitation for centuries accompanied with less land management practice. Secondly the livelihood system is still directly dependent to the direct impacts of the climate factors, mainly rainfall performance. Thirdly, they have limited productive assets and inadequate access to improved farming technologies to cope with the threats of climate change.

On the other hand, adaptation often involves substantiatial investments and changes in practices that may take time to implement or show benefits. It must therefore be complemented by other responses that address the immediate effects of climate change and protect those who cannot adapt. Hence, recently, social protection has got attention of policy makers and researchers to consider it as instrument to build the adaptive capacity of the vulnerable. As reflected in a number of literatures, a range of social protection instruments have been designed and implemented in such a way to respond to threats of climate change impact in a number of developing countries. PSNP, the second largest social protection intervention in sub Saharan Africa following South Africa, is implemented to reach about 8 million chronically food insecure people in more than 300 woredas of Ethiopian since the year 2005. Furthermore, OFSP/HABP was implemented to complement PSNP to achieve its objectives for the last years. Although these two programmes hardly incorporate the idea of climate change adaptation in their respective documents, they are believed to play the role as instrument of adaption in addition to achieving their multiple objectives. This study, therefore, tried to explore the impacts of PSNP and OFSP to enhance the adaptive capacity of subsistence farmers to the adverse impacts of climate change. The impact of these programmes can be demonstrated in a number of areas to respond to the threats of climate change. The study, therefore, assessed the impact in relation to different factors which are summarized in the following paragraphs.

In order to take corrective measures to respond to the potential threats of climate change, farmers need to be well aware on the nature of the adverse impacts of climate change and the possible adaptive measures. In addition, households' access to appropriate and timely weather information forecast is really significant in order to incorporate these information while they made decision of farming practice. FTCs are believed to serve as contact center for the subsistence farmers from which they would get a number of information and lessons on different technologies. Although a number of FTCs has

established through PSNP PW, the study result showed little impact of FTCs to serve as contact center to disseminate weather forecast information and to raise awareness of subsistence farmers on climate change related concepts. The result of the study revealed that the established FTCs are not providing weather information forecast. Furthermore, the awareness of the community on the trends of the climate change, potential threats as a consequence of the climate change, and the possible available adaptation strategies to the adverse impacts of climate change was found very poor.

Impacts of the PSNP transfer as provision and preventive social protection instrument was found significant and commendable. The result of the study showed that, predictable cash or food transfer helped households to meet their food needs. In addition, the impact of PSNP transfer to prevent against the distress asset sales to meet food needs was found immense. As a result, the subsistence farmers were able to take risky decision to use improved farm inputs such as fertilizer and improved seeds. However, the findings of the study showed almost no change on the impacts of PSNP in preventing distress asset sales to raise emergency cash needs such as health expenditure. This also implies that the saving potential of households is still poor. Although, unlike to relief, the PSNP transfer is predictable, discussions with focus group have revealed that the timeliness of the transfer was very challenging with extended delay in transfer. In the case of food transfer, the absence of oil and pulse from the food basket was also one concern raised by the PSNP clients.

Impacts of PSNP PW on conserving and harvesting of rain water and the consequence recharge of ground water was encouraging. The impacts of implemented different PW activities have demonstrated good result to change soil moisture holding capacity and fertility of the farm land though the consequence impact to enhance crop production and productivity was not felt by the subsistence farmers. The implemented different physical and biological soil and water conservation measures have significant role in protecting the susceptibility of properties (such as farmland, homestead and other properties) to extreme weather event, particularly flood. Provided that PW are properly designed and implemented, the result of the study showed that PW have significant role to establish irrigation scheme following to the combined effects of proper watershed management and implementation of a number of small scale irrigation interventions. Although the study found very few households (7.6% of the sampled households) who be able to use irrigation for crop production as a result of the implemented PW activities, the impact of PW to promote irrigation was found very worthy, given that significant role of irrigation to reduce the livelihood dependence to climate related factors. The point here is to draw lesson from the best PW technologies that have impact to promote irrigation in order to scale up and reach more households. Physical soil and water conservation measures need to be complimented with biological measures (mainly reforestation) to sustainably rehabilitate and restore the degraded watershed areas. Unfortunately, although a number of Physical soil and water conservation have been implemented in the study area through the PSNP PW, very little efforts has been made to accompany with reforestation programme, as showed by the result of the study. Though there are a number of soil fertility management measures potentially can be applied in the study area, the woreda overlooked to include them in the five year PW work plan. Only one soil fertility management technology (compost making) was planned and implemented.

