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ROLE OF PRODUCTIVEE SAFETY NET PROGRAM ON HOUSEHOLDS PARTICIPAION ON OFF-FARM ACTIVITIES IN ETHIOPIA: THE CASE OF MAREKO DISTRICT

A THESIS SUBMITED TO THE DEPARTMENT OF ECONOMICS, SCHOOL OF GRADUATE STUDIS WOLKITE UNIVERSITY IN PARTIALS FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN ECONOMICS (MAJOR IN DEVELOPMENTAL ECONOMICS)

BY

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Declaration

I, Redwan Kedir, declare that this thesis entitled: ***"Role of Productive Safety Net Program On Households Participation On Off-Farm Activities In ETHIOPIA: The Case of MAREKO District"*** is outcome of my own effort and study and that all sources of materials used for the study have been duly acknowledged.

To the best of my knowledge, this study has not been submitted for any degree in this University or any other University. It is offered for the partial fulfillment of the degree of Masters of Master of Science in ECONOMICS.

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Acronym and Abbreviation

DFID	Department for International Development
EEA	Ethiopian Economic Association
FDRE	Federal Democratic Republic of Ethiopia
GDP	Gross Domestic Product
IFAD	International Fund of Agricultural development
MDGs	Millennium Development Goals
MoA	Ministry of Agriculture
MoFEC	Ministry of Finance and Economic cooperation
MWANO	Mareko Woreda Agricultural and Natural Resource office
NGO	Non Governmental Organization
PSM	propensity score matching
PSNP	Productive Safety Net Program
RIGA	Rural Income Generation Activities
RNF	Rural Non-farming
SSA	Sub Saharan Africa

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ABSTRACT

This research attempted to assess the role of productive safety net program on household participation on off-farm activity in Mareko district of Southern Nation Nationality Region. Purposive, stratified proportionate random sampling and simple random sampling techniques were employed to select sample respondents. A total of 200 households were selected for the study. The instrument developed was survey questionnaire. Both qualitative and quantitative data were gathered for the study. Descriptive statistics like frequency, percentage, and econometrics models were employed to analyze the survey data. The descriptive statistics result revealed that, from the sampled respondents the majority (66.5 %) of households was participated in off-farm activity. From the total sampled respondents almost all were got their livelihoods from agricultural activities, which account on average (50 %) of the total annual income. The remaining 27% of incomes of the rural household head were off-farm activities. The result of probit model regression also indicates that, Gender (sex of household head, farming land size and total household size were found out significantly and positively affect the off-farm activity participation, while, age of household head, farm income and marital status were found out negative and significant factors. Propensity score matching techniques was used to analyzes the effect of PSNP participation on off-farm activity income. Albeit the result from the PSM was not statistically significant, it indicates that participation in PSNP program had negative effect on the off-farm activity income. Finally, it was recommended that Government and NGOs should provide training on more profitable off-farm activities for PSNP beneficiaries to support household's participation on off-farm income generating activities.

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Keywords: Off-Farm, Productive Safety Net Program, Propensity Score Matching, probit

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Over two-thirds of the world's poorest people are located in rural areas and are engaged in subsistence agriculture. According to Binswanger *et al.* (2010), the relative reduction of the importance of agriculture and the expansion in rural nonfarm (RNF) activities and income diversification are likely features of the process of economic development. Growth in RNF activities cannot be seen in isolation from agriculture, however, as both are linked through investment, production and consumption.

According to IFAD (2011), a profile of poor households in 15 countries in Africa, Asia, Eastern Europe and Central Asia, and Latin America and the Caribbean (Rural Income Generating Activities – or RIGA – database) yields a consistent picture across countries, showing that, compared with non-poor households, poor rural households generally have more members, a greater share of dependents, less education, less land and less access to running water and electricity. Depending on circumstance, rural households can derive their incomes from a range of sources: from their own on-farm production (crops and livestock), from employment, from self-employment and from transfers, including remittances and social transfers.

Butler and Mazur (2004), observed that the African rate of development, which is lagging significantly behind much of Global South despite decades of assorted development approaches, has been receiving increased attention as the United Nation's Millennium Development Goals (MDGs) provide the goal for international development effort.

According to Yishak, G. *et al.* (2016), agriculture is the basis of Ethiopian economy. It contributes over 50 percent of the GDP and 90 percent of raw material requirements of the country's small and medium sized industries. It is also estimated that agriculture provides employment for about 85% of labor force, (World Bank, 2000) and (MEDaC, 2008). However, Ethiopian agriculture is characterized by low productivity. Over the last two decades, it has not been able to produce sufficient food to feed the country's rapidly growing population. A close look at the country's declining agricultural outputs and at the same time, ever increasing population growth begs for a search of alternatives: (Jirström, et al., 2013).

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Like other Sub-Saharan Africa countries, Ethiopia is characterized by a complex, diverse and risk-prone agricultural production environment, (MoFC ,2002). Natural disaster forced people into alternative livelihood such as the collection and sale of firewood and grasses (Goodrich, 2001). The agricultural production has been deteriorating overtime, and has forced people to look for alternative employment option other than agriculture. That means, households engage in diverse livelihood strategies away from purely crop and livestock production towards farm, non-farm and off-farm activities that are undertaken to broaden and generate additional income for survival and livelihood improvement.

Diversification has been analyzed as a rational response by households to lack of opportunities for specialization, and was initially considered not the most desirable option. However, studies indicate that rather than promoting specialization within existing portfolios, upgrading them to augmenting income could be more realistic and relevant for poverty reduction, (Ellis and Freeman, 2005).

Regarding the rural economy in Ethiopia, policy makers give almost full attention to agricultural sector. Nevertheless, there is a growing evidence that rural sector is much more than just farming, (Csaki and Tuck, 2000). This implies that, multiple employments are also potential livelihood strategies on part of the rural people when the farm does not provide an adequate amount of income to the peasant families. For instance, about 25% of the households in rural Ethiopia own one or more non-farm activities. It profits on average account for approximately 38% of total household income for those households who run it, (Bob Rijkers, 2008).

The Productive Safety Net Program (PSNP) is Ethiopia's rural safety net for food insecure households. The program covers households in Afar, Amhara, Dire Dawa, Harari, Oromiya, Southern Nations, Nationalities and Peoples (SNNP), Somali and Tigray, and targets households that are chronically and transitorily food insecure. The program provides cash and/or food transfers to these households, (MoAN, 2010).

Mareko woreda is one of the drought prone and food insecure districts affected by recurrent rain shortage in Ethiopia. Information from the district finance and economic development indicates the total population is 86957. Productive safety net program is intended to protect the poorest

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section of the society or those who, as a result of shocks find themselves temporarily below a given welfare level. About 4645 household hade rural inhabitants in 22 kebles have been identified as a target for both public work and direct support beneficiaries (MWANO, 2016). The different ways through which intervention by safety net is carried out include cash transfer including family allowances, need based assistance programs ; food based programs including supplementary feeding programs ,school feeding programs ,food for work ,emergency food distribution, (MoANR, 2014).

The program provides technical assistance and training in livelihood activities (crop and livestock, off-farm, and employment) to clients to enable households to increase and diversify their incomes and build their assets. While many clients who participate in livelihoods activities are referred to credit providers, for the poorest households, the program provides livelihood transfers that do not need to be repaid, helping them build their assets more rapidly while avoiding a cycle of indebtedness (MoANR, 2014).

According to Mareko woreda agriculture and natural resource office, in last 13 years the program transfers125005610 birr to the beneficiaries in terms of transfer and capital budget. From 1998-2002 the program also release credit for beneficiaries through family package, 3285 program beneficiaries received 10006056 birr credit for improving their household level asset. From 2003 -2010 through household asset bulging program and house hold livelihood component 1005 the program beneficiaries' received 4020000 birr in terms of credit. This all indicates that through this program the district receives huge amount of financial resources and this resource can result multiple impact on local economy. Because of this on this research the researcher investigates what the program contributes for off-farm activity participation of the program beneficiaries, (MWANO, 2016).

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1.2. Statement of the Problem

The increasing population growth in rural Ethiopia obliged households to cultivate and make their living on extremely small size of land. For instance, 29% of grain farmers in 2006/7 had cultivated a land less than 0.5 ha per household (EEA, 2008). Federal Democratic Republic of Ethiopia (FDRE, 2010), evidence, nearly 55 percent of all smallholder farmers operate on one hectare or less. Moreover, (CIDA, 2013) indicates the declining average per capita farmland holdings 36 % of households cultivate land below half a hectare, 59.8 per cent below one hectare, and 83.8 per cent below two hectares. Due to the smaller farm size and low return from farming activities, majority of rural households are engaged in diversified income sources.

It is increasingly becoming clear that the agricultural sector alone cannot be relied upon as the core activity for rural households as a means of improving livelihood and reducing poverty. One phenomenon that is gaining prominence in the rural development literature is the promotion and support for non-farm diversification opportunities (Stifel, 2010). Non/off-farm economic activities include seasonal migration, off-farm to engage in wage employment, handicraft production, trading of agricultural produce, provision of agricultural services and the like. Such non-farm activities provide a way of off-setting the diverse forms of risks and uncertainties (relating to climate, finance, markets, and the like) associated with agriculture and create a way of smoothing income over years and seasons (Barreter, et al., 2001).

