From the Inside Out: Importance of Community Participation in sustaining an Asset-Based Social Protection Program

The Case of the Productive Safety Net Program in Doba, Ethiopia

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This document represents part of the author's study programme while at the Institute of Social Studies. The views stated therein are those of the author and not necessarily those of the Institute.

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List of Acronyms

ANOVA	Analysis of Variance
CBD	Community Based Development
CDD	Community Driven Development
CBPWD	Community Based Participatory Watershed Development
CBPWDG	Community Based Participatory Watershed Development Guideline
CSA	Central Statistical Authority
EGS	Employment Guarantee Schemes
FAO	Food and Agriculture Organization
FSP	Food Security Program
IFAD	International Fund for Agricultural Development
MoARD	Ministry of Agriculture and Rural Development
NGO	Non-Governmental Organization
OLS	Ordinary Least Square
PIM	Program Implementation Manual
PL	Public Law
PSNP	Productive Safety Net Program
PW	Public Works
PWCM	Pair-Wise Correlation Matrix
PWDP	Participatory Watershed Development Planning
SWC	Soil and Water Conservation
SCFC	Soil Conservation and Flood Control
UNDP	United Nations Development Programme
USAID	United States Agency for Aid
WARDO	Woreda Agriculture and Rural Development Office
WB	World Bank
WFP	World Food Program
WCWH	Water Conservation and Water Harvesting

Abstract

The Productive Safety Net Program (PSNP) is the biggest Food Security Program (FSP) in Ethiopia and started its operations in 2005. Its main aim is to shift from a dependence on annual food aid and emergency food assistance that were used to tackle the deep-rooted poverty since the 1983/84 famine, to providing a combined solution of supporting the needs of chronically food insecure households and developing long-term solutions to deal with the root cause of food insecurity. In fact, the program has three intermingled objectives. The first two, which are related to short-term solutions, are directed towards protecting households from hunger by smoothing food consumption and preventing them from further impoverishment by protecting current household assets. The third objective, on the other hand, relates to providing long-term solution to the existing food insecurity by creating community assets that contribute to the promotion of sustainable livelihoods. Further to this, unlike preceding initiatives, the program formally distinguishes between two types of beneficiaries: direct support (DS) and public work (PW). The DS covers vulnerable but labour-constrained households while those in the PW component are expected to use their labour to build community assets. The latter follows the Community Based Participatory Watershed Development Guideline (CBPWDG) which aspires for community participation throughout the cycle. Consequently, achieving the long-term objective of the program relies on proper planning, implementation and management of the assets created by the PWs. Despite this fact, many studies on the PSNP concentrate on evaluating and analysing issues related to the short-term objectives although the long-term objective is crucial in terms of sustainably addressing problems of food insecurity.

Motivated by this gap, this study uses primary data from a sample of 118 soil and water conservation projects found in Doba woreda, West Hararghe Zone of Oromiya Region, to examine the effect of community participation on quality and maintenance of the assets. The estimates presented in the paper show that, at least in this specific woreda, the extent of community participation in project planning has a positive effect on project maintenance. However, increased community participation in implementation, which includes a number of technical decisions has a significant negative effect on project quality as measured by a project's operational state.

Relevance to Development Studies

Unlike previous studies on PSNP, the current study emphasises the two crucial elements in an asset-based social protection program, durability of the assets and participation of beneficiary community in project decisions. Indeed, by focusing on issues of durability, the study points out the major factors behind sustainability of such assets. Moreover, with the emphasis on the later, the study tries to evaluate the CBPWD approach followed in the cycle of the PWs from the two mechanisms that are used in most development interventions

targeting communities, community-based and –driven development (CBD and CDD). Hence, it contributes as empirical evidence for the on-going discourse on issues related to sustainability of asset-based social protection programs and effectiveness of CBD and CDD mechanisms.

Keywords

Productive Safety Net Program, Public Works, Community-based and –driven development, Participation, Project assets, OLS, Oprobit, Quality, Maintenance

Chapter 1
Introduction

1.1 Background

As is well known, developing countries are characterized by low levels of living standards and low and subsistence levels of productivity aggravated by the existence of market imperfections. In rural areas households face substantial risks and shocks (Alderman and Paxson 1992). For instance, erratic rainfall and weather conditions, macroeconomic instability and imperfect and limited information on prices and price policies are common covariate shocks while the death and illness of household head or members are sources of individual shock (Bardhan and Udry 1999).

Ethiopia is a low income country where households are particularly vulnerable to shocks and experience deep rooted poverty. It is a country where chronic food insecurity[1] is found to be a defining feature of poverty. The rain-fed nature of agriculture (which is the main source of employment and income for more than 80% of the rural population) together with variable weather; pest and frost accompanied by the relatively high idiosyncratic shocks faced by the rural poor have made shocks and insecurity a central aspect of the lives of people. Recent statistics show that more than 38 percent of rural households live below the poverty line (MoARD 2010).

Since the 1983/84 famine, the country has been trying different measures to tackle deep-rooted poverty ranging from regular annual food aid to emergency food assistance. The latter has been delivered either as payments to public works or direct support. Though these measures have been successful in averting mass starvation, they have not banished the threat of further shocks. With this regard, efforts have been put in place with the objective of promoting sustainable rural livelihoods by building sustainable local infrastructures through different food security programs (ibid).

In 2003, the country's government initiated a consultation with development partners for an alternative to the existing emergency response of channelling food aid to fill consumption gaps. This alternative was aimed at supporting the needs of chronically food insecure households while at the same time developing long-term solutions to the root cause of food insecurity. The process ended by proposing a Food Security Program (FSP) which encompassed a shift of households from emergency relief system to sustainable food security. This program was formally launched in 2005 with the name Productive Safety Net Program or PSNP (Gilligan et al. 2009). Indeed, the program brings together three inter-connected objectives. Firstly, it tries to protect beneficiaries against hunger by smoothing food consumption. Secondly, it aspires for prevention

[1] Food insecurity is defined as a lack of access, at any time, to enough food for an active, healthy life. Chronic food insecurity is the persistence of this state over time such that household are generally unable to meet their own food needs (Reutlinger 2010).

from further impoverishment by protecting already existing household assets. Thirdly, it promotes sustainable livelihoods by building community assets. While the first two are more or less related to the short-term perspective, the third objective is directly related to the long-term solution of addressing the problems of food insecurity (Deveruex et al. 2007).

Moreover, unlike preceding interventions, the program formally distinguishes between direct support and public work beneficiaries. While the former includes those vulnerable but labour constrained households, those in the later are expected to exert their time to build community assets. In fact, materializing the long-term objective highly relies on the proper selection, implementation and management of the assets built under the public works including its sustainable maintenance (MoARD 2009b).

1.2 The Setting, Justification and Relevance

For most developing countries, the use of Public Works (PWs) and Employment Guarantee Schemes (EGS) as alternatives for solving problems of chronic food insecurity and poverty is a relatively recent phenomenon. Indeed, it was mostly after the 1980s that countries started investing in productive employment for the poor replacing various forms of food subsidies (Von Braun 1995). These public work programs are aimed at promoting community participation while at the same time solving problems of poverty by targeting the poor (Adato and Haddad, 2010). Hence, the focus on community participation led to emphasising on community-based development (CBD) and community-driven development (CDD) approaches. As a result, these approaches played significant roles in development projects implemented in developing countries by influential bilateral and multilateral agencies. The literature on the issue has two contrasting perspectives (Rao 2004).

On the one hand, we find the perspective that highly supports this development approach relating to the large potential of reversing the existing power relations providing agency, voice and control to the poor. Moreover proponents of this approach argue that this will lead to better achievement in the allocation of funds and will be more responsive to the needs of the community which at the end produce better quality and maintained community assets. Opponents of this approach, on the other hand, view CBD or CDD as inefficient because of its lagging effect on the speed of projects suffering from their implementation and vulnerability to local elite capture (Shackleton et al. 2002 Mansuri and Rao 2004, Peterson 2006, Dasgupta and Beard 2007).

However, cost-benefit analysis of community participation such as the one by Finsterbusch and Wicklin (1987) indicate that, community participation by itself has intrinsic value. Therefore, there is a need for institutionalization of community participation in the policies of bilateral and multilateral development agencies as it adds to the effectiveness of development programs/projects. Moreover, community participation gives power to the people to solve their own problems and empowers them by giving an active role, which was previously retained by government and authorities by default (ibid).

Coming to the PSNP PW context, integration of the PSNP program into the existing local system is one of the key principles of the program the implementation of which requires the active and crucial participation of the community in the overall cycle of the program. Many papers about PSNP (Andersson et al. 2011, Nigussa and Mberengwa 2009, Slater et al. 2006) have highly concentrated on evaluating and analysing the short term objectives of the program although the long term objectives is likely to play a crucial role in determining the overall success and sustainability of the program.

To begin with, the study by Andersson et al. (2011) examined the immediate impact of the program on rural household's holdings of livestock, trees and forest assets. Nigussa and Mbrengwa (2009), on the other hand, have tried to analyse the challenges of implementing the program at woreda level by taking the case of one program woreda. Here again, the study limited itself to the challenges of targeting and implementation only in the short-term Likewise the study by Slater et al. (2006) addresses issues related to the policies, programs and institutional make up of food security programs in Ethiopia. Although this study gave special emphasis to the targeting, implementation and institutional linkages of the PSNP program, it was again limited to the short-term objectives. Further evidence from the study by Gilligan et al. (2009), shows much focus on the impacts of the PSNP and its linkages[2] on household food security, consumption, credit use, use of improved agricultural technologies, own business activity, assets (livestock and agricultural tools), labour market participation and transfers and remittances. As such, what goes on with the long-term objective was ignored.

Compared to the above studies, limited evidence on examining the sustainability of the assets created under PSNP PW is found in the work of Devereux and Guenther (2007). In this study, the examined assets were evaluated to have poor quality. Accordingly, failure to meet minimum technical standards and inadequate attention given to the quality and maintenance of the PW assets, considering them as one time jobs, are the major reasons given for the poor quality. Furthermore, the study brings the issue of variations in performance of different localities reflecting regional implementation capacity differences. Although prominent in raising the issue of sustainability of assets, this study again limits itself in just reporting the low performance in quality of the assets and the variations in performances of different localities. In addition, the study being undertaken only one year after the launching of the program puts a question mark on its credibility of examining sustainability and variations in performances.

The novelty of the current study lies on its attempt to address the aforementioned gaps and questions. Indeed, the study combines assessment both in performance and variations across and within localities by focusing on the intrinsic factor in labour-based infrastructures, community participation. Moreover, by examining the linkage between performance and community participation in the different phases of the public works, the study enables us to analyse the effectiveness of the CBPWD approach in ensuring the quality and sustain-

[2] Linkages of PSNP to other Food Security Programs (Gilligan et al. 2009)

ability of the assets. In view of this, assessing the quality of the infrastructure assets built under PSNP in relation to the participation of the community lies at the centre of evaluating the effectiveness of both community-based and -driven developments and the extent of community participation in key decisions in the project process. Further to this, the study uses professional on-site observations and assessments to evaluate the operational and physical states of project assets and gets on-board the beneficiaries to tell their own involvements in project decisions. Although it was time consuming from collection to analysis of findings, using primary data has allowed us to combine the different methods we used in our study. In addition, getting the views from direct beneficiaries on the specific issues of interest brings originality and reliability.

Most importantly, the study will also strengthen the empirical basis on which government policy makers and donors can make informed policy choices to allocate scarce resources towards the effectiveness of the program and to refine future food security strategies and programs. Indeed, given limited research on the program both in terms of evaluating the PW assets and effectiveness of community participation, this study could also provide a spring board for further research in the area.

1.3 Scope of the Study and Research Questions

The PSNP program covers a wide area both in terms of woreda (319 woredas) and range of activities implemented under PWs (MoARD 2010). Yet, due to its strong linkage to the central problem, this paper focuses on bio-physical soil and water conservation assets built in Doba woreda of West Hararghe Zone of Oromiya Region. Focusing the period 2006-2011, the study aims to analyse the effectiveness of community participation in determining the quality and maintenance of these assets. To respond to this question the paper provides:

i. An assessment of the condition of the community assets in terms of operation and maintenance.

ii. An assessment on community participation in various project-related decisions and

iii. An examination of the effect of community participation in determining the quality and maintenance of the assets.

The study took off by making two major hypotheses. Firstly, integration of the CBPWD approach brings an increase in the degree of community participation in project-related decisions. And secondly, project's meeting local community needs, reflected by community participation, have a better chance to be in better state of both operational and physical conditions. Indeed, project assets having these features are of great importance for PSNP to achieve its long term objective.

To investigate the above specified hypotheses and answer the research questions, this paper revolves around three major objectives. First, it attempts to provide a discussion on the history and importance of public works in poverty alleviation and food security development interventions. Besides, the dis-

cussion further elaborates the existing linkages both in terms of solving the problem and the time dynamics. In fact, this discussion clarifies the crucial role of long-term objectives in the success of asset-based interventions compared to the short term ones.

Then, considering the general focus on capacity of local community and the logical framework in the PSNP PW, we provide a contextual framework on the community-based and –driven development approaches. More specifically, we provide a review of pertinent theories in view of community participation and its materialization.

Lastly, after describing the context and the particulars PSNP PW and details on the woreda, we will give a quantified estimate of the effect of community participation, in project related decisions, on the quality and maintenance of the PW assets. This estimate relies on primary data collected from corresponding 118 project response groups (PRGs) located in six kebeles of Doba woreda.

With this background, the paper is organized in the following manner. Chapter two provides a theoretical and conceptual framework. The third chapter provides details on the PSNP. Special emphasis is paid to the PW component of the program and defining participation in this specific context. Chapter four briefly discusses the study area and the methodology used in addressing the research question. Discussion of the results from both quantitative and qualitative analysis is given in the fifth chapter. The sixth chapter concludes the paper and indicates limitations and identifies areas for further research.

Chapter 2
Theoretical and Conceptual Framework

2.1. Literature Review

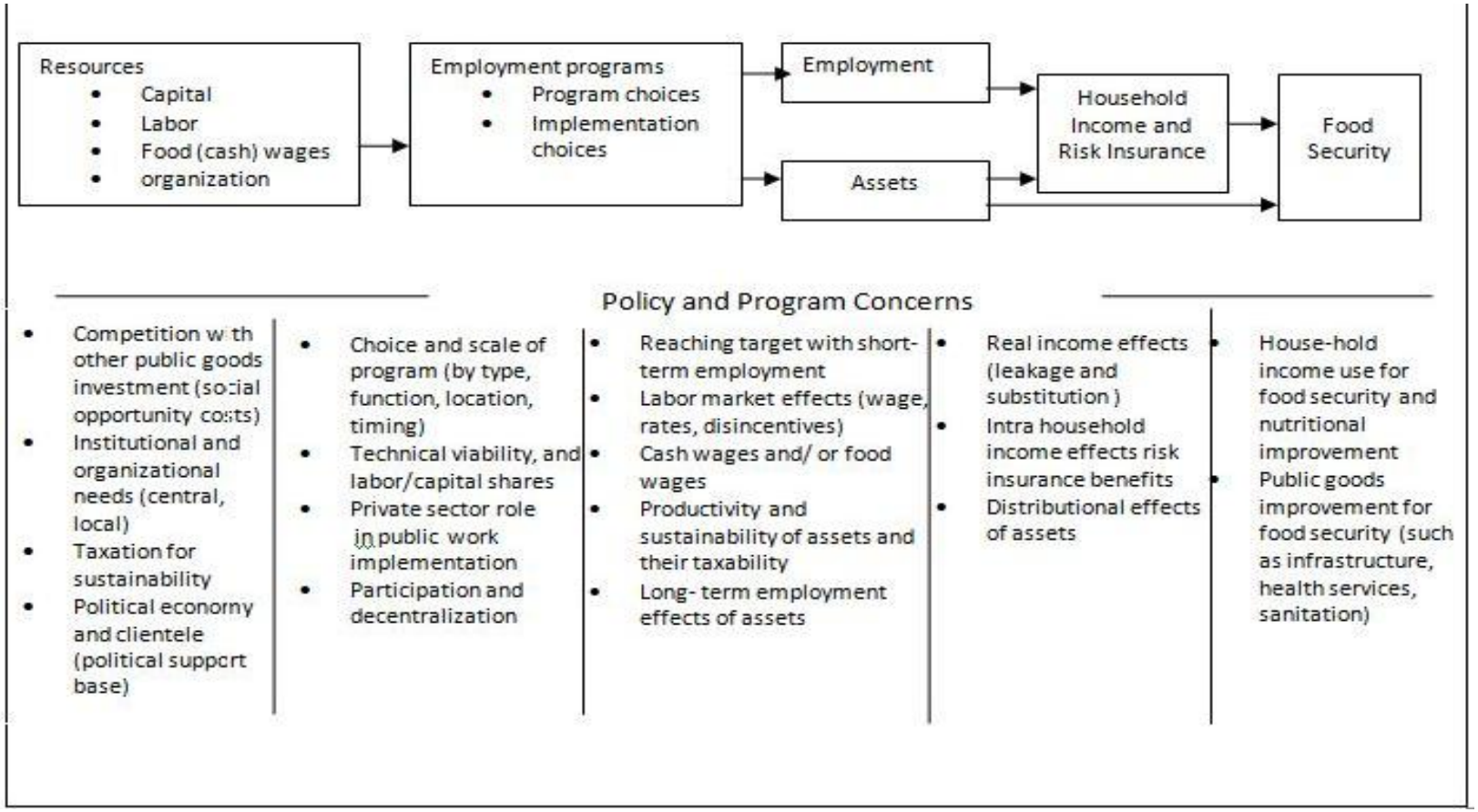
2.1.1 Public Works as a Solution for Poverty

The majority of the poor in developing countries depend on agriculture both for their incomes and food entitlements. This makes agricultural production the main determinant of household's food security. This exacerbated by backward agricultural technologies, weather shocks and increased population, has made dependence on low levels of per capita food production, which in the end, led to increased food insecurity (Todaro and Smith 2009). Moreover, in most of these countries we see failure of employment opportunities to keep pace with the growth in working age population. The case even gets worse when considering Sub-Saharan African countries where we see an imbalance between the rate of growth of population and the rate of growth in labour absorption. Although foreign aid was used by most of these countries to temporarily compensate for the discrepancy, it did not bring any long term solution to problems coming both from shocks in production and increased population. These gave the justification to look for an instrument that comes with alleviating the problems of poverty, bringing efficient utilization of resources and increasing employment opportunities, especially for the poorest segments of the rural population, while at the same time decreasing the dependence on foreign aid. Most of these instruments used were either labour-intensive investment policies or designing schemes with the focus of employment generation (Gaude and Watzlawick 1992, Von Braun 1995). The linkage is best described in the following sessions.