As reflected in different literatures, the PW component of PSNP has a potential to promote resilience through livelihood diversification and security to withstand climate related shocks. The impact of PW as a promotive strategy has been found by the study not as such significant though it was encouraging. The result of the study indicated that a number of delivered outputs through implementation of several PW activities have given some opportunity to diversify and increase the income of households to some level. Some households reported to use irrigation to diversify and enhanced their income. While others reported that their livestock production was enhanced to some level following the improvement of animal feed/forage in the communal lands and area closure. Improvement of market access through the implemented access road has helped for others to receive fair price for their agricultural product. And for the rest, the production and productivity of their land showed some improvement due to the implemented physical and biological soil and water conservation activities.

For PW to be resilient to climate change impacts, it would have impact to reduce dependence of income on climate sensitive livelihood activities. The result of the study, however, showed that the PW component of PSNP have little impact to reduce direct dependence of livelihood on climate related factors, mainly rainfall performance. The livelihoods of the subsistence farmers in the study area were still remained vulnerable to extreme climate related hazards, particularly drought.

As realization of HABP was delayed at national level, the old OFSP is still implemented in the study area. The study found that PSNP clients have received credit, training and technical and extension support from OFSP, with objective to enable PSNP beneficiaries to create and accumulate assets and eventually graduate from PNNP and OFSP support. The type of the credit provided to household was either in cash or in-kind or a combination of both. The size of credit obtained cash form was found to be between 800 and 1,000 Birr with an interest rate of 13 and 14 % depending on the source of the credit. Households reported to invest the cash credit to purchase agricultural inputs (45% of the total sampled households), Purchase of livestock (small ruminant animals or cattle, 33% households), to lease of farm land and water pump. The provided in – kind credit was limited crop and vegetable seeds (57 % of the total borrowers), livestock mainly goats and sheep. The study found that loan repayment status to be good.

A number of studies have reflected that access to credit and asset transfers as social protection instruments have significant impact to promote the resilience of subsistence farmers though livelihood diversification and income increase. As reported by the key informants, the credit and other support obtained through OFSP enabled households either to acquire more productive resources (buying oxen, renting farmland) or adopting new and innovative production technologies (modern farm inputs, improved animal breed). However, as the result of the study indicated the impacts of OFSP on household livelihood diversification was found very minimal though there was some achievement to increase income of households.

The study found that on average household income increase by 1,043 birr per annum as a result of OFSP support. But the programme has little impact to diversify the livelihood of households mainly because of three reasons. Firstly, nature of the progrmme is supply driven. It provides credit for the purpose of pre-defined activities, although the demand of households varies depending on the interest and business opportunities to engage. Secondly, the alternative packs are bounded to accessing

productive assets with in agricultural farming sector. Thirdly, the size of loan is very small which did not allow household to invest in more than one productive resource. The result of the study indicated that OFSP support has little impact in achievement its objective to enable households graduate (become food self-sufficient), leave alone to promote climate change adaption through livelihood diversification and security to with stand climate related shocks.

The study found the combined efforts of PSNP and OFSP have started to show promising and encouraging result to improve the resilience of the small holding subsistence farmers to cope or adopt impacts of moderate shocks such as failure of rainfall. But the number of activities implemented both by PSNP and OFSP have little effect in changing the resilience of the small holding subsistence farmers to cope or adopt impacts of extreme shocks, particularly drought. According to Neil and Agrawala (2007), adaptation to climate change are differentiated in three level from temporal perspective: response to current vulnerability, observation medium and long term trends, and anticipatory planning response to model-based scenarios of long term climate change. From this perspective, PSNP and OFSP have made significant progress to build the adaptive capacity of targeted groups to respond to the current vulnerability. But in relation to response of the medium and long term trend of climate change impact, the programmes needs to improve their intervention type and quality which of course demand to reshape the progrmme design and build implementation capacity of actors to meet qualities and standards of deliverable outputs.

