DETERMINANT OF HOUSEHOLDS TO PARTICIPATION IN PRODUCTIVE SAFETY NET PROGRAM IN RURAL ETHIOPIA: THE CASE OF ADAMI TULLU JIDO KOMBOLCHA DISTRICT, EAST SHEWA ZONE, OROMIA REGION.

A SENIOR ESSAY SUBMITTED TO DEPARTMENT OF ECONOMICS, COLLEGE OF BUSINESS AND ECONOMICS, WOLKITE UNIVERSITY IN PARTIAL FULFILLMENT FOR THE REQUIREMENT BACHELAR ART(BA) DEGREE IN ECONOMICS

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DECLARATION

This is to certify that Woyama Dawo with ID No 450/11 that the research paper, title the determinants of household to participation in PSNP in rural Ethiopia: The Case of Adam Tullu Jido Kombolcha district East Shewa zone Oromia region is my original work submitted for the award of the fulfillment for Bachelor of Art (B.A) Degree in Economics at the Department of Economics, WOLKITE UNIVERSITY. It has not been presented for the award of any degree or other similar titles in any other institution of higher learning to the best of my knowledge, and all resources used have been duly acknowledged.

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APPROVAL SHEET

This is to certify that the research entitled "*the determinants of household to participation in PSNP in rural Ethiopia: The Case of Adam Tullu Jido Kombolcha district"* submitted in partial fulfillment of the requirements for the Bachelor degree in Economics, of the Department of Economics, and has been carried out by Id. 450/11 under my/our supervision. To the best of my knowledge, is an original work and not submitted earlier for any degree either at this University or any other University.

Therefore, I recommend that the student has fulfilled the requirements and hence here by can submit the thesis to the department.

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List of Acronyms

ADLI: Agricultural Development Led Industrialization

DFID: Devereux Food Insecurity in Ethiopia

DS: Direct Support

FAO: Food and Agricultural Organization

FDRE: Federal Democratic Republic of Ethiopia

FSP: Food Security Program

FSS: Food Security Strategy

MoFED: Ministry of Finance and Economic Development

NGO: Non-Government Organizations

OFSP: Other Food Security Program

PIM: Program Implementation Manual

PSNP: Productive Safety Net Program

PW: Public Work

Abstract

The research conducted under the topic of determinants of households to participation in PSNP in rural Ethiopia the case of Adami Tullu Jido Kombolcha district East Shewa zone Oromia region. The main objective of this study was to identify determinant of households to participation in PSNP of the study area. the researcher used both primary and secondary source of data that are gathered through stratified sampling method and was analyzed by using both descriptive analysis of tabulation and econometric analysis which apply logit regression model. The finding of the study comes up with the determinants significant factors such as age, family size, income earning, education levels, sex, land owners and farm land households which affect to participation in PSNP in the study area. From those four variables (income, sex, family size and farm size) significantly determines households in the study area. Thus, the government and all other concerned bodies to pay due attention given by all concerned body in eliminating the adverse effect of those variables and improvement on variables that contributes to the participation in the program in the study area.

Key words:PSNP participation , logit model.

CHAPTER ONE

1. INRODUCTION

1.1. Background the study

The PSNP is one of the major components of the food security program implemented by the Ethiopian government with the joint support of donors that aimed at providing more reliable and timely support to chronically food insecure households. It extends support to those households through two channels: public works (PW) which provides temporary employment on rural infrastructure projects such as road construction and direct support (DS) which delivers unconditional transfers to the households with disabled members. PSNP operates as a safety net, intended to enable households to smoothen consumption so that they do not need to sell their productive assets in order to overcome food shortages (MoARD, 2014).

The Ethiopian government has various Food Security Programs (FSP). The Productive Safety Net Program is one of those programs implemented by the Ethiopian government to control food insecurity. There are also other components such as voluntary resettlement and Other Food Security Programs (OFSP). OFSP has many activities in different purposes which is mainly targeted towards "household packages" which supports both agricultural and non-agricultural economic activities (Gilligan et al., 2016). The PSNP works in Five Year term which means the beneficiaries would stay for five years and with the help of OFSP the households are expected to graduate from the program. According to Stephen Devereux, who presented a paper on Food insecurity in Ethiopia for a DFID Ethiopia Seminar in 2014, Food insecurity is an enduring, critical challenge in Ethiopia which is Africa's second populous country after Nigeria. Over 80 percent of Ethiopian population live in rural areas and are heavily dependent on rain-fed agriculture; this makes them extremely vulnerable to changes in weather conditions (Devereux et al, 2018).

Dependence on unreliable and low-productivity rain fed agriculture may well be the primary determinant of household food insecurity in Ethiopia. For example, food-for-work programs select community projects (such as soil and water conservation activities) that will enhance food production and reduce vulnerability to drought, thereby steadily reducing the numbers of

people who are dependent on food aid. Food-for-work has also contributed to developing feeder roads and other physical infrastructure (Woldehanna 2015).

The problem of food insecurity in Ethiopia has, to a large extent, been addressed by annual emergency food aid from abroad. During the past two decades, Ethiopia has been the largest recipient of food aid in Africa and one of the largest recipients in the world (Little 2014). For the individual beneficiary, food aid has been characterized by uncertainty, poor timing, and insufficient assistance. In 2005, to combat the persistent problem of food insecurity and to move away from the previous system of annual emergency appeals, the Ethiopian government and a consortium of donors (including the World Bank, U.S. Agency for International Development, Canadian International Development Agency, and several European donors) launched a new social protection program called the Productive Safety Net Program (PSNP). With an annual budget of nearly US$ 500 million, the PSNP is a huge program, reaching more than 7 million Ethiopians (Gilligan et al. 2016).

The PSNP as one of the major components of the food security program implemented by the Ethiopian government with the joint support of donors that aimed at providing more reliable and timely support to chronically food insecure households. It extends support to those households through two channels: public works (PW) which provides temporary employment on rural infrastructure projects such as road construction and direct support (DS) which delivers unconditional transfers to the households with disabled members. PSNP operates as a safety net, intended to enable households to smoothen consumption so that they do not need to sell their productive assets in order to overcome food shortages (MoARD, 2018).

The prime aims of the productive safety net program are to reduce household vulnerability; improve household and community resilience to shocks and stresses and to break the cycle of dependence on food aid through two main components – public works (PW) and direct support. The aim of PW component of PSNP is to mitigate the impacts of climatic and food insecurity risks on chronically food-insecure households by creating employment opportunity to “able-bodied” laborers (Anderson *et al.,* 2017).

On this basis, within the frame work in Adami Tullu Jido Kombolcha woreda, national food security program (PSNP), which emphasizes food availability, access to food and utilization is one of several instruments to address the need of this chronically food insecure household via productive food security program, rather than through a system dominated by emergency humanitarian aid. This policy shift has been strongly supported by safety net donor group who have worked closely with the government. The government and the donors share a common goal to shift the financing of the program from food aid to development-oriented grants.

The research findings conducted so far have focused on the direct impacts of the PSNP, especially on asset accumulation and improving food security status of the participating households. In other words, the determinants of household to participation in PSNP and was not conducted in the country in a sufficient level though the public component of the PSNP is thought to bring a positive effect on the participating households. This is especially true in the case of Oromia region Adami Tullu Jido Kombolcha woreda where there was no sufficient study carried out to evaluate the impact of PSNP so far. Therefore, this study aimed to assess the determinants of household to participation in PSNP, in Adami Tullu Jido Kombolcha woreda.

1.2. Statement of the Problem

The Productive Safety Nets Program is one of the Government of Ethiopia's (GoE) flagship programs and represents a significant transformation of the Government's strategy for meeting the Poverty and Hunger Millennium Development Goal (MDG) in Ethiopia. The PSNP represents a serious and innovative attempt on the part of the Government to move away from responding to chronic hunger through emergency appeals towards a more predictable response with predictable resources for a predictable problem (Yadete, 2017).

Food insecurity can be said to be the identification of Ethiopia in terms of recurrent food crisis and famines, and responses to food security have conventionally been dominated by emergency food-based interventions. However, the past decades of large-scale food aid deliveries have done little to prevent households' asset depletion because of ignorance of incorporating these aids with natural resource management (Devereux *et al*., 2018). Recognizing this, the government of Ethiopia changed the emergency food-based assistance to

multi-year PSNP in 2015 that provide transfers to food insecure households with the aim of breaking dependency on food aid in the long term. These transfers are expected to be used partly to meet immediate consumption needs, but also partly invested in farming and enterprise activities (Devereux *et al*., 2018).

According (Walelign Abiye,2019), The program was strengthen the gender and social development provisions including family planning provided by the program implementation manual to increase women's participation in productive works and income generating activities and decreasing the burdens of women in social and reproductive works. Because based on this study female have more probability to participate in the program that means women are categorized in the poor category of wealth status and a large family member leads to poverty and participation in PSNP.