2.1.1.1 Linkage of public work programmes with the food security problem

Public works for improving food security have multi-sectoral policy context and they should be seen from several macro-economic perspectives including employment, food and agricultural production, and trade and price stabilization policies of a country under consideration (Von Braun et al. 1992). As can be seen from the figure in the next page, when the program choice includes both the employment and asset creation motives, it can lead to enhancement in food security with the multiplier effect the household income and risk insurance entails. Moreover, we observe a direct effect of asset creation on food security which gives evidence on the claim made on the strong linkage of assets to long-term solutions of food security. Beside the linkages, the figure also shows the importance of institutional settings, which are identified as resources for the effective implementation of these policies and programmes. Hence, countries with 'good' institutions are expected to have relatively better achievements both in the objectives and linkages than those with poor institutions. Furthermore, the physical capital used for investment and payment for public works is also found to play crucial role (Von Braun et al. 1992: 5).

Figure 2-1 Employment for poverty reduction and food security: Linkages and program and policy concerns



Source: Adopted from Von Braun et al. (1992)

Another work on role and effectiveness of public works programs by Subbarao (2003:1) puts public works as 'counter-cyclical' interventions both for developed and developing countries though the rationale differs in the two set of countries[3]. The major objectives of interventions using public work programs in low income countries were categorized into four. The first one is its provision of transfer to the poor which is usually given by the wage income less the costs of participation, which could bring prevention from further poverty. The second objective relates to consumption smoothing which emanates from the ability of the program to reduce the risk faced by program beneficiaries, especially at slack seasons where agricultural demand for labour is very low. Indeed, the income received as payment enables the households to smooth their consumption. The third motivation comes from the physical outcomes and outputs of the program which mostly bring the build-up of infrastructures that are needed by the rural poor[4]. The program targeting the high unemployment and poverty prevalence areas links to the fourth motivation of the benefit accruing to the beneficiaries and areas in terms of either direct transfer benefits or indirect physical assets built and maintained by the program. This fourth motivation could also improve the growth potential of the targeted areas (ibid). This linkage could also be analysed from time horizon.

2.1.1.2. Short-term and Long-term Linkages

As argued by Ssewamala et al. (2010), the inter-disciplinary nature of asset-based development approach ultimately enables building economic, human and social capital of a given country. In fact, the approach entails interventions in human development, for instance, education and health and the time horizon for operating these inter-linked objectives differs.

On the one side, the immediate income generated from the employment opportunities gives a quick solution to the poverty and food insecurity faced. On the other side, the changes in attitude, the mental and physical well-being from the human resource related motivations require longer durations to be realized (Von Braun 1995:7)[5].

Having this brief on public works and linkages, we now move on to highlight the two inter-connected approaches mostly used in interventions aiming at poverty alleviation and reduction of food insecurity. These approaches are known with the names community-based and –driven developments. As a

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[3] The study distinguishes between the interventions in developed and developing countries in terms of time and context. Much of the interventions in developed countries were related to the economic depression of the first half of 1930s and in milder depressions after this period. The programs in most of South Asia, however, started in 1950s as 'food-for work' whereby payments for workers was made in kind, food aid coming from Western countries. Gradually the program started to be operated by governments in the region and brought short-term employment with low wage rates and the name changed to "cash-for-work" (Subbarao, 2003).

[4] The resulting infrastructures could bring second round employment benefits to the beneficiaries which come with well-developed infrastructures (ibid).

[5] We recommend the reader to refer to the work of Von Braun (1995) for details on the short-term and long-term linkages.

matter of fact, these approaches have currently gained significant attention both in development interventions; and theoretical and empirical literature.

2.1.2 Community-based development (CBD) and Community-driven development (CDD)

CBD refers to development projects that actively involve beneficiary communities in decisions related to design and management. CDD, on the other hand, goes beyond CBD involving communities in deciding on key project decisions including managing "investment funds" (Mansuri and Rao 2004: 1-2). In the discussion on CDD, the World Bank defines CDD as:

> "... an approach that gives control over planning decisions and investment resources for local development projects to community groups."[6]

In this regard, recent poverty alleviation efforts have emphasized local people's empowerment and participation shifting the focus to demand-driven and community-driven development. Hence, the focus on human and social causes of poverty. Indeed, in its nature, CDD gives more attention to involvement of the communities to manage their own development including managing the design and implementation of the projects. CDD also aspires to a public administration culture viewing 'communities as development partners in their own right, rather than as simply recipients of benefits through public expenditure' (Mansuri and Rao 2004: 2).

The International Fund for Agricultural Development (IFAD) argues that, the extent of application of the CDD approach can be defined based on the degree of community's involvement in shaping their own 'development priorities'[7]. For instance, the World Bank has increased its funding for such projects from $3billion in 1996 to$7 billion in 2003 (including lending for adjusting the existing environment) based on the view that this kind of development could improve effectiveness and efficiency, which combined with the more inclusiveness nature enhances sustainability (ibid). In fact, it is a common phenomenon to find an overlap in the use of these two terms when development projects involve participation of communities even in the design and often we see the CDD used more widely than the CBD.

Coming to the particulars, as shown in figure 2-2, CDD projects have their own distinct characteristics. Focus on communities, following a participatory planning process, channelling resources directly to the community, and highly involving the community in the implementation and progress monitoring are some of these distinct characteristics. As to progress monitoring, it also entails handling complaints and appeals as part of the project design.

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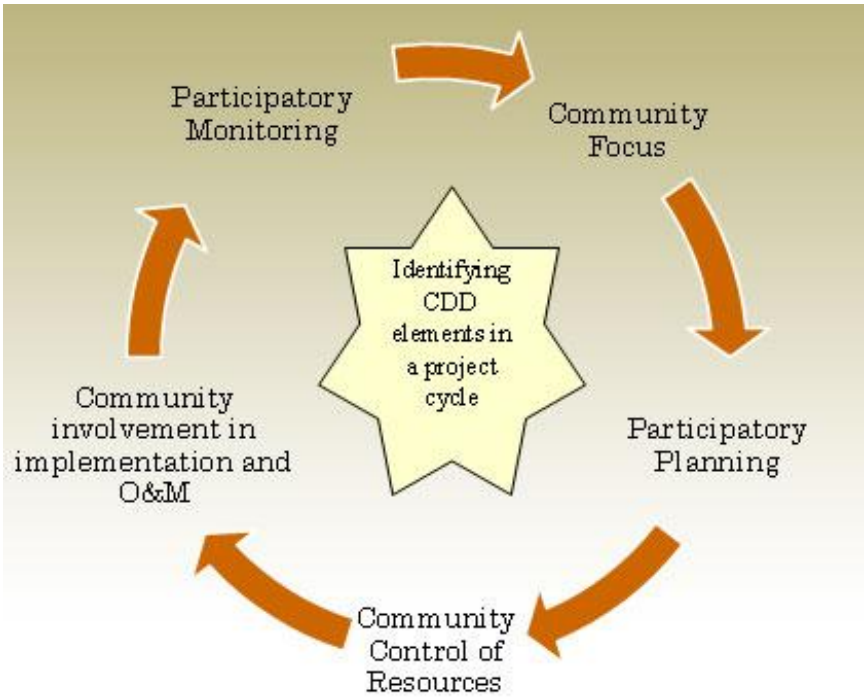
6 http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTSOCIALDEVELOPMENT/EXTCDD/0,,contentMDK:20268049~menuPK:8827985~pagePK:210058~piPK:210062~theSitePK:430161,00.html

7 http://www.ruralpovertyportal.org/topic/home/tags/community_driven_development

To look at this in another way, the major elements distinct to the CDD are its role in enabling community-based organizations to play a major role in the plan and implementation of development policies and/or programs aimed at improving the livelihoods of the community in concern. CDD is also expected to bring better local governance whereby the local governance has the willingness to commit for a partnership with the local community. With these elements, CDD is expected to maximize the impact of public expenditure invested at the local community level (Rao 2004).

Figure 2-2 Elements of CDD in a project cycle



Source: Adopted from World Bank[8]

In both approaches, a central role is given to community participation. The next session takes us into details on the theoretical discussion on community participation.

2.1.3 In-depth into community participation

Community participation is defined in different ways depending on the context and level. One form of differentiation is made by considering participation as a "means" and as an "end". When defined as a means it is directed towards using participation to reach predetermined objectives. In other words it focuses on

[8] http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTSOCIALDEVELOPMENT/EXTCDD/0,,contentMDK:23013531~menuPK:535770~pagePK:210058~piPK:210062~theSitePK:430161,00.html

the results of participation in achieving the targets of the development program. It is argued that this form of participation as just a 'short-term exercise' ending with the phasing out of the intervention under consideration. Participation as an 'end', on the other hand, considers participation as a process having a long-term dynamic. It continues growing with the progress of the development project and becomes the eternal feature of the intervention empowering the rural people to increase their involvement (Oakley 1999).

In relation to this; recent development of Sen's "capabilities approach"[9], focusing on human and social development ethics, indirectly addresses the issue of participation. Emphasizing individual's freedom to achieve alternative functioning combinations, the approach gives emphasis to person's real opportunities to do and be what they have reason to value. This again led to a new policy paradigm that argues for valuing people's capabilities from either means or end philosophies. Indeed, the actual operations are the means while the impacts on people's capabilities are the ends (Sen 1993: 30-33).

Another argument by Chambers (1994) again gives stress to the importance of participation. In fact, he puts participation as a paradigm shift from "things" to "people" and describes its major three intrinsic values. The first is related to making the proposed development intervention look decent in its ability to allow the local people take part in the process. Second, participation by itself pronounces a practice of self-decision of communities to mobilise their own labour which in turn reduces costs. Third, participation could also describe an "empowering process" which would enable local communities to build confidence by doing than own analysis and decisions of the costs and benefits of their participation. Hence, this third outcome of participation can be directly associated to the shift of paradigm from "things" to "people" (Chambers 1994: 1-3).

Despite these benefits, participation is claimed to have challenges both on the practice of it or in the due process of materializing it. In particular; structural, administrative and social impediments are the most discussed obstacles. Fear of project delays, unpredictable nature of participation methodologies, fear of project opposition by the local people, need for additional staff to support participation and the involvement of unskilled people in decisions are the associated risks and costs of participation discussed in relation to these three broad obstacles. Furthermore, participation could also bring "psychological" and "physical" pressures to the poor resulting from possible conflict of interest between these group and the elite groups. Consequently, there is no certainty that benefits outweigh costs making it difficult to draw generalization on the effectiveness of participation (Oakley 1991, Mansuri and Rao 2004, Peterson 2006, Dasgupta and Beard 2007).

[9] "Capabilities approach" is a framework which emerged as a leading alternative to address issues of poverty, human development and inequality (Sen 1993, Nussbaum et al. 1993).

2.2 Empirical Evidence

Several quantitative and qualitative empirical studies have been done dealing with the issue of public works as a solution for poverty including the linkage between public works and poverty and/or food security and the importance of community participation in building community assets. However, the focus for most of these studies is the basic design choice that is targeting, the prerequisites for effective implementation, institutional setting and impact analysis focusing poverty alleviation (Devereux and Solomon 2006). The following discussion provides some evidences on the evaluations of labour- and asset-based poverty alleviation programs. Special attention is given to objectives, successful implementations and limitations of the programs in relation to the approaches followed and the quality of the public assets built.

The Food for Works (FFW) and the Rural Maintenance Programme (RMP), for instance, are the big public work poverty alleviation programs in Bangladesh. The FFW, the major employment generation program in the country, is a kind of employment provision to the rural poor who work on the development and maintenance of rural infrastructures. In fact, the beneficiaries are targeted with a self-targeting mechanism with low wages and labour exertion demands discouraging the non-poor from inclusion. Particularly, each project has a Project Implementation Committee (PIC) having 7 to 9 members representing the elites in the community. The public works in both cases were found to contribute in mitigating seasonal unemployment and food insecurity problems of the desperate poor in the country. Moreover, the programs have brought welfare implications for the rural poor related to the improved production and infrastructure development. Despite their impacts, the programs were found to still have limitations in their design and quality of infrastructures. The latter lacking proper maintenance (Devereux and Solomon 2006).

The evaluation on the other labour–based poverty alleviation program in Bangladesh, facilitated by the Local Government Engineering Department (LGED) and largely involving community organisations, showed that the infrastructures created under this set of programs to be more durable than those created by the FFW. Moreover, benefits here accrue relatively more to the poor compared to the benefits from public work programs. On the poverty reduction impact however, this category also suffers from limitations. The major limitations for this are its scale in terms of allocated resource, the number of beneficiaries falling short of those in need and the limitation in the long term impact of the program in sustainably reducing poverty (ibid).

The critical review of some empirical works on effectiveness of CBD and CDD approaches from the angles of impact on the poor, improving public service delivery and the ability for scale up by Mansuri and Rao (2004) gives mixed evidences. Notably, the advocated decentralization by these approaches was not found to be always effective especially in the area of targeting the poor within communities and in few cases the project selection was not reflecting the preferences by the poor. In addition, the improvements in project quality and performance the evidences are not conclusive on the effectiveness of participation in improving project outcomes. The impact of social and economic heterogeneity for enhancing collective action capacity in general and improved

project performances in particular found intrinsic in the approaches provides complex relationship making the measurement of the relationship between inequality and project performance cumbersome (Mansuri and Rao 2004). The following studies give particular evidences on analysis of the effectiveness of these approaches in some developing countries.

Analysing the poverty alleviation efforts from the five major principles of CDD (community empowerment, empowering local government, centre realignment, improved accountability and capacity building) in Burkina Faso, Bado (2012) has concluded that the principles are not properly integrated. Indeed, the study indicated that the reasons for the persistence of poverty in the country lie on the improper implementation of the CDD. Hence, he recommends that for the country to escape from its deep rooted poverty it needs to implement the fully integrated CDD shifting the top-down approach with a transfer of power and resources to lower levels of government and the people.

Moreover, a comparative analysis of the Agha-Kahan supported community-driven projects with other projects with no community participation in Pakistan by Khwaja (2001) has concluded that those projects managed by community are found in a good condition than those solely governed by local governments. His analysis also showed more specifically the participation of community in non-technical decisions significantly improves maintenance while the participation in technical decisions has the opposite impact on quality and maintenance (Khwaja 2002, Mansuri and Rao 2004). The later claim has further been developed by the author in his empirical work on comparing the project-design effects to community-specific effects intending to deal with the issue of identifying intrinsic group attributes from nature of collective actions (Khwaja 2009). This recent analysis has found out that projects with good design could be successful even in communities that have low social capital. But again some complementary factors are indicated for the project design to achieve its objective. Improved leadership with minimal complexity, information sharing allowing community participation in project decisions and ensuring a fair and equal distribution of project benefits are among these complementary factors for appropriate project design (ibid).

Furthermore, in an attempt to analyse how communities selected their proposals and how resources are allocated in CDD project context, a study by Labonne and Chase (2009) on Philippines indicate that an increase in participation of households/its members in community activities and improved local social capital have positive impact on the representativeness of community proposals to more reflect community needs. Most importantly, the study showed that resources more flow to poorest villages with active communities, proxied by participation in village meetings, and politically involved villages.

On the contrary, a systematic study on China's poor village investment, the largest community-based development program in the world, has showed little evidence on the benefit of participatory decision making to the poor or its impact in reducing the existing poverty. Indeed, the study concluded that it is the working context of the CBD in relation to the local governance and institutions that matter most than the community-based development *perse* (Park and Wang 2010).

However, analysing the effectiveness of the Indian National Rural Employment Guarantee Scheme (NAREGS) in sustainably achieving its long term objective and whether the projects meet local needs in Bankura district, Bedi and Roy (2012) have showed that projects meeting community needs; reflected by participation in project site, type, design and scale; are found to be in a good physical and operational state than those not reflecting community needs. Moreover community's perception on initial quality is also found to significantly affect both project quality and maintenance.

To our knowledge, there is no single study conducted on PSNP in Ethiopia examining the effect of community participation in the quality of the public work assets. The mixed evidence from the works of other authors, like those mentioned above, and the differences in specific context and program logic limit making conclusions based on evidences from experiences of other countries. Hence is the need for studying the specifics of the PW assets and community participation within the PSNP PW and Community Based Participatory Watershed Development Guideline (CBPWDG) logical framework.

Chapter 3
The Productive Safety Net Program in Ethiopia and its Public Works Component

3.1 The PSNP Logic

Ethiopian economy is an agrarian economy, where we find agricultural sector being the main driver of economic growth. This is depicted by its high contribution to GDP (about 50%), high share to export revenues (almost 90%), rural employment (more than 80%) and most importantly the major source of national food supplies (MoARD 2005, MoARD 2009a). Moreover, the country has a huge potential of natural resources with conducive climate for agricultural production. Despite this fact, quite a large number of its population suffers from recurrent poverty. The country started facing severe levels of drought and famine in the first half of the 1980s. Although these shocks are the major triggers for the witnessed food insecurity; continuous land degradation, limited household assets, low levels of farm technology and lack of employment opportunities accompanied by increasing population pressure are the major factors creating and exacerbating the vulnerability to these shocks. More devastating is the over exploitation of forests in response to poverty, hunger and demand for agricultural land which in turn brought land degradation and climate change (MoARD 2009a, Brown et al. 2011).

In the specific context; land degradation problem is the major cause behind low productivity, poverty and food insecurity in the country. Among the several dimensions of this problem, deterioration of soil fertility; degradation and drying up of water resources; loss of vegetation cover and biodiversity are the most severe ones. Indeed; population pressure (mainly in highlands), encroachment on marginal lands (mainly in lowlands), overgrazing, poor crop and land rehabilitation management practices have exacerbated the problem. As a result, millions of people were obliged to live with hunger and food shortage even with normal rainfall. This has made food insecurity to widely exist in the country (MoARD 2009b).