6.2. Recommendations

Although as social protection intervention, PSNP and OFSP, have been implemented for the last six years, the livelihood strategy of the rural subsistence farmers of Ethiopia remains still highly vulnerable to the direct adverse impacts of climate variability and change. Therefore, doing business as usual may not work to respond to the existing and future threats of climate change. In order to mainstream climate change adaptation into the existing social protection interventions (PSNP and OFSP), two important points must be critically seen by policy makers. Firstly, selection, design and implementation of activities through PSNP and OFSP/HABP must be conducted with the view of their significance to reduce the direct dependence of livelihood strategy to the climate related factors, mainly the unreliable and erratic rainfall. Secondly, both PSNP and OFSP need to focus on and give priority to activities that can enhance and promote livelihood diversification, both within and outside agriculture sector.

The livelihood of ten millions of small holding subsistence farmers of Ethiopia extremely rely on the natural resource base which is characterized by high degradation due to over-exploitation for centuries and lack of proper resource management. As a result of this and accompanied with the declining of rainfall performance, millions of rural people have faced chronic food insecurity. Hence, environmental restoration and transformation is pivotal to improve and continue productivity of the natural resource base. Therefore, PSNP need to strengthen and redouble the Public Work's emphasis on environmental rehabilitation and transformation. To do so, appropriate physical and biological soil and water conservation measures should be identified and implemented depending on the agro-ecology nature of the environment based on the watershed development approach. Implementation capacity of the

implementers, particularly woreda experts and DA's, need to improve through various trainings on different thematic areas.

For PSNP as a social protection to make farmers resilient to adverse impacts of climate change, PW intervention need to emphasis on reducing the vulnerability of livelihood of subsistence farmers to climate related factors, mainly rainfall. This can be achieved by increasing the focus of PW intervention to harness and efficient use of the rain water. As much as possible selection and implementation of PW measures should be based on their impact to harvest the rain water and improve the ground water recharge. To do so construction of small scale irrigation through the PW should be intensified. In addition more water harvesting technologies such as trench bund, Negarimes, microbasinces semicircular bunds, water ponds need to be constructed through the PW.

Although there are a number of potentials to implement different soil fertility management activities in the study area, the woreda gives less attention to implement them through the PSNP PW. Therefore, focus should be given also to implement a number of soil fertility management activates (Biological/live check dam, Mulching and crop residues management, Grass stripping, Compost making, Vegetative fencing, Fertilization and manuring) through the PW. Furthermore, implemented physical structures need to be further complemented with different biological measures, particularly improved grasses and trees.

As HABP documents seemed to properly answer the weaknesses of OFSP to diversify the household income, the government needs to speed up the implementation of HABP. But before realizing HABP, the government needs to establish sufficient rural micro-credit providers and allocate adequate budget both from its budget and other financial sources. During implementation of HABP, equal opportunity should give for clients to engage in off-farm as much as to on farm income generating activities depending on the relevance and feasibility of the business activities.

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Annex 1: Household Questionnaire

Addis Ababa University
Colleague of Development Studies
Centre of Food Security Studies
Household survey questionnaire on the contribution of social protection for enhancing adaptive capacity to climate change

Name of respondent		Start and end time	
Sex of respondent		Region	
Age of respondent		Zone	
Name of Enumerator		Woreda	
Name of Supervisor		Kebelle/Tabia	
Questionnaire number		Village	
Date of interview			

PART ONE: HOUSEHOLD DEMOGRAPHICS

No	Name of the household members(including respondent)	*Sex*	*Age*	*Marital status*	*Education*	*Relationship to household head*	Occupation
		01	02	03	04	05	06

1. Column 01: 1. Male 2. Female

2. Column 02: Write age in full year

3. Column 03: 1. Single 2. Married 3. Divorced 4. Widow/widower

4. Column 04: 1. Illiterate 2. Adult Education /Meserete Timhrt/Golmasoch Timhret

3. 1st - 4th grade 4. 5th -6th grade 5. 7th – 8th grade 6. 9th – 10th grade 7.