According to Disaster Prevention and Preparedness Commission/DPPC (2016), because of high exposure to drought and natural disasters the food security situation in most part of Oromia Regional State (ORS) in general and agro-pastoral area of East Shewa Zone (including Adami Tullu Jido Kombolcha Woreda) in particular is in a serious problem. In 2016, for instance, East Shewa zone experienced lowest rainfall. Considering the current performance of long cycle crops in Adami Tullu Jido Kombolcha and Dugda woreda of east Shewa Zone, was very much below the average for the past five years and it is deteriorating.

Oromia region East Shewa zone is one of the chronically food insecure areas where PSNP has actively been implemented together with other food security programs (OFSP) to change the life of households. There are some empirical studies have been worked by different researchers to assess the impact of PSNP in Adami Tulu Jido Kombolcha woreda. (Ali, 2011), he focused in rural Ethiopia in general. According to (Ali, 2011), PSNP increases the labour supply and have reduce total consumption, food consumption and assets of the beneficiary households rigorously evaluate the impact of PSNP panel data is needed.

Even though some literatures did a cross sectional they did not focus household welfare. For instance, (Mamo, 2018) he saw only a changes on asset accumulation. Many researchers were conducted positive impact of PSNP on asset holding of households. Studies conducted by

(Yitagesu 2014), (Nesreddin, 2014) and (Hermela 2015) studies result shows that PSNP plays a great role in preventing depletion of livestock assets, increasing household income and reducing poverty by enhancing asset accumulation. There was also a methodology difference in an analysis of the research data to examine the impact of productive safety net program. Authors like: (Yitagesu, 2014) who conducted study at kebribeyah district of Ethiopia Somali national regional state used data only from program beneficiaries before and after the program without examining the non-beneficiaries' food security status leading to counterfactual problem. Moreover, the study did not control for other factors that could affect food security status of the households as it relied on simple descriptive statistics. and (Hermela 2015).

Even though several attempts have been made to evaluate the general impact of PSNP country wide, there are limited empirical evidences on food consumption whether or not the program efforts have the intended effect on household welfare. All used respondents (treated and control) from PSNP kebele in which the effect of a program may benefit or affect the eligible groups taken as a control group. Besides these findings, as far as the knowledge of researcher no one had a research of study about the determinant of household participation in PSNP.

The objective of this study is to evaluate the determinant of households to participation in productive safety net program (PSNP) status for the selected study area. To achieve this purpose, the study used logistic regression model by using cross sectional data in Adami Tulu Jido Kombolcha woreda in particularly.

1.3. Research Question

This study attempted to answer the following questions

1. What determines the participation in PSNP in the study area?

2. To what extent PSNP affected the households' welfare?

1.4. Objectives of the Study

1.4.1 General Objective

General objective of the study was to evaluate the determinant of households to participation on productive safety net program in Adami Tulu Jido Kombolcha woreda.

1.4.2. Specific objectives

- To identify the determinants of households' participation in PSNP program in the study area.

- To evaluate the impact of PSNP on households' welfare.

1.5. Significance of the Study

The study provides some policy suggestions that would help both the Government and those Non-Governmental organizations (NGO) in the program implementation. Since the study contains both theoretical and empirical issues, the researchers who are interesting on the area can get both aspects from the document. Furthermore, the study can serve as a point of departure for further researches on the arena. It also enhances understanding the determinants of households to participate in PSNP that affects household welfare at the household level. The empirical information that would produce through this study serves as a basic document for future reference and existing knowledge improvement.

1.6. Scope of the study

The study was focused on assessing the determinants of PSNP on household welfare, East Shewa zone mainly focuses on Adami Tulu Jido Kombolcha woreda. The researcher used multistage sampling technique in selection rural household respondents. In first stage, out of 12 woreda in East Shewa zone, Adami Tulu Jido Kombolcha woreda was selected purposively. In the second stage, the kebeles of Adami Tulu Jido Kombolcha woreda was stratified and selected purposively.

1.7 Limitation of the study

The study was limited with a number of scarcities such as financial resource, insufficient time human resource, absence of previous study on the topic and transportation service conducting the overall study. Moreover, attempt was made to focus only on two kebeles out of 43 kebeles found in the woreda and to interview 93 households head selected randomly from the two kebeles both participants non participants out of selected kebeles.

1.8. Organization of the Paper

This study was organized into five chapters. In chapter one, introduction of the study which contains background of the study, statement of the problem, research questions of the study, objectives of the study significant of the study and scope of the research. In chapter two, both theoretical and empirical literatures reviewed. Chapter three would follow by research methodology. Chapter four includes analysis results and discussions. Chapter contains conclusion and recommendation.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical literature review

2.1.1. Definitions and overview of productive safety net program and food security

The PSNP is one of the major components of the food security program implemented by the government with the joint support of donors that aimed at providing more reliable and timely support to chronically food insecure households. It extends support to those households through two channels: public works (PW) which provides temporary employment on rural infrastructure projects such as road construction and direct support (DS) which delivers unconditional transfers to the households with disabled members. PSNP operates as a safety net, intended to enable households to smoothen consumption so that they do not need to sell their productive assets in order to overcome food shortages (MoARD, 2014).

Maxwell (2017) and Ehui *et al.* (2018) defined food security as physical, social and economic access by all people at all times to sufficient, safe and nutritious food which meets the dietary needs for an active and healthy life. This definition shows that food security can be ensured if and only if three conditions are fulfilled. First, sufficient food shall be available through domestic production and/or import. Second, people must have adequate resources to get the appropriate food. Third, food must be used in combination with adequate water, sanitation and health to meet nutritional needs. Similarly, (Thomson and Metz, 2011) defined food security as assuring to all human beings the physical and economic access to the basic foods they need. This definition comprises three closely related concepts: availability, stability and access. According to (Haddad, 2011) food security is achieved when people at all times have access to sufficient food for a healthy and productive life and has three main components: food availability, food access and food utilization.

Based on level of analysis, food security can be seen either at national level or at the household level. However, the household level of food security is probably the most important for analyst, in so far as the household is the basic economic unit which determines the level of consumption by the individual. In most analysis, there is a presumption that income comes to the household as a whole, resource allocation decisions are made at the household level and household consumption is divided amongst its members in some relation to the needs of the individuals. The households are identified as food secure if their entitlements, or demand for food is greater than their needs, defined as the aggregation of individual requirements (FAO, 2017). Vulnerability is also seen as referring to factors placing people at risk of becoming food insecure or reducing ability to cope. Vulnerability is a function of exposure to risks/shocks and of resilience to risks/shocks are events that threaten people's food access, availability and utilization and hence their food security status (FAO, 2017).

Chronic, cyclical and transitory food insecurity has been endemic in Ethiopia for several decades. The main causes of transitory food insecurity in Ethiopia are drought and war. Seasonality is a major cause of cyclical food insecurity. Structural factors contributing to chronic food insecurity include poverty (as both cause and consequence), the fragile natural resource base, weak institutions (notably markets and land tenure) and unhelpful or inconsistent government policies (Devereux, 2018). According to (FAO, 2017), food insecurity in Ethiopia is characterized by a chronic form affecting between 6 and 13 million people every year.

2.1.2. Food security strategy of Ethiopia

Ethiopia's Food Security Strategy (FSS), issued in November 2013, highlighted in the government plan to address causality and effect of food insecurity in Ethiopia (FDRE, 2013). The regional food security programs and projects were subsequently designed on the basis of this strategy. The revised food security strategy of the country was developed in 2015 which updated the original 2016 FSS by sharpening the strategic element to address food insecurity based on lessons learned to date (FDRE, 2013a).

Unlike the first strategy, the revised document targeted mainly to the chronically food insecure and moisture deficit pastoral areas. A clearer focus on environmental rehabilitation as a measure to reverse the level of degradation as well as a source of income generation for food insecure

households through focusing on biological measures like planting trees on the farm land marks a deviation from the 2015 strategy. Water harvesting and the introduction of high value crops, livestock and agro-forestry development further inform its content. In recognition that the pursuit of food security is a long-term and multi-sector challenge, institutional strengthening and capacity building is included as a central element of the strategy. As in the past, however, the overall objective of the FSS is to ensure food security at the household level (FDRE, 2013a). This strategy is mainly assisted by Agricultural Development Led Industrialization (ADLI) which focuses on creating the conditions for national food self-sufficiency (FDRE, 2013b).

In line with the revised food security strategy, food security program (FSP) was designed in 2011 to improve the food security status of some fifteen million rural Ethiopians within five years starting from 2012. The FSP was designed with two core objectives. The first objective was to help five million chronically food insecure people attain food security while the second was to significantly improve the food security of up to ten million additional food insecure people within five years. The program had three main components namely, resettlement, productive safety nets and other food security (OFSP). The resettlement program aimed at enabling about 440,000 chronically food insecure households to attain food security within three years through voluntary resettlement program (FDRE, 2011). The other two components (OFSP and PSNP) are presented in detail in the following sub-sections.