A lot of effort has been in place to alleviate the above mentioned problems although much of it hasn't gone beyond giving food aid and emergency assistance on nearly annual basis (Deveruex et al. 2006). Though this emergency response enabled in solving the problem at hand it did not give resilience to further problems on a long term basis as it suffers from unpredictable resource provision with its failure to prevent further asset depletion of the marginally poor rural households in particular. Further to this, the effort was limited in building community assets (Gilligan et al. 2009). With the objective of breaking the dependence on food aid and protecting assets, the Ethiopian government together with development partners launched the PSNP as part of the country's food security program.

This program has been operational since 2005 and was started with the aim of shifting the trend from meeting short term food needs, through emer-

gency relief, to addressing the underlying causes of food insecurity, through predictable food transfer. To date, the program has been run in two phases, 2005-2009 and 2010-2014. The first phase started with 4.84 million food insecure people which with almost 2 years (December 2006) scaled up to covering 7.57 million people. The second phase of the program builds upon the efforts of the first phase with the second phase stressing the achievement of the objectives in all program areas by maximizing linkages with other elements of FSP for promoting sustainable attainment of food security (MoARD 2010).

The PSNP has its own underlining principles and objectives. As stated in the Program Implementation Manual (MoARD 2010: 5) the major objective of the program is:

> "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."

To ensure effectiveness towards achieving the above stated objectives, the program follows certain guiding principles. These principles, which are to be applied all the times and in all the coverage areas could be categorized into five major elements. First, the program is expected to provide predictable cash or food transfers to the chronically food insecure households to ensure consumption smoothing whether they are conditional (public work) or unconditional (direct support) beneficiaries. Second, the program can temporarily scale up its coverage when there is a shock such as drought or flood to protect households (including non-beneficiaries) affected by the shock. The third element is, in fact, related to the sustainable management of the infrastructures created by the public works. Appropriate management,, operations and maintenance procedures should be established to assure sustainability of these community assets. Most importantly, this element highly contributes to the build-up of an enabling community development environment and addressing the root causes of food insecurity transforming the natural environment. Indeed, by following the guidelines for community based watershed management the PW activities are integrated within Woreda development plan (MoARD 2010). The particulars of the fourth element are related to the contribution of resource and capacity entailed in the implementation of the program. The program makes investments for capacity building and provision of resources important for the effective delivery of PSNP.

Coordination between programme implementers and with other development and relief efforts is the other important element necessary for the successful implementation of PSNP. The linkages to other food security programmes, opportunity to link with initiatives aiming to achieve the development objectives for instance those outlined in GTP[10], gender equality and mainstreaming HIV and AIDS are the major areas the program is making specific efforts to achieve better outcomes (ibid).

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[10] GTP refers to the Growth and Transformation Plan the country is following for its strategic development 2010-2014.

Program Implementation Area

The program is implemented in 319 woredas, found in Afar; Amhara; Dire Dawa; Harari; Oromia; Somale; Southern Nations, Nationalities and People; and Tigray, defined as chronically food insecure by the government. According to the plan for 2011/2012, the number of beneficiaries is estimated to be 7,642,158 found in these woredas (MoARD 2011: 8). Taking the total population of the country (estimated 73.9 million by the 2007 census), we can say that the program reaches 10.2 percent of the population (CSA 2008). The underlying criteria for program eligibility links to the frequency of food assistance in the ten years before the design of the PSNP, that is, the ten years before 2004 (MoARD 2009b)[11].

Moreover, the new phase of the PSNP tries to build upon the poverty alleviation efforts in the rural areas with two components, direct support and public works (PWs). The direct support comprises 1,158,984 (15%) of the program in terms of number of beneficiaries, and includes those household who are vulnerable but are labour constrained. On the other side, PW comprises 6,483,178 beneficiaries of the program. The major objective of the PWs is meant to build community assets and prevent asset depletion (ibid: 9). Being the focus for the paper, the following section gives some details on PWs in general and the PSNP PWs in particular.

3.2 Public Works and Principles

Many countries, particularly those having significant areas with complex, mountainous and fragile ecosystems, have developed national watershed development programs or projects. For instance, the Indian National Watershed Development Project for Rain fed Areas (NWDPRA) is one such initiative operating in conformity with the common approach for participatory watershed development. Indeed, the initiative was formulated and adopted by the Indian Ministry of Agriculture and Rural Development (MoARD) and has incorporated the lessons learnt from previous projects especially in the area of community participation. In relation to this, China also has a history in successfully practicing watershed-based development. For China, the focus is combining soil erosion control measures with the optimum utilization of biological measures and in the end farmers got the ecological, economic and social benefits out of the management of the comprehensive flood and erosion control measures (MoARD 2005).

Moreover, we find a considerable success in the application and implementation of large-scale watershed development programs in other Asian countries like Indonesia, Nepal and The Philippines. Some African countries are also successful in introducing and expanding participatory conservation and watershed-based approaches to combat problems of desertification and poverty. In fact, Kenya, Niger, Burkina Faso and Mali are particular examples that

[11] The reader can see Appendix I to locate the woredas targeted by PSNP.

are considerably discussed in relation to this successful introduction and expansion of the approaches even before 2005 (ibid).

Coming to the specifics, the PSNP PW activities mainly evolve around six major classifications: soil and water conservation; rural feeder roads, bridges and fords construction; water supply for animal and human use; social infrastructures (schools, health and animal posts); small scale irrigation and dams; and agricultural activities related to composting and farmers training. Among these sub-categories, water harvesting and soil and water conservation activities focusing on land rehabilitation and natural resource management comprise the major share of the public work component, more than 70 percent in most cases (MoARD 2010). More specifically, these activities identify the rehabilitation of natural resources and arable land with enhanced productivity, asset creation and livelihood diversification as main strategies which at the end are believed to enhance the ability of food insecure households to meet the necessary food needs and improve the livelihoods of the community. Moreover, these activities are implemented with locally available materials and involve high labour share (MoARD 2005).

In doing this, the public works combine both the short-term and long-term objectives. The protection of households from selling their current assets to fill the consumption gap is considered as the short term objective, the realization of which comes as payment for the time spent on public work activities. This helps households to smooth their consumption while at the same time they are protected from selling their current assets. The long term objective, on the other hand, relates to giving long-term solutions to the existing food insecurity problems (MoARD 2009b, MoARD 2010).

Furthermore, the implementation of public work projects takes place during the agricultural slack season in order not to undermine normal agricultural activity. This, in fact, avoids interference with the high demand for labour during the peak period of the agricultural cycle. With this, there is a possibility for different timings of public works since dry and rainy seasons occur at different times in different parts of the country (MoARD 2010).

As in the case for most rural development interventions focusing on watershed development, the general guideline followed in the cycle of the public works (planning to monitoring and evaluation) is the Community Based Participatory Watershed Development Guideline (CBPWD). Accordingly, public works planning and selection of PSNP beneficiaries occur within communities and kebles under the context of the CBPWD. At kebele level, communities with support of kebeles, identify beneficiaries; mobilize community members to participate in planning exercises and periodically monitor public works. At community level, in particular, this is undertaken by the Community Watershed Development Committee (CWSDC). This committee comprises a kebele official, the local Development Agent (DA) and elected villagers representing men, women, youth, and the elderly. This being the underlying process, the projects selected for implementation are expected to reflect the needs of the respective community and the quality and maintenance of the projects will be highly affected by the involvement of the community (MoARD 2010).

The CBPWD guideline is, therefore, prepared in a way to help implementers follow important steps uniformly and ensure community involvement right from the inception of the idea to its implementation and impact assessment. It has two parts with the first part dealing mostly with the steps to be followed, interventions and details of technologies to be implemented. The second, on the other hand, is an annex giving additional information on the steps to be followed for the technologies[12]. Indeed, for ease of application, the guideline is translated into three main languages: Amharic, Affan Oromo and Tigrigna (MoARD 2005).

Coming to the particular PW principles, the first principle relates to the participation of communities in the stages of planning, implementation and management of watershed development activities. Hence, participation is considered as a continuous process as opposed to a one time issue. The second principle addresses the gender aspect of the public works. Considering the relative vulnerability of women in environmental problems, watershed development process from planning to management should involve women to ensure the equitable benefit share from the various measures. The third principle, on the other side, focuses on building upon local experiences and strengthening what works. In fact, local knowledge is important for either improve existing technologies or adapt new technologies in managing natural resources and related measures introduced and established. This also helps in scaling up best practices to other similar areas.

The fourth principle underlines the realistic, integrity, productive and manageable factors to be considered in watershed development planning. Respecting the watershed logic and potential is the fifth principle under PWDP. In fact, this logic is linked to adopting "ridge to valley approach", which emphasizes on the manageability in size and the focus on interactions between land used and their capability which in away covers the focus on quality physical structures and rehabilitation of degraded marginal lands. Need for flexibility is considered as the sixth principle. Selection of community watersheds including size and clustering should be done in a flexible manner. The flexibility should be extended even with design to allow for better quality and integration.

Notably, empowering local communities to build sense of ownership and get involved in cost sharing is the other important component of the PWDP principles. This would help in assuring the sustainability of the development project by establishing responsive local stakeholders. The last principle is linked to the complementarity feature of PWDP to efforts of food security and other forms of rural development including mainstreaming HIV/AIDS, health and education, and other social development infrastructures (MoARD 2005: 11).

[12] Technologies here refer to the watershed development activities/projects/structures (MoARD 2005).

3.3 Participation in PW

Comprising more than 70 percent of the PW implementation and high correlation to the root cause of poverty and food insecurity, soil and water conservation come at the heart of the watershed development. Hence, the CBPWDG gives emphasis on the workings of these projects starting from their planning to their upkeep. The detail on the design of each structure in the big category of biophysical soil and water conservation together with the work norms (including the person days needed) is provided in the guideline. According to the CBPWD guideline (2005:9):

> "Participatory watershed development can be defined as the rational and socially acceptable utilization of all the natural resources for optimum production to fulfil the present need with minimal degradation of natural resources such as land, water and environment."

As it is indicated in the guideline, participatory watershed development highlights the importance of multi-institutional and multi-disciplinary strategies and brings together multiple interventions having the possibility of combining effective utilization of any form of assistance with community contribution and sound management and upkeep of the assets created. Moreover, with the process of participatory watershed development it is expected that the needs and aspirations of the people living in the area are the major factors driving the watershed planning process and the appropriateness of planning highly depends on the human element than the technical and physical aspects. Indeed, the uniqueness of participatory planning lies in its ability to go beyond the usual "consultation" of the beneficiaries[13]. Participatory planning necessitates setting mechanisms to ensure prioritization and decision-making at local level on prior informed alternatives. The planning should address their concerns and felt needs (MoARD 2005).

Furthermore, the participatory planning process should be followed by a system of monitoring and evaluation done with the participation of the local people. In fact, this enables the community to measure the progress and make the necessary corrections to bring satisfactory results for themselves (ibid).

Informed by the theoretical and conceptual discussions and the specifics of the PSNP PW context, the primary data collection for our study identified projects physical and operational state in relation to the standard in the guideline and it also investigated the degree of community participation in major project decisions. With regard to the later investigation area, we identified four categories in relation to the PWs cycle. These are participation in planning which more deals with inception of the project to be implemented (type, site and design), participation in implementation (scale, supplying the labour and material required and fixing wage rates and compensation for any land given for the purpose of the project), participation in usage and benefit distribution of projects and participation in upkeep and maintenance of projects. Details on study area and methodology used are provided in the next section.

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[13] In fact, the usual trend adopted by project designers is consulting the targeted population and then develop the detailed project proposal (MoARD 2005: 9-10).

Chapter 4
Methodology

4.1 Study Area, sampling strategy and data collection

Study Area

According to MOARD (2005), natural resource degradation in general, and soil erosion and drying out of water sources in particular, are the root causes behind the declining agricultural production, eventually leading the rural households to poverty and food insecurity. Indeed, the natural resource degradation is more serious in the case of communal lands, where the community sends its livestock for free grazing and no one is held responsible to rehabilitate it. Exacerbated by the increasing number of population, behaviours such as the one just described have led to the formation of big gullies, making the land less fertile with high level of soil erosion, reduction in water table and drying out of springs (WARDOb 2012). Hence, natural resource management using soil conservation and flood control structures, together with water harvesting and water conservation projects, comes as crucial part of the PW projects implemented under PSNP.

The aforesaid central role of the soil and water conservation structures has gave us the motivation to choose a woreda that could exemplify the implementation of these projects, and could be a suitable context where to collect primary data to answer our research questions. Moreover, researcher's familiarity to the regional language and context of the woreda and easier access (due to prior regional and field level experience) have made us choose Doba woreda among the alternative ones.

Doba woreda[14] is one of the woredas in West Hararghe zone of Oromiya region. The woreda is found 380km east of the national capital, Addis Ababa and 52km west of thez Zonal capital, Chiro. The total area of the woreda is 702.82SqKm with a major land use statistics of 36 percent cultivated land followed by 20 percent of unproductive and bare land. On the other side, Natural forest, land for social service, shrubs and grazing land constitute the remaining 14, 11, 11 and 8 percent land usage respectively (WARDOb 2012). Moreover, having an altitude ranging between 1200-2000 masl, an intensive traditional agricultural production takes place in the woreda. Cereals (sorghum and maize) and cash crops like haricot bean, coffee and chat are majorly grown in the area even though the production is limited. In fact, the undulating and hilly land terrain has led to susceptibility to erosion hazards and low productivity. In addition to agricultural production, livestock rearing and animal fattening are practiced to support farmers' livelihoods.

[14] Appendix II gives the map of the study area.

The 2012 estimated population of the woreda is 154,423. The woreda has 42 kebeles out of which two are urban and the rest forty are rural. The dominant climatic zone is low altitude, with 54.6% coverage followed by 41.6% mid altitude and 3.8% high altitude (ibid).

The severity of the poverty and chronic food insecurity witnessed in the woreda made it one of the first targeted when the program started operstion in 2005, although other food security and land rehabilitation programs were operational in the woreda before this year. Out of the 40 rural kebeles 30 are covered by the PSNP. In this 30 kebeles, there are 22,947 PSNP beneficiaries out of which 20,650 (90%) participated as PW beneficiaries in the year 2011/12 and the rest 2297 (10%) were direct support beneficiaries (ibid).

Sampling Strategy Data collection

The data for this study concerns a field survey of 'natural resource conservation'[15] projects implemented under the PSNP PWs in Doba woreda. Having in mind the agro ecological climatic zones in the woreda, accessibility and resource limitation (budget and time) we decided to use 5 percent of the total beneficiary kebeles. Thanks to the information we got on the distribution of PW projects across kebeles from "Doba woreda PSNP and Public Work 2005-2011 Performance Report", we chose one relatively *dega,* three *woynadega* and two *kola*[16] kebeles for the primary data collection. These kebeles are namely Behaadu, Weltane, Legalencha, Welkitumawejin, Kufakas and Ifaaman.

Moreover, from the aforementioned report, two categories were identified with regard to project types. The first is the category that includes projects aiming at soil conservation and flood control, while the other comprises assets that have been built for the purpose of water harvesting and water conservation. Further, the report gives the evidence that the program has peaked up in terms of number of kebeles, beneficiaries and PW project implementation across the years. Hence, we considered the years 2006-2011 to keep uniformity in the distribution of projects across this six kebeles.

Moving to the choice of projects, it was first difficult to choose projects for our sample within the natural resource conservation category. This is because of the difference in the unit of measurement of projects in this category. Hence, the alternative we used was using the number of person days spent on public works. As a result of this, we decided to take twenty projects from each kebele making the total sample 120. However, the final sample we arrived at was 118 with the impossibility to finish the survey for two projects in Behaadu and Kufakas, one sample each. In fact, the distribution within kebeles and across years of implementation followed the distribution of person days within the above specified two project categories. The distribution of these final 118

[15] Natural resource conservation projects include all structures concerned with soil erosion/flood control and water conservation/water harvesting.

[16] The local names *Kola*, *Woynadega* and *Dega* are used to literally mean low altitude , mid altitude and high altitude respectively

projects across the sample kebeles and years of implementation is provided in the following tables.

Table 4-1 gives the evidence on the distribution of sample projects in the two categories. Accordingly, out of the 118 projects surveyed 54 and 64 projects were constructed for water construction and harvesting and soil conservation and flood control respectively. For instance, among other kebeles, out of the 19 projects surveyed in Behaadu, 9 were constructed for the purpose of water conservation and water harvesting while those built for the purpose of soil conservation and flood control were 10. In case of Waltane among 20 surveyed projects 9 were designed for water conservation and water harvesting and 11 were for soil conservation and flood control, likewise 20 projects investigated in Lagalencha, 10 for the purpose of water conservation and water harvesting and the other 10 for soil conservation and flood control. In fact, the distribution within each kebele followed the actual distribution among the two categories.

Table 4-1 Distribution of sampled projects across Kebeles N(%)

Kebele	Water Conservation/Water Harvesting structures	Soil Conservation/ Flood Control Structures	Project Total
Behaadu	9(17)	10(16)	19(16)
Weltane	9(17)	11(17)	20(17)
Legalencha	10(18)	10(16)	20(17)
Welkitumawajin	9(17)	11(17)	20(17)
Kufakasa	8(14)	11(17)	19(16)
Ifaaman	9(17))	11(17)	20(17)
Kebele Total	54 (100)	64 (100)	118 (100)

Source: Author's data collected in July & August 2012

Similarly, table 4-2 presents sampled project by the year of implementation in the two categories from the year 2006 – 2011. For instance, in 2006 there were 4 water conservation and harvesting structures and 15 soil conservation and flood control structures. Whereas, for 2008 we had 12 water conservation and harvesting structures and 9 soil conservation and flood control structures. As in the case for the within kebele distribution, the variation in distribution across the years followed the actual distribution of the natural resource conservation activities among the two categories.