The government of Ethiopia has developed a Productive Safety Net Program under Food Security Program with the objectives of smoothing food consumption, protecting household assets and building community assets, (Gilligan et al., 2008). According to Ministry of agriculture natural resource this program targets households that are vulnerable to environmental and other induced situations such as variability in rainfall. Approximately 8.5 million people, 10 percent of Ethiopia's population are chronically food insecure. These households' survival mechanism during unfortunate situation is known on mining of their already limited capital and assets. The mining of assets occur when families take last resort actions such as selling of productive assets, household goods or taking children out of school in order to survive, which as a result increases their vulnerability to future shocks and exacerbates their poverty. These survival strategies result in long-term negative impacts (Barnes, 2008).

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Several studies have been made on. Assessments and impact evaluations of productive safety net programs. For instance, Judit and Matt, (2011), tried to emphasize the remarkable achievements of PSNP starting from the efficiency of community targeting systems. They have noted that the timely payments made sure that people are not forced to sell their productive assets. PSNP has helped in rehabilitating the environment in which these communities live through public work activities and much more.

Other study on impact evaluation of PSNP explains that households that received payments for five years experienced a larger improvement in food security, than households that received payments for only one year. This describes that the more beneficiaries receive PSNP services the better they become over the years (John et al., 2011). Another study done by (Sabates et al., 2013) also showed the reduction in food gap, improvement in roads and services as well as access to education in selected areas of Afar, Oromiya and Somali regions.

On the other hand, there is an international perception that social protection programs could be the cause for dependency. Beneficiaries may attempt to hide true information about their income and assets, so as to continue to appear eligible when in fact they might have sustained their own assets and a good harvest. Food aid may change the behavior of the recipients by making them less active on their own economic and social responsibilities (Little, 2008). All of these behavioral responses to the delivery of social transfers can result in programs failing to achieve their long-term objectives, and generating large-scale dependency rather than large-scale graduation.

Even if there is economic centrality of agriculture in the study area, many households have been engaged and pursue diverse off/non-farm livelihood activities to maintain and improve their wellbeing. PSNP has been implemented for the past thirteen years. Several assessment and impact studies were made on productive safety net program; however, fewer studies have been made on the effect of PSNP at regional and district level. However, to the best knowledge of the researcher, research work on the role of Productive Safety Net Program on off-farm activity participation has not been conducted and untouched in study area. This study therefore aims to examining the existing main off-farm activates adopted by the beneficiaries'; and identify the roles have the program on the households participation on off-farm activities specifically in Mareko district.

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1.3 Research Questions

- What are the main off-farm activities adopted by the beneficiaries?
- What are the factors that determine the program beneficiaries from participation in off-farm income activities?
- Does PSNP have a role in helping families to participate on off-farm income?

1.4 Objective of the Study

The general objective of the study is to investigate the role of Productive Safety Net Program on households' participation on off-farm activities, and its determinants: Specifically,

- To assess the existing main off-farm activities adopted by the beneficiaries.
- To identify the factors that determines the program beneficiaries from participation in off-farm income activities.
- To examine the role of PSNP in helping families to participate on off-farm income.

1.5 Significance of the Study

The study is significant for it increases individuals understanding the role of productive safety net program on off-farm income, determining factors of off-farm activity participation. The outcome of the study could also be use full for local administrators and NGOs in order to devise intervention that could improve the livelihoods of the rural poor. Particularly this study could serve as source of reliable information for district administrative and policy makers regarding the action that should be undertaken so as to improve PSNP beneficiaries' participation on off-farm activity. The finding could also use as reference for researchers who are interested to conduct further study on the field.

1.6 Scope and Limitation of the Study

The study has undertaken in the Southern Nation and Nationality State, Gurage Zone of Mareko district. That is, due to the existence of resource and time constraints the study is confined to this area only. Since farmers do not keep records and due to mind lapse, and fear to graduation from the program, the researcher faced difficulty to get exact values for some questions.

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1.7 Hypotheses

Hypotheses to be tested in this study are; to check whether PSNP participation has no positive impact on off-farm activity participation or positive impact on off-farm activity participation

1.8 Organization of the Paper

The remaining part of this paper is organized as follows. Chapter two presents the literature review which deals with the theoretical and empirical literature review. Chapter three presents description of the study area, data source, sampling techniques and sample size and method of data analysis, and econometric models used for analyzing the data set are presented. The results are discussed in chapter four and the last chapter is conclusion and recommendation part of the study.

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CHAPTER TWO

LITERATURE REVIEW

2.1 Social Protection in Ethiopia

There are different social protection programs to address the most vulnerable groups of people living both in urban and rural areas of Ethiopia. As most of the population is living in the rural, the livelihoods of the majority depend on farming as well as pastorals'. Many literatures state that poverty is widespread in both rural and urban; however, its magnitude is much greater in drought-prone rural areas than in urban areas. The major causes of food insecurity in Ethiopia include land degradation, recurrent drought, and population pressure and subsistence agricultural practices characterized by low input and low output (Ministry of Agriculture, 2010).

The social protection policy of Ethiopia was developed by the Ministry of Labor and Social Affairs in March 26, 2012. It includes issues of pension, aging, support to vulnerable children, nutrition, etc., along with food security. The policy states that focus must be given to vulnerable groups of the society with the notion of including the disabled and the aged. It focuses on households and individuals who should receive social assistance in order to function properly, and achieve quality of living within the society (MoLSA, 2012).

Food Security is one component of Social Protection Policy. As explained in many literatures, food is a basic necessity for people to survive in this world; therefore food security is a very critical issue. The Ministry of Agriculture had formulated a Food Security Strategy issued in November 1996 that highlighted its plan to address causality and effect of food insecurity in Ethiopia.

2.2 Productive Safety Net Program

One of the social protection programs designed to protect the Ethiopian population is productive safety net program. PSNP started in 2005 by the Ethiopian government with the help of international donors as a new approach to responding food insecurity. It targets chronically food-insecure households in known famine-prone areas in rural Ethiopia. The program is led by the Ethiopian government but most of the budget comes from donors. The government's expense is the cost of civil servants who are involved in the management of PSNP. When it started, PSNP

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had 4.5 million beneficiaries in 2005. PSNP operates in Afar, Amhara, Dire Dawa, Harare, Oromiya, SNNP, Somali and Tigray Regions. (Julie et al. 2011).

The Productive Safety Net Program (PSNP) is Ethiopia's rural safety net for food insecure households. The program covers households in Afar, Amhara, Dire Dawa, Harari, Oromiya, Southern Nations, Nationalities and Peoples (SNNP), Somali and Tigray, and targets households that are chronically and transitorily food insecure. The program provides cash and/or food transfers to these households (Ministry of Agriculture, 2010).

Households that have able-bodied adult labor engage in public works and receive transfers for 6 months of the year. Public works focus on integrated community-based watershed development, covering activities such as soil and water conservation measures, rangeland management (in pastoral areas), and the development of community assets such as roads, water infrastructure, schools, and clinics. These works contribute to improved livelihoods (through increased availability of natural resources including water and cultivatable land, soil fertility, increased agricultural production and improved market access), strengthened disaster risk management and climate resilience, and nutrition. The program facilitates linkages with health and nutrition services, particularly for pregnant and lactating women who have antenatal care and nutrition-related co-responsibilities (soft conditionality) as they transition to temporary direct support, but also for public works clients, whose participation in nutrition behavioral change communication (BCC) sessions counts towards their public works requirement(Ministry of Agriculture, 2014). Households without labor capacity, permanent direct support clients, receive 12 months of unconditional transfers and are linked with social protection services.

The program provides technical assistance and training in livelihood activities (crop and livestock, off-farm, and employment) to clients to enable households to increase and diversify their incomes and build their assets. While many clients who participate in livelihoods activities are referred to credit providers, for the poorest households, the program provides livelihood transfers that do not need to be repaid, helping them build their assets more rapidly while avoiding a cycle of indebtedness (Ministry of Agriculture, 2014).

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Together, these interventions aim to strengthen resilience, improve nutrition, and help households become food sufficient and, eventually, food secure.

2.2.1 Objectives of Productive Safety Net Program

As per PSNP program implementation manual, PSNP has the following general objective:
"To assure food consumption and prevent asset depletion for food insecure households in chronically food insecure districts, while simulating markets, improving access to services and natural resources and rehabilitating and enhancing the natural environment" (Ministry of Agriculture, 2010). In fact in the new PSNP design which was finalized in November 2014 emphasizes that its goal for the next phase of PSNP is: "Resilience to shocks and livelihoods enhanced and food security and nutrition improved for rural households vulnerable to food insecurity" (Ministry of Agriculture, 2014).

The PSNP, PIM further elaborates that the program focuses on chronically food insecure districts; and households. The program intends to insure that food insecure individuals or members of the households have enough to eat throughout the year. PSNP aims to prevent asset depletion. It is known that families are forced to sell what they have to put food on the plate. The program insures that people will not be forced to lose their assets in order to provide food for their families. In its implementation, PSNP involves public works having a positive contribution towards rehabilitating the natural resources. Furthermore, PSNP contributes to the creation of an enabling environment for community development by increasing access to services, such as health, education, roads and market infrastructure. In general, PSNP provides safety net to food insecure families helping them to be able to secure food and asset platform and improve their status over time (Ministry of Agriculture, 2010).

2.2.2Program Goal

The PSNP 4 has the following goal:
"*Resilience to shocks and livelihoods enhanced, and food security and nutrition improved, for rural households vulnerable to food insecurity."*
While the PSNP is expected to make a substantial contribution to this goal, its achievement will also require support from other interventions as well as a more general enabling environment.

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The PSNP's contribution to achieving this goal will be regularly measured through program impact assessments, using the following indicators: % of children age 6-23 months of age who receive minimum acceptable diet, Household dietary diversity, Average value of asset holdings, and Number of different income sources.