2.1.3. Productive safety net program

The Productive safety net program (PSNP) aims to reduce the number of people who rely on annual humanitarian appeals, by providing predictable and timely cash and food (DFID, 2012). It aims to shift away from a focus on short-term food needs met through emergency relief to addressing the underlying causes of household food-insecurity. The PSNP, started in 2011, has been supporting 7.2 million Ethiopians who are vulnerable to shocks such as droughts and floods. The Program tries to reduce the vulnerability of households that do not have enough to eat even when the weather and harvest is good (FAO, 2013).

The PSNP has special features such as: types of transfers, specific objectives, basic principles, basic components, and targeting principles. The type of transfer may be cash only, both cash and food or food only based on specific situation of the safety net areas. The specific objectives of

the cash and food transfers provided through the PSNP are: (1) to smooth household consumption – to bridge production deficits in chronically food insecure farming households that are not self-sufficient, even in good rainfall years; (2) to protect household assets – to prevent poor households from falling further towards destitution, vulnerability to future shocks and chronic dependence on external assistance; and (3) to create community assets – by linking the delivery of transfers to activities that are productivity-enhancing, in order to promote sustainable developmental outcomes (FDRE, 2015).

The PSNP are based on two crucial basic principles. (1) Predictability – A safety net delayed is a safety net denied. Consequently, resource flows must be predictable (2) avoiding dependency **–** This can be achieved by requiring able-bodied beneficiaries to provide labour in exchange for program transfers (FDRE, 2015).

The PSNP has two components. The first component popularly known as public works is aimed at the provision of counter-cyclical employment on rural infrastructure projects such as road construction and maintenance, small-scale irrigation and reforestation. The second component referred as direct support is aimed at provision of direct unconditional transfers of cash or food to vulnerable households with no able-bodied members who can participate in public works projects (ibid).

Graduation is another important issue that should be defined in relation to PSNP implementation. PSNP beneficiaries are expected to be resilient from chronic food insecurity and graduated from the PSNP within three to five years (ibid). Based on the PSNP program implementation manual (PIM) and discussions with federal food security coordination office and PSNP implementers in the four regions, there are at least three definitions of graduation in common use without a uniform understanding of which applies in which situation: The first is graduation from the PSNP program, which requires households to achieve food security for one year only according to the PIM rules. The second is graduation into food security, which implies a more sustainable transition away from chronic food insecurity. The third is graduation out of poverty, which is a more substantial objective which goes beyond food security considerations. Measuring graduation and setting graduation target are based on graduation out of poverty (Slater *et al*., 2014).

2.1.4. Chronically food insecure households

According to Gilligan et al. (2016) chronically food insecure households are those who have been receiving continuous emergency food aid and failed to smooth their consumption in the last three years before targeted to the productive safety net program. The failure of households to have smooth and predictable consumption is both manmade and natural factors. Therefore, households in this state are labeled as chronically food in secured and targeted to productive safety net program in the past 10 years.

2.1.5. Food Sufficiency and Security

A food self-sufficient household is described as, in the absence of receiving PSNP transfer, it can meet its food requirement for one year and was in a pole position to with stand modest shocks, at this point household is labeled as food sufficient considered as no longer in need of transfer (except in the event of a major shocks) (MOARD, 2012). On the other hand, food security can define as'' access by all people at all times to sufficient food for an active and healthy life'' (FAO, 2013). In Ethiopia, food insecurity was the task still need attention and remains a widespread problem. More than 85% of Ethiopia's 80 million people live in rural areas and are heavily dependent on rain fed agriculture; this makes them extremely vulnerable to changes in weather conditions. Over the last four decades, there have been a number of severe famines due to droughts in Ethiopia. Even in years with normal rainfall, food shortages and hunger are recurrent problems for millions of people. More recently, this problem has been exacerbated by increase in food price (Anderson et al., 2017).

2.2. Empirical Literature

2.2.1. The Social and Economic Impacts of Social Safety Net in Africa

Devereux, (2018) assessed the impact of three social safety-net interventions in Southern Africa – namely- cash transfers in Namibia (social pensions) and Mozambique (cash payments to urban destitute), and public works in Zambia. The research, by using descriptive statistics and by reviewing different researches on these areas, identified different poverty and other economic and social outcomes

of these income transfers. The research reviewed Low et al. (2010) which found that the number of beneficiary households living in absolute poverty had fallen from 71% to 65% as a result of GAPVU.

The article discussed also that in western Zambia, where 86% of farming households survive below the poverty line, differential cash-for-work earnings by district resulted in differentiated poverty impacts by providing empirical evidences. When the program ended in 2009, the proportion of participating households still below the poverty line had fallen to 74% in Kalabo District, was approximately equal to the provincial average at 86% in Mongu District, but remained at an extremely high 97% in Lukulu District, indicating that higher income transfers made the greatest difference to economic well-being in Kalabo.

In Malawi the study by Miller et al. (2014) employed both descriptive and econometric techniques of difference-in-differences estimates to analyze the impact of this cash transfer on household food security or welfare. They also used separate regression models to examine, for instance, the differential impact of the transfer depending upon the gender of the household head. The results from this study show that intervention households in Malawi allocated 62% of total expenditures to food purchases. The study also pointed that, although the evaluation was relatively short-term in length, conducted over the course of one year, recipients were able to reach what they reported as an acceptable level of food security. According to the authors by end line, 13% of intervention versus 81% of comparison households reported that food consumption was less than enough. On average, cash recipients consumed a variety and adequate amount of foods per day, without experiencing many days of food shortages, which is in striking contrast to the comparison group.

2.2.2 Social and Economic Impacts of PSNP in Ethiopia

Gilligan et al. (2016) tried to assess the impact of Productive Safety Nets Program together with the Other Food Security Program on different household economic situations by using Propensity Score Matching and Nearest Neighbor Matching. They find that access to the PSNP improves two measures of household food security: it reduces the likelihood that a household has

very low caloric intake and it increases mean calorie availability. However, the study also came up with, relative to the control group; beneficiaries did not experience faster asset growth. But the work tried to assess the impact of the program one year after the onset of the program using cross sectional data.

Similarly, the study by (Alemtsehay Aberra et al.2017) find that the PSNP, unlike to Vietnam ‘s safety net program which is discussed by (Walle, 2013), is (now) reaching the poor. This is an interesting finding that the paper came up with regarding the targeting of the program. The study identified that institutional structures for combined administrative and community targeting are in place in most areas (though not all), and are functioning with varying degrees of success. Some major misinterpretations and confusions in targeting during the first year have now been corrected. No systematic corruption or large-scale abuse of the targeting system was found. In addition to above (Devereux et al. 2016) have done a paper on PSNP using cross sectional data set and by employing both qualitative and quantitative (both descriptive and econometric) analysis.

The study pointed the following findings among others. In line with the PSNP targeting issue the study says that the PSNP was well targeted, using labour constraints as targeting criteria. This result confirms with Aberra et al. (2013). They also found that Cash only ‘PSNP recipients report higher current asset values to food only ‘and mixed food plus cash ‘beneficiaries, for both male- and female-headed households. This is in contrary with Sabates-Wheeler et al. (2014). Regarding the PSNP ‘s ability of acting as safety net the study reveals the PNSP has stabilized household asset holdings, allowing them to retain assets and in many cases to increase assets.

Andersson et.al. (2017) have also conducted a study on Impacts of Productive Safety Net Program in Ethiopia on livestock and tree holdings of rural households using panel data. They evaluated the impacts of the Ethiopian Productive Safety Net Program (PSNP) on rural households' holdings of livestock and forest assets/trees. They found no indication that participation in PSNP induces households to disinvest in livestock or trees. In fact, households that participated in the program increased the number of trees planted, but there was no increase in their livestock holdings. They found no strong evidence that the PSNP protects livestock in times of shock. Shocks appear to lead households to disinvest in livestock, but not in trees. Their

results suggest that there is increased forestry activity as a result of PSNP, and that improved credit access encourages households to increase their livestock holdings. In spite of the fact that the study employed panel data in its regression, it did not directly focus on welfare or poverty situation of the rural households.

2.6 Conceptual Framework

The following diagram illustrates the conceptual framework of growth model in which household welfare is dependent variable and expected by influenced by independent variables which can be expressed in terms of those variables, (age of household, family size, sex, educational level, land size, participant on public work household, livestock ownership, and income of household). In addition to this among seven explanatory variables contained in this paper (sex, educational level, age of household, livestock assets of household, and household income) have positive effect and (family size and land size) have negative effect on household welfare. As a result, to understand the concept of household welfare and the determinant of household participant in PSNP the conceptual framework would given a good clue to the study.