Table 4-2 Distribution of sampled projects across implementation years N(%)

Year of Implementation	Water Conservation & Water Harvesting structures	Soil Conservation & Flood Control Structures	Project total
2006	4 (7)	15 (23)	19 (16)
2007	7 (13)	11 (17)	18 (15)
2008	12 (22)	9 (14)	21 (18)
2009	10 (19)	8 (13)	18 (15)
2010	10 (19)	11 (17)	21 (18)
2011	11 (20)	10 (16)	21 (18)
Total from 2006-2011	54 (100)	64 (100)	118 (100)

Source: Author's own data collected in July & August 2012

Data collection

A structured questionnaire was used as survey instrument to gather data for our analysis. And this questionnaire was administered at a Project Response Group (PRG) level comprising four to six individuals. In fact, to be considered in a PRG, an individual has to be a resident in the catchment area and be a participant of the public works. The information in the questionnaire included (See Appendix III for the detail) watershed/community socio-economic (number of households in the watershed, access to public facilities, cultivable land and livestock distribution) and PRG profile (age, sex, level of education, year of joining the program and religion), project characteristics (type, age, make and initial quality, major decision maker in project related decisions and current state of quality and maintenance) and project benefit and maintenance specific questions.

In line with the research questions, the respective PRG were asked to provide their views on operational and damage state of project under consideration. In fact, these views on project operational and damage states were subject to onsite verifications by soil and water conservation engineers. The engineers used the technical standards provided in the CBPWDG to estimate the operational state and percentage of damage to a project. In addition, the PRGs were asked to provide their perceptions on initial quality of projects, project benefits realized so far and details on activeness and role of the watershed committee.

On the other hand, to identify the extent to which communities participate in project related decision making, the PRGs were requested to identify the major decision maker in fourteen project decisions. Thanks to the CBPWD, these decisions were categorized into four major participation types.

Table 4-3 Categorization of Project Decision-making

Planning	**Project usage and benefit**
• Project Type Selection	• Project usage rules
• Project Site Selection	• Nature of sanctions on project misuse
• Project Design	• Benefits distribution
Implementation	**Maintenance**
• Project timing	• Maintenance system, rules and policy
• Project scale (length, capacity, material...)	• Maintenance cost contribution
• Wage rate	• Maintenance labour contribution
• Compensation for any land given up	• Sanctions for failure to contribute in maintenance

Source: Author's own manipulation of survey questionnaire

The other alternative we have was to categorize the fourteen decisions into two categories: technical and non-technical decisions. However, we did not proceed with this alternative as most of the decisions were found to be non-technical. In fact, the technical decisions were more found under the implementation category compared to the remaining participation categories. Nonetheless, we will keep in mind this alternative to have an all-round justification for our empirical estimates.

For collecting these data six enumerators[17] were recruited, one for each kebele, and were given two days orientation/training on the contents of the survey instrument and on how to administer it. The answers given on the functional and damage status were subject to verification by engineering measurement. The soil and water conservation engineers gave estimation on operational state, damage percentage and maintenance work need based on the technical standards put in the CBPWDG. In addition, two natural resource conservation experts were recruited from the woreda to support the researcher control for the accuracy and quality of the data collected by the enumerators.

Information was also collected from the six kebeles Food Security Task Forces (KFSTFs) as these were found to highly involve in ensuring quality and technical standards of the assets built. This was also used as a mechanism to triangulate the information collected regarding the process of watershed development planning from the PRG to support our empirical estimation (See Appendix III).

[17] The enumerators are two years college education graduates from the field of natural resource conservation.

4.2 Methods of Data Analysis

To analyse the data collected with the help of the above ascribed methods, both quantitative and qualitative data analysis techniques were used.

4.2.1 Quantitative Data Analysis

4.2.1.1 Descriptive method

Descriptive method was employed to explain the variation in the functional and physical states of the surveyed projects and community participation in the different project related decision makings which give contemporary answer to the first two sub questions. The specific methods of data analysis involved tabulation, cross tabulation, frequencies, percentages and computation of summary statistics with mean and standard deviation.

4.2.1.2 Description of variables and Econometric Framework

Dependent Variable

As it is indicated, both in the justification of the research and review of relevant literature, creation of durable assets serve as a basis for sustainability of development projects aiming at poverty alleviation and reduction of food insecurity. Indeed, they are vital for the realization of the long term objective of the PSNP in particular. In this context, projects that have been implemented with quality and maintained properly will potentially indicate the program's performance towards achieving its long term objective. Consequently, the major outcome variables in this research are operational state and physical condition. For the outcome on physical condition, we had two alternatives. The first was given by a technical estimate of project's damage percentage that engineers provided based on the technical measurements. This, in fact, gives a proxy estimate to the amount of maintenance work needed for the project to return to its initial physical condition. The other alternative we had for this outcome was the projects state of damage based on current physical condition perception. Both the PRG and the engineers categorized projects into five (ranging from severe damage to no damage) categories based on their perception of damage intensity to the particular project.

Like the damage state, the other outcome variable, project's operational state is given in a categorical manner. In fact, here the outcome categories were found to be three as no projects were evaluated to be non-operational both by the PRG and the engineer. Operational state of projects tells the degree to which a project is currently operating in giving the expected benefits.

To analyse both outcomes we used the estimates provided by engineers. In fact, the estimates base of technical measurement and professional observation justifies our inclination to the engineerial estimates compared to the PRG. Besides, the continuous measurement of project damage on a scale of 0 to 100 (with 0 showing no damage and 100 total damage) provides the possibility to use both bivariate and multivariate Oridnary Least Square (OLS) estimation techniques.

Independent Variables

The Ethiopian government has adopted the CBPWDG as a governing watershed-development guideline for all rural development intervention. Having the huge share of development investment in the country PSNP PW follows this guideline for the proper execution and build-up of community assets that could help in breaking the vicious circle of poverty. This guideline emphasizes the participation of communities in the different watershed development activities taking place in their area.

For the reason specified above, we have chosen community participation as a major explanatory variable in the analysis. As can be recalled from our earlier discussion, the participation of community in fourteen project decisions were clustered into four major categories namely planning; implementation; usage and benefit; and maintenance. In fact, these variables capture the extent of participation in project decisions. From the theories and the contextual framework, we can make the hypothesis that increase in degree of participation in planning and maintenance are expected to significantly reduce the damage of a project than the other two participation variables.

Other factors that can potentially affect the dependent variable are also considered in the regression. First, the nature of sole reliance on human power of the SWC structures justifies considering number of households in the catchment area as one of the control variables. Again the number of households is expected to have a negative relationship with damage of projects. Second, the year the asset was built can cause variations both in operational status and project damage with the hypothesis that more recent projects will have less damage and be in a good state of operation. To control for variations coming from the kind of make of the project, that is, the project being made new or was built as extension to an already existing project, it was worth considering the project make variable in the model. Indeed, it is more likely for new projects to have less damage and be in a better state of operation than the extensions.

In dealing with labour-based structures, it is again worth picking perceptions of PRG on initial quality of the projects as the damage and operation states highly rely on the initial design and material combination (Bedi and Roy 2012). Accordingly, we expect projects that were perceived to have been made with appropriate material combination and design to be in a better state of operation and have less damage than those not. Existence of maintenance committee is also expected to have an effect on the damage of projects. In fact, we expect that projects found in a watershed/village where maintenance committee exists to be in a good operational and physical condition. This is because of the coordination role that this committee could execute in maintenance and upkeep of the assets.

In addition, to control for variations between and within kebeles, it was worth considering the kebele where the project was found in the model. Furthermore, an attempt was made to control for socio-economic factors that were believed to have bearing on project outcomes. These include type of school existing in the watershed, access to water; electricity and health facilities,

ratio of households with maximum and minimum cultivable land distribution and distance of market from the respective watershed/market.

Model Specification

The Ordinary Least Square (OLS) Model

Using the above dependent and independent variables setup the study first employs OLS technique to estimate the effect of changes in community participation and other control variables on the damage of project under consideration. The econometric model that we estimated is:

$$Y_i = \alpha + \beta P + \gamma Xi + \varepsilon_i \quad (1)$$

Where: Yi –the damage to a particular project asset i

Pi: the degree of community participation

Xi: set of project and group specific characteristics (year of make, project type, project make, kebele, number of household, access….)

The sign and magnitude of β tells how and by how much the community participation affects the damage percentage of a project. Indeed, the effect first depends on the statistical significance of β given by the test statistics.

The Ordered Probit (Oprobit) Model

Even though equation (1) is suitable in estimating the expected value in the percentage of project damage for a given set of explanatory variables it won't be consistent to use OLS in estimating the operational status of projects using the same set of independent variables. The reason lies in the fact that responses on operational states (both from PRG and engineer) are given in an ordered discrete manner. In fact, if we proceed with OLS, our estimation suffers from probability of outliers lying outside the unit interval (Jackman 2000, Gujarati 2009). This made us to use another way of estimation that suits this ordering.

In particular, our responses for the operational state was given in an ordered manner with the orders entailing differences (better than/less than) in outcomes of one category from the other. For this reason, among the set of Maximum Likelihood Estimation (MLE), the ordered probit was chosen for its appropriateness to the specific context. Indeed, the argument for using ordered probit for such cases is supported by econemetricians like Greene and Hensher (2010), Long (1997), Jackman (2000: 2), Long and Chen (2004).

Unlike OLS, the oprobit estimation gives the estimate on the latent index (y_i^*). This latent index measure is unobserved but has certain values, known as threshold values, (Mallick 2009)that determine the probability of the outcome to be in a specific category; state of operation in our case. The latent continuous variable which is unobserved is estimated by the following model:

$$y_i^* = \beta P + \gamma Xi + \varepsilon_i \quad (2)$$

While the observed outcome from the response is given:

$$y_i = j \text{ if } \mu_{j-1} < y_i^* \leq \mu_j \quad (3)$$

where j=0, 1, 2,…J are the natural ordered responses and μ's are (J-1) unknown parameters known as threshold parameters. Consequently, the ordinal outcomes for our interest variable, project operational state, will then take the following cumulative functions in relation to the threshold values of the latent (Greene and Hensher 2010):

$$yi = 0 \; if \; y* \leq \mu_0$$
$$y_1 = 1 \; if \; \mu_0 < y^* \leq \mu_1$$
$$y_2 = 2 \; if \; \mu_1 < y^* \leq \mu_2$$

The values μ_0, μ_1 and μ_2 are certain threshold values that determine the project's outcome to be placed in the partially operational, more or less operational and fully operational categories respectively.

The particular argument here is that, unlike the case in OLS, it is only the cumulative distribution function that shifts to the right or left for a change in the independent variables. Indeed, the slope of the distribution remains constant (Jackman 2000: 2). Based on the parallel regression assumption[18], the marginal effects would then tell how changes in the predictors would determine the probability of observing a particular ordinal outcome (Long and Chen 2004, Jackman 2000). Accordingly the probabilities for each category can be estimated as:

$$\Pr(y_i=0) = \Pr(y_i^* \leq \mu_0)$$
$$= \Pr(\beta P + \gamma Xi + \varepsilon_i \leq \mu_0)$$
$$= \Pr(\varepsilon_i \leq \mu_0 - \beta P - \gamma Xi)$$
$$= \Phi[\mu_0 - \beta P - \gamma Xi] = 1 - \Phi[\beta P_i + \gamma X_i - \mu_0]$$

Following the same procedures Pr (yi=1) and Pr (yi=2) will be given by:

$$\Pr(y_i=1) = \Phi[\beta P_i + \gamma X_i - \mu_0] - \Phi[\beta P + \gamma Xi - \mu_1] \text{ and}$$

$$\Pr(y_i=2) = \Phi[\beta P_i + \gamma X_i - \mu_1] - \Phi[\beta P + \gamma Xi - \mu_2]$$

With the help of the two types of models (OLS and Oprobit) discussed above, we examined the effect of community participation on our outcome variables, projects state of operation and physical condition. Moreover, for sensitivity analysis alternative estimations were made on specifications controlling for the remaining independent variables interchangeably and all together. Indeed, this helped us to control for over/under estimation of the effect from our explanatory variables of interest, participation.

[18] What this assumption tells is that for an increase in the independent variable the cumulative distribution function shifts inward or outward without a shift in the slope of the distribution. In other words the *β*s on each categorical equation are assumed to be the same. That means the shift in the probability curves is assumed to be the same for all j categories (Long and Cheng 2004).

4.2.2. Qualitative Data Analysis

Some information from the responses of the village group discussion were used to strengthen the quantitative estimates on process of project implementation and evaluating it to the framework of CBD and CDD.

All in all, the estimation results together with the supplementary qualitative information have a strong potential to provide the answers to the research questions. In particular, the results will give an indication on the effectiveness of community participation in solving problems of development in general and addressing problems of chronic food insecurity in particular. Most importantly, the outcomes on project's current operational states and physical condition can give evidences on quality and maintenance conditions of the project assets built by public works.

Chapter 5
Findings and Discussion

5.1 Descriptive Statistics

5.1.1 Project Quality and Maintenance

The long term development potential of the PSNP program is likely to be strongly influenced by proper upkeep and subsequently the operational state of the implemented projects. The distribution of the projects in terms of their quality and damage state that we got from the responses of the PRG and the on-site observation and verification by the engineers gives some evidence on the potential of the projects for achieving their long term objectives. The operational state of the projects across the years of implementation is given as follows:

Table 5-1 Project operational state across year of implementation

Operational State	Year of Implementation						Total
	2006	2007	2008	2009	2010	2011	
Partially operational	2	1	1	-	-	-	4
Moderately operational	7	3	7	5	6	5	33
Fully operational	10	14	13	13	15	16	81
Total	19	18	21	18	21	21	118

Source: Author's field survey July-August 2012

As can be seen in the above analysis, all the surveyed projects were found to be operational although the state of operation differs across and within the year of implementation. In particular, out of the 118 projects surveyed 81 (69%) were fully operational followed by 33 (28%) in moderate operational state and only 4 (3%) partially operational. The statistics also show that those that are partially operational are those that have been built in the earlier years of the program. Indeed, finding the majority of projects in a good operational state is critical in indicating the progress of the program towards achieving its lasting objective. Hence, we get the justification to control for the year the asset was built in our model.

The analysis from the responses from the PRGs gave almost the same result. Considering the particular differences, the PRGs evaluated 88 projects to be in a full operational state. However, the engineers view with on-site verification puts seven in the moderate operational state and two in the partial state of operation. In fact, two projects that were viewed to be in a moderate operation by the PRG were found to have a full state of operation by the engineers.

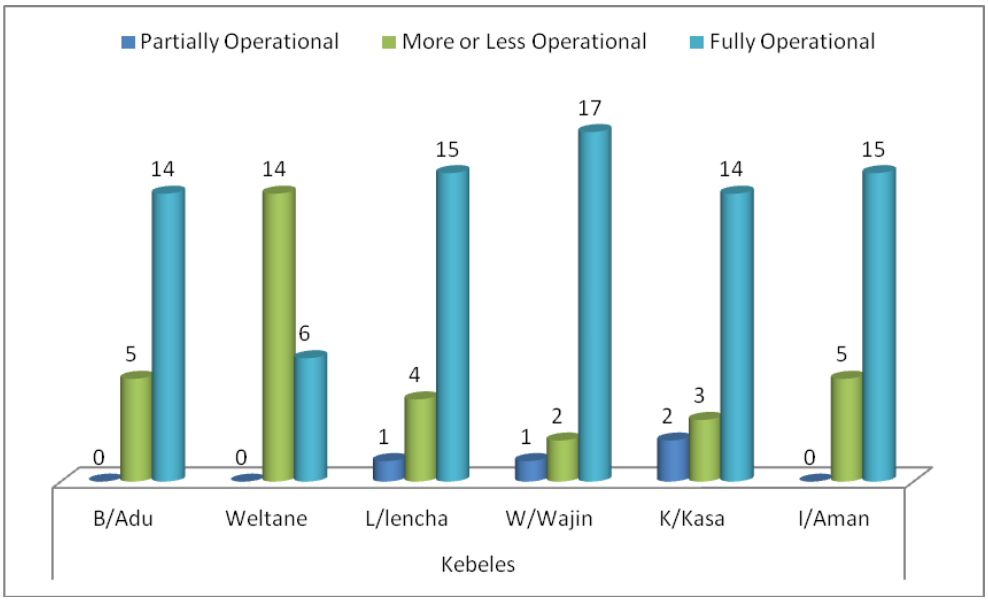
Table 5-2 Projects Operational state: PRG Vs Engineer Evaluation

Project operational state: PRG	Operational State of Project: Engineer			
	Full operation	Moderate operation	Partial operation	Total
Fully operation	**79**	7	2	88
Moderate operation	2	**26**	-	28
Partial operation	-	-	**2**	2
Total	81	33	4	118

Source: Author's filed survey July-August 2012

For the same categories of operational states we see variations across kebeles. Indeed, out of the four projects found partially operating two (50%) are found in Kufakasa while the remaining two were found in Legelencha and Weltkituamawejin, the latter two comprising 25% each of the partially operating projects surveyed. A majority of the projects in Weltane kebele were found to be moderately operational (70%) and the remaining 30% being fully operational. All the kebles, with the exception of Weltane have projects majorly lying in full operational state. Indeed, the analysis gives the evidence of variations between and within kebeles of project's current operational state. Accordingly, the evidence here gives the justification to control for kebele fixed effects in our model of estimation.

Figure 5-1 Operational state of projects across kebeles



Source: Author's field survey July-August 2012

Although the projects state of operation is an indicator on the project's potential to give its expected benefits, we need to check on how maintained the projects are as it is only with proper maintenance that the project can last for long generating the expected outcomes. Hence the need for assessing the

maintenance condition of projects. Here we had two alternatives, one giving the damage state rated in a categorical manner based on the intensity of damage, and the other the percentage of damage to a project, calculated based on the extent of damage compared to its technical standard. The reference for the initial state was taken from the CBPWDG. Although we have the views from the PRG on the first alternative (shown in table 5-3), we proceeded with the rating of the engineer in our descriptive analysis.