The above indicators will be analyzed to allow comparisons between PSNP clients, a control group (or counterfactual) and those who have exited the program (graduates). This will allow an assessment of the impact of the program on households participating in the program, and the contribution of the program to achieving sustainable livelihood security. Furthermore, data will be disaggregated to assess the differing impacts by gender of household head and gender of the household member participating in livelihood enhancing activities (whether credit or livelihood transfer) (Ministry of Agriculture, 2014).

2.2.3Program Outcome

The PSNP's outcome is as follows:

"Enhanced participation in improved rural safety net, livelihood and nutrition services by food insecure female/male headed households".

The PSNP's achievement of this outcome will be realized through a combination of the expanding scale of the program; improved quality of implementation; the introduction of instruments and tools which can enhance implementation and are one of the building blocks of a broader system; and key activities that improve program clients' access to key social services (particularly in relation to nutrition) (Ministry of Agriculture, 2010).

2.2.4Coverage of Productive Safety Net Program

According to PSNP, PIM, the productive safety net program is implemented in districts defined by the government as chronically food insecure. The eligibility of households to be part of PSNP is defined by the frequency in which they required food assistance for the past ten years preceding the design of PSNP. Households that are chronically food insecure are included for regular PSNP transfers. The researcher selected one PSNP districts namely mareko which has been part of the program participant for the past ten years (Ministry of Agriculture, 2010).

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2.2.5 Principles of Productive Safety Net Program

According to (Ministry of Agriculture, 2010), the program has its own principles to help achieve its objectives. One of its principles is having a fair and transparent client selection. Beneficiaries are selected by the community and district food security workers. There is an appeal system to address if there are any grievances in the selection process. Transfer of benefits to selected families is timely and predictable. The PIM states that if transfers are timely, beneficiaries surly know when they will be receiving their entitlements and what type of transfer they will receive.

PSNP clients receive their entitlements for the reason of being selected. But they are expected to engage in public work activities as long as they are able. The PIM mentions that the productive element comes from infrastructure and improved natural resources base created through PSNP public works. In addition, the program is a key element in development planning. It links its beneficiaries to other development programs to ultimately help them achieve resilience over food insecurity (Ministry of Agriculture, 2010).

One of the major outputs of PSNP as stated in the new phase four designs is Clients' livelihood opportunities facilitated through three pathways: crop and livestock, off-farm income generation, and employment. The livelihoods component of the PSNP 4 seeks to strengthen the livelihoods of PSNP clients in order to build household assets, increase incomes, and strengthen resilience to shocks. Improved livelihoods and increased incomes and assets will lead some households to graduate from the PSNP (Ministry of Agriculture, 2014).

PSNP's coverage increases as there is a need to scale up assistance in the event of shocks. When possible, the first choice of assistance is cash as it has the power to stimulate local markets. Food transfers are provided in areas where markets are not available in nearby places or where market prices for food are very high. The program participate both men and women to help them benefit equally. It responds to women's responsibility in both the productive and reproductive work and focuses to improve the living conditions of female headed households (Ministry of Agriculture, 2010).

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2.3 Livelihood Strategy

According to DFID.s sustainable livelihoods glossary the term *livelihood strategies* denotes: the range and combination of activities and choices that people make in order to achieve their livelihood goals. Livelihood strategies include: how people combine their income generating activities; the way in which they use their assets; which assets they chose to invest in; and how they manage to preserve existing assets and income. Livelihoods are diverse at every level, for example, members of a household may live and work in different places engaging in various activities, either temporarily or permanently. Individuals themselves may rely on a range of different income-generating activities at the same time. (DFID 2000).Rural household construct basic alternatives in rural diversification strategies through which they can overcome poverty related problems making what they have is the central concern. It can be through wage labor (local or migratory), or self-employment (on agricultural). Livelihood literature (Ellis, F. 2000) suggests that though exogenous trends and shocks play an important role in pushing rural people towards a diversified livelihood strategy, diversification choices are also firmly rooted in the micro-economic logic of farming households. However, there can be entry barriers in the non-farm labor market because non-farm activities may require investment on equipment purchases or rent. Poor households cannot afford the investment required in the non-farm activities if they face binding liquidity and credit constraint. Availability of key resources and other opportunities such as land, labor, credit, market accessibility, infrastructure development, and institutional factors might play an important role in pulling rural household towards livelihood diversification. Rural diversification can become a viable pathway towards sustainable livelihoods only if some basic conditions listed above are made available to rural households.

2.3.1 Rural Livelihood Diversification

Diversification is the norm where many people collect their income from diverse activities. Very few people collect all their income from any one source, hold all their wealth in the form of any single asset, or use their assets in just one activity. Multiple motives prompt households and individuals to diversify assets, incomes, and activities. The first set of motives comprise what are traditionally termed push factors: risk reduction, response to diminishing factor returns in any given use, such as family labor supply in the presence of land constraints driven by population pressure and landholdings fragmentation, reaction to crisis or liquidity constraints, high

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transactions costs that induce households to self-provision in several goods and services, etc. In other cases, households engage in non-farm activities throughout the year because they have more labor than is needed for their land holdings or, in areas with unpredictable weather patterns, want to insure against bad harvests. Nearly all of the push factors cases involve households devoting labor and/or other resources to activities that are less productive than their primary income source: agriculture (Barrett *et al,* 2001)

The second set of motives comprise pull factors realization of strategic complementarities between activities, such as crop-livestock integration or milling and hog production, specialization according to comparative advantage accorded by superior technologies, skills or endowments (Barrett *et al,* 2001). Pull factors. Designate the reason for household income diversification driven by the desire for capital accumulation. Most frequently, economists focus on the pull factors such as rising income, education levels, and market access as primary drivers. These factors enable households to seize off-farm opportunities that they previously did not have access to pull factors, as found in most of the standard literature, are usually associated with an upward spiral of household income and well-being. Diversification strategies for the rich, usually initiated by pull factors, tend to be in many cases different from diversification strategies of the poor usually motivated by push factors. Depending on the level of barriers like credit constraints or skills required to enter some non-farm activities, the level of earnings from non-farm activities by rich and the poor could be different. Households who possess land and are primarily agricultural also deploy capital and labor between farm and non-farm activities enabling them to diversify incomes across the calendar year and reduce seasonal and inter-annual consumption risks (Nega, 2008**)**.

In line with the Sustainable Livelihood framework, a livelihood is defined here as .the activities, the assets, and the access that jointly determine the living gained by an individual or household. Rural livelihood diversification is then defined as .the process by which households construct a diverse portfolio of activities and social support capabilities for survival and in order to improve their standard of living (Ellis, 2004). It refers to the broadening by rural individuals/households of their income-generating activities portfolios. Diversification patterns reflect individuals. voluntary exchange of assets and their allocation of assets across various activities so as to achieve an optimal balance between expected returns and risk exposure conditional on the

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constraints they face (Barrett *et al*,. 2001). Livelihood diversification activities are now very likely to be central to the construction of sustainable livelihoods and its acceptance is going to increase and has wide contribution to poverty reduction. It has generally occurred as a result of an increased importance of off-farm wage labor in household livelihood portfolio or through the development of new forms of on-farm/on-site production of non-conventional marketable commodities. In both cases, diversification ranges from a temporary change of household livelihood portfolio (*occasional diversification*) to a deliberate attempt to optimize household capacity to take advantage of ever-changing opportunities and cope with unexpected constraints (*strategic diversification*) (Warren, 2002).

Diversification includes on-farm activities (e.g. incorporating a new crop or livestock into the production system), non-farm (trading, local food and drink selling, hand crafts) and/or off-farm activities. The rural livelihood diversification and economic expansion can be pursued: within the primary agricultural production, within a wide agro business sector and/or beyond the agricultural sector. The latter two are under the scope of this study but rural small holding household diversification confined to some traditional activities as stated above. Such activities did not generate sufficient income as to overcome poverty related issues. But the level of diversification and income generated for the sector is not same for poor and better off household. As stated by Ellis (2004) the better off and the poor may exhibit similar degrees of diversity (as measured, for example, by count frequencies of the different occupations in which they are engaged), yet per capita income outcomes are entirely different. The reason for this is that the better off diversify in different labor markets from the poor, and in Sub-Saharan Africa, for example, the better off tend to diversify in the form of non- farm business activities (trade, transport, shop keeping, brick making etc.) while the poor tends to diversify in the form of casual work, especially on other farms.

The question of how to achieve rural income diversification is likely to become increasingly important. As the Ethiopian economy develops, with higher productivity and better performance in agriculture, the non-farm sector will also grow and become increasingly important as an alternative employer of labor and source of livelihood in rural areas. This suggests the policy priority should not be either agriculture or the non-farm sector but a balanced approach focusing on the spillovers between the sectors, particularly consumption linkages (Imru et al, 2009). This

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is because the extent to which farm households are able to feed themselves often depends on non-farm income as well as their own agricultural production. The factors that usually identified as causes for diversification are seasonality, risk, labor markets conditions, credit markets, asset strategies, and coping strategies, just to name a few (Lemi, 2005). The ability to diversify at all is often critical to the food security of the most vulnerable rural populations (Ellis, 2004).

According to Ellis (2004) two fundamental causes of diversification, these are seasonality and risk. Seasonality causes peaks and troughs in labor utilization on the farm, and creates food insecurity due to the mismatch between uneven farm income streams and continuous consumption requirements. These are often called the labor smoothing and consumption smoothing problem respectively. Diversification can contribute to reducing the adverse effects, by utilizing labor and generating alternative sources of income in off-peak periods. The degree to which it is necessary to diversify for seasonality reasons evidently varies according to the robustness of the underlying farm basis of people's livelihoods, the degree to which they are able to realize cash income from market sales, and their confidence in the ability of markets to provide food supplies at reasonable prices in the agricultural lean season. In situations where all these factors are deteriorating, perhaps due to declining farm sizes and erratic markets, it is to be expected that diversification for this reason might rise over time.