10^{th} – 12^{th} grade (preparatory) 8. Colleague/TVET Diploma 9. University degree and above

5. Column 05: 1. Household head 2. Spouse (Husband/wife) 3. Son 4. Daughter 5. Grand daughter 6. Grand Son 7. Father/mother of the head 8. Father/mother of spouse 9. Other relatives

6. Column 6:

1. Farmer or family farm work
2. On –farm wage employment
3. Off-farm wage employment
4. Crafts work/pottery
5. Weaver/Thatcher
6. Blacksmith/mason
7. Food seller
8. Tella/Arequi Seller
9. Petty trader
10. Business owner (eg. Milling, trade in agricultural products ….)
11. Government employee
12. Not in lobour force
13. Other, specify

Qn 7. Household head highest grade of schooling (if he is not the interviewee)

1.None 2. Adult education /Meserete Timhrt/Golmasoch Timhret

3. 1^{st} - 4^{th} grade 4. 5^{th} -6^{th} grade 5. 7^{th} – 8^{th} grade

6. 8^{th} – 10^{th} grade 7. 10^{th} – 12^{th} grade (preparatory) 8. Collage Diploma

9. University degree and above

PART TWO: SOCIO-ECONOM CONDITION OF THE HOUSEHOLD

Qn 8 What is/are the main sources of the household income (livelihood)?

1. Crop production 2. Livestock keeping 3. Mixed agriculture 4. Casual employment 5. Business and trading 6. Salaried employment 7. Remittance 8. Transfer 9. Other, specify _____.

Qn 9. Does your livelihood / source of income/ enough to cover your household's basic needs?

1. Yes 2. No

Qn 10. Does your household own farmland? 1. Yes 2. No

Qn 11. If yes for Qn 10, what is the plot size?

1. Less than 0.25 ha (less than one TIMAD) 2. 0.25 – 0.5 ha (one – two TIMAD)
3. 0.5 – 0.75 ha (two – three TIMAD) 4. 0.75 – 1 ha (three – four TIMAD)
5. 1 – 1.25 ha (four – five TIMAD) 6. 1.25 – 1.5 ha (five – six TIMAD)
7. 1.5 – 1.75 ha (six – seven TIMAD) 8. 1.75 – 2ha (seven – eight TIMAD) 9. 2 – 3 ha (8 – 12 TIMADE) 10. 3 – 5 ha (15 – 20 TIMADE) 11. More than 5 ha (more than 20 TIMADE)

Qn 12. How do you rate the quality of the land your household has/own?

1. Poor 2. Moderate 3. Good 4. Very good

Qn 13. Does your household own livestock? 1. Yes 2. No

Qn 14. If yes for Qn 13, fill the below table?

Type of Livestock (a)	**Number owned and present at your farm**
1=Oxen	
2=Bulls	
3=Young bull	
4=Local cows	
5=Crossbred Cows	
6=Local heifers	
7=Crossbred heifers	
8=Local calves	
9=Crossbred Calves	

10=Sheep	
11=Goats	
12=Donkeys	
13=Horse	
14=Mule	
15=Camel	
16=Poultry	
17=Other_____	

Qn 15. Does your household own business activities? 1. Yes 2. No

Qn 16. If yes for Qn 15, what type of business activities? (Enumerator: Pls circle as much the respondent tales you)

1 Weaving/spinning
2 Milling
3 Handicraft, incl. pottery
4 Trade in grain/general trade (incl. banana, pepper, honey, etc.)
5 Trade in livestock/livestock prod.
6 Retail trade in non-agricultural goods
7 Traditional healer/religious teacher
8 Transport (by pack animal)
9 Collecting, selling firewood or dungcakes
10 Local beverage
11 INJERA selling
12 DABBO selling
13 Other activities? Specify _____

PART THREE : OCCURRENCE OF CLIMATE CHANGE

Qn 17 . How do you rate the rainfall condition in the area before 10 years ?

1. Poor 2. moderate 3. good 4. very good

Qn 18. Is there change in rainfall in your area during the last 10 years?

1. No 2. Slightly 3. Highly 4 . Very highly (if no go to question 24)

Qn 19. If changed, how does it affect your livelihood?

1. Permanent shift in the onset and off-set of the rain season.
2. Frequent shortage of rainfall during rainy season leading corps drying out or livestock not having sufficient water
3. Frequent shortage of rainfall during the rainy season leading to drought
4. Frequently too heavy showers during rainfall leading to damage to crops, livestock and property
5. Frequent excess rainfall leading to floods
6. Extreme temperatures leading to scorched crops.
7. Others, specify _____

Qn 20. Do you think that the rainfall condition gradually deteriorated in your lifetime?