As in the case for operational state, the ratings by the PRGs were almost similar to the ratings by engineers. Both ratings gave the same number of projects in the moderate damage state. Considering the particular differences, the PRGs evaluated 86 projects to be in a condition of very little damage while the engineers rated only 80 to be in this state. In addition, out of the 6 projects verified to have slight damage condition by the engineers, 4 were rated to have very little damage while two were viewed to have no damage by the PRG. As a matter of verification, two projects that were viewed to be in a severe and slight states of damage were verified to have very little damage by the engineers.

Table 5-3 Projects Damage state: PRG Vs Engineer Evaluation

Physical State of Project: PRG	Physical State of Project: Engineer						
		Severe damage	Moderate damage	Slight damage	Very little damage	No damage	Total
	Severe damage	2[19]	-	-	1	-	**2**
	Moderate damage	-	**8**	-	-	-	**8**
	Slight damage	-	-	**14**	1	-	**15**
	Very little damage	1	-	4	**78**	3	**86**
	No damage	-	-	2	-	**4**	**6**
	Total	**3**	**8**	**20**	**80**	**7**	**118**

Source: Author's filed survey July-August 2012

Analysing the distribution of damage state of projects across the year of implementation (engineers rating), as can be seen from table 1 of Appendix IV, out of the 118 projects surveyed 7 were found to have no damage, followed by 80 with very minor damage and 20 in a slight damage condition. On the other side, 11 projects were rated to have more than moderate damage out of which 3 were categorized to be in a state of severe damage. Taking the particular years, the projects that were found in a severe damage state are those projects built in earlier years 2006-2008 with a distribution of one project each. But this later finding is inconclusive considering the findings on projects built in both 2010 and 2011. The possible explanation for the damages of 2010 projects is provided in the discussion on the distribution across kebeles.

As can be seen from table 2 of the same Appendix, out of the three severely damaged projects two are found in Behaadu kebele and one is found in Welkitumawejin kebele. The projects surveyed from Kufakas Kebele were found only in a moderate and slight damage condition with 8 and 11 number of projects respectively. All the projects surveyed in Weltane were rated to have very little damage. The same works for Legalencha except here one project was rated to have a slightly higher damage.

Although the damage state provided the variations across implementation years and kebeles, it was inconclusive in providing the within variation as there were cases of projects lying in the same category of damage state, for instance Weltane. We, therefore, used the percentage damage to a project which provides variation according to percentage of damaged part out of the full scale project.

As can be seen from the summary statistics in table 5-4, the maximum damage to a project was 80% making the project severely damaged and the minimum was 0% with no damage. Consequently, the mean value for the percentage of damage is 17.5% with a standard deviation of 16.46. The distribution of this damage across kebeles, in particular, was found to vary both between and within kebeles. Indeed, the evidence in Figures 5A1 and 5A2 of Appendix VII depict the distribution from the overall mean and within mean respectively. This evidence validates the justification for considering kebele fixed effects in our estimation.

Table 5-4 Descriptive statistics of dependent variables and independent variables of interst

Variable	Obs	Mean	Std. Dev.	Min	Max
Damage of a project	118	17.49364	16.46275	0	80
Damage state	118	3.70339	.8092343	0	5
Operational state	118	1.652542	.5450181	0	2
Participation in planning	118	1.966102	1.003687	0	3
Participation in implementation	118	1.483051	.9127122	0	4
Participation in project. usage & benefit distribution	118	1.79661	.7796484	0	3
Participation in maintenance	118	2.330508	1.086475	0	4

Source: Author's field survey July-August 2012

5.1.2 Community Participation in Project Decision making

As can be recalled from the theoretical discussions and the conceptual framework of the PSNP PWs, the nature of public works both from the poverty alleviation and the development perspective incorporates the active role of communities as paid workers. In view of this, we have tried to investigate the extent of community participation in project related decisions. It is to be recalled that from our discussion in the previous chapter that we have categorized these participations into four major categories: planning, implementation, project usage and benefit, and maintenance. Further in that division, participation in planning and project usage and benefit distribution each composed three particular decisions while implementation and maintenance each consist of four decisions.

Table 5-5 Community Participation in Project Decision-making

Extent of Community Participation	Type of Participation: N (%)			
	Planning	Implementation	Project Usage and Benefit Distribution	Maintenance
None	8(7)	20(17)	9(8)	10(9)
One decision	37(31)	33(28)	23(20)	8(7)
Two decisions	24(20)	55(46)	69(58)	51(43)
Three decisions	49(42)	8(7)	17(14)	31(26)
Four decisions	-	2(2)	-	18(15)
Total	118(100)	118(100)	118(100)	118(100)

Source: Author's field survey July-August 2012

The above statistics gives the evidence that the community and its representatives, watershed development committee, make the majority of decisions in the planning stage. The cumulative statistics (62%) shows the high involvement of community in the planning stage of projects. Indeed, 93 percent of the cases the community at least decides in one of the planning decisions. The same happens when we see the case for participation in project usage and benefit distribution. Again here, more than two third (72%) of the cumulative cases indicate the community to be the lead decision maker on project usage and benefit distribution decisions. On the other hand, we got the evidence that in only 9 percent of the cases community mainly decides in project implementation decisions (three or more decisions). In majority of the cases (55 percent of the cases) community decides in at least two implementation decisions. Yet, in 17 percent of the cases the community is not involved in making any of the project implementation decision. Considering the case for maintenance, we can see that in 84 percent of the cumulative cases the community takes the lead role in at least two out of four decisions related to project maintenance.

Looking at the correlation of these participation variables, the following was witnessed in their pair wise correlation. The matrix seems to suggest that all participation variables are correlated to each other with a correlation coefficient ranging between -0.02 to 0.67. Moreover, this correlation becomes significant at 5% significance level for the correlation between participation in planning and the remaining participation variables. When looked in terms of

magnitude, the correlation is strong correlation between participation in planning and implementation than the others. Participation in implementation is also significantly correlated to participation in maintenance. The analysis on participation variables obviously shows two things. First, the communities make the majority of decisions which could be taken as a good indication of the mainstreaming of the CBD or CDD approach in the area though the context did not go beyond CBD. This was because the communities were not involved that much in investment decisions like wage rate, compensation for land forgone for the purpose of project and other decisions on project investment funds (mostly included in implementation category). Second, the significant correlation of participation in planning to the remaining three participation indicators the evidence that community participation in the project cycle is ensured only when communities are involved from the inception of the project. Indeed, this makes planning participation the basic feature for mainstreaming CBD or CDD.

Table 5-6 The correlation matrix among participation variables

	Planning	Implementation	Project usage & Benefit Dist.	Maintenance
Planning	1.00			
Implementation	0.67*	1.00		
Project usage & Benefit Dist.	0.44*	0.15	1.00	
Maintenance	0.27*	0.38*	-0.02	1.00

Source: Author's own data collected July-august 2012

Existence of maintenance committee was also considered as a control variable as the absence/presence is believed to have a potential impact on project outcomes of interest. Our investigation and discussion on this factor shows that, there is no formal maintenance structure and system set in any of the community watersheds or the kebeles at large. Conversely, in 29% of the responses, 34 cases, there is an informal maintenance committee taking the lead in maintenance works in the watersheds. Apart from these, all the others responded that the CWSDC plays the role in organizing communities for maintenance work especially when communities provide thirty days of free labour for watershed development activities on an annual base. In fact, table 5-7 provides the descriptive statistics for the explanatory variables that were used interchangeably as controls.

Table 5-7 Descriptive statistics of control varialbes

Variable	Obs	Mean	Std. Dev.	Min	Max
Number of households	118	91.94915	36.73673	35	180
Kebele	118	3.508475	1.708429	1	6
Distance from market	118	7.463559	5.387571	.5	15
Hh land dist. ratio	118	0.43161	0.3676844	0.0714	2.57
Maint. committee (1=yes)	118	.28813	.4548259	0	1
Initial make (1=Well made)	118	.9406	.2372338	0	1
Type of project (1=SCFC)	118	.5423	.5003258	0	1
Year the asset was built	118	2008.5	1.722048	2006	2011
School in the village	118	.4745763	.5655625	0	2
Potable water (1=Yes)	118	.0423729	.2022974	0	1
Access to electricity (1=Yes)	118	0	0	0	0
Health facilities (1=Yes)	118	.1864407	.3911227	0	1

Source: Author's own data collected July-august 2012

The descriptive analysis we did in the section 5.1 provides two particular evidences in relation to our research objectives. Firstly, majority of the projects surveyed were evaluated to be in a good operational and physical condition showing that the projects are in a good condition to provide their expected benefits and could sustain for a longer-term with proper maintenance. Secondly, the analysis on participation in projects decision seems to indicate that the communities are involved in majority of the project decisions. However, this does not provide any evidence on the effect of community participation on project outcome. We, therefore, move to our empirical analysis to estimate this potential effect and relationship.

5.2 Empirical Findings

Project Damage and Participation

Preliminary tests

Before running the model to show the relationship between the maintenance condition represented by damage state and the independent variables, we employed different preliminary tests to give us an all-rounded understanding of the problem at hand. The correlation between the dependent variable and the independent variables and the analysis of variance (ANOVA) were done to check for the existence of correlation and the variation in the between and within means respectively. We have reported the estimates only from bivariate analysis using the ANOVA.

Bivariate Analysis

Table 4 in Appendix VII gives the results of the bivariate analysis using the ANOVA provides the estimated between and within mean variations of dam-

age percentage for the different independent variables of interest. The between variation is indicated by the F-test and p-value while the within variation is given by the estimated coefficients from the ANOVA regression.

When we consider participation in planning (column 1), we can see that the F-test and p-value show the existence of difference in the mean value of damage between projects selected by community participation and those that are not. In particular, the damage to a project found in a community participating in one of the planning decisions decreases by 11 percent compared to that found in a non-participating community. The estimate becomes insignificant for the communities in two decisions. Meanwhile, if communities participate in all the three decisions, the reduction effect becomes 15 percent compared to those found in a community that doesn't participate in planning. This shows that participation in planning brings reduction in project damage and this participation should be intensified to full level (all the three decisions) in order to remain effective in its reduction effect.

The ANOVA estimate for implementation (column 2), on the other hand, shows insignificant result for both between and within mean differences. In the opposite, participation in usage and benefit distribution (column 3) has a significant effect in reducing the damage to a project compared to those not participating (given by the F-test and the p-value). Indeed, the mean value of damage reduces with 18, 14 and 21 percents for communities participating in one, two and three of the decisions in this category respectively, compared to those that are not participating at all.. Likewise, participation in maintenance decisions (column 4) is found to have a significant effect of on determining the mean value of project damage. However, the within variation show that it is only those communities that are participating in three decisions, that show a significant variation compared to those that are not participating. Yet, this effect is surprisingly positive in increasing the percentage of damage to a project (13 percent)

From the control variables considered, existence of committee brings difference in the damage of project. More specifically, presence of maintenance committee has an effect of reducing the damage to a project by 11 percent. In the kebele the project is located is also another factor that brings variation in the mean value of damage to a project.. Considering the within variation, projects located in Weltane have 8 percent less mean values in their damage than those located in Behaadu. In the contrast, the mean value of damage increase by 21 percent for those projects located in Kufakas kebele. The remaining three kebeles were found not to have a significant effect of determining the mean value of project damage when Behaadu kebele is taken as reference category.

OLS Estimation Results

Employing the model we developed under section 4.2.1, we estimated the effects of different community participation variables on the dependent variable, project's damage percentage.

Table 5-8 gives the estimates from the model that brings all participation indicators together. The estimate from specification (1), which considers only the four participation variables, shows that an increase in planning deci-

sion by one unit seems to reduce project damage by 4.2% significant at 10 percent. After controlling for project specific control variables (column 2) of this table, planning participation still remains robust in significantly reducing project damage, the same magnitude and level of significance. Meanwhile, the three types of participation, except for participation in maintenance, become statistically significant in reducing project damage when they are brought together with community socio-economic factors and kebele fixed effects.

More specifically, a one unit increase in planning participation lowers the damage percentage by 6.1 percentage points while the reduction effect is 6.3 percentage points for a one unit increase in project usage and benefit distributions decisions. In the same specification, a one unit increase in implementation decisions reduces the damage of a project by 5.8 percentage points. The significance level is 5 percent for all the three estimates. This result shows the underestimation on the estimated coefficient for planning participation, and underestimation both on the coefficient and significance for participation in implementation and usage and benefit distribution decision, when the variations in damage across kebeles and for differences in community socio-economic factors are not controlled. The estimates remain almost the same when all project specific characteristics, community socio-economic factors and kebele fixed effects are controlled together. Particularly, we see a small increase in magnitude for the reduction effect of participation in implementation (6.2 percentage points) and small decrease on the estimated coefficients on planning and project usage and benefit distribution, 5.9 and 6.1 percentage points respectively. Here again, the level of significance is 5 percent for all the three estimates.

In specification (5) which controls additionally for existence of maintenance committee, all types of community participation become significant in reducing project damage. In particular, apart from the reduction effects by 6.2, 6.1 and 5.9 percentage points for one unit increase in planning, implementation and usage and benefit distribution participations respectively (all significant at 5 percent), participation in maintenance decisions by one unit seems to lower the damage to a project by 4.5% with 10 percent level of significance. The association of maintenance systems, rules and/or the coordination of maintenance cost and labour contribution to the presence of responsible committee justify this effect.

Among the control variables, the existence of maintenance committee and the keble where the project is located are worth discussing here. In both individual and group estimations, presence of maintenance committee showed to have an on average significant reduction effect on project damage. Even though these committees were informally formed, their presence has a significant contribution to the maintenance and upkeep of projects. Indeed, presence of maintenance committee reduces the damage of projects by 8.2 percentage points with 5 percent level of significance.

Moreover, taking Behaadu kebele as reference, projects in Legalencha have 23.1% reduction in project damage with 5 percent significance level. On the other side, those in Kufakas and Ifaaman have the opposite effect of (31.7% and 31.0% respectively) increasing project damage for the same reference kebele and after controlling for community participation and socio-

economic factors, project specific characteristics and presence of maintenance committee.

For sensitivity checks estimations were made using individual participations separately. These estimations presented in tables 5-8 of Appendix VIII give almost similar results to the analysis we made above.

The overall analysis on the OLS model above vindicates the significant reduction effect of community participation, especially participation in planning, on the damage to a project. This result is interesting as it confirms the claim that participation in planning more reflects community needs and it is through increased participation that their voices can be heard and their needs can be met (Laboone and Chase 2009, MoARD 2005). Moreover, in all cases existence of maintenance committee was found to have a significant reduction effect on project's damage indicating the importance of placing formal maintenance systems and mechanisms for the proper upkeep of projects. Project specific factors like make (new or extension), project type (for soil conservation and flood control or water conservation and water harvesting) and year the asset was built were all found to be insignificant in determining the project damage. Likewise, village socio-economic factors were all insignificant in determining the average percentage of damage to a project.

Table 5-8 Project damage and participation: OLS Estimates

VARIABLES	(1)	(2)	(3)	(4)	(5)
Participation in planning	-4.165*	-4.163*	-6.139**	-5.925**	-6.161**
	(2.261)	(2.304)	(2.704)	(2.745)	(2.704)
Participation in implementation	2.155	2.115	-5.871**	-6.167**	-6.032**
	(2.332)	(2.409)	(2.395)	(2.490)	(2.451)
Participation in use and benefit	-2.256	-2.489	-6.346**	-6.188**	-5.884**
	(2.191)	(2.271)	(2.464)	(2.517)	(2.481)
Participation in maintenance	1.378	1.403	-4.042	-3.822	-4.500*
	(1.492)	(1.528)	(2.439)	(2.490)	(2.472)
Number of households			-0.0515	-0.0440	-0.0507
			(0.0441)	(0.0464)	(0.0457)
Distance from market			0.265	0.208	0.191
			(1.212)	(1.280)	(1.260)
Weltane			13.96	12.93	11.62
			(13.77)	(14.10)	(13.89)
Legalencha			-17.99**	-18.34**	-23.14**
			(9.020)	(9.158)	(9.311)
Welkitumawejin			21.15	21.41	16.76
			(14.18)	(14.45)	(14.40)
Kufakas			34.82***	35.03***	31.66***
			(8.587)	(8.996)	(9.002)
Ifaaman			28.12*	26.80*	31.03**
			(14.91)	(15.44)	(15.33)
Maintenance committee (1=Yes)					-8.153**
					(3.979)
Observations	118	118	118	118	118
R-squared	0.074	0.085	0.470	0.481	0.503

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Dependent Variable: Project's damage percentage. Specification (1) has no any control variable while specification (2)controls for project specific characteristics. Specification (3) controls for community socio- economic factors and kebele fixed effects while specification (4) controls for both project specific characteristics, community socio- economic factors and kebele fixed effects. The fifth specification additionally controls for existence of maintenance committee.

Project Operational State and Participation

As described in the earlier chapter the nature of the response on the operational state of a project supports the use of an ordered (probit) model. This section reports marginal effect estimates from an ordered probit model.

Oprobit Estimates

Column (1), (2) and (3) of table 5-9 show the marginal estimates on the probability of a project to be placed in a state of partial operation, moderate operation and full operation respectively. And these marginal effects are estimated based on ordered probit specification that combines all the participation variables together with the major control variables. As can be seen in column (2), after controlling for all participation and control variables, an increase in planning participation by one unit significantly reduces the probability of a project to be placed in the category of moderate state of operation by 16.9 percentage points. Most importantly, this increase in participation has 18.5 percentage points effect of increasing the probability of a project to be in a full operational state.

On the other side, the marginal effect of an increase in project implementation decisions by one unit only increases the probability of a project to be in a moderate operational state by 15.1 percentage points while it has a significant (16.5 percentage points) but opposite effect on the project's probability of being fully operational. Having technical components in it, increase in implementation decisions can enhance the operational state of the projects only to a certain level, moderate state of operation. Indeed, it reduces the probability of a project to be in a full state of operation. A finding from previous study by Khwaja (2009) also showed the negative effect of increased community participation in decisions aspiring technical on projects physical operational outcome.