Similar considerations apply to risk reasons for diversifying. Risks related to adverse weather conditions (drought, flooding, storms etc.) and to sudden appearances of pests and diseases are also high in Africa and the occurrence of such events often has strongly negative effects on the livelihoods of farmers, their families and rural populations at large, affecting their production systems and food security. Agricultural growth in general and a diversification of livelihoods in particular reduces some of the risk at community and sector level (AAA, 2007). Financial services at large can have a vulnerability reducing effect, by smoothing consumption, alleviating shocks, and planning ahead for expectable family and social expenses (Guérin, 2008). Rural families increasingly come to resemble miniature highly diversified conglomerates (Cain and McNicoll, 1988: p. 105 cited from Ellis 2000). Aside from income generation, diversification will, in most instances, increase employment for the rural poor. Thus it is not surprising that in the light of the reiterated environmental, economic and political shocks affecting rural areas of

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developing countries diversification has become increasingly attractive for many rural households.

2.3.2 Rural Non-Agricultural Income

The rural non-farm economy (RNFE) may be defined as comprising all those nonagricultural activities which generate income to rural households (including income in-kind and remittances), either through waged work or in self-employment. Ellis (2000) defines the off-farm as wage or exchange labor on other farms, including payments in kind and cash. Whereas non-farm as non agricultural income sources that includes non-farm rural wage or salary employment, non-farm self-employment income and remittances. Participation in the RNF sector allows poor people to smooth out or offset fluctuations in agricultural income that might occur on a seasonal basis or as a result of unexpected events (Gordon and Craig2001).According to Gordon and Craig (2001), potentially important role of rural non-farm activities in reducing poverty in rural areas includes: absorb surplus labor in rural areas; help farm based households spread risks; offer more remunerative activities to supplement or replace agricultural income; offer income potential during the agricultural off-season; provide a means to cope or survive when farming fails.

The RNFE is of great importance to the rural economy because of its production linkages and employment effects, while the income it provides to rural households represents a substantial and sometimes growing share of rural incomes. The demand for non-farm activity arises in the rural farming community because of an increase in the fragmented land holding which barely satisfy annual income of households. In the past it was believed that agriculture on its own could achieve the objective of poverty reduction, primarily by raising agricultural productivity continuously over time, but also by redressing issues of access to key resources such as land by land tenure reform and other devices. It has become apparent however, that agriculture on its own often cannot provide the means of escaping poverty for the majority of rural poor (Ellis, 2000). Small and fragmented farm sizes, coupled with low-level technology and soil degradation have reduced the capacity of small farmers to undertake long-term investments and innovation.

As employment opportunities within agriculture are unable to keep up with growth in the labor force, there is a widely recognized need for diversifying rural incomes (Imiru et al., 2009). Even though agriculture is the backbone of Ethiopia's economy, it no longer provides sufficient employment for the growing rural labor force, and the share of people below the poverty line has

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increased over time. Hence the promotion of non-farm activities in addition to farm activities seems indispensable to alleviate rural poverty (Berg and Kumbi, 2006). There is evidence that RNFE contribution is becoming increasingly significant for food security, poverty alleviation and farm sector competitiveness and productivity (Davis, 2003).As the food insecure households are resource poor, living in drought-prone and degraded areas, focusing on crop and livestock production alone may not entirely solve the problem of food insecurity in some areas. For such areas, income diversification through promoting nonagricultural activities is of paramount importance (MoFED, 2006). As MoFED (2006) recognizes on country PASDEP documents some proposed interventions are: Strengthened market effectiveness, credit services through micro-finance institutions, Establishment of marketing cooperatives to be able to sell products at good price, and Provision of training and organizing cooperatives.

All of these interventions are important for both agricultural and non-agricultural activities. Diversified source of income, by reducing risk, promote farmers to invest in farming activities that increase their farm income. Farmers with more non-farm income source expected to purchase farm inputs (fertilizers and improved seed etc.) and rent in land to expand their farm operation, engaged in production of market demanded crops like coffee. Non-farm income in this context is one means of assisting agricultural production and vice versa. Rural non-farm activities may: Absorb surplus labor in rural areas, Help farm-based households spread risks, Offer more remunerative activities to supplement or replace agricultural income, Offer income potential during the agricultural off-season, and Provide means to cope or survive when farming fails.

However, (Imru et al., 2009), states that while non-farm enterprises make an important contribution to rural income and employment, running a non-farm enterprise in Ethiopia is predominantly a means to complement agricultural income, rather than an alternative pathway out of poverty.

This calls for policy priority in which non-farm activity should take into account as development sector for alleviating poverty. That is, policies seeking to address food insecurity in rural Ethiopia should consider the potential contribution of the rural non-farm enterprise sector.

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2.4. Empirical Literature Review

Several empirical studies have been conducted to examine the effect of social protection programs, such as PSNP, on various households' welfare outcomes. Evidence from Alderman and Yemtsov (2012) shows that 62% of the households that participated in the PSNP avoided selling assets in states of food shortages, and 36% avoided using savings to buy food. In addition, they found that 23% of participants acquired new household assets, 46% used healthcare more, and 39% sent more children to school while 50% kept them in school longer.

A study done by Gilligan et al. (2009) assessed the impact of the PSNP, on its own and together with the OFSP, on household food insecurity, consumption levels, agricultural and non-farm production enhancement, and asset accumulation by classifying the treatment households in to three categories (Ellis, 1999). The result shows that the definition of participants does matter for the impact of the program. Accordingly, if all participants of PSNP were included in the analysis, the overall effect was insignificant. On the other hand, the beneficiary households that received at least half of the intended transfers experienced a significant improvement in food security. Most importantly, for those households who participated in both the PSNP and OFSP (Bryceson, 2005), the result indicated a significant effect on food intake and no evidence of deterrence effects in terms of labor supply or private transfers, slower asset growth, than for non-participants(Ellis and Freeman, 2007). However, Gilligan et al. (2009) used recall data to fill the gap of lack of pre-intervention data. This recall data was collected from the same respondents by employing retrospective questions about demographic characteristics, prior experiences with emergency assistance, assets, and selected food security outcomes such as the size of the food gap. However, respondent recall is often in accurate since it is hard to remember all past events correctly, resulting in over or under reporting of past events that leads to recall bias (Sudman & Bradburn, 1973).

Berhane et al. (2011) estimated the impact of Ethiopia's PSNP and other related transfers(OFSP/HABP) on food security using panel data of the Ethiopian Central Statistical Agency (CSA), called the Ethiopian Food Security Surveys, collected in 2006, 2008 and 2010 from woredas across the four major regions of Ethiopia, namely Tigray, Amhara, Oromiya and SNNP. The estimator that Berhane et al. employed was the 'dose–response' model. Instead of considering participation in the program as a binary treatment variable, they considered

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treatment as a continuous variable, years of receipt of the PSNP. They argue that using binary matching techniques to study the impact of the PSNP is less attractive when there has been considerable movement in and out of the program which makes the construction of control group more difficult. Moreover, the levels of participation in the program may also vary widely. However, these problems are not the issue in the current study since participant households in my data set were beneficiaries of the PW payments both in the second and third waves of the survey after the intervention of PSNP. In addition, knowing the participation status of the households before the second wave (2006) is not significant since, due to lag of implementation, the program had no impact after a year of its inauguration in 2005 (Woldehanna, 2009). The results of Berhane et al. show that food security of beneficiaries of both PSNP and the OFSP significantly increased. They also found that the joint effect PSNP and OFSP on livestock holdings is statistically significant and larger than the effect of PSNP alone.

Similarly, using the same data and estimation approach used in Berhane et al. (2011), Hoddinott et al. (2012) evaluated the impact of the Ethiopia's PSNP and other related transfers (OFSP/HABP) on agricultural productivity. The results of Hoddinott et al. indicate that access to both the PSNP and OFSP programs led to considerable improvements in the use of fertilizer and enhanced investments in agriculture likely to improve agricultural productivity among households receiving both programs. In addition, households receiving OFSP transfers that also participated in the PSNP for a long period had significantly higher yields than OFSP beneficiaries with low levels of PSNP participation. They also found that high levels of transfers in the PSNP program alone had no effect on agricultural input use or productivity and a limited impact on agricultural investments.

Using panel data collected in three waves from 2002 to 2007, Andersson et al. (2011) investigated the impact of the PSNP on livestock and tree holdings in Ethiopia. To estimate the impact of the program, Andersson et al. employed a linear regression model by including key covariates which are expected to affect the change of livestock and tree holdings. The results prevailed that the program improved tree holdings but had no significant effect on livestock accumulation, and protection of them in times of shocks. However, since transfers were delayed during the first year of implementation of the PSNP (Gilligan et al., 2009), the results of Andersson et al. (2011) may not be the long term impact of the program on the outcome since for

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the food insecure households, who are in general liquidity constrained, investing in livestock within short period of time might be a challenging activity. On top of that the external validity of the study of Andersson et al. is questionable since the study area, South Wollo, in Amhara region, has been affected by severe droughts repeatedly and, hence, is an impoverished and risky part of the country, even when compared to other low-income areas of rural Africa (Little et al., 2006). In addition, Woldehanna (2009) estimated the impact of PSNP on child welfare by using Young Lives child level panel data set and a propensity score matching model. The estimated results show that the PW component of the PSNP increases child work for pay; reduces children's time spent on child care, household chores and total hours spent on all kind of work combined; and increases girls spending on studying.