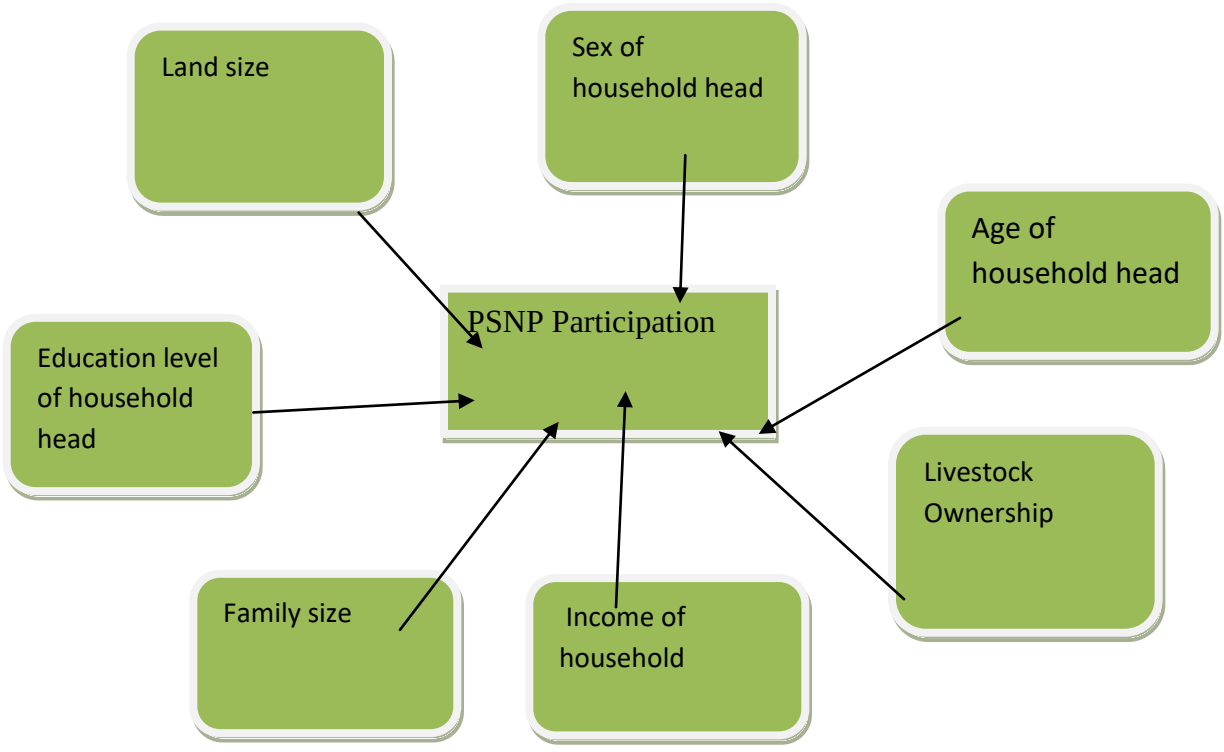

Figure 2.1 Conceptual Framework of the Study

Source: Own draw, 2021

As a number of factors influence household welfare to food consumption. As shown in above figure 2.1, that household depends on participation on PSNP can protect their assets which facilitate the way out of poverty. Moreover, the households own effort need to support by PSNP non PSNP program including credit, follow up by development agents and targeting mechanism. Beneficiaries with access to credit, development agents close follow up and recipient of fully family targeting participants than the non-participants access. Furthermore, drought prone households struggle to become food self-sufficient and leave in the program participation. The above factors determine beneficiaries' food self-sufficiency.

CHAPTER THREE

3. METHODOLOGY

3.1. Description of Study Area

Adami Tullu woreda, which is found in East Shewa zone of Oromia National regional state. There are 12 woredas and 2 urban administrative towns in East Shewa zone. Adami Tullu woreda is one of these 12 woredas. The woreda has 43 rural and 4 urban kebeles (Adardo, 2016). Most of this woreda ranges in altitude from 1500 to 2300 meters above sea level; mount Aluto is the highest point. Rivers include the Bulbula, Jido, Hora kilos and Gogessa. A survey of the land in this woreda shows that 27.2% is arable or cultivable land,21.6% pasture,9.9% forest,15.7% swampy and the remaining 25.6% is considered degraded or otherwise unusable.

. It is located on the Addis Ababa to ziway road, south of Addis Ababa and 163 away from Addis Ababa. The woreda shares boundaries with southern Nation and Nationalities People Regional State (SNNPRS) in West and North West, Dugda Bora Woreda in the north, Arsi Zone in the east and Arsi Negele Woreda in the south. Astronomically the woreda lies between 70 35' and 80 05' north latitude and between 380 20' and 380 55' east longitude.

The 2007 national census reported a total population for this woreda of 141405, of whom 71167 were men and 70238 were women; 20923 of its population. Adami Tullu woreda is bordered on the south by west Arsi zone with which it shares the shores of lakes Abijatta and Langano, on the west by the southern nations, nationalities and peoples Region, on the northeast by lake Ziway, and on the east by the Arsi zone.

Agriculture is the backbone of the economy of the district. It provides means of occupation for almost all population of the district. Accordingly, Wheat, Barley, Red paper, Maize, Teff, Bean, Potato, Cabbage, Onion, are the major crops produced in the Adami Tullu local areas. Moreover, Animal husbandry is another sector for the areas since the district is favorable for livestock production, peoples of the area rears Cattle Goats, Sheep, House, Mule, Donkey and Chicken are alternative source of income (ADARDO, 2016).

3.2. Research Design, Type and Source of Data

The study was addressed the stated objectives a cross sectional household survey. The household survey used cross sectional survey enables to effectively manage after data collection. The study used quantitative and qualitative types of data from both primary and secondary sources. The source of data for the research was both primary source and secondary source. The primary data was collected from Number of sampled who safety net participant and non-participant from the selected kebele of the district and the secondary source data was collected from published and non-published documents of the program office.

3.3. Method of data collection

To collect necessary raw data, the researcher was used both primary data collection instrument and secondary data collection instrument. Primary data collection instrument is interview questionnaires employed. The interview questionnaires were done for those household who cannot read and write to collect necessary raw data. It collected in both open ended and close ended question. Key information interview used for those respondents who can read and write. The secondary data collection instrument, published and unpublished such as books, internet, and annual report was used. Information that used to describe geographical location and Socio-economic activities of the study area was collected from Adami Tullu woreda Agricultural and Rural development office.

3.4 Sampling Technique and Sample size determination

The researcher was used multistage sampling technique in selection of rural household respondents. In first stage, out of 12 woredas in East Shewa zone, Adami Tullu woreda would selected in purposively. Secondly, two Kebeles was selected among 43 kebeles of the woreda, both kebeles participants in PSNP by using simple random sampling techniques. From both kebeles, the participant households, and non-participant households were identified from the selected available at each kebeles. To determine the sample size of the study area the researcher was used Yamane formula (1977), with 90% confidence level. The reason for using this formula is because this kind of formula is valid for survey researchers which compose large population

and the population under the investigation is homogenous in its socio economic and geographic context. The calculation formula of Yamane is presented as follows;

$$n = \frac{N}{1+N(e^2)}$$

Where: N = Total PSNP households of selected kebeles

e = Level of significance 10%

n = Sample size.

The total households of 43 kebele of Adami Tullu woreda were about 33,333. The target population household of selected kebeles were about 1388 and the level significance is 10% (0.1). Then the sample size is

n = N/1+N (e) ^2 =1388/1+1388(0.1) ^2 =1388/14.88 = 93.279 ≈93

Table 3.1 The total number of households from each kebeles included in the sample proportionally as follows.

Sample kebeles	Total number of households	Number of sampled households	Percentage (%)
Jela Aluto	678	678/1388×93=45	678/1388×100%= 49%
Abine Germama	710	710/1388×93=48	710/1388×100%= 51%
Total	1388	93	100%

Source own survey 2021

3.5. Method of data Analysis

After the data collection the result analyzed by using both descriptive and econometric method of data analysis from primary source through analyzing, and meaningful information and conclusions were drawn. The descriptive method of data analysis would analyze by using percentage, tables, frequency distribution, standard deviation and the mean. The econometric method of analysis analyzed by using logit model because dependent variable of the study is dummy variable.

3.6. Model Specification

The study used logistic regression model specifically binary logistic regression which is a non-linear regression model specifically designed for binary response of a dependent variable system. It is non-linear model that can be *linearized* using appropriate transformations. It is called ‘’binary logistic regression model’’ (Gujarati, 2004). Binary logistic regression model employed to address the determinant households PSNP participant due largely to the binary nature of dependent variable, PSNP participant; that could be expressed as yes or no responses.

Logistic regression model is an alternative to discriminate analysis and cross tables when certain assumptions (such as presence of normality aid common covariance) cannot be obtained. When the dependent variable is a discrete one consisting of, 0 and 1, or more levels, logistic regression model can be properly used. In addition, mathematical elasticity and simplicity of interpretations increases the popularity of the model (Tathdil, 2002). Binary logistic regression model is employed for this study, where Y is PSNP participation and independent variables are depicted by X’s.