Furthermore, the effects of participation both in maintenance and usage and benefit distribution are insignificant in determining the probability of project's outcome of operation. Unlike physical damage (which takes into consideration only the percentage of damage out of the total length of the specific project), operational state additionally considers the proper incorporation of technical standards in addition to the labour and material contribution in construction and maintenance. Hence, the multifaceted dependence of project's operational state on keeping the technical standards than participation *perse* shouldn't make surprising the absence of any significant effect from community participation in usage and benefit distribution and maintenance decisions.

As far as the control variables are concerned, the presence of maintenance committee seems to have a significant effect of increasing the probability of a project to be fully operational. In fact, the presence increases the probability by 22.5 percentage points. On the opposite, the existence of maintenance committee decreases the probability of a project to be in a moderate state of operation by 20.9 percentage points. This effect again confirms the importance of maintenance committee for the keeping the quality and maintenance of project assets.

For sensitivity check we have done analysis using specifications considering each participation variables separately. When considered alone, participation in planning becomes insignificant in determining project's state of operation. This is not surprising considering the fact that state of operation deals with actual functioning. Therefore, unless accompanied by implementation, planning alone could not bring any effect on project's current state of operation. Table 9 of Appendix IX provides the marginal estimates from an oprobit model considering participation in planning (column 1-3) and participation in implementation (columns 4-6) separately. In addition table 10 of the same Appendix provides the estimates considering participation in usage and benefit distribution (columns 7-9) and participation in maintenance (columns 10-12) respectively.

Table 5-9 Projects operationa state and participation: Oprbit marginal effects

VARIABLES	(1) Partial operation	(2) Moderate operation	(3) Full operation
Participation in planning	-0.016	-0.169*	0.185*
	(0.013)	(0.099)	(0.107)
Participation in implementation	0.014	0.151*	-0.165*
	(0.010)	(0.088)	(0.093)
Participation in use and benefit	-0.012	-0.134	0.146
	(0.012)	(0.101)	(0.111)
Participation in maintenance	0.001	0.014	-0.015
	(0.008)	(0.081)	(0.089)
Maintenance committee (1=Yes)	-0.016	-0.209***	0.225**
	(0.011)	(0.075)	(0.079)
Weltane	-0.016	-0.255	0.272
	(0.018)	(0.247)	(0.262)
Legalencha	0.015	0.123	-0.138
	(0.046)	(0.294)	0.339
Welkitumawejin	-0.026	-0.370***	0.396**
	(0.024)	(0.136)	(0.153)
Kufakas	0.115	0.352	-0.498*
	(0.164)	(0.138)***	(0.288)
Ifaaman	-0.021	-0.327*	0.3488
	(0.021)	(0.175)	(0.190)
Observations	118	118	118

Source: Author's own computation of data collected on field survey July-August 2012. Robust Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Pseudo R2 =0.1887

Note: The specification used to estimate the marginal effects above has controlled for all the control variables. These include project specific characteristics, village socio-economic factors, kebele fixed effects and existence of maintenance committee.

Chapter 6
Conclusion

This study was motivated by the limited evidence on analysing the PSNP PWs in reference to the long-term objective in general and the effectiveness of the CBPWD approach in particular. With this regard the study examined two major aspects of the PSNP PWs on a primary data collected from a sample of 118 Soil and Water Conservation (SWC) projects found in 6 representative kebeles of Doba woreda. First, we tried to analyse the degree of community participation in project decision making. To this effect and based on the context in the PW guidelines we divided project decision making into four major categories; participation in planning, implementation, project usage and benefit distribution, and maintenance and upkeep of projects. Second, we did a technical assessment of the projects, with the help of engineers, focusing on the operational and maintenance conditions and examined how the role of community participation, with the four classifications, affects these project outcomes.

To this end, both quantitative and qualitative data analysis techniques were made of use. Descriptive methods, bi-variate analysis, multiple linear regression and ordered probit models are those used in the quantitative analysis. The qualitative analysis, on the other hand used some detailed information to strengthen the quantitative results. Details on the process of project decision making is used to qualitatively understand the process of decision making and the perceptions of beneficiaries on the public works in general and the community based participatory watershed development in particular.

Our analysis of the primary data reveals that at least in Doba woreda the community and their elected representatives, called the Community Watershed Committees (CWC), take the lead role in major PSNP PW project decisions. Seen from the community-based and –driven development perspectives, the analysis reflected the evidence of mainstreaming of the CBD, the scaling up to CDD limited by both the approach followed in the cycle of PWs and the existing administrative structure of the program itself. Likewise the analysis on the technical assessment of physical and operational states of the projects indicate that the program is on track to achieve its long term objectives of creating community assets and giving solutions to the problem of land degradation, which was identified as the root cause for the witnessed chronic food insecurity in the area.

The estimates from our set of exploratory regressions revealed that projects that meet community needs, proxied by increased community participation in planning decisions, have an on average significant reduction effect on project's physical damage. Moreover, when accompanied by the increased participation in the other decisions the magnitude of the marginal reduction effect increases significantly. The result validates the argument made in favour of community participation by most of the proponents of the CBD or CDD. More specifically, it confirms the claim that projects meeting the needs of community have better chance to sustainably provide the expected benefits for a longer duration.

On the other side, increased participation in implementation decisions was found to significantly reduce the probability of projects to be in a full state of operation. Indeed, given the nature of the decisions entailing technical expertise, this effect should not be surprising. The results of the study by Khwaja (2009) give further evidence to this negative effect of community participation on project outcomes entailing technical decisions. Therefore, the advocacy for community participation in project decisions needs to take the contextual factors into account.

Furthermore, existence of maintenance committee was found to have a significant positive effect both in project's current state of operation and physical conditions. Based on this promising effect, the study recommends the need to formally establish and integrate such committee for the sustainable maintenance and upkeep of public work assets.

Although our study provided the above empirical evidences, estimating the effect of community participation on project outcomes might have a potential bias problem because of some reasons related to the data source or the nature of some factors in the study itself. First, there is a possibility for physical and functional state of the projects to drive participation of the community, especially the participation in maintenance. Although an attempt was made to find an instrument variable to solve this problem, the specific areas covered in the questionnaire couldn't allow us to find one. Taking the damage measurement and operational grouping of projects done by the engineers may not worsen the problem if it doesn't minimize it. Second, as it is common in most econometric studies involving cross sectional data, the data we collected could not allow us to control for time-invariant unobserved community/village heterogeneities. This problem could have been solved if we have the data collected at different time periods at least two times. With this in mind, there is a possibility for overestimation or underestimation of the effect of community participation estimated with both OLS and Oprobit models. The third problem we have is related to the administration of the questionnaire at group level. The best way could have been to handle the questionnaire at beneficiary household level but because of time and resource limitation, in addition to the nature of the project, the questionnaire was administered at a group level. The small number in a group might lessen the problem. With these limitations, we couldn't certainly make inferences for the whole PSNP PW implementations based on our analysis, as the data we collected was too small and could not reflect the general conditions because of regional and zonal heterogeneities.

Future research in the area can, therefore, start from these limitations which could lead to a better investigation of the problems that this study has tried to address. With regard to community participation, a research can be done to investigate the possible determinants of participation in project decisions. Most importantly, given the central role in the long-term objective of the program further research can be done in the same area by including more woredas representing different zones and regions in the country.

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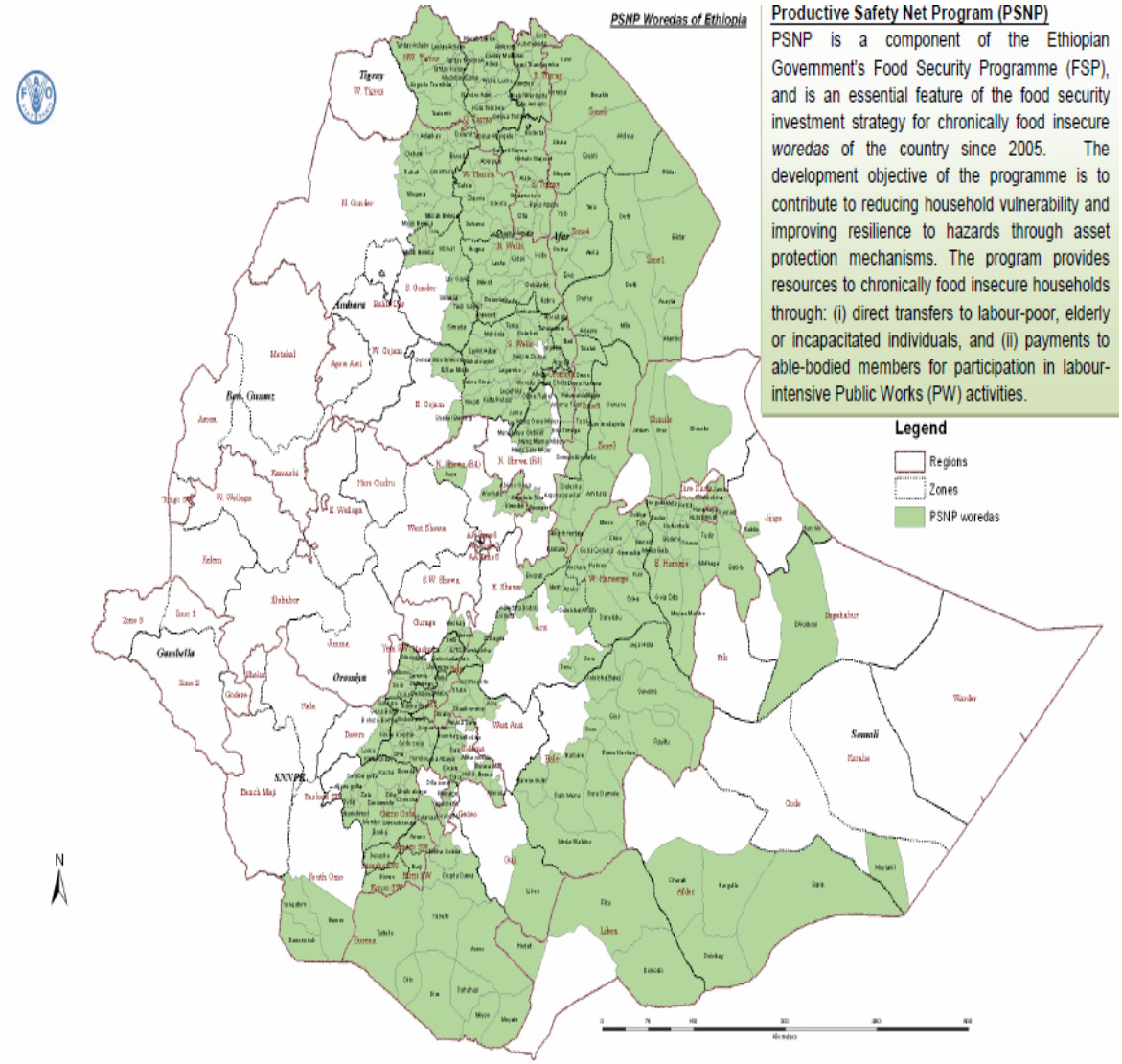
Glossary

***Woreda*:** an administrative division in Ethiopia (managed by a local government), equivalent to a district with an average population of 100,000. *Woreda*s are composed of *Kebele*s, or neighborhood associations.

***Kebele*:** part of a *Woreda*, is the smallest unit of local government in Ethiopia, equivalent to a ward.

Appendices

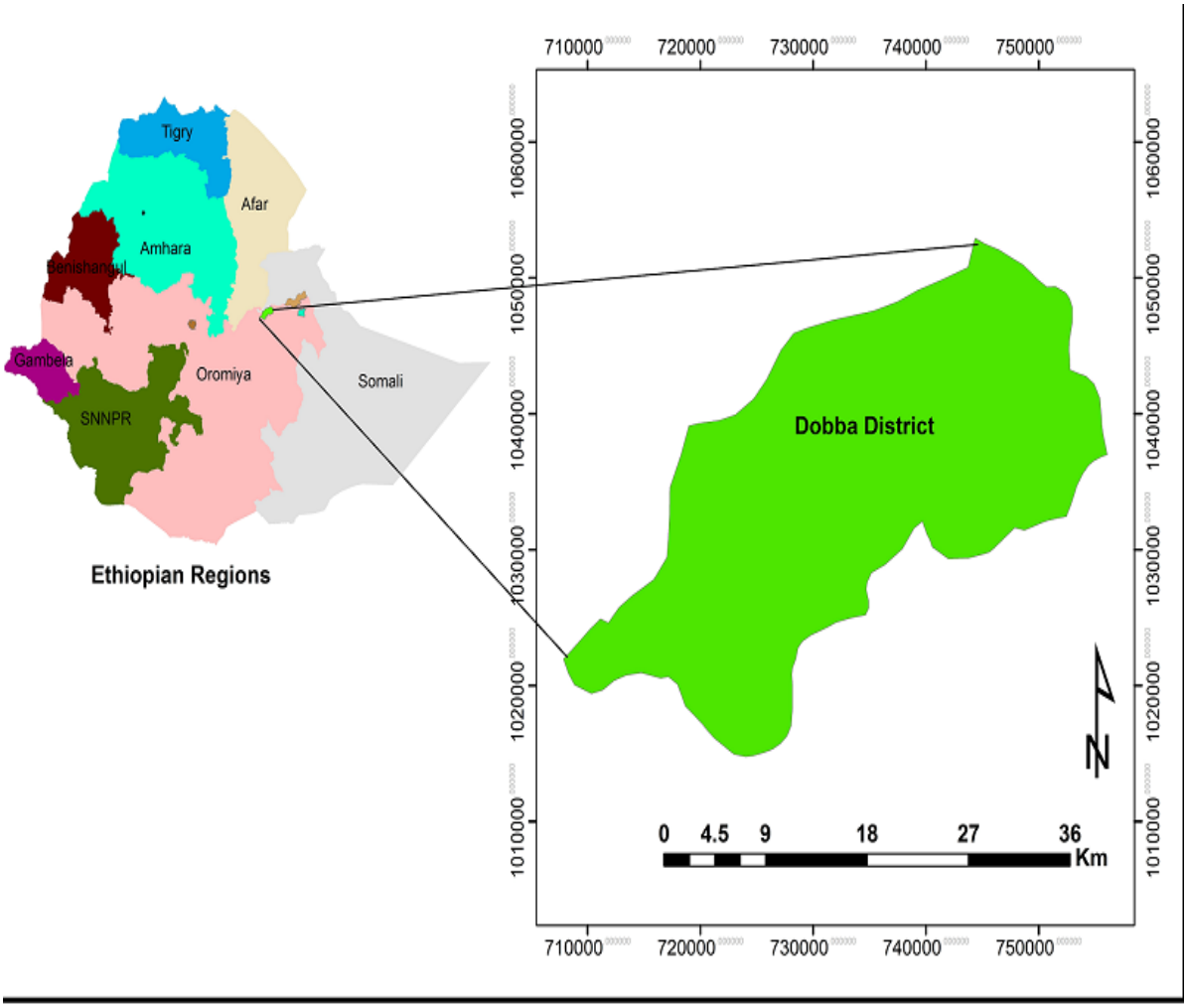
Appendix I
Map PSNP Woredas in Ethiopia



Source: East and Central Africa disaster Risk Reduction[19]

[19] http://www.disasterriskreduction.net/east-central-africa/maps/detail/en/c/1146/

Appendix II
Map of study area



Source: Aramde Fetene 2012, Geographic Information System (GIS) Expert

Appendix III: Survey Instruments

I. Project Response Group Questionnaire

QUESTIONNAIRE I.D. _____

Date _____ Kebele Name _____

Enumerator's name _____ Supervisor Name_____

Module I. Watershed/Village/Got Socio-economic Profile

1. Name of Watershed/Village (Village refers to the group of PSNP PW beneficiaries and therefore it may be an actual village, sub-village or a "Got". The enumerator will ascertain the exact nature of the "village" in each case) _____
2. Total number of Households in the Village _____
3. Distance of Village from nearest (large) market-place:
   i) _____ km
   ii) _____ minutes of travel time by motorized transport (on road) [during summer]
   iii) _____ any *Additional* minutes of travel time by foot [during summer]
   iv) _____ Birr cost/person of two-way transport travel
4. Is the village cut from the nearest marketplace in a year? Yes/No, _____
   If Yes, _____months.
5. Number of commercial enterprises (general stores, workshops etc.) in Village:

   i) Retail Stores (general stores, grocery etc.) _____
   ii) Productive & Service enterprises (eatery, tea-stall, wholesalers, steel, auto shop, barber, tailor etc.)_____

6. Give the total number of months in the year during which the villagers suffer serious food shortages

   a. Bad Year: _____months Name of months_____
   b. Medium Year: _____months Name of months:_____
   c. Good Year: _____months Name of months:_____

7. _____ What type of school does the village have?