Using cross sectional data from Tigray region central zone Yibrah Hagos (2014) on his study Economic impact of productive safety net program on poverty found that, the program has positive and significant impact on poverty reduction through increasing household consumption expenditure per adult equivalent and protecting productive asset. Chemeda Bokora (2015) on his study on eastern harerge zone found that the program did not reliably bring change in the livelihood of the target households in terms of asset creation and also 72% of household's could not meet the daily minimum recommended allowance of calorie per capita.

To sun, several assessment and impact studies were made on productive safety net program. The above studies found to the best of the researcher. However, fewer studies have been made on the effect of PSNP on household at regional and district level and most of them base their study on panel data. However, research work on the role of productive safety net program on off farm activity participation at district level has not been conducted and untouched in study area. This study therefore aims to assess the existing main off-farm activates adopted by the beneficiaries'; and identify the roles have the program on the households participation on off-farm income.

This study will contribute to the existing literature by analyzing the role of the PSNP on off-farm activity participation using a cross-sectional data.

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CHAPTER THREE

RESEARCH METHODOLOGY

This section presents an overview of the study area description, the methods used for data collection and economic models applied in the study. That is it includes the data source and data collection models, sample size and sampling techniques, methods of data analysis, econometric models apply for the study and description and expected sign of explanatory variable.

3.1. Description of the Study Area

This study was conducted in Mareko District, Gurage Zone of southern Ethiopia. Mareko District is one of the Woreda administrations in Gurage zone (Southern Nations Nationalities Peoples' Region). The District is located at a distance of 184 km south west of Addis ababa on the Addis Ababa Zeway Butajira road. It is found between the border of Oromia region at the north and east, Meskan District at the west and Silitie District at the south. The District is subdivided in to 26 kebeles ,and 22 kebles are productive safety net program participant. The District has a total area of 32750 ha. The information from District finance and economic development office indicates that this District has total population of 86957 of whom 49.2% of this were women. The District altitude ranges from 1820 to 2020 masl, mean annual rain fall ranges from 750 to 950 mm and the temperature is 10 -27^0c. Road networking between PAs connected which makes access to any part of District to using transportation especially in dry season.

Intensive agricultural production system is practiced in the district. 80% of the district topography is gentle slope (flat) and the remaining is hilly, soil type is silt loam. As a result of erratic rain fall, the nature of erodible soil and low vegetation cover there is soil erosion and flood hazard.

The farmers cultivate cereals principally maize, wheat, teff vegetables (onion) and green pepper, while livestock mainly cattle, sheep, goat, donkey and horse are kept. The dominant food crops are maize, wheat and teff, while the cash crops are onion and pepper. Because of the nature of low and uneven distribution of rain fall the area is classified as chronically food insecure. Average farm size is estimated at 1.38ha and oxen are used for cultivation.

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There are two cropping seasons namely Belg (short rainy season) and Meher (main rainy season). The short rainy season (Belg) starts from February to April and used for planting long cycle crops such as maize, onion and pepper &also used for preparing land for long rainy season crops. The main rainy season starts from June to September and used for planting cereal crops like wheat, teff and also used for the growth and development of crops that are planted before.

3.2. Sampling Techniques and Sample Size

Multi-stage sampling procedure employed to select sample households. In the first stage, Mareko district is selected because it is one of productive safety net program implemented districts. In the second stage 5 sample kebeles are selected by using random sampling techniques because they are productive safety net program participant and based on their program participant density. In the third stage, sampling frame (complete village household lists) will be obtained from each kebele's administrative office. Then, in the last stage, the probability proportional to sample size method has been applied to draw the sample household from each kebele. Finally, total samples of 200 households were selected by using simple random sampling techniques.

The total sample size for the study was 200 households which were determined using the sample size determination formula of Yamane Taro (1963). To determine the required sample size at 93 % confidence level, degree of variability = 0.05 and level of precision = 7% (0.07).

$$n = \frac{N}{1+N(\alpha)^2} \qquad n = \frac{4645}{1+4645(0.07)^2}$$

Where, N is the total household Hades participates in productive safety net program, n is the sample size and α is the level of significance for the present study. The total number of households Heads participates in productive safety net program in Mareko District is 4645 and the above formula gave the sample size for the study.

3.3. Types and Methods of Data Collection

In this study both primary and secondary data were collected from different sources. A structured interview schedule was developed to collect the necessary data in which both quantitative and qualitative data were gathered from the sample respondents through face to face interview. The

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questioner includes information on households demographic characteristics, livelihood activities that household involve in off-farm employment activities for household that at list one member of the household participates in such activities during the study period. In addition income from farm activity, the amount of livestock in terms of livestock unit and the access of credit for household head were collected. In addition, secondary data has been collected available reports and records of the agriculture and rural development office, and finance and economic development office of the study District, published journals from websites and unpublished literature from different sources.

3.4. Methods of Data Analysis

Two types of data analysis, namely descriptive statistics and econometric models has been used to analyze the data collected from sample households. According to descriptive statistical methods, quantitative categorical types of data has been analyzed using percentage and frequency. While quantitative continuous types of variables has been analyzed using minimum, maximum, mean and standard deviation. After computing the descriptive statistics, probit regression model used to identify the determinants of off-farm activity participation and, PSM model was used to analyze the effect of productive safety net program on off-farm income. On identifying the determinants of off-farm activity participation, households' participation in off farm activities where the dependent variable will found to be dichotomous (for example, 1 if household participate in off-farm activity and 0 otherwise). On the identification of the effect of productive safety net program on off-farm income participation on productive safety net program participation is treatment variable and off-farm income is outcome variable. STATA version 13 has been used for descriptive and econometric analysis.

3.4 Econometric Model Specifications

Both probit and logit analysis are well-established approaches in the literature to estimate dummy dependent variables (Feder, and Zilberman, 1985). The cumulative probability functions of the probit and logit models are quite similar, so they usually generate predicted probabilities that are almost identical. Logit, however, has the advantage that these predicted probabilities can be arrived at by hand calculator. Further, when there are many observations at the extremes of the distribution then logit is preferred over probit

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(Liao, 1994). Also, Sharma (Sharma, 1997) reported that the logit model is computationally easier to use than the other type.

3.4.1 Specification of the Probit Model

The general specification for the probit model as stated in Green (2003) presents in equations 1and 2 below. Participation of rural households on several off-farm employment activities depends on the value of unobserved (latent) variable which indicates some utility difference for the rural households by participating and not participating in off-farm works. Often the relationship between the value of the unobserved (latent) variable Yi* and the observed characteristics X ′j and unobserved characteristics $\in_i$ are assumed to be linear. Yi* for the off-farm activity participation can be stated as:

$$Y = X_i'B_i + \in, Y = 1, if\ y > 0, 0\ otherwise \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

And $E[\in/X] = 0$

$$Var[\in/X] = 1$$

$$cov[\in/X_i'] = p$$

Where i=1, 2.. and p= the cross equation correlation coefficient

Individual's decision to participate or not to participate in off-farm activity depends on the value of Yi*.The observed value, Yi= 1(households participated in some off- farm employment) if (Yi*>0 and Yi = 0 (not participated) if Yi* < 0. Where, X_i' are the vectors of explanatory variables in equation (1). If the vector X'= X_i' and let $X_i'B_i$= $X'p$. Thus, p contains all the nonzero elements of B_i and possibly some zeros in the positions of variables in **X** that appear only in the other equation. The probit for the probability of participation in off-farm activity participation is thus defined as:

$$prob[Y = 1/X] = \Phi_2[X_i', p] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

3.4.2 Specification of the logit Model

The logit model will be applied in this study to estimation of propensity scores. According to Gujarati (Gujarati, 1995), the functional form of the logit model is presented as follows:

$$P_i = E(Y_i/\mathrm{X_i}) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_i)}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$P_i = E(Y_i/\mathrm{X_i}) = \frac{1}{1+\mathrm{e}^{-\mathrm{z_i}}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where Pi is a probability that a i^{th} household participated in off farm activities and ranges from 0 to 1; Zi is a functional form of m explanatory variables (X) which is expressed as:

$Z_i = \beta_0 + \sum_{i=1}^{m} \beta_{i,}$,1,2,3…..m……..(3)

Where; β0 is the intercept and βi are the slope parameters in the model. The slope tells how the log-odds in favor of a given household participating in income diversification change as independent variables change. If Pi is the probability of a household being in off farm activity participation, then 1-Pi indicates the probability that a given household did not participate, which can be given as:

$$1 - P_i = \frac{1}{1+e^{z_i}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$e^{z_i} = \frac{P_i}{1-P_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Equation (5) indicates the odds ratio in favor/in terms of a given household participating in off farm activity. It is the ratio of the probability that a household will participate in to the probability he will not participate. Lastly, the logit model is obtained by taking the natural logarithm of equation (5) as follows:

$$L_i = ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Where; Pi =the probability that Y=1 (that a given household is participating in off farm activity); 1-Pi=the probability that Y=0 (that a given household does not participate in off farm activity);

L=the natural log of the odds ratio or logit;

βi =the slope, measures the change in L (logit) for a unit change in explanatory variables (X);

β0 =the intercept. It is the value of the log odd ratio; pi/(1+pi)when X or explanatory variable is zero. Thus, if the stochastic disturbance term (U i) is taken into consideration the logit model becomes

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$L_i = \beta_0 + \beta_i X_i + u_i$ ………………………………………………………………………………..(7)

3.4.3Propensity Score Matching Model

Since participation in the PSNP is not random, the simple difference in off-farm income between treated and non-treated households will not identify the true impact of the program. Thus, to obtain the exact impact of the program, one would ideally look at the difference between the outcomes for PSNP participant households and the outcomes from the same households had they not participated in the program. However, due to the impossibility of observing the same unit under both treatment and control at the same time (Holland, 1986), the outcomes for the households had they not participated in the program can't be observed. More formally, let Ti be the treatment variable, participation in PSNP, a binary variable which equals 1 if household i was enrolled in the PSNP and 0 otherwise. The Average Treatment Effect on the Treated [ATT] can be calculated as

$\text{ATT} = \text{E}(\text{Y}_1 - \text{Y}_0/\text{T} = 1) = \text{E}(\text{Y}_1/\text{T} = 1) - \text{E}(\text{Y}_0/\text{T} = 1)$,……………………………..(1)

Where $Y1$ and $Y0$ are the potential outcomes of interest, off-farm income measured in birr, for a household with and without the program respectively. However, as stated above, ($Y0$| T=1) can't be observed. Thus, unless a proxy control group consisting of non-participant households as similar as possible to participant the households is not constructed, using the off-farm income of untreated household as an estimate of counterfactual will generate a bias.