It summarizes observed characteristics of sample household into a single indicator, i.e., conditional probability that households get access to transfers affect household welfare. The model is mainly concerned with identifying the determinants of households households to participation in PSNP of selected kebele. Logistic regression model was employed to evaluate the determinant. Because, the dependent variable in this study is binary indicating whether the household participant in PSNP which takes 1 and 0.

$$\text{Pi}= E(y = 1lX1) = \frac{1}{1+e^{(\beta 0+\beta 1X1)}} \quad (1)$$

In the logistic distribution, Pi is the dependent variable, Xi is the data, i, the possibility of response by an individual (possibility of having 1 and 0 values by i^{th} individual). When $\beta_0+\beta_1 Xi$ in equation 2 is obtained.

$$\text{Pi} = \frac{1}{1+e^{zi}} \quad (2)$$

The probability that a given household is PSNP participant is expressed by equation (2) while, the probability for being program non-participant is given by:

$$\text{1-Pi} = \frac{1}{1+e^{zi}} \quad (3)$$

Therefore, the odds ratio can be written as:

$$\frac{Pi}{1-Pi} = \frac{1+e^{Zi}}{1+e^{-Zi}} = e^{Zi} \quad (4)$$

Now $\frac{pi}{1-pi}$ is simply the odds ratio in favor of participation in PSNP- the ratio of the probability that a household would be influenced by the program to the probability of that they are not influenced. Finally, taking the natural logarithms of the odds ratio of equation (4) would result in the logit model as indicated below.

$$Li = \ln\left(\frac{Pi}{1-Pi}\right) = Zi = \beta 1 + \beta 2Xi \quad (5)$$

The probability that a given household is PSNP participant is expressed by equation (1) while, the probability for being program non-participant is given by equation (2)

$Zi=\beta_0 +\beta_1 X_1 +\beta_2 X_2 \ldots + \beta_n X_n + \mu$

Where, Zi= represent dependent variable which is PSNP participant and B_0 is an intercept, B_1, $B_{2,} \ldots B_n$ are partial slopes of the equation in the model

In the logistic distribution, Pi is the dependent variable, Xi is the data, i, the possibility of response by an individual (possibility of having 1 and 0 values by i^{th} individual). When $\beta 1+\beta 2Xi$ in equation 2 is obtained.

PSNP Participant = f ($_{AGE,\ SEX,\ EDU,\ FSIZE,\ FARSIZE,\ LVSTK,\ INCOMHH}$)

$$Zi = \beta_0 + \beta_{1SEX} + \beta_{2AGE} + \beta_{3FSIZE} + \beta_{4EDUC} + \beta_{5LANSIZE} + \beta_{6LVSTK} + \beta_{7INCMHH} + \mu$$

Where: βs are parameter

PSNPP =PSNP Participant

$_{SEX}$ = Sex of household

$_{AGE}$ = Age of household

$_{FSIZE}$ = Family size of household participant in PSNP

$_{EDUC}$ = Education level of household

$_{LANSIZE}$ = Land size

$_{LVSOWR}$ = livestock ownership of household

$_{INCMHH}$ = Income of households

μ = Random disturbance term

3.7 Description of variables

3.7.1. Dependent variable

PSNP Participation (PSNPP): is dependent variable of this study. It is dummy variable which takes 1, if household participant and 0, if household is non-participant. That the determinants of PSNP transfer on household welfare is vary positively or negatively affected by selected variables enlisted below. Therefore, those variables analyzed to determine whether household welfare improved or not.

3.7.2. Independent variables

Sex of households (SEX): it is dummy variable which takes 1 if household head is male and 0 if the household head is female. These are respondent of hypothesis that existing gender difference male head household have participating in PSNP the probability of being wealth change for male headed. The study expect it effects negatively.

Age of household (AGE) It is continuous variable measured in year. These is the household head participating that existing relation with the probability of being wealth or not. Therefore, the study expected those effects negatively related.

Family size of household (FSIZE) It is continuous variable refers to the number of family in a household Therefore, it was affected positively relation with the probability of change in asset value.

Education level of household (EDUC) It is dummy variable which takes 1 if household head is literate and 0, for otherwise. Therefore, it was expected the household head advanced in school level have better negatively determinant of household welfare wealth change.

Land size, (FARS), It is continuous variable refers the cultivated land measured in hectare. Therefore, it affected negatively relation with household head that participation.

Livestock ownership (LVTOW) It is dummy variable which takes 1, if the household with livestock assets and 0, otherwise. These it is hypothesis that household having livestock assets effects positively or negatively related.

Income of household (INCMHH) It is continuous variables refers the income of household that get in year. Therefore, it expected the household having income is increases over the year income change.

Table 3.2 summary of explanatory variable and their expected sign

Variable	Measurement	Abbreviation	Description	Expected sign
Current income	Continuous	Incmhh	Income of household	Negative
Sex	Dummy; 1 for male 0 otherwise	Sex	Sex of household head	Negative
Age	Continuous	Age	Age of household head	Positive
Family-size	Continuous	Fmsize	Total number of household head	Negative
Land size of household head	Continuous	Lanshh	Size of cultivated land in hecture	Negative
Education level	Dummy; 1 for literated 0, otherwise	Educ	Education status of household head	Positive
Livestock ownership	Dummy ,1, if the household with livestock assets and 0, otherwise	Lvstowr	Livestock ownership household head	Positive

3.8 Diagnostics test

3.8.1 Multicollinearity test;

Is the term which was used in order to show the linear relationship between the explanatory variables not the dependent and independent variables.in otherwise help to identify the correlation between explanatory variables and dependent variable to avoid the double effects of independent variables from the model. multicollinearity problem arises from use of large values of explanatory variables exceed the number of observations. A high multicollinearity results a parameter instability, wrong decision and model specification and insignificant individual test statistics. Simply the multicollinearity problem can be tested by VIF (Variance Inflator Factor). Brook (2008) indicated that, if the variables are highly correlated the solution is ignoring, avoiding one variable that have multicollinearity and transforming that variable to ratio. If mean VIF value greater than 10, then we would say there is a problem of multicollinearity. However, it is by far less than 10, implying there is no problem of multicollinearity in this estimation. The decision rule is when the mean of variance inflation factor is below ten (10), then the presence of multicollinearity problem become less and less.

3.8.2 Heteroscedasticity test

Heteroscedasticity test: It is created when the distribution of μ (error term) around the explanatory variables are not constant (no constant variance). It signifies that the individual variance of the disturbance term around the independent variable may be different (Wooldridge, 2000). In the presence of heteroscedasticity, the variance of logit estimator is not provided by the usual logit formulas, the t and F tests based on them can be highly misleading, resulting in erroneous conclusion. An important assumption is that the variance in the residuals has to be homoscedastic or constant. A non-graphical way to detect heteroscedasticity is the Breusch-Pagan test. The null hypothesis is that residuals are homoscedastic. If the p-value is sufficiently small, that is below the chosen significance level, then we reject the alternative hypothesis, if not, we accept the null hypothesis. The decision rule is, if the p-value of the Breusch-Pagan test is greater than any of the chosen significance level i.e., 10%, 5%, and 1%. This indicates no problem of heteroscedasticity. Decision rule since the if probability is greater than 5%level of

significance, then we reject null hypothesis and has no constant variance. so, in order to solve this problem, the researcher will be adjusted by Robust which is best to solve heteroscedasticity problem.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

In this chapter major result about the determinants of productive safety net program on household welfare rural household in Adami Tullu woreda obtained from both descriptive and econometric of data analysis would be presented. Besides, some discussion on major finding of the survey was also made. In the first section of this chapter summaries of result obtained from descriptive method of data analysis was presented. In the second section result obtained from econometric method of analysis was presented. In this part the result of the estimated model, diagnostic test result of the model and discussion on major findings of the study was presented. So, this part of the study devoted to answering the objectives of the study using both Descriptive and Econometric data analysis.

Appendix 1

```
. sum

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
      Observ |         93          47    26.99074         1         93
          pp |         93   .5483871    .5003505         0          1
         Sex |         93   .5591398    .4991812         0          1
         Age |         93   46.05376    13.40536        23         74
        Fams |         93   6.172043    2.943761         2         13
-------------+---------------------------------------------------------
         Edu |         93   .4623656     .501284         0          1
       Farml |         93   .5806452    .4961281         0          1
          Lv |         93   .5806452    .4961281         0          1
         Inc |         93   30473.12    22352.58      4000      75000

.
```

4.1 Descriptive analysis

This section mainly concerned with the result of descriptive data analysis and interpretations based on the data gathered from the respondents. In order to see the determinants of PSNP on household welfare rural household farm income in Adami Tullu woreda, questionnaire was randomly distributed to 93 respondents. Analysis was made using graphs, percentage, mean, standard deviation and frequency distribution

4.1.1 Socio-demographic Characteristics of Respondents

4.1.1.1 Age distribution of the respondents

Table 4.1 Age distribution of respondents

Age head	Participant	Non-participant	Total

Age	Frequency	%	Frequency	(%)	Freq	%
20-30	1	2.13	12	26.08	13	13.97
31-40	8	17.02	17	36.95	25	26.88
41-50	11	23.4	6	13.04	17	18.27
51-60	12	25.53	7	15.21	19	20.43
above 61	15	31.91	4	8.69	19	20.43
Total	47	100	46	100	93	100

Source: own survey, 2021

In this study as age of household increase, it is hypothesized that participants would acquire more knowledge and experience. Age is another demographic characteristic of households expected to determine household welfare household of participation either positively or negatively. The combined mean of age of households was 46.05 as shown in table 4.1 The mean difference among participation and current beneficiary were not significant in this study. More than 25 (26.88 %), of households found in the age group from 31-40 which have similar share between participation and non-participation beneficiaries. Moreover, 19(20.43), of households belong to age group of 51-60 with 8 participation and 17 non-participation households. In this study the age group of both participation and non-participation households is distributed almost equally under the three age groups.