1. Yes 2. No

Qn 21. How do you rate the impact of the change in rainfall condition on the lives and livelihoods of the community in your area?

1. Positive Effect 2. No effect 3. Little adverse effect 4. High adverse effect.

Qn 22. Are you aware about the global climate change and its effect?

1. Yes 2. No

Qn 23. If yes for Qn 22, how did you know?

1. From my experience
2. From mass media
3. From the extension agent
4. From the farmers training center established by PSNP
5. From adult education (YEGOLMASOCH / MESERET TIMHRTE)
6. From regular education (school)
7. Other , mention _____

Qn 24. Do you get regular and timely weather forecast information?

1. yes 2. no (if no proceed to part four)

Qn 25. If yes for Qn 24, who provided you the information?

1. Extension agent
2. From the Farmers Training Center established by PSNP
3. Radio
4. Other, mention _____

Qn 26. Do you use the weather forecast information for the decision in your agricultural practices?

1. Yes 2. No

PART FOUR: PRODOCTIVE SAFATY NET PROGRAMME (PSNP) CONTRIBUTION

Qn 27. Since when is the household covered by PSNP?

1. For the last five years (since 1998 EC/2006 GC)
2. For the last four years (since 1999 EC/2007 GC)
3. For the last three years (since 2000 EC/ 2008 GC)
4. For the last two years (since 2001 EC/2009 GC)
5. For the last one year (since 2002 EC/2010 GC)

Qn 28. How many of member of your household covered/targeted by PSNP?

1. only one member of the household
2. two member of the household
3. three member of the household
4. four member of the household
5. five and more member of the household
6. Full family targeting

Qn 29. What was the modality of transfer in your area in the last two years?

1. Cash only transfer. 2. Food only transfer. 3. Cash and food mix.

Questions related to smoothening food consumption

Qn 30. On average, how many months in a year did your household faced food deficit before your household targeted by PSNP?

1. less than three months
2. three months
3. four months
4. five months
5. Six months
6. more than six months

Qn 31. How did you meet your household's food deficit before your household was targeted by PSNP?

1. Borrow of grains from others
2. Contracting out farm land
3. Remittances
4. Casual labour
5. Selling of non productive household asset
6. Selling of forest products
7. Petty trading
8. Participation in FFW activities
9. Other, Specify _____

Qn 32. What proportion of your household food deficit is met or fulfilled by the transfer your household received through the PSNP?

1. Less than $1/4^{th}$ (a quarter) 2. $1/4^{th}$ (a quarter) 3. ½ (half)
4. ¾ (three-forth) 5. Fully

Qn 33. How does your household use the PSNP transfer (cash/food)?

1. Fully for household consumption.

2. Partially for household food consumption and partially for investment in other agricultural activities.
3. Partially for household food consumption and partially for investment in non-agricultural activities.

Qn 34. If the answer for Qn 33 is 2 or 3, where does your household invest?

1. Purchase of seeds
2. Purchase of fertilizer
3. Purchase of livestock
4. Purchase agricultural tools
5. Business investment
6. Debt repayment
7. Education expenses
8. Other, Specify _____

Qn 35. Before covered by the PSNP programme, did your household forced to sell any productive assets (agricultural tools, livestock ....) in order to meet the food needs of the household (distress asset sales)?

1.No 2. Some times 3. Frequently 4. Several times

Qn 36. Before covered by the PSNP programme, did your household forced to sell any productive assets (agricultural tools, livestock ....) in order to raise cash for emergency cash needs such as health expenditure (distress asset sales)?

1.No 2. Some times 3. Frequently 4. Several times

Qn 37. Since the period your household is covered by PSNP, did your household sell any productive assets (agricultural tools, livestock .....) in order to meet the food needs of your household?

1.No 2. Some times 3. Frequently 4. Several times

Qn 38. Since the period your household covered by PSNP, did your household sell any productive assets (agricultural tools, livestock .....) in order to raise cash for emergency needs such as health expenditure?