If the selection is based on variables that are observable to the researcher, the problem of selection bias can be circumvented by controlling for these variables in the propensity score matching method [PSM] (Rosenbaum and Rubin, 1983). The PSM model, however, hinges on two main identifying assumptions. The first assumption is the conditional independence assumption [CIA], which implies, given the observable covariates (X), the potential outcomes do not depend on treatment status($X\colon Y_1, Y_0\, T/X$). However, when estimating the ATT, this assumption can be relaxed to $Y_0 \perp T/X$ (Rubin, 1977). The second identifying assumption is the common support or overlap assumption. It states that the propensity score [PS], defined by (x)=Pr[T=1|X]=E(T|X), should be between 0 and 1 (0<Pr[T=1|X]<1) both for the treated and untreated. The intuition is that for each treated household, there is another matched untreated household with similar X (Rosenbaum and Rubin, 1983).

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Estimating the PS removes the problem of dimensionality since the information set which justifies matching on X can also justify matching on the (x) (Rosenbaum and Rubin, 1983). Thus, if $p(x)$ is the propensity score, then: $X \perp T|p(x)$, which asserts that, conditional on the PS, the distribution of covariates should be the same across the treated and the control groups. The participation model

$((x)=Pr[T=1|X]=E(T|X))$, ……..(2)

Was predicted using a logistic probability model. The model was characterized by including relevant variables based on theory and existing empirical studies such Dehejia and Wahba (1999), Woldehanna (2009), Andersson *et al.* (2011), Sharp *et al.* (2006) and Black and Smith (2004).

In implementing PSM, the propensity score was estimated for each household by running the logit model for participation in the PSNP,T_i , on key pre-intervention covariates that are expected to affect both the participation in the program and the outcome variable, off-farm income. Then, individuals in the treated group were matched with those in a comparable group on the basis of their PS using various matching algorithms (for robustness purpose) such as the Nearest-Neighbor Matching, Radius Matching, and Kernel matching.

As indicated in Caliendo and Kopeinig (2005), the Nearest Neighbor [NN] matching method is the straightest forward matching estimator with several variants, such as NN without replacement, NN with replacement, and NN with replacement and caliper. The NN matching without replacement indicates that only a single NN untreated household is considered as a match for a treated household, i.e., it is a one-for-one NN matching variant. On the other hand, in the case of NN matching with replacement, an untreated household can be used more than once as a match for treated households.

It is also suggested to use more than one nearest neighbor which is important to see the influence of the inclusion of more comparison households for the construction of the counterfactual outcome on the estimated effects (Caliendo and Kopeinig, 2005). This k-NN matching method, where k>1, takes more than one nearest neighbor for each treated household. In this matching method, the outcome of each treated household is contrasted to a weighted average of the outcome of the k-nearest neighbors; where an equal weight for each of the k neighbors is assumed, i.e., a simple average of the k-NN outcomes is estimated.

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Another matching method used in this study is the radius matching method. This matching method is a variant of caliper matching method, but has an advantage to use not only the k-NN within each caliper but all of the control members within the caliper (Caliendo and Kopeinig, 2005). This means that in the caliper matching method, we focus on only k-nearest neighbors of the treated household if the difference in propensity scores of the treated and the control households is less than the predetermined tolerance, the caliper. In the radius matching, however, the number of control households may be more than k-NN as long as the difference in the propensity scores of the treated and the control households is less than the specified caliper. For instance, in the case of NN matching using k nearest neighbors of control households with a certain caliper, we can take k=3 but there may be other control households within the specified caliper which can be included by the radius matching method.

In the kernel matching method, all treated are matched with a weighted average of all controls with weights that are inversely proportional to the distance between the propensity scores of treated and controls. The advantage of using kernel method is that by using all the information in the control set for each treated household the variance of the estimator is reduced. However, since even control households very far from the treated are used this can increase the bias (Caliendo and Kopeinig, 2005). In this study, the weights are calculated using the Gaussian kernel function, since it one of the widest employed kernel functions.

Thus, by following the approach of Caliendo and Kopeinig (2005), after estimating the propensity score and implementing the matching estimator of choice, the PSM estimator for the ATT can then be written as

$$\mathrm{ATT} = \frac{\sum_{i\in T}\left[Yi - \sum_{j\in M(i)} w_{ij} Y_j\right]}{N_T} \text{..} (3)$$

This means that the observed outcome Yi of each treated household i is compared with an estimate of $i's$ counterfactual outcome, $\sum_{j\in M(i)} w_{ij} Y_j$. The estimate of this counterfactual is obtained as the average outcome in the matching set for household i,(i) that represents the set of control households which are selected to match with i. Different methods choose differently the (i) and the weights to assign to matched controls, j belonging to (i). After an estimate of the counterfactual has been obtained for each treated household, the difference in the square bracket

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is calculated, and finally, the average over the treated is taken, dividing by NT, the number of treated households.

For the purpose of improving the overlap (common support) assumption (Heckman, Ichimura, & Todd, 1997), treatment observations whose estimated propensity score was greater than the maximum or less than the minimum of the PS of comparison group were dropped. Similarly, comparison group observations were also dropped if their PS were below the minimum or above the maximum of PS of their counterparts. Most importantly, by using Absolute Standardized Bias [ASB] test and t-test the quality of balancing was also checked by testing that both treatment and comparison observations had the same mean distribution of propensity scores and of covariates in the case of both before and after matching. As suggested by Rosenbaum and Rubin (1985), the ASB is a measure of the average imbalance in each covariate X existing between treated and control units. For each covariate X, the ASB can be defined as the difference of sample means in the treated and matched control subsamples as a percentage of the square root of the average of sample variances in both groups. Generally, the ASB before and after matching is given by;

$$\text{ASB} = \frac{\bar{X}_T - \bar{X}_C}{\sqrt{0.5(S^2_T + S^2_C)}}(100) \quad \text{.....(4)}$$

Where $\bar{X}_T$ and $\bar{X}_C$ indicate the mean in the treatment and control groups, respectively, S^2_T and S^2_C are the variances in the treatment and control groups, respectively.

3.5 Definitions of the Variables and their Expected Signs

The dependent variable of this study is participation on off farm activity. The explanatory variables in this study are those variables which are thought to have influence on household participation on off farm activities.

PSNP participation (Psnpp); It is dummy variable, it take one for participant households and zero otherwise. Participation on productive safety net program gates more money for participants. this will have negative role on off farm activity participation.

Credit access (Credacces): It is a dummy variable which take the value 1 when the sample household gets credit facility and 0 when the sample household did not get credit facility. There

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is the assumption that credit is the primary financial need of rural poor household. It is also expected to improve productive capacity of the intended activities, which in turn have a positive impact on income. This variable is hypothesized to positively influence off- farm activity participation.

Sex (sex): It is a dummy variable which takes the value of 1 if the household is male and 0 otherwise. Relatively male household heads are in a better position to expend their labor force than female household heads to participate on off-farm activity and Expected to have positive effect on off-farm activity participation.

Remittance (REMITANCE): it is dummy variable which takes 1 for households get support from their family and 0 otherwise. This implies support from family members from other place. Households get more support from their relatives' decrees participation on other income generating activities and expected to affect negatively off-farm activity participation.

Land size (LAsize): continuous variable most rural residents rely on agriculture as means of livelihood. This is the total farm size cultivated by the household given in hectare. If the farm household has extra farm land, there is a possibility of out renting own land and/or sharecropping, which in turn believed to generate additional income to the household. It is hypothesized to negatively affect household participation on off-farm activity.

House hold hade age (age): Age is a continuous variable measured in years. In rural areas, agriculture is the main occupation and source of income for the rural households. At old age (> 65 years) and at age under 15 years it is difficult to perform productive work and to participate in farm as well off-farm activities. So, age within the age range of active labor force is expected to have positive effect on participation of off-farm activity. As the age of the household head age fares from active age the participation on off-farm activity decreases. In general the age of the household age expected to have negative Signe.

House hold hade education level (HHEdulev): continuous variable it represents the level of formal schooling completed by the household head. Education remains a cornerstone of development literature and plays a very important role in diversification. An educated household can better identify off-farm opportunities and are more likely to possess the necessary skills to

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take advantage of them. Educated farmers are expected to have more exposure to the external environment and accumulated knowledge through formal learning which might enable them to participate on off-farm activities than non-educated household.

Farm income (FARMINCOME): continuous variable this implies that income from their farm activities in terms of ETB. Households who have more farm income decrees their participation on off-farm activity and expected to have negative sign on this study.