4.1.1.2 Sex distributions of the respondents

Table 4.2 Sex distributions of the respondents

Sex head	Participant		Non-participant		Total	
	Frequency	%	Frequency	%	Freq	%

Male	30	62.5	44	97.8	74	79.6
Female	18	37.5	1	2.2	19	20.4
Total	48	100	45	100	93	100
%	51.61		48.39			

Source: own survey, 2021

The survey result in table 4.2 above shows, 79.6 % of the respondents are male household heads while 20.4% are female headed households. Besides, 18(94.73%) of participation households are female headed which indicate female headed beneficiaries' participation than their male counter parts due to the fact that female headed households might have not the capability to engage in other source of income which enable them enhancing their income. In generally, among the total of 93 households, the participants in PSNP were 48(51.61%) while the rest 45(48.39%) were non-participants.

4.1.1.3 Distribution of the sample respondents with respect to education level

Table 4.3 Distribution of the sample respondents with respect to education level

Education	Participant		Non-participant		Total	
	Freq	%	Freq	%	Freq	%
Literate	18	37.5	25	55.6	43	46.2
Illiterate	30	62.5	20	44.4	50	53.8
Total	48	100	45	100	93	100

Source: own survey, 2021

Table 4.3 shows that in the sample households, 37.5% and 55.6% of household heads were literate from formal education system among participants and non-participants household heads

respectively. From above table 4.3 62.5% participants and 44.4 % non- participants household head were illiterate.

With regard to the other type of education 46.2% of household heads were literate and 53.8% of household were illiterate from informal educational system. The educational status of non-participants heads were 55.6% greater than that of participants household heads 37.5. The other important issue that is noticed here is that the smaller proportions of household heads 46.2 that are educated from both formal and informal systems indicate that much of the household heads 53.8 in the both kebele are illiterate.

4.1.1.4 Number of households with their family size

Table 4.4 family size of the respondents

Family size	Participants		Non-participants		Total	
	Frequency	%	Frequency	%	Frequency	%
1-5	10	20.83	33	73.33	43	46.24
6-10	28	58.33	12	26.67	40	43.01
11-15	10	20.83	0	0	10	10.75
Total	48	100	45	100	93	100

Source: own survey, 2021

The above table 4.4 shows that, 20.83 % of participants household head have family size of 1-5, while 73.33 % of non-participants household head have family size of 1 -5. The highest family's size of participant household was found in 6-10 which was 28(58.33%) and the highest families size of non-participants of household were found in 1-5 which was 33(73.33). This implies that the majority of the non-participants sample household have family size of 1-5. Therefore, family size of household was determined to participation in PSNP.

The survey data also reveals that average family size is 6.17 persons per household. When we compare participants households with the non-participants ones, we observe that there was no significant difference between participant and non-participant households, with an average 5.9 and 5.6 family sizes per household respectively. Family size is the other important variable with implications to household welfare. It was that family size is determine the household welfare status in such a way that large families tend to be participation in PSNP to improve household welfare than smaller families.

4.1.2 Economic factors affecting rural households farm income

4.1.2.1 Land holding and size of land

Table 4.5 land holding of respondents

	Do you have farm land	Participant		Non-participant		Total	
		Frequency	%	frequency	%	Frequency	%
	Yes	36	76.6	34	73.9	70	75.3
	No	11	23.4	12	26.1	23	24.7
Total		47	100	46	100	93	100

Source: own survey, 2021

Household characteristics do not inform us a great deal on the asset base the households can use to survive or to better off. Households in rural areas typically depend on the physical asset base available to them for their wealth creation. Access to sufficient land and livestock ownership were identified as the two crucial determined of wealth and poverty in the study area. Asset ownership or farmers economic status affects participation in PSNP on household welfare. Thus, the study examines the existence of any systematic relationship between asset ownership and

participation non-participation among sample farmers. In this regard, the relations between participation of household welfare and variables such as land holding size and livestock holding in study area are examined. Land was owned participation household by 50.5 percent. About 45.5 percent were owned by non-participation households owned.

Table 4.6 land size-based households

Size of land in hectare	Participant		Non-participant		Total	
	Frequency	%	frequency	%	frequency	%
<3	18	38.3	24	52.2	42	45.2
3-6	21	44.7	20	43.5	41	44.1
>6	8	17.0	2	4.3	10	10.7
Total	47	100	46	100	93	100

Source: own survey, 2021

The above table shows that most of sample respondents have their own land (farm land) which account 75.3% and the rest of 24.7% have not own lands. And the second (tab two) shows the size of land for 94 respondents who have land. As indicated in the above table, participants of household were 38.3% have land size <3 hectare 52.2%while non-participants household were have land size <3 hectare. 45.2% of the respondents have land size of <3 hectare, 41.1% of household (sample respondents) have Land size of 3-6 hectare, and 10.7% of the sample respondents have Land size of >6 hectare. Therefore, the majority of rural households in study areas have land size of less than 3 hectares.

Average land holding size was 2.23 hectare, and the maximum landholding reported was 12 hectares. There was no significant difference in size of landholding between participant household and non-participants 47 households, 1.77 hectare and 2.44 hector respectively. Data from survey result indicates that average cultivated land is 2.05 hectors (Table 4.6). Some studies in the country classify farmers with land holding size of 2 or more hectares as surplus producers. However, under the condition of study area, this amount of land per household could not allow adequate food production as the area is characterized by poor and erratic distribution of rain fall.

It was hypothesized that farm households which are participants have less average farmlands than those which are non-participants households.

4.1.2.2 livestock ownership

Table 4.7 livestock ownership of sample respondents, by PSNP status

		Participant		Non-participant		Total	
	Do you have assets	Frequency	%	Frequency	%	Frequency	%
	Yes	34	72.3	36	78.3	70	75.3
	No	13	27.7	10	21.7	23	24.7
Total		47	100	46	100	93	100

Source: own survey, 2021

From the above table 72.3% of participant household head were have livestock, and 27.7% were they have not livestock assets. In addition to this, 78.3% of non-participant of household heads were have available of livestock and 21.7% were they not have available livestock. In terms of TLU livestock between participation and non-participation households the vital role of livestock, mainly in the rural economy, the attention giving to land and livestock development is not significant. Nowadays, land use seems to be neglected. Since livestock is an important asset in the study area, land productivity per household has to be improved as it can sustain a family and has indirect contribution to the national economy. Therefore, the majority respondents of household had 70(75.3%) available livestock assets. The availability of livestock of the study area was determines the households to participate in PSNP.

4.1.2.3 Annual income from both crops production and livestock

Table 4.8 Annual income level of respondents

Income of households	Participant		Non-participant		Total	
	Frequency	%	frequency	%	Frequency	
4000-24000	47	100	0	0	47	50.5
25000-45000	0	0	19	41.3	19	20.4
46000-66000	0	0	21	45.7	21	22.6
>67000	0	0	6	13.0	6	6.5
Total	47	0	46	100	93	100

Source: own survey, 2021

As the above table shows, 100% participants of household head have earned annual income between 4000-24000birr, while 0% non-participants household heads were earned 4000-24000 income annual. This implies that the participants households in PSNP due to earned in average less annual income than non-participant households. the respondents have earned annual income between 50.5% of the households of the studied area were have earned annual income between 4000-24000birr, 20.4% of the households have earned annual income between 25000-45000birr, 22.6% of the households were earned annual income between 46000-66000birr, and the remaining 6.5% of the household heads have earned annual income above 67000 birrs from farm (crop and livestock). Therefore, the majority of the households in study area have earned annual income between 4000-24000birr from crop production and livestock. This implied that income is the main factor that determined the households either to participate in PSNP.

4.2. Econometric Model Results

This section describes the econometric analysis. The study aimed to examine the factors determining household participation in PSNP and depict the magnitude of the effect of these factors. 7 potential determinants were examined in this study namely, demographic factors

(Age, Education, Sex and Family size) and socio-economic, (Farm land, Income of households in annually and Livestock owners). As indicated earlier the dependent variable in this model is binary whether the household were participation in PSNP take a value of 1 and 0 otherwise. Stata version 13 computing software was used for the estimation purpose.

Before undertaking the economic estimation, different econometrics assumptions were tested using relevant techniques. First the presence of strong multicollinearity among the independent variables, power correlation has been tested that actually lets the researcher to drop variables that correlates highly. Secondly, the inclusion of irrelevant variable in logit regression analysis was tested by linktest (Appendix 2). Thirdly, to control the heteroscedasticity problem among the explanatory variable, instead of Bresch Pagan test (hettest), robust standard error calculation of logit model has been employed (Appendix 5).