   (0 = none, 1= primary, 2 = Junior high school, 3 = high school, 4=others)

8. Does the Village have facility for potable water? Yes/No
9. Does the Village have access to electricity? Yes/No
10. Does the Village have health center/facilities? Yes/No
11. Total cultivable land for all Households in the village area_____ hectare
12. Distribution of cultivable land-holdings in the village:
    i) Choose the Household with the Maximum cultivable land-holding and give that amount _____hectare
    ii) Choose the Household with the Minimum cultivable land-holding and give that amount _____ hectare/hectare
    iii) _____ number of Households that have cultivable land holdings near the Maximum
    iv) _____number of Households that have cultivable land holdings near the middle
    v) _____number of Households that have cultivable land holdings near the Minimum

16. Average number of major livestock and household assets

    i) Choose the Household with the Maximum number of major livestock and give the number_____

ii) Choose the Household with the Minimum number of major livestock and give the number_____
iii) _____ number of Households that have number of major livestock near the Maximum
iv) _____number of Households that have number of major livestock near the middle
v) _____number of Households that have number of major livestock near the Minimum

17. Cropping Zone with area (in hectares): Single (1) _____ / Double(2) _____/Triple(3)
18. How many Households have farming as their *primary* occupation: _____

Module II: Project Respondent Group Questionnaire

Part I: PRG Profile and Project Generic Question

Composition of PRG:

SN	Sex Code 0=M or 1=F	Age Code: 1. Under 30 yrs 2. 30 to 50 yrs 3. Above 50 years	Religion: Code: 1.Islam 2. Christian 3. Others	Educational Background Code: 1. No Edu. 2. Primary 3. High school and above 4. Others (specify)	Family size	HH head 1=Male 2=Female	Year of joining the program
1							
2							
3							
4							
5							
6							

Part II: Generic Questions (common to all projects)

1. Project Type: _____(specify)
2. Project code & name: _____
3. Was the project made:
   i) Completely new
   ii) Built upon/extended an existing project
4. Month & year the Project was : physically started _____ ; completed_____
5. Total amount sanctioned by Govt. /NGO/external agency for the Project _____Birr
6. Materials cost _____Birr
7. Labor-cost _____person days
8. Village labor employed: i) _____Persons ii) _____Days
9. Outside Village labor employed i) _____ Persons ii) _____Days
10. Total expenditure on skilled workers _____Birr (including semi-skilled workers)
11. Did the villagers contribute to the cost of the Project? Yes/No
12. If 'Yes' then:
    i) Number of Households that paid for materials cost _____
    ii) Amount paid per Household _____Birr
    b) Number of Households that contributed free or partially paid labor _____
    c) Number of Households that gave up land without compensation _____

13. Total number of Village Households that have benefited from the Project usage (i.e. received benefits from using the Project) _____
14. What kind of mutual relationship currently exists in the village (please tick √):
    a) Extremely united b) Average unity c) Some conflict d) High conflict
15. How hard is it to get villagers to contribute, for community works, their (please tick √):
    a) Voluntary Labor
    i) Almost Impossible ii) Very Hard iii) Slightly hard iv) Easy
    b) Materials/Cash
    i) Almost Impossible ii) Very Hard iii) Slightly Hard iv) Easy
16. Nowadays do the villagers cooperate/provide free-labor/money for the following tasks:
    a) Animal grazing management (controlling free-grazing etc.) Yes/No
    b) Community wood-lot management (prevent illegal felling etc.) Yes/No
    c) House building Yes/No
    d) Help for unexpected expenditures in:
    i) Birth Yes/No
    ii) Death Yes/No
    iii) Wedding Yes/No
    iv) Natural disasters (flood etc.) Yes/No
    v) Sickness (expenditure to send to hospital etc.) Yes/No
    vi) Business help (loans, bailing out etc.) Yes/No
    e) Collective agricultural tasks on a villager's fields (land development, harvesting etc.) Yes/No
    f) Collective festivals, village events etc. Yes/No
17. Has the Village Development Committee /Community Waster shed Committee been formed? If 'Yes', then give the month & year of formation. Yes/No_____
18. If 'Yes', how often does it meet? _____ times/year.
19. If 'yes', how active is the VDC/CWSC [on a scale of 1(inactive) to 5(extremely active)] in participating community for selection, implementation monitoring and maintenance of PSNP PW structures: _____
20. Provide Reasons for the above:
    _____
    _____
    _____
    _____
21. List what you believe are the most important attributes for a leader?
    _____
    _____
    _____
22. How many members of the VDC/CWSDC have all/most of such attributes?
    _____
23. Have the members of the VDC/CWSDC received any formal training? Yes/Some of them /No_____
24. Do the VDC/CWSDC members have any previous experience of development works? Yes/Some of them /No___
25. Give the number of members of the VDC/CWSDC whose educational level is
    a) No education_____ b) Primary_____ c)High School and above_____ d)Other (specify)_____

Project maintenance:

(Attention: The Project should be examined in person by soil and water conservation engineer)

1. What is the current state of the Project (please tick √)?
   a) Fully Operational b) More or less operational c) Partially operational d) Non-operational

PRG	Engineer

2. How long has it been in this state? _____ months/years
3. How well is the Project performing now, in terms of generating the expected benefits, as compared to when it first started operating (please tick √):
   a) Much worse than when it first started operating (less than half the benefits)
   b) Slightly worse than when it first started operating
   c) Just the same as when it first started operating
   d) Slightly better than when it first started operating
   e) Much better than when it first started operating (more than double the benefits)
4. What is the reason for the above?

   _____
   _____
5. What is the current physical condition of the Project (please tick √)?
   a) Severely damaged (almost all damaged)
   b) Moderately damaged (around half damaged)
   c) Slightly damaged (less than half damaged)
   d) Very little damage
   e) Undamaged

PRG	Engineer

6. Approximately what percentage of the Project is damaged _____ % (engineer)

Part III: Project Specific Questions to the PRG

1. Who selected this particular Project?

   _____
2. Please describe in detail how the Project was actually chosen (who decided, how many people agreed and participated in decision, who took final decision, why not some other project etc.):_____

   _____
   _____
   _____

3. In your opinion, was the Project (please tick √):
   a) Badly made (used bad design, poor materials, insufficient labor etc.)
   b) Not so well made
   c) Well made (used good design, good materials, sufficient labor etc.)

4. Was there any suggestion to the design of the Project made by the villagers? Yes/No_____

5. If 'Yes' please describe the suggestions given_____

   _____
6. Was local suggestion included in project design (please tick √)?
   a) Not at all b) A bit c) A lot
7. If answer to above is (b) or (c), state the part of the suggestion that was included in the design by the PIA_____

_____

_____

8. Do you think that the Project was:
   a) Socially feasible (i.e. there were no serious social problems/conflicts in it)? Yes/No
   b) Technically feasible (i.e. engineering design wise)? Yes/No
   c) Economically feasible (cost of making, running, obtaining benefits was reasonable)? Yes/No
9. Has social audit of the Project been done by the villagers or representatives of the villagers? Yes/No
10. If 'yes', mention the date _____
11. If 'yes', did the Kebele officials show all books and records of the projects during social audit? Yes/No
12. Were there any flaws/mistakes in the project design, construction etc. identified:

_____

_____

_____

13. What action was taken by concerned agency based on the social audit report?

_____

_____

14. List and give details on the project benefit (actually accrued) in order of importance:

Benefit no. (1=most important)	A Description of benefit	B Number of HH that got the particular benefit	C Maximum value in Birr that you would ascribe to the benefit (for a year)	D Remarks (Mention non-pecuniary value of the benefit, if any)
1				
2				
3				
4				
5				
6				
7				

15. Method of benefit distribution (please tick √):
   a) Random draw
   b) Leader (e.g. CWSC/VDC Member, other political leader etc.) decides (specify) _____
   c) Elders decide
   d)Keble officials decide
   e)Benefits cannot be divided
   f)Benefit is customarily equally divided
   g)Other (specify) _____
16. Perceptions:
   a) Were the benefits of the Project equitably distributed amongst the villagers? Yes/No
   b) Are the maintenance costs of the Project equitably distributed amongst the villagers? Yes/No
   c) Over time, is the need of this Project going to:
   i) Decrease ii) Stay the same iii) Increase
   Explain why
   _____
17. Has any villager ever been excluded from the Project's benefits? Yes/No
18. If one villager gets a Project's benefit, does it lessen the benefit of other villagers? Yes/No

19. Is there any user charge for benefiting from the Project? Yes/No
20. If 'Yes' above then give the amount charged_____Birr per Household per year

Participation in Project Rights/Decision making/duties

21. If given a chance would the Village select the same Project type as they did before? Yes/No
22. Was there a better alternate project that wasn't chosen because it was too conflictual/not socially feasible? Yes/No
23. Was there a better alternate Project that wasn't chosen because it was too expensive? Yes/No
24. Was there a better alternate Project that wasn't chosen because it was too not technically feasible? Yes/No
25. Does the village own all of the assets of the project? Yes/No
26. Describe what you believe are the main *rights* that villagers have concerning all aspects of the Project (since its inception to eventual end):
    _____
    _____
27. Describe what you believe are the main *responsibilities/duties* that villagers have concerning all aspects of the Project (from its inception to eventual end):_____
    _____
    _____
28. Select the main player in each of the following decisions/actions:
    [Code:1= Keble officials, 2 = VDC/CWSDC, 3 = Village leader, 4 = Villagers, 5 = Others (NGO), 6 = Not done]
    a) Project type selection _____
    b) Project site selection _____
    c) Project scale (length, capacity etc.) _____
    d) Project design _____
    e) Time-frame of Project construction (start time, total duration etc.) _____
    h) Village labor wage rate (i.e. what amount villagers were paid for their work) _____
    i) Village Non-labor contribution compensation (e.g. cost of any land given up etc.) _____
    j) Project usage rules (who gets to use the project when) _____
    k) Nature of sanctions for Project misuse (i.e. are people fined etc.) _____
    n) Distribution of Project benefits (division of new land etc.) _____
    o) Maintenance system, policy & rules of Project _____
    p) Cost contribution, level and distribution, in maintenance of Project _____
    q) Labor contribution, level and distribution, in maintenance of Project _____
    r) Nature of sanctions for failure to contribute in Project maintenance (i.e. are people fined etc.)
    _____
29. Is there a maintenance committee set up for the Project (please tick √)?
    a) Yes, Formal (i.e. setup by Villagers/VDC/Kebele); name _____
    b) Yes, Traditional; name _____
    c) No
30. If 'Yes' above, how often does the committee/group meet? _____ times/year
31. If 'Yes' above, how many months has it been since the committee last met? _____
32. Does the committee/group collect any money for maintenance? Yes/No
33. If 'Yes' then give the amount _____Birr/year per Household.
34. Does the committee/group take initiatives for regular maintenance? Yes/No
35. If 'Yes' above, then how often and at what cost is *regular* maintenance of the Project done:
    a) Number of times/year _____
    b) Labor cost per year
    Person-days _____
    c) Total non-labor cost per year _____Birr
    d) Total number of beneficiary Village Households involved _____
    e) Total number of non-beneficiary Village Households involved _____

Module III: Project maintenance and benefit Specific Questions:

*Verification by Engineer

Soil Conservation/Flood Control and Protection (Benefits)

36. What was the main purpose of the flood protection Project (please tick √)*:
    a) To protect run-off and down streaming
    b) To increase soil moisture and productivity
    c) Others (specify) _____
37. Mention total area of the village protected by the Project_____ hectares.
38. Has any crop change taken place on the protected lands? Yes/No_____
    If 'Yes' please give the following details:

A. Before Project: Crop/fruits/non-fruit trees name	B. Annual production before Project: For crops (Quint/hectare), for fruits (Quint/kg), for non-fruit trees give number	C. After Project: Crop/fruits/non-fruit trees name	D. Annual production after Project: For crops (kg/hectare), for fruits (kg), for non-fruit trees give number

39. If this Project stops/has stopped operating, how hard is it to protect the area (please tick √)?
    a) Almost Impossible b) Very hard c) Slightly hard d) Easy
40. If this Project were/is only partially (50%) operational, how hard is it to protect the area (please tick √)?
    a) Almost Impossible b) Very hard c) Slightly hard d) Easy

Soil conservation/ Flood Control *and* Protection (Maintenance)

41. Are the protection walls/drains fallen in/ damaged on any part of it?* Yes/No
42. If 'Yes' above, what is the extent of the damage?*
    a) Number of places damaged _____
    b) Total project length _____ meter
    c) Total damaged length _____ meter
43. For any damaged protective wall/drain that was repaired, was it done according to*:
    a) The same material as in the original design? Yes/No
    b) The same height/depth as in the original design? Yes/No
    c) The same thickness/width as in the original design? Yes/No

44. Special Remarks (if any) of the Enumerator/Engineer:
    _____
    _____
    _____
    _____

Water harvesting and conservation structures (Benefits)

45. What was the main purpose of the water harvesting/conservation Project (please tick √)*:
    a) To increase the moisture capacity
    b) For planting trees
    c) to increase water percolation/recharging

d) other (specify)_____

46. Mention total area of the Village protected by the Project_____ hectares.
47. Has any crop change taken place on the protected lands? Yes/No
    If 'Yes' please give the following details:

A. Before Project: Crop/fruits/non-fruit trees name	B. Annual production before Project: For crops (Quinta/hectare), for fruits (Qut/hectare), for non-fruit trees give number	C. After Project: Crop/fruits/non-fruit trees name	D. Annual production after Project: For crops (kg/hectare), for fruits (kg), for non-fruit trees give number

48. If this Project stops/has stopped operating, how hard is it to harvest water in the area (please tick √)?
    a) Almost Impossible b) Very hard c) Slightly hard d) Easy
49. If this Project were/is only partially (50%) operational, how hard is it to harvest water in the area (please tick √)? a) Almost Impossible b) Very hard c) Slightly hard d) Easy

Water harvesting and conservation Structures (Maintenance)

50. Are the structures/basins/pits fallen in/ damaged on any part of it? * Yes/No
51. If 'Yes' above, what is the extent of the damage?*
    a) Number of places damaged _____
    b) Total project _____ numbers
    c) Total damaged _____ numbers
52. For any damaged basins/pits/structures that was repaired, was it done according to*:
    a) The same material as in the original design? Yes/No
    b) The same height/depth as in the original design? Yes/No
    c) The same thickness/width as in the original design? Yes/No
53. Special Remarks (if any) of the Enumerator/Engineer:

_____
_____
_____
_____

II Kebele Questionnaire

Date: _____ Name of enumerator: _____ Kebele No._____

Question nos.1 to 13 shall be asked to a mixed group of Kebele Food Security Task force functionaries:

1. Name of the Kebele:_____;
2. Name of Chairperson of the committee:_____
3. Name of Vice Chairperson: _____
4. Number of Watershed committee members:

	1=Under 30 years	2=30-50 years	3=Above 50 years	Total
Female				
Male				
Total				

5. Have the committee members received training regarding their roles and responsibilities?
   a. Yes, all of them b. Only some of them c. None
6. Give the number of committee Members whose educational level is:

	No Educa-tion	Primary	High school and above	Others (please specify)
Male				
Female				
All Members				

7. How frequently are meetings held in the committee regarding PSNP issues?
   _____
8. How were the projects for PSNP selected by the committee?
   _____
   _____
9. What procedures were followed to prioritize the projects in the Annual Action Plan (AAP)?
   _____
   _____
   _____
10. Did the community/villagers send their recommendations for projects to be executed under PSNP PW? (Yes/No) _____
11. If 'yes', were their recommendations considered for the AAP? (Yes/To some extent/No)
    _____
12. What checks and balances did the committee follow to maintain technical standards of the projects?
    _____

_____

_____

13. State the problems, if any, the committee faced in implementing the projects and how did it overcome?

_____

_____

_____

Question nos. 14 to 16 should be asked to the chairperson or vice chairperson separately:

14. List three most important qualities that you believe the main committee members managing PSNP should possess in order to execute their work effectively.

_____

_____

_____

15. On a scale of 1(poor) to 5(excellent) how will you rate the members of the committee on the basis of their demonstrating such qualities through their work:

SN	Position	Quality 1	Quality 2	Quality 3	Overall
1					
2					
3					
4					
5					

16. What effect do you believe the above has on effective implementation of PSNP PW projects?

_____

_____

_____

Question nos. 17 to 19 should be asked to the main committee members separately:

17. List what you believe are three most important leadership attributes that the Committee functionaries should possess for effective implementation of PSNP PWs?

_____

_____

_____

18. On a scale of 1(poor) to 5(excellent) how will you rate the leadership qualities demonstrated by the committee functionaries through their work:

SN	Position	Quality 1	Quality 2	Quality 3	Overall
1.	Chair person				
2.	Vice Chair person				

19. What effect do you believe the above has on effective implementation of PSNP PW projects?

_____

_____

_____

Appendix IV: Project Damage State: Engineer Rating

Table 1 Project Damage state across year of implementation

Damage state	Year the project was made						
	2006	2007	2008	2009	2010	2011	Total
Sever damage	1	1	1	-	-	-	3
Moderate damage	1	1	2	1	1	2	8
Slight damage	2	5	3	3	4	3	20
very little damage	13	10	15	13	16	13	80
No damage	2	1	-	1	-	3	7
Total	19	18	21	18	21	21	118

Source: Author's filed survey July-August 2012

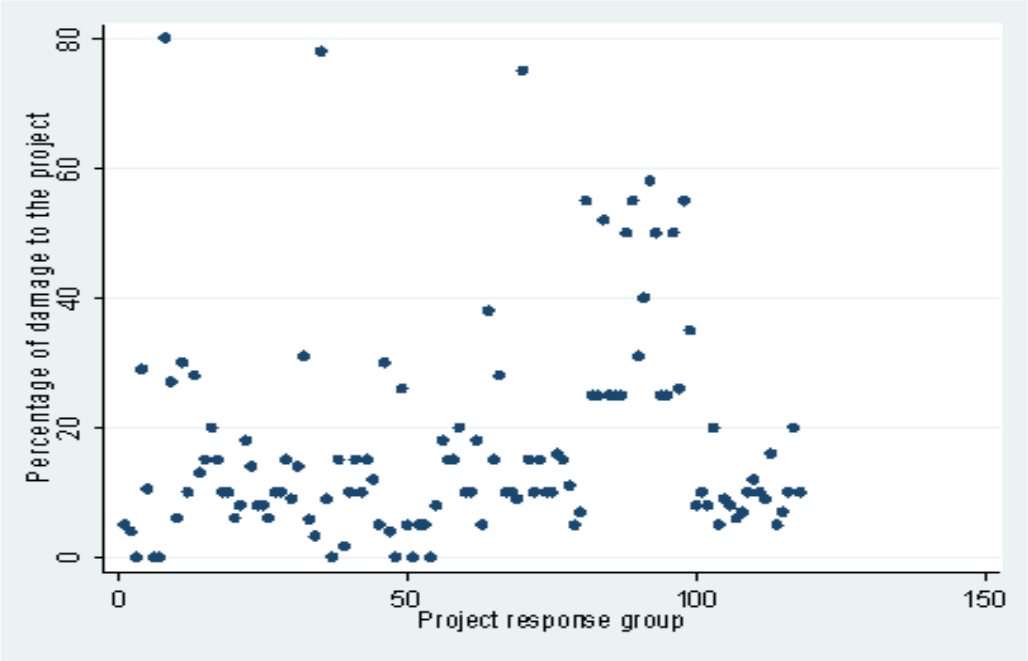
Table 2 Project state of damage across kebeles