Family size (TOHHsiz): It is a continuous variable related to the sample households living under the same roof and influence seriously household's consumption and status of food self sufficiency, as well as asset formation. Households with many number of members expected to have excess labor and participate in different activities and, Expected to have positive effect on off-farm activity participation.

Livestock holding (TLU): It is the total number of livestock owned by the households excluding. Livestock is one of the major sources of farm income and hypothesized that it is positively correlating to household income. Livestock is a popular productive asset with high expected returns through consumption of dairy products and sale of the product to generate income. Livestock holding is measured in terms of standardized common conversion factor called Tropical Livestock Unit (TLU). These are possessed as the wealth of the households and coping mechanism during the food shortage to sale. The livestock in the study area were cattle, sheep, goat, equine and poultry. The number of livestock possessed ensures the farmers' livelihood and socio-cultural status of the households. Therefore, the variable would have a negative influence on off- farm activity participation.

Dependency ratio

Dependency ratio refers to the household structure in terms of age composition and is believed to affect income diversification opportunities of the household. "The burden of non-active members is expected to reduce intra-household specialization opportunities and increase the inducement for risk averse households to allocate more factors to food production" (Crole-Rees, 2000).
The numbers of the active persons and the non- active members is thus believed to have a direct impact on the management, resource allocation and specialization possibilities of the household.

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CHAPTER 4

RESULTS AND DISCUSSIONS

This part is mainly concerned with the description and interpretation of the findings. The analyses were conducted as to assess whether the program have impact on off farm income of the participants.

Descriptive statistics analysis made use of tools such as mean, percentage, standard deviation and frequency distribution were used to test mean difference between the two groups on the dependent variable participation.

Logistic model is used to assess the major determinants of off-farm activity participation in the study area in general in productive safety net program beneficiaries in particular. To examine the impact of productive safety net program participation on off-farm income the researcher used propensity score matching model.

4.1. Descriptive Statistics

4.1.1 Descriptive analysis of personal characteristics of households

Sex of the household head: From the total sample (200) 113 household heads (56.5.%) were male and 87 households (43.5%) were female. Likewise, from 153 participants, 89 households (58.17 %) are male headed households and 64 (41.83%) were female headed. This implies that in both participants and non participant households the numbers of male headed households are more than female headed this result is fare from country level gender ratio which is almost equal. As we have seen above in off-farm activates male headed households are relatively more participate than female headed households.

Age of the household head: The mean age of the sample household heads was 42.93 years with the standard deviation of 10.7. Accordingly the mean age of participants was 42.83 years and 43.23 years for non-participants. This implies that the average age difference between participant and non participant household heads are not significant. The average age for both groups is at adult and at this age able to participate at any type of farm and off-farm activity.

Education level of household head: The mean education level of the total sampled household heads was 1.15. It is 1.12 for program participants and 1.23 for non-participants. From the sample respondents, 24% were literate while 76% are illiterate. This indicates that on average

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most of the sample households are illiterate, and this limits' their participation on permanent salary employment.

Family size: In the study area, the average family size for all samples is 5.81 persons per household. The mean family size for participants was 6.03 with a standard deviation of 2 and it is 5.06 for non-participants with a standard deviation of 1.9. Households with large number of families expected to have excess labor from their farm and, this enables' them to participate on off-farm activities.

Farm land size: survey results showed that participants owned a mean of 0.5117 hectares of farm land, whereas non-participants owned a mean of 0.655 hectares of farm land size with the mean difference of -0.14. This is smaller than country level average land holding size. For households with small land size expected to participate on other income generating activities to sustain their consumption.

Livestock holding (TLU): The participants owned a mean of 0.32 TLU and the nonparticipants owned a mean of 0.458TLU. Non-participants owned larger livestock population in terms of TLU than the program participants. This implies most of the households not have oxen for plowing there farm and they used to rent oxen from other.

Credit facility: From total sample only 44 households (22 %) got short term credit service to purchase different agricultural inputs and to participate on different income generating activates, while 156 households (78%) did not get short term credit service. Accordingly from the project participants 35 households (22.8%) got credit service, while only 9(19.5) Non-project participants have got no credit service. Credit access is the main input to participate on on-farm and off-farm activities. Because of the luck of credit most of the households participate on wage labor than those of more productive activities.

Off-farm participation& income: from total sample households 133 (66.5%) were participate on off-farm activities and there average income from off farm activity is 3888 birr. From total 153 program participants 99 household heads were participated on off farm activities. Most of the households participate on off-farm activity and get more off-farm income in addition to farm an transfer from the program this enable them to attain there food security and graduate from the program.

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Farm income: for the total sample the average income from annual crop is 6723 birr, and for program participants the average income is 6806 birr and for non participant it is 6451. On average farm income for participants' is greater than for non participants**.** This indicates that participant households get more income from their farm than non participant households. This may negatively determine their participation on off-farm activity.

Table 4.1: Descriptive Statistics for Continues Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	200	42.93	10.7	23	95
HHEdulev	200	1.15	2.21	0	9
LASize	200	.55	.48	0	3
ToHHsiz	200	5.81	2.02	1	10
deperat	200	.54	.245	0	1. 7
OFFfarminc	200	3800.5	4846.14	0	28800
TLU	200	.35	.57	0	3.015
FARMINCOME	200	6723	3638.75	0	24250
REMIAM	200	398	2794.59	0	36000
Psnp transfer	200	3077.55	1895.54	0	4970

Source: Own survey data (2018)

Table 4.2: Descriptive Statistics for Dummy Variable

Variable	Category	Freq.	Percent	Cum.
Sex	Female	87	43.50	43.50
	Male	113	56.50	100.00
MariSta	Un marred	22	11.00	11.00
	Married	178	89.00	100.00
Psnp beneficiary	Not beneficiary	47	23.50	23.50
	Beneficiary	153	76.50	100.00
Off-farm activity	Not participant	67	33.50	33.50
	Participant	133	66.50	100.00
Credit access	Yes	156	78.00	78.00
	No	44	22.00	100.00

Source: Own survey data (2018)

4.1.2 Types of farm activity:

Trade

Among trade activities, only small shops ('suks') and, grain trade and cattle trade are observed. From total sample 3(2.27) households participate on cattle trade, and 13(9.85) households are participated on pity trades like small suke and grain trade. Because of this activates need starting

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capital and law accessibility of credit in the study area participants in this off-farm activities are very small. In addition to starting capital this activate need capacity building and skill trainings but because of no institution that offers such type of support for the farmers the participants are very small.

Sale of local Drinks and Small Eateries

From the total sample of off farm activity participants 5(3.8%) household Heads engaging in this activity. Most of women households do not have skill to make local drinks and eateries and because of most of rural residents in the study area are Muslims there is low cultural acceptance for this business.

Traditional crafts (hand craft)

The common traditional crafts in Ethiopia include weaving, pottery, tannery and Blacksmithing. In the study area, from total sample of participants on off farm activity 4(3.8%) households are participating on blacksmith. In the study area most tolls for farming activity made and maintain locally. This enable household's participate in this activity to get customers and additional income.

Wage and salary Employment

Wage and salary employment is categorized first as public sector employment and private sector employment. Public sector employees in the study area are mainly teachers, health workers, development agents (DAs) and staff of the kebele administration. Their number in the sample is is 3(2.27%). Apart from the above categories of employment, which have a regular nature, poor farmer in the area have also access to casual employment opportunities as daily laborers on construction works, quarries and farms (plowing, threshing ,etc.). Their number is considerably higher 104 (78.79%). Daily wage rate in the study area ranges from 60 -100 birr for unskilled casual labor. This indicates that majority of households participate in this activity during the off farm and farm seasons.

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Table 4.3: Off-Farm Activities

Off farm activity type	Freq.	Percent	Cum.
Cattle trade	3	2.27	2.27
Daily labor	104	78.79	81.06
Hand craft	4	3.03	84.09
Local drink	5	3.79	87.88
Salary employment	3	2.27	90.15
Small trade	13	9.85	100.00
Total	132	100.00	

Source: Own survey data (2018)

4.2. Econometric Result Analysis

This section focuses on the results from the econometric analysis from the Probit and PSM models. This study used Probit model to identify the factors that affects the participation of the household in off-farm activity and PSM model was use to identify its role.

But before estimation was done, data exploration is an important step. To start with, to check whether multicollinearity is present or not a simple correlation coefficient matrix was conveyed. Gujarati (2005) establishes a rule of thumb, which says that multicollinearity is a serious problem when the correlation coefficient is 0.8 or above. Thus, though correlation is present, multi collinearity is not a serious problem in our data. (Appendix 2)

To test the significance of the probit model; the log-likelihood ratio test, the pseudo-R2 are used. The computation result for pseudo R2 is 0.1139 this results show that the models are statistically acceptable as 11.39% of the variation is explained in the probit model (table 4.6). For the Wald test, the calculated wald chi2 (13) is 24.41 The chi-square test shows that the model is significant at 5 percent level of significance showing that the overall model is a good fit and p value is too small, Prob > chi2 = 0.027. Hence, our data fits the probit model very well. (See table 4.6)

In most econometric data particularly in cross-sectional data, we are more likely to encounter heteroscedasticity problem. Since our data is cross sectional by its nature we are likely to encounter with the problem of heteroscedaticity. One of the important methods used to test the existence of heteroscedasticity in both logit and probit model is the log–likelihood ratio (LR) tests show the existence of Hetroscedasticity problems. This test shows that the null hypothesis

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of homoscedasticity is rejected, i.e. heteroscedasticity is the problem for the model. Because of this we cannot use a simple probit and Tobit model for this study rather we use heteroscedastic.