According to the model result there is no serious multicollinearity among the variables. Normal logistic regression results are also in Appendix 6 and for interpretation of the results the marginal coefficient of the binary logistic regression was used. Marginal effect is the partial derivative of the event probability with respect to predictor of interest. A more direct measure is the change participation of households for unit change in the explanatory variables (appendix 6).

A logistic regression is used to determine the joint effect of different independent variables and to examine why some of the participants become food self-sufficient soon and others lag behind.

4.2.1 Diagnostics test

4.2.2 Test for multicollinearity

An indication for a liner relationship between independent variable is called multi-collinearity (Gujarati 2004). The idea is that change the value of one independent variable and not the others. However, when independent variables are correlated, it indicates that changes in one variable are associated with shifts in another variable. The stronger the correlation, the more difficult it is to change one variable without changing another. A decision rule for multicollinearity test for the

model stated that a variable whose VIF value exceeds 10 and the tolerance margin (1/VIF) less than 0.1 or 10%, then we would say that there is a serious problem of multicollinearity. On the hand, the value of VIF less than 10 and the tolerance margin (1/vif) is greater than 0.1 or 10% then we would say there is no a problem multicollinearity. However, the co-variation is strong it was affect the significance of the estimates and remedial is necessary (Melese, Solomon, Amsalu,2017).

Multicollinearity shows the presence of possible relation among the independent variables. With the presence of multicollinearity, it will be difficult to predict the effect of a given explanatory variable on the dependent variable without the effect of any other independent on a given explanatory variable. V IF (variance inflation factor) test is used since multicollinearity is the issue of the independent variable but not for dependent variable.

- If VIF= less than 4 there is no multicollinearity problem
- If VIF=4-10 there is multicollinearity problem but it is tolerable

VIF=greater than 10 there is serous multicollinearity problem. So, it needs remedial action, such as - prior information about nature of variable.
-drop variable.

- Increase sample.

In this model run same test and found a mean VIF value =1.74 which indicates there is no multicollinearity problem.

4.2.3 Auto Correlation Test

The correlation matrix generated using survey data shows that there is no multi collinearity problem in the model results. A decision rule for multicollinearity test for the model stated is a variable whose correlation test value less than 0.8(Gujarati, 2005), is don't have collinearity problem. As it is observed from appendix 4, All variable correlation test value is below (0.8), So it was concluded that there are no collinearity problems between explanatory variables (age, family size, household income earning, educational level sex, farm land and livestock ownership) and between each independent variable and the dependent variable

4.2.4. Test for Heteroscedasticity

This type of test is used in order to examine the pattern of the error terms variance. Heteroscedasticity is present if variance of error term is not constant or different variance for different segments of the population or sample size. The other problem of econometric data particularly cross-sectional data is heteroscedasticity, which is the case were homosdaciticity assumptions are violated. To correct this heteroscedasticity problem robust standard error can be estimated

```
. Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of pp

         chi2(1)      =    10.88
         Prob > chi2  =   0.0010
```

From this we show that the variance of the error term is constant. We should be accepting the null hypothesis, because of the hypothesis indicates that the statistics computed which is 0.0010 less than the 10% a given level of significant. So, there is Heteroscedasticity problem between variables.

So, this model has a problem of heteroskedasticity. Then would have appropriate model using robust regression to avoid the problem of heteroskedasticity. Robust estimation should be considered as when there is a strong suspicion of heteroskedasticity.

Robust logistic regression used to control for heteroskedasticity in binary outcome model. Heteroscedasticity in binary outcome models which affect both “Betas” and their standard errors (Wooldridge,2001). In this particular study both earlier and robust logistic regression have the same result. None of the coefficient estimates changed but the standard error and hence the z values are a little different. In addition to correct heteroscedasticity problem robust standard error is use Therefore this model is free from heteroskedasticity. (See appendix 3) for correcting problem of heteroskedasticity, model specification error test.

4.2.5 Regression result and interpretation

* Significant at 5% level and 10% level of significance

Examination of logit maximum likelihood estimates demonstrate that 7 predicator variables were regressed and 4 variables are significant at ,5% level, and 10% levels (income of household, family size, having farm land, and sex of respondents).

As shown in the table above all variables which have odds ratio greater than one indicate that variables have positive coefficient. Whereas, variables which have odds ratio of less than one has negative coefficient. The researcher was interpreted the marginal effects of households participants and non-participants.

Table 4.9 Stata computes a p-value which shows directly the significance of a parameter:

Variables	Coef	p-value	marginal effect	Standard error	interpretation
Sex	-3.553	0.056	-0.5023	1.861	At 10%significant
Age	-0.148	0.859	-0.0023	0.083	Insignificant
Fams	0.881	0.076	0.1372	0.496	At 10% significant
Edu	0.0403	0.972	0.0062	1.134	Insignificant
Farml	-2.8737	0.090	0.0062	1.693	At 10% significant
Lv	0.6031	0.640	-0.4008	1.290	Insignificant
Inc	-0.00017	0.002	0.0968	0.00057	At 10% significant
Cons	5.367	0.149	-0.00027	3.716	0.149>0.1 insignificant

Income of households

Income of household is significant at 5% level and has negative sign. The result indicates that keeping other factors constant, as household's income increase by has significant and negative 1 birr annually the likely of participating in programme decrease by 0.000028 units. It indicates that a household who has less income has opportunity to participation in the PSNP. But if households have enough income in annual, they have less access to participation on PSNP. This result confirms with Tedase (2011).

Sex of Respondents

The literature shows that the sex of households, significant at 10% level and has negative sign. The result indicates that keeping other factors constant, as households being male increased by 1 person the of favour being participation decrease by 0. 0286. That means the male household easily escape from the program than those who be a female household has low. Because being a male have not opportunity to participation on the PSNP. To being female is have better opportunity to participation and better to increase their welfare which has high level of earning. This result confirms with (2012), (Tadese 2010) and (Habtamu Ali, 2011).

Family size of households

The family size of households significant at 10% level, and positive coefficient as expected explains. The result indicates that keeping all other factors constant as household size increase by 1, the probability of participation in the programme increases by 0.137 unit. This is because large family with in household means there is large number of dependent there and they become participate on the PSNP. This result is in line with, Amsalu (2017), Hayalu. (2014) and (Yitagesu, 2015).

The variable age, and education have negative coefficient and insignificant at 10%level they have no impact on the house hold being non-participation in study area. The variable credit has positive coefficient and has no impact on household being non-poor in our study area, the variables farm land and livestock owners have positive coefficients and insignificant in the study area.

Farm Size of Households

The sign of coefficient of this value showed a negative relationship with participation in the programme and is significant at 10% probability level the negative relationship implies that households who own farm land they have not chance to participate in the programme than who have not own farm land households. Households have not own farm land more likelihood of being food self-sufficient. The result indicates that keeping all other factors constant as household farm size increase by 1 per hectare, the probability of participation in the programme decreases by 0.4009 unit. This is because households who have own farme land they got high crop in annual and they were not participate in PSNP. This because, the households with own farm land have capability to produce more than two times in season which enhance their production, diversify their income and enables them to smooth their food consumption more than participants strengthen the finding of this study, households' path to food self-sufficiency.

CHAPTER FIVE

5. CONCLUSION AND RECOMMEDNTAION

5.1. Conclusion

In this study determinants of household to participation on productive safety net program has been evaluated using cross sectional data from Adam Tullu District. In addition, the study has also assessed the perception of participants and non-participants in PSNP and its implementation in the study area. Taking this idea, the result of the study shows, more than half of the respondents perceives, participant of households in PSNP.

Model result revealed and come up with some plausible findings, four variables were found statistically significant (including sex, family size, farm land and, income of household) while the remaining three were found less powerful in explaining the dependent variable which is participation in the programme.

The finding of the study states that sex has negative significant correlation with the rate of households participation in the programme in which, the household of participant decreases when the household head is male. This means that, male headed households not sooner than their female in study area. Households who have large family size and have inexperience in programme are actively participate in the programme. This implies that the large family size which requires much consumption, welfare and saving. Farm land also determines the households to participate in the programme.

Income of household is the other variable which correlates significantly and negatively with participation. The household welfare of in the program participants when the participants having high income. A closer look at the model also shows that, family size influences households' path to food self-sufficiency. Participants have family size high, has high probability to participate on the program. As family size increases by one person, the participant households increase by the coefficient of odd ratio. The model estimation clearly

shows, participation with decrease annual crop production have the probability to participation.

The process of households on the program disregard, the participation guidance notes and the implementation manuals. Participants have little knowledge about the concepts of food self-sufficiency, majority of household's asset is not registered, rare risk financing practice, unpredictable transfer, low access of the program. The implementation has also overlooked the role of public participation and decision making in the process. This all leads, to premature participation which was massively used in the study area through quota participation based on income, family size, and sex and farm land of the households and other criteria participation on the program. Moreover, the insignificant determinant of households in the study area might be

due to the fact that these activities outcomes are not directly expected from the primary objectives of PSNP.