1.No 2. Some times 3. Frequently 4. Several times

Questions pertinent to contribution of PSNP (PW component) to minimize vulnerability to rainfall variability and change.

Qn 39. Does member/s of your household participate in Public Work activities of PSNP?

1. Yes 2. No

Qn 40. What are the public work activities implemented by PSNP? (for detail refer the annex from the FSCD annual plan)

10. Soil and water conservation (terracing, bunding ....)
11. Flood control and improved drainage (cut off drains, waterway construction, percolation trenches ....)
12. Community and micro-level water projects (hand dug well, pond construction, low cost micro ponds, farm pond, percolation pit and pond, farm dam, spring development and maintenance, roof water harvesting, dam construction ....)
13. Small Scale Irrigation (SSI) construction or expansion (diversion weir construction, irrigation canal construction, land clearance for SSI, ...)
14. Gully control (check dams, SS dam, Gabion construction, Gully treatment ....)
15. Feeder road construction and maintenance
16. Social infrastructure construction and rehabilitation (farmers training center construction, School rooms construction, basic alternative school construction, DA office construction, health post construction, vet post construction, Cattle trough construction ....)
17. Agro-forestry, forage development and forestry (areas closure, seedling production, forage or grass seed production, seedling plantation ...)
18. Soil fertility management and biological soil conservation (biological/live checkdams, mulching and crop residues management, Grass stripping, compost making, vegetative fencing .....)

Qn 41. Did your skill on Public Work activities raised either by participating in the PSNP PW activities or by getting training on Public Work activities?

1. Yes 2. No

Qn 42. If answer for Qn 41 is yes, what skills did you develop as a result of the PSNP support?

1. Soil and water conservation
2. Flood control and improved drainage
3. Community and micro-level water projects
4. Small Scale Irrigation (SSI) construction or expansion
5. Gully control
6. Feeder road construction and maintenance
7. Social infrastructure construction and rehabilitation
8. Agro-forestry, forage development and forestry
9. Soil fertility management and biological soil conservation

Qn 43. Did you apply the knowledge you acquired from the PSNP on your private farmland?

1. Not at all 2. Partially applied 3. Fully Applied

Qn 44. a) Did the implemented public work activities improved harnessing of rain water?

1. No change 2. Little improvement 3. Medium Improvement
4. Significant improvement

b) Did the moisture retention/holding capacity of your farmland improved as a result of the PSNP support?

1. No change 2. Little improvement 3. Medium Improvement 4. Significant improvement

If improved, how and what PSNP intervention has contributed? (control question)

_____

_____

_____

_____

Qn 45. Has the soil fertility of your farmland improved as a result of the PSNP?

1. No change 2. Little improvement 3. Medium Improvement 4. Significant improvement

If improved, how and what PSNP intervention has contributed? (Control question)

_____

_____

_____

_____

Qn 46. Did the household's homestead, farmland or any other property susceptible for flood before the PSNP implementation?

1. Yes 2. No

Qn 47. If yes for Qn 46, did the PSNP public work activities minimized the susceptibility to flood?

1. No change 2. Slightly minimized 3. Moderately minimized 4. Significantly minimized

If minimized, what are the PSNP PW activities contributed to minimize the susceptibility to flood? (control question)?

_____

_____

_____

_____

Qn 48. Do the susceptibility of the farmland to extreme temperature minimized as a result of the PSNP support?

1. No change 2. Slightly minimized 3. Moderately minimized 4. Significantly minimized

If minimized, what are the PSNP Public Work activities that contributed to minimize the susceptibility to extreme temperature? (control question)

_____

_____

_____

_____

Qn 49. Did you use irrigation for your crop production before the PSNP implementation in your area?

1. Yes 2. No

Qn 50. Did you use irrigation for your crop production as a result of the PSNP PW intervention?

1. Yes 2. No

Qn 51. If yes to Qn 50, what is the water source of the irrigation scheme constructed by PSNP PW intervention?

1. Stream diversion 2. Ponds 3. Springs 4. Shallow wells 5. Small dams 6. flood diversion

Qn 52. To what extent can the irrigation water source supplement the rainwater for your agricultural practices (crop production?)

1. Little contribution 2. Moderate contribution 3. Significant contribution 4. Entirely meet the crop water requirement.

Qn 53. Does source of your household income increased and diversified as a result of the PSNP PW intervention?