Damage state	Location of Project-kebele						
	Behaadu	Weltane	L/lencha	W/wajin	Kufaakas	Ifaaman	Total
Sever damage	2	-	-	1	-	-	3
Moderate damage	-	-	-	-	8	-	8
Slight damage	4	-	1	2	11	2	20
very little damage	9	20	19	17	-	15	80
No damage	4	-	-	-	-	3	7
Total	19	20	20	20	19	20	118

Source: Author's filed survey July-August 2012

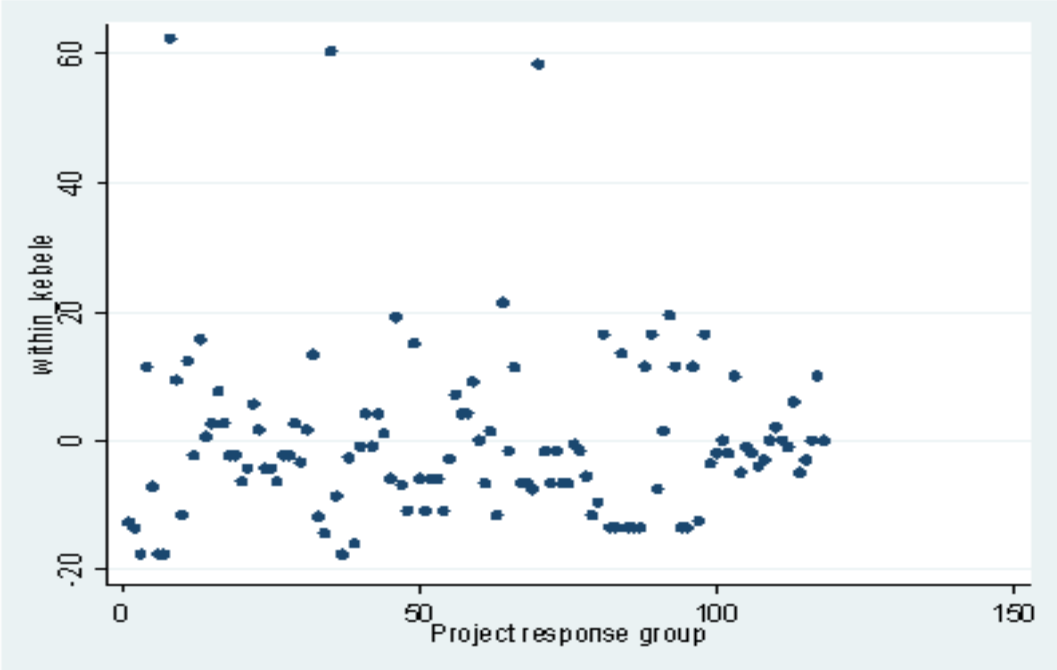
Appendix V: Project damage variations within and between kebeles

Figure 5A-1
Variation in project damage percentage between kebeles (variation from the overall mean)



Source: Author's own survey July-August 2012

Figure 5A-2
Variation in project damage percentage within kebeles (variation from the kebele mean)



Source: Author's own survey July-August 2012

Appendix VI: Description and measurement of variables used in analysis

Table 3 Description and measurement of variables used in analysis

Variables	Description	Measurement
Damage Percent	Physical damage of a project	Percentage
Operational State	Functional state of a project	Order
Planning	Number of planning decisions made by communities	Number (0-No decision, 1=1/3 decisions, 2=2/3 decisions and3=3/3 decisions)
Implementation	Number of implementation decisions made by communities	Number (0-No decision, 1=1/4 decisions, 2=2/4 decisions, 3=3/4 decisions and 4=4/4 decisions)
Usage and Benefit	Number of project usage and benefit distribution decisions made by communities	Number (0-No decision, 1=1/3 decisions, 2=2/3 decisions and3=3/3 decisions)
Maintenance	Number of maintenance decisions made by communities	Number (0-No decision, 1=1/4 decisions, 2=2/4 decisions, 3=3/4 decisions and 4=4/4 decisions)
Number of Households	Number of households in project catchment area	Number
Kebele	The *kebele* where the project is found	Dummy 1=Behaadu, 2=Waltane, 3=Legalencha, 4=Walkitumawajin, 5=Kufakas and 6=Ifaaman
Year of make	The year the project was completed	Number varying between 2006-2011
Distance from market	Distance of village from the nearest market	Kilometers
Project type	Type of project	Dummy, 1=SCFC, 0 otherwise
School type	The level of school found in the catchment area	Dummy: 0=No school, 1=Primary, 3=High School
Water	Villages access to potable water	Dummy: 1= Access, 0 otherwise
Electricity	Village's access to electricity	Dummy: 1=Access, 0 otherwise
Health facility	Village's access to health facility	Dummy: 1=Access, 0 otherwise
Make	Type of make of the project	Dummy: 1=Newly made, 0 otherwise
Initial quality	Quality of the project when initially made	Dummy: 1=Well made, 0 otherwise
Maintenance committee	Existence of maintenance committee	Dummy=1 if a maintenance committee exists, 0 otherwise
Land distribution ratio	Share of households with max land divided by share of households with minimum cultivable land	Number constructed by the ratio

Source: Author's field survey July-August 2012

Appendix VII: Bivariate estimates with ANOVA

Table 4 Summaries of within coefficients and ANOVA for the relationship between project damage and the independent variables

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Planning (1/3)	-11.04*					
	(6.281)					
Planning (2/3)	-7.375					
	(6.577)					
Planning (3/3)	-15.16**					
	(6.143)					
Implementation (1/4)		-0.0667				
		(4.721)				
Implementation (2/4)		0.132				
		(4.350)				
Implementation ((3/4)		0.350				
		(6.969)				
Implementation (4/4)		-13.15				
		(12.36)				
Usage & Benefit (1/3)			-18.42***			
			(6.239)			
Usage & Benefit(2/3)			-14.48**			
			(5.624)			
Usage &Benefit (3/3)			-21.40***			
			(6.541)			
Maintenance (1/4)				-0.700		
				(7.473)		
Maintenance (2/4)				3.938		
				(5.448)		
Maintenance (3/4)				13.30**		
				(5.729)		
Maintenance (4/4)				-2.328		
				(6.213)		
Maintenance Committee (=1 if yes)					-10.66***	
					(3.212)	

Weltane						-7.645*
						(4.362)
Legalencha						-5.295
						(4.362)
Welkitumawejin						-1.045
						(4.362)
Kufakas						20.88***
						(4.418)
Ifaaman						-6.745
						(4.362)
F-test	2.73	0.31	3.98	3.69	11.01	11.80
Significance (p-value)	0.0474	0.8703	0.0097	0.0073	0.0012	0.9654
Observations	118	118	118	118		
R-squared	0.067	0.011	0.095	0.116		

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix VIII: Project Damage and individual participation: OLS Estimates

Table 0 Project Damage and Community Participation in Planning

VARIABLES	(1)	(2)	(3)	(4)	(5)
Plan	-3.218**	-3.358**	-7.824***	-7.525***	-7.913***
	(1.493)	(1.547)	(2.670)	(2.715)	(2.684)
Number of households			-0.0685	-0.0636	-0.0685
			(0.0453)	(0.0474)	(0.0468)
Distance from market			0.607	0.600	0.624
			(1.235)	(1.305)	(1.287)
Weltane			10.94	9.726	10.35
			(12.81)	(13.29)	(13.11)
Legalencha			-7.393	-8.095	-10.87
			(6.583)	(6.667)	(6.724)
Welkitumawejin			19.28	19.24	16.71
			(13.22)	(13.60)	(13.47)
Kufakas			26.97***	26.60***	23.92***
			(8.410)	(8.756)	(8.741)
Ifaaman			17.67	16.71	22.04
			(14.54)	(15.28)	(15.31)
Inequality in cultivable land dist.			-3.901	-3.549	-3.730
			(4.102)	(4.177)	(4.120)
Year of make		-0.901		-0.577	-0.373
		(0.902)		(0.781)	(0.777)
Maintenance committee (1=Yes)					-8.000*
					(4.075)
Observations	118	118	118	118	118
R-squared	0.038	0.049	0.412	0.424	0.445

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Dependent Variable: Project's damage percentage. Specification (1) has no any control variable while specification (2)has project specific characteristics. Specification (3) controls for community socio- economic factors and kebele fixed effects while specification (4) controls for both project specific characteristics, community socio- economic factors and kebele fixed effects. The fifth specification additionally controls for existence of maintenance committee.

Table 5 Project damage and implementation participation

VARIABLES	(1)	(2)	(3)	(4)	(5)
Participation in implementation	-0.586	-0.711	-5.899**	-6.214**	-6.294**
	(1.674)	(1.749)	(2.333)	(2.430)	(2.404)
Number of households			-0.0490	-0.0412	-0.0446
			(0.0451)	(0.0472)	(0.0467)
Distance from market			0.799	0.863	0.895
			(1.247)	(1.311)	(1.297)
Weltane			6.988	6.920	7.092
			(12.68)	(13.15)	(13.01)
Legalencha			-11.18	-12.25*	-14.80**
			(6.947)	(7.016)	(7.086)
Welkitumawejin			11.27	12.75	9.888
			(12.63)	(13.04)	(13.00)
Kufakas			24.98***	24.61***	21.90**
			(8.382)	(8.656)	(8.697)
Ifaaman			8.592	9.059	13.37
			(13.97)	(14.75)	(14.79)
Make of project (1=New)		-0.844		-3.638	-2.865
		(3.278)		(2.850)	(2.852)
Project Type (1=SCFC)		0.453		0.489	0.203
		(3.181)		(2.717)	(2.693)
Initial quality (1=Well made)		-1.812		-1.904	-1.403
		(6.617)		(5.749)	(5.694)
Year of make		-0.882		-0.829	-0.650
		(0.922)		(0.785)	(0.783)
Maintenance committee (1=Yes)					-7.317*
					(4.100)
Constant	18.36***	1,792	19.78	1,687	1,331
	(2.911)	(1,854)	(16.20)	(1,576)	(1,571)
Observations	118	118	118	118	118
R-squared	0.001	0.011	0.401	0.418	0.436

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Dependent Variable: Project's damage percentage. Specification (1) has no any control variable while specification (2)has project specific characteristics. Specification (3) controls for community socio- economic factors and kebele fixed effects while specification (4) controls for both project specific characteristics, community socio- economic factors and kebele fixed effects. The fifth specification additionally controls for existence of maintenance committee.

Table 6 Project damage and participation in project usage and benefit distribution decision making

VARIABLES	(1)	(2)	(3)	(4)	(5)
Participation in usage and benefit	-4.268**	-4.483**	-2.467	-2.427	-1.984
	(1.920)	(2.005)	(2.375)	(2.432)	(2.431)
Number of households			-0.0393	-0.0366	-0.0411
			(0.0468)	(0.0490)	(0.0488)
Distance from market			0.702	0.689	0.732
			(1.278)	(1.349)	(1.339)
Weltane			2.164	1.271	0.967
			(12.88)	(13.31)	(13.21)
Legalencha			-3.779	-4.728	-7.386
			(7.097)	(7.181)	(7.324)
Welkitumawejin			7.264	7.734	4.621
			(12.92)	(13.26)	(13.31)
Kufakas			22.08**	21.96**	19.01**
			(8.574)	(8.952)	(9.080)
Ifaaman			7.442	6.844	10.08
			(14.74)	(15.39)	(15.41)
Make of project (1=New)		-0.0523		-3.089	-2.420
		(3.212)		(2.934)	(2.943)
Project Type (1=SCFC)		0.0982		-1.025	-1.301
		(3.078)		(2.726)	(2.712)
Initial quality (1=Well made)		-5.178		-4.458	-3.863
		(6.613)		(5.927)	(5.896)
Year of make		-0.760		-0.646	-0.493
		(0.902)		(0.807)	(0.807)
Maintenance committee (1=Yes)					-6.715
					(4.253)
Constant	25.16***	1,558	15.47	1,319	1,013
	(3.758)	(1,812)	(16.49)	(1,620)	(1,620)
Observations	118	118	118	118	118
R-squared	0.041	0.052	0.370	0.386	0.401

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Dependent Variable: Project's damage percentage. Specification (1) has no any control variable while specification (2)has project specific characteristics. Specification (3) controls for community socio- economic factors and kebele fixed effects while specification (4) controls for both project specific characteristics, community socio- economic factors and kebele fixed effects. The fifth specification additionally controls for existence of maintenance committee.

Table 7 Project damage and participation in maintenance decisions

VARIABLES	(1)	(2)	(3)	(4)	(5)
Participation in maintenance	1.065	1.160	-3.510	-3.322	-4.154*
	(1.403)	(1.448)	(2.396)	(2.448)	(2.450)
Number of households			-0.0512	-0.0500	-0.0555
			(0.0461)	(0.0484)	(0.0478)
Distance from market			0.408	0.505	0.472
			(1.290)	(1.355)	(1.336)
Weltane			-7.508	-7.153	-8.672
			(13.51)	(13.92)	(13.74)
Legalencha			-15.60	-15.92*	-21.03**
			(9.458)	(9.576)	(9.791)
Welkitumawejin			-2.747	-1.059	-6.096
			(13.56)	(13.91)	(13.95)
Kufakas			19.61**	19.22**	15.92*
			(8.327)	(8.645)	(8.686)
Ifaaman			0.710	1.621	6.047
			(14.18)	(14.95)	(14.91)
Make of project (1=New)		-1.472		-3.508	-2.666
		(3.293)		(2.915)	(2.906)
Project Type (1=SCFC)		0.248		-0.953	-1.290
		(3.136)		(2.715)	(2.682)
Initial quality (1=Well made)		-2.307		-2.491	-1.667
		(6.594)		(5.898)	(5.830)
Year of make		-0.838		-0.615	-0.386
		(0.918)		(0.804)	(0.802)
Maintenance committee (1=Yes)					-8.356*
					(4.242)
Constant	15.01***	1,700	29.75	1,267	812.9
	(3.606)	(1,846)	(19.53)	(1,614)	(1,608)
Observations	118	118	118	118	118
R-squared	0.005	0.015	0.377	0.391	0.414

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Dependent Variable: Project's damage percentage. Specification (1) has no any control variable while specification (2)has project specific characteristics. Specification (3) controls for community socio- economic factors and kebele fixed effects while specification (4) controls for both project specific characteristics, community socio- economic factors and kebele fixed effects. The fifth specification additionally controls for existence of maintenance committee.

Appendix IX: Project operational state and individual participation: Oprobit marginal effects

Table 8 Projects Operationa State and Participation

VARIABLES	(1) Partial operation	(2) Moderate operation	(3) Full operation	(4) Partial operation	(5) Moderate operation	(6) Full operation
Participation in planning	-0.013	-0.093	0.105	-	-	-
	(0.014)	(0.097)	(0.110)			
Participation in implementation	-	-	-	0.020	0.159**	-0.179**
				(0.013)	(0.080)	(0.087)
Maintenance committee (1=Yes)	-0.023	-0.199**	0.222**	-0.021	-0.199**	0.220**
	(0.015)	(0.075)	(0.081)	(0.013)	(0.070)	(0.074)
Weltane	-0.021	-0.214	0.235	-0.036	-0.374***	0.410***
	(0.026)	(0.258)	(0.281)	(0.029)	(0.097)	(0.116)
Legalencha	-0.013	-0.120	0.133	0.002	0.016	-0.018
	(0.015)	(0.138)	(0.151)	(0.024)	(0.180)	(0.203)
Welkitumawejin	-0.036	-0.367	0.403**	-0.055	-0.445***	0.500***
	(0.029)	(0.119)	(0.139)	(0.038)	(0.082	(0.101)
Kufakas	0.086	0.288*	-0.374	0.017	0.107	-0.124
	(0.121)	(0.167)	(0.278)	(0.048)	(0.226)	(0.274)
Ifaaman	-0.032	-0.338**	0.371**	-0.050	-0.430***	0.480***
	(0.029)	(0.154)	(0.176)	(0.039)	(0.084)	(0.107)
Observations	118	118	118	118	118	118

Source: Author's own computation of data collected on field survey July-August 2012. Robust Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Pseudo R2 = 0.1313 when only participation in planning is considered (columns 1-3)

= 0.1514 when only participation in implementation is considered (columns 4-6)

Note: The specification used to estimate the marginal effects above has controlled for all the control variables. These include project specific characteristics, village socio-economic factors, kebele fixed effects and existence of maintenance committee.

Table 90 Projects Operationa State and Participation

VARIABLES	(7) Partial operation	(8) Moderate operation	(9) Full operation	(10) Partial operation	(11) Moderate operation	(12) Full operation
Participation in use and benefit	-0.017	-0.147	0.164	-	-	-
	(0.014)	(0.091)	(0.099)			
Participation in maintenance	-	-	-	0.007	0.047	-0.054
				(0.010)	(0.061)	(0.070)
Maintenance committee (1=Yes)	-0.018	-0.180**	0.199**	-0.022	-0.180**	0.202**
	(0.012)	(0.080)	(0.086)	(0.014)	(0.076)	(0.08)
Weltane	-0.019	-0.227	0.246	-0.023	-0.236	0.260
	(0.021)	(0.244)	(0.262)	(0.025)	(0.235)	(0.255)
Legalencha	0.001	0.001	-0.011	0.003	0.018	-0.020
	(0.021)	(0.161)	(0.191)	(0.037)	(0.247)	(0.284)
Welkitumawejin	-0.034	-0.371***	0.414***	-0.040	-0.380***	0.420***
	(0.027)	(0.108)	0.125	(0.030)	(0.104)	(0.122)
Kufakas	0.106	0.335**	-0.441*	0.059	0.232	-0.291
	(0.135)	(0.137)	(0.257)	(0.090)	(0.180)	(0.261)
Ifaaman	0.027	-0.333**	0.360**	-0.040	-0.380***	0.420***
	(0.025)	(0.160)	(0.178)	(0.032)	(0.105)	(0.126)
Observations	118	118	118	118	118	118

Source: Author's own computation of data collected on field survey July-August 2012. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Pseudo R2 =0.1507 when only participation in project usage and benefit distribution is considered (Columns 7-9)

=0.1258 when only participation in maintenance is considered (Columns 10-12)

Note: The specification used to estimate the marginal effects above has controlled for all the control variables. These include project specific characteristics, village socio-economic factors, kebele fixed effects and existence of maintenance committee.