5.3. Recommendations

Based on the findings of the research, the following policy recommendations were suggested to improve household saving in the study area.

Based on the findings of research, low-income households participate in the program than non-participants. This study brought facrors affecting households to participation in PSNP. Income affects households to participate. This programme increases the income, consumption and saving of the participants in the study area So, the provision of this programme by the government is (in the case of income factor) proved important in improving household welfare. The government should therefore increase it incentive fund rising to increasing the income consumption and saving levels of households of the study area.

Since income is the major determinant of households to participate in PSNP in the study area. Hence, policies and strategies that will increase household income of area households are necessary to enhance welfare of households increase.

Based on the findings of the research, female participation higher than men, means that being female shows, participate in the programme would be high. But, most of the time men dominate female and control income and assets. Thus, in order to improve welfare of the female households the government should enhance women empowerment and pave the way for women to increase their income. Moreover, there should be equality especially on the control of income and other assets among men and women. Based on family size results households have high number of children participates than who have low family size, this implies in the study area to increase the welfare of those households the kebeles should have to select the households of high family size. Based on result farm land, household who have high farm land per hectare they had not participate in the programme.

Households who had not farm land should have to participate than the owners of available of land. Finally, additional researcher should be carried out using much large sample size at different location to acquire empirical findings on the determinants of households to participation

in PSNP. Government also should have to give attention about the criteria of the selection to participate in the programme.

Local level implementers should follow the participation guidance note and the PSNP implementation manual. This helps to build the capacity of households to participate, prepare long term business plan and achieve food self-sufficiency at short period of time.
The support from the complementary programs like complementary community investment should be fully fledged for enhancing the potential of households in accumulating assets and participate in other income generating activities.

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Appendix 1

Appendix 2; logit regression from Stata

Logistic regression — Number of obs = 93; LR chi2(7) = 105.25; Prob > chi2 = 0.0000; Log likelihood = -11.403355; Pseudo R2 = 0.8219

pp	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Sex	-3.55318	1.861211	-1.91	0.056	-7.201086	.0947269
Age	-.0148813	.0838958	-0.18	0.859	-.1793141	.1495514
Fams	.8810276	.4967292	1.77	0.076	-.0925438	1.854599
Edu	.0403977	1.134281	0.04	0.972	-2.182752	2.263547
Farml	-2.87376	1.693467	-1.70	0.090	-6.192895	.4453737
Lv	.6031407	1.290122	0.47	0.640	-1.925451	3.131733
Inc	-.0001773	.0000576	-3.08	0.002	-.0002901	-.0000645
_cons	5.367252	3.716725	1.44	0.149	-1.917395	12.6519

Source household survey, 2021

Appendix 3 multicollinearity test

```
. vif
```

Variable	VIF	1/VIF
Fams	2.66	0.376382
Age	2.29	0.436144
Inc	2.10	0.476496
Farml	1.72	0.580310
Lv	1.24	0.805557
Edu	1.16	0.863733
Sex	1.03	0.967125
Mean VIF	1.74	

Source household survey, 2021

Appendix 4 Auto correlation test

```
. corr Sex Age Fams Edu Farml Lv Inc
(obs=93)
```

	Sex	Age	Fams	Edu	Farml	Lv	Inc
Sex	1.0000						
Age	-0.0419	1.0000					
Fams	0.0263	0.7297	1.0000				
Edu	0.1526	-0.0458	0.0118	1.0000			
Farml	0.0415	0.0360	-0.0175	0.0445	1.0000		
Lv	0.0559	-0.1484	-0.0757	-0.0720	-0.0067	1.0000	
Inc	0.2419	-0.4485	-0.4887	0.1243	0.0145	0.1021	1.0000

Source household survey, 2021

Appendix 5 heteroscedasticity test

```
Logistic regression                             Number of obs     =         93
                                                Wald chi2(7)      =      26.16
                                                Prob > chi2       =     0.0005
Log pseudolikelihood = -11.403355               Pseudo R2         =     0.8219
```

pp	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
Sex	-3.55318	1.299032	-2.74	0.006	-6.099235	-1.007125
Age	-.0148813	.0539299	-0.28	0.783	-.120582	.0908193
Fams	.8810276	.4306919	2.05	0.041	.036887	1.725168
Edu	.0403977	1.136265	0.04	0.972	-2.18664	2.267435
Farml	-2.87376	1.41098	-2.04	0.042	-5.63923	-.108291
Lv	.6031407	.8598954	0.70	0.483	-1.082223	2.288505
Inc	-.0001773	.0000384	-4.61	0.000	-.0002527	-.000102
_cons	5.367252	1.94675	2.76	0.006	1.551692	9.182812

Source household survey, 2021

Appendix 6; logistic regression

```
. logistic pp Sex Age Fams Edu Farml Lv Inc

Logistic regression                             Number of obs     =         93
                                                LR chi2(7)        =     105.25
                                                Prob > chi2       =     0.0000
Log likelihood = -11.403355                     Pseudo R2         =     0.8219
```

pp	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Sex	.0286334	.0532929	-1.91	0.056	.0007458	1.099359
Age	.9852288	.0826566	-0.18	0.859	.8358433	1.161313
Fams	2.413378	1.198796	1.77	0.076	.9116093	6.389136
Edu	1.041225	1.181041	0.04	0.972	.1127309	9.617143
Farml	.0564861	.0956574	-1.70	0.090	.0020439	1.561073
Lv	1.827851	2.358149	0.47	0.640	.14581	22.91364
Inc	.9998227	.0000576	-3.08	0.002	.9997099	.9999355
_cons	214.2733	796.3949	1.44	0.149	.1469894	312356.2

Source household survey, 2021

Appendix 7; marginal effect after logit

```
. mfx

Marginal effects after logistic
      y  = Pr(pp) (predict)
         =  .80688689
```

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
Sex*	-.5023044	.21904	-2.29	0.022	-.93161	-.072999	.55914
Age	-.0023188	.01284	-0.18	0.857	-.027482	.022845	46.0538
Fams	.1372821	.06963	1.97	0.049	.000818	.273747	6.17204
Edu*	.0062889	.17669	0.04	0.972	-.340013	.352591	.462366
Farml*	-.4008725	.17865	-2.24	0.025	-.75102	-.050725	.580645
Lv*	.0968433	.22262	0.44	0.664	-.339492	.533179	.580645
Inc	-.0000276	.00001	-2.30	0.022	-.000051	-4.0e-06	30473.1

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Source household survey, 2021

Appendix 2

Survey Questionnaire Administered for determinant of Productive safety net program on household welfare participation and Non-participation Household Heads.

General Instruction: Dear respondents, there are two parts participant and non-participant household head parts of questions to be completed by you in the subsequent sections. Thus follow the specific instructions which are illustrated under each section and try to indicate your position for that relatively represent your idea from the possible alternatives, that in the case of close ended items and try to explain your ideas freely when you encounter with open ended items.

Part One: Socio demographic characteristics of household head

. Are you participate on PSNP? 1. =Yes 0. =No

1. Sex? (1, Male, 0, Female)

2. Age (specify it in complete years) _____

3. Your marital status? Single: 1 Married: 2 Divorces: 3 Widowed: 4

4. Forms of the Marriage 1: Polygamy 2: Monogamy

5. Household size (specify) _____

6. What is your educational status? 1 Primary level (1-4): 2 Lower secondary level (5-8): 3 Secondary levels (9-10): 4 Higher secondary levels or Preparatory (11-12): 5 Adult literacy program 6 Other specify) _____

Part two: Data concerning Socio-economic Conditions of household

7.Do you have farm land? 1. =Yes 2. =No

If your answer for question number 7 is ‘’yes’’ how much hectare do you possess (size of farm land by hectare) _____

8.Of the land you possess do you have irrigable land? 1. =Yes 2. = No

9.If your answer for Question number 8 is No what is the reason? Please specify _____

10.What is the amount of your total crop production annually (in Quintal)? _____

11. Do you have livestock? 1 Yes 2 No

If your question number 11 is “yes” what kinds of livestock, you have?

1 Oxen 2 Cows 3 Sheep 4 Goats 5 Donkeys and Horse 6 Others(specify) _____

12. Has your household received any services from the new government PSNP?

1.= Yes 2. = No

13. If your answer for question number 12 is “yes” what services your household has been received from PSNP? 1 Free food aid 2 free cash 3 others services(specify) _____

14. How much is your income in birr last 13 months? _____

15. Is your household was selected to receive food or cash from the new government Safety Net program? Reason Yes=1 No=2

If your question number 15 is “No” reason. We are not so poor as the selected households 2. We have enough food/ income 3. We own livestock 4. We have some land/ enough land/ or better-quality land 5. Other reason (specify): _____

16. Are your household have assets? Yes=1 No=2

If your question number 16 is “yes". A Productive asset 1 Plough 2 Sickle 3 Pick axe 4 Axe 5 Hoe 6 Spade 7 Other (specify): _____

B Household durables 1 Mobile telephone 2 Radio 3 Television 4 Jewellery (gold, silver) 5 Bicycle 6 Other (specify): _____