1. No change 2. Slightly 3. Moderately 4. Significantly

Qn 54. If income of the household increased, how did the PSNP PW component contribute?

1. Irrigation practice (supplement to crop production, horticulture practice)
2. Creating opportunities to practice alternative income generating activities as a result of land rehabilitation (feeding for bee keeping ....)
3. Enhance Livestock production as a result of animal feed/forage improvement in the area closure and communal land.
4. Improved market access as a result of road construction.
5. Enhanced the skill of the household or household head through the training obtained from Farmers Training Center.
6. Other, specify_____

Qn 55. Did the PSNP PW component contributed to reduction of direct dependence of your household's means of livelihood on rainfall?

1. No change 2. Slightly 3. Moderately 4. Significantly

Qn 56. If contributed, what proportion of your livelihood income is independent from the direct effect/impact of rainfall?

1. Less than $1/4^{th}$ 2. $1/4^{th}$ 3. $2/4^{th}$ 4. $3/4^{th}$ 5. Fully

Qn 57. Did you create productive asset as a result of the PSNP support?

1. Yes 2. No

Qn 58. If yes for Qn 57, what type of productive asset did you create? (for detail refer in the annex = from DCT hhd questionnaire)

1. Agricultural Production Asset (eg Plow yoke= maneko and kember, Maresh, Sickle, Pick axile, ...mechanical and motorized water pump, ...)
2. Livestock including traditional and modern bee hive

3. Consumer durable (Improved charcoal/wood stove, Kerosine stove, sofa, Leather bed, metal bed, modern chair, TV, Jewelry, cellular phone ....)

4. Construction and maintenance of house.

5. Other, specify _____

Qn 59. How do you rate your household's livelihood sensitivity/vulnerability status to the climate related hazards (such as drought, flooding, extreme temperature) before the implementation of PSNP in the area?

1. Less vulnerable 2. Moderately vulnerable 3. Vulnerable

4. Extremely vulnerable

Qn 60. How do you rate your household's livelihood sensitivity/vulnerability status to the climate related hazards (such as drought, flooding, extreme temperature) after the implementation of PSNP in the area?

1. Less vulnerable 2. Moderately vulnerable 3. Vulnerable 4. Extremely vulnerable

Part three: Other Food Security Programme/OFSP/HEP/ or Household Asset Building Programme component (HABP)

Qn 61. From which food security programme was/is your household benefiting?

1. Other Food Security Programme/OFSP/ (Household Food Security Package)
2. The new Household Asset Building Programme (HABP)

Qn 62. Since when your household has been benefiting from the programme?

1. For the last five years (since 1998 EC/2006 GC)
2. For the last four years (since 1999 EC/2007 GC)
3. For the last three years (since 2000 EC/ 2008 GC)
4. For the last two years (since 2001 EC/2009 GC)
5. For the last one year (since 2002 EC/2010 GC)

Qn 63. Who provided you the credit (source of the credit)?

1. Microfinance Institution
2. Cooperatives (RUSACOS)
3. Kebelle
4. Women association
5. Youth Association
6. NGOs
5. Othre, specify _____

Qn 64. In what form did you receive the credit?

1. In cash 2. In Kind 3. A combination of cash and in kind

Qn 65. If it is in Cash, how much did you receive from the credit service?

_____ in Birr

Qn 66. What is the interest rate for the credit you received?

_____ percent (%) of the principal per a year

Qn 67. For what purpose did you use the cash credit?

_____

_____

_____

_____.

Qn 68. If the credit is in Kind, what are the types of package you received?

1. Seeds
2. Vegetable production
3. Dairy production
4. Cattle fatting
5. Goats and sheeps fattening
6. Apiculture/beekeeping
7. Pottery

8. Weaving/spinning
9. Trading/business activities
10. Other, Specify _____

_____

Qn 69. What other types of support did you receive from the OFSP/HABP?

1. Training
2. Technical Assistance
3. Regular extension services
4. All
5. Not received

Qn 70. Did you prepare a business plan for how to use the credit you received from the programme?

1. Yes 2. No

Qn 71. How is the repayment status of your household to the loan you received from the programme (both the principal and interest rate)?

1. Less than $1/4^{th}$ repaid 2. $1/4^{th}$ repaid 3. $2/4^{th}$ repaid
4. $3/4^{th}$ repaid 5. Fully repaid

Qn 72. What was your household main means of livelihood (main source of income) before targeted by the programme?

1. Rain fed crop production
2. Rain fed and irrigation crop production
3. Crop and livestock production
4. On farm wage employment (others on farm employment)
5. Off-farm wage employment (eg unskilled, semi-skilled, skilled labor .....)

6. Own micro and small business activities (Small shops, Cafeteria, Renting donkey cart, Renting horse, Petty trading, Weaving, milling, handcraft and pottery, trade in livestock …. …….)
7. Transfer
8. Remittance
9. Other, specify _____

Qn 73. What are the new or additional sources of income/means of livelihood/ your household benefited/gained as a result of your household's coverage by the programme (OFSP/HABP)?

1. Rain fed crop production
2. Rain fed and irrigation crop production
3. Crop and livestock production
4. On farm wage employment (others on farm employment)
5. Off-farm wage employment (eg unskilled, semi-skilled, skilled labor …..)
6. Own micro and small business activities (Small shops, Cafeteria, Renting donkey cart, Renting horse, Petty trading, Weaving, milling, handcraft and pottery, trade in livestock …. …….)

Qn 74. Did your household income increased as a result of the support you received from programme (OFSP/HABP)?

1. No change 2. Slightly 3. Moderately 4. Significantly

Qn 75. If the income increased, by what amount did your household income increased per a year? _____ Birr/year

Qn 76. Did your household source of income diversified as a result of the support your household received from the programme (OFSP/HABP)?

1. No change 2. Slightly 3. Moderately 4. Significantly

Qn 77. Did your household's means of livelihoods/source of incomes direct dependence on rainfall reduced as a result of support by the programme?

1. No change 2. Slightly 3. Moderately 4. Significantly

Qn 78. If there is change (reduced) for the above question, why is it reduced?

1. Use of improved inputs/technology (drought tolerant seeds, improved animal breeds, application of irrigation, use of new technologies such as fertilizer, …)
2. Income from farm diversified (Fattening, Dairy ,beekeeping, poultry …..)
3. Additional income from non rainfall dependent (non agriculture) income generation activities (eg Small shops, Cafeteria, Renting donkey cart, Renting horse, Petty trading …….)
4. Additional income from own business activities (eg weaving/spinnig, milling, handcraft including pottery
5. others, specify _____

_____

Qn 79. Did you own your business activities as a result of the support your household received from the programme?

1. Yes 2. No

Qn 80. If yes for Qn 79, what is the business activity you owned?

1. Weaving/spinning
2. Milling
3. Handicraft, incl. pottery
4. Trade in grain/general trade (incl. banana, pepper, honey, etc.)
5. Trade in livestock/livestock prod.
6. Retail trade in non-agricultural goods
7. Traditional healer/religious teacher
8. Transport (by pack animal)
9. Collecting, selling firewood or dungcakes
10. TELLA

11. ARAQI
12. INJERA
13. DABBO
14. Renting houses
15. Other activities? Specify _____

Qn 81. Did the resilience capacity of your household's livelihood enhanced/improved, as a result of the benefit received from the programme, to cope or adapt for the impacts of moderate shocks (eg failure of rainfall ...)

1. No change 2. Slightly 3. Moderately 4. Significantly

Qn 82. Did the resilience capacity of your household's livelihood enhanced/improved, as a result of the benefit received from the programme, to cope or adapt for the impacts of extreme shocks (eg drought, damaging flooding ...)

1. No change 2. Slightly 3. Moderately 4. Significantly

Qn 83. How did you rate the sensitivity/vulnerability of your household's livelihood activities (source of income) to climate related hazards (such as drought, flooding, extreme temperature) before your household targeted by the programme?

1. Less vulnerable 2. Moderately vulnerable 3. Vulnerable 4. Extremely vulnerable

Qn 84. How did you rate the sensitivity/vulnerability of your household's livelihood activities (source of income) to climate related hazards (such as drought, flooding, and extreme temperature) after your household benefited from the programme?

1. Less vulnerable 2. Moderately vulnerable 3. Vulnerable
4. Extremely vulnerable