To correct these problem robust standard errors can be estimated. The coefficients of the bivariate probit model only give the significance and the direction of the effects of each explanatory variable on off-farm activity participaton. The marginal effects indicate that the probability that respondents accept or reject the offered bid due to a unit change in continuous explanatory variables and a change of dummy variables from 0 to1, for discrete variables (Greene, 2003). Both the coefficients and marginal effects of the probit of the general model with all covariates without constrained model are presented in below table:

Table 4.4: Estimation of Determinant using Probit model

Number of obs = 200
Wald chi2(13) = 24.41
Prob > chi2 = 0.0276
Log pseudolikelihood = -113.01071 Pseudo R2 = 0.1139

Varibles	Coef.	Robust Std. Err.	z	P>|z|	**Marginal effects**
Psnpp	-0.69	0.60	-1.14	0.25	-0.22
Sex	0.42	0.23	1.86	0.06	0.15
MariSta	-0.79	0.35	-2.29	0.02	-0.23
REMITANCE	0.18	0.41	0.45	0.66	0.06
Credacces	-0.19	0.24	-0.81	0.42	-0.07
FARMINCOME	-0.00008	0.00	-2.04	0.04	-0.000316
TLU	-0.23	0.20	-1.15	0.25	-0.08
Deperat	-0.19	0.44	-0.44	0.66	-0.07
ToHHsiz	0.13	0.07	1.89	0.06	-0.07
LASize	1.03	0.41	2.53	0.01	0.37
HHEdulev	0.08	0.05	1.64	0.10	0.03
Age	-0.02	0.01	-2.11	0.04	-0.01
Psnptransfer	0.00	0.00	0.61	0.54	0.00
_cons	1.49	0.69	2.17	0.03	

Source: Own survey data (2018)

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4.2.1. Determinants Of Off- Farm Activity Participation

Off-farm activity participation is one of the means to generate income for rural households. There is a general agreement in the literature that the driving forces of diversification operate at different levels i.e. macro, meso and micro levels (Davis, 2004; Warren, 2002; Haggblade, 2006).

Determinants of diversification at macro level include trade policies, exchange rate, fiscal and monetary policies, market and infrastructures policies and research and extension policies. Trade policy, for instance "directly affects diversification through inputs availability and prices, and production opportunities for export and for domestic consumption as well as through availability and price of goods for consumption" (Crole – Rees, 2002). Determinants of diversification at the meso level include environment (regional or local agro-ecology, topography, soil quality, rainfall etc) population, infrastructure and markets. More densely populated areas, for instance "may induce land pressure, which is most often the case, and hence, force household members to seek income outside the crop sector to secure food" (Crole-Rees, 2002).

Davis (2004) treats the meso level factors under the rubric "wider factors determining rural non-farm employment opportunities" and identifies five such factors that affect the viability of the rural non- farm economy: a) agricultural development b) natural resource endowments c) economic infrastructure d) level of public services e) rural town development, and f) business environment.

Diversification choices are also firmly rooted in the microeconomic logic of farming households (Warren, 2002). The elements usually considered include the household asset basis (such as land, livestock, savings, education, labor) and household characteristics (such as age, gender, dependency ratio). Some of the above elements (age and education, for instance) are dimensions of human capital as well. Apart from the above micro-level determinants, which are fairly measurable and quantifiable, some authors also propose less tangible and quantifiable factors like personal vision (Gordon and Craig, 2001). Those determinant factors that usually fall under social capital or social networks are of similar nature as the latter.

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Diversification decisions of rural households, as we have seen above, are determined by different factors operating at different levels. The analysis that follows, however, examines only the influence of the micro level (household and community level) factors in the study area on diversification using logistic regression. The following relationship is therefore investigated using these models.

Land size (farm size)

The coefficient of farm land size is contradicts from expected hypothesized singe but it is statically significant at 5%. Farm size was hypothesized to reduce the likelihood of participation on off-farm activities. Various studies on the relationship between farm size and off-farm income have also reported an inverse relationship (Mulat, 1997; Demissie and Workineh, 2004). Both theory and empirical evidence, however, are ambiguous concerning the relation of land holding or non-land wealth to income source diversification behavior. Delgado (2005) observes that both land and non-land assets have an empirically and theoretically ambiguous effect on the household's desire and capacity to diversify. "On the one hand, theory predicts that as the wealth of the household increases (in land and non-farm activities) the less risk-averse will be the household, and hence the more willing to undertake investments with uncertain return (such as new non-farm activities. On the other hand, households with less land or non-land assets would be more risk averse and hence more sensitive to the need to diversify"(Delgado,2005).

The average farm size of a household in the study population sample is, as mentioned earlier, 0.55 hectares, which is considerably lower than the national average of about 0.75 hectares. However, very acute land constraint is being experienced by the youth. Young people who were interviewed for this study have invariably reported their inability to access enough land to take up farming as their main occupation. An increasing number of male offspring are not receiving any inheritance. Table (4.4) indicates that increase in landholding by one hectare increase the probability of off-farm activity participation by 37%. This result is inconsistent with the finding of, Fadil .e and Elias (2016) and Delgado (2005) in both studies the farm land size affects off farm activity participation negatively.

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Livestock

Apart from serving as accumulation of wealth and social prestige, livestock holding generate income through sale of animals and animal products (milk, butter and the like.) and provide transport service. Livestock endowment seems, therefore an important asset for enhancing diversification It "is expected to have a positive effect on livelihood diversification through different channels: reducing risk aversion attitude of households, relieving liquidity constraints and generating income through sale of its products and services" Demisse et al. (2004). Livestock can also be used as collateral for loans to start off-farm enterprises.

The coefficient of livestock is not statistically significant this is because of that those households that have more live stoke unit have more risk averse behavior than that of lower livestock unit .

Livestock holding is statistically not significant and positively influence participation in off-farm income generating activity. The insignificant effect of livestock ownership on participation into off- farm activity could be attributed to the fact that households with no or small livestock holding are pushed towards the less rewarding wage employment activities like the Government rationing programs (PSNP) in which the resource poor households are targeted.

Gender

The sex dummy for the household head is meant to proxy gender-based differentiation of participation in off-farm rural livelihood activities. As hypothesized the sex coefficient has come out positive.

Sex of household head became a significant and positive determinant of participation in non/off-farm activity participation, at10% levels of significance, respectively revealing that the male headed households were able to participate in all off-farm employment activities compared to female headed households.

Among the study population, the predominant non-farm activity practiced by women is the sale of local drinks and pottery. These activities are the exclusive domains of women, as no male household heads are involved. Women also engage in sale of low-priced prepared food along with brewing local drinks. As the marginal effect estimation result from table (4.4) revolted that being male increase the probability of off farm activity participation by 15%, on average other factors remaining constant.

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Education

As expected, the education coefficient has turned out to be positive in the probit model result, and it is statically not significant. Age and education are commonly taken as proxies for human capital and management skills. Therefore, it is natural to expect that at least one of them is positively related to income and activity diversity.

Skilled and educated people are believed to be more prone to engage in non-farm activity because of their access to information and opportunities. Gordon and Craig (2001) state that there are several processes that reinforce the effect of education on incomes: Education increases skill levels, which are required for some rural non-farm activities, or contribute to increased productivity; Education can set in train processes that increase confidence, establish useful network or contribute to productive investment; and Non-educated family members may benefit from advice given by more educated relatives.

Family size

Family size was hypothesized to have a positive influence on off-farm activity participation. The coefficient has come out positive, confirming this and this is statistically significant at 10% level of significance. Family size is usually considered as an indicator of labor availability (Tegegne and Demssie et al 2000). Households with abundant labor supply are believed more likely to engage in livelihood diversification or have a higher participation in non-agricultural activities. Labor-rich households feel less constraint to send some of their members to non-farm activity (Demisse et al. 2004).

The size of a household may also set a limit to the number of household members able to survive from agriculture alone. Some members would thus be forced by the economic circumstances of the family into non-farm activities to supplement income. Thus, as household size increases, intra- household specialization can also increase. The result from table(4.4) indicates that one more increase in household size, increase the probability of participation on off –farm activity by 4% other factures being constant.

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Dependency ratio

Dependency ratio was expected to have a negative association with off-farm activity participation. The results that emerged from probit model have confirmed this but it is not statically significant.

Dependency ratio refers to the household structure in terms of age composition and is believed to affect income diversification opportunities of the household. "The burden of non-active members is expected to reduce intra-household specialization opportunities and increase the inducement for risk taker households to allocate more factors to food production" (Crole-Rees, 2000).
The numbers of the active persons and the non- active members is thus believed to have a direct impact on the management, resource allocation and specialization possibilities of the household.

Age of Household head

As hypothesized, the age coefficient has turned out to be negative in the models and it is statically significant at 10% level of significance. The usual reason offered in the literature by those who postulate a positive association between age and diversification is that older farmers are generally richer in experience and accumulated capital which makes non-farm activities attractive and feasible for them.

On the other hand, as Abdulai and Delgado (1999) found, "the probability of participation in non-farm activities increases up to a certain age (up to 33 for men and 30 for women), and is thereafter inversely related to age". Older farmers could be less prone to take risks than younger ones; they could also be less active, all of which are possible factors that may discourage them from engaging in non-farm activities.

In the study area, as mentioned earlier, the predominant non-farm activity is daily labor
, and most of those participating in these activities are the landless youth households. The probit model result revolted that as the age of the household increase by one more year the probability of participation on off-farm activity decrease by 1% other factures remaining constant.

Marital Status: this variable has negative relation with off- farm activity participation of household hade. The probit model regression result from table (4.4) indicates that the marital status coefficient is negative and it is statistically significant at 5% level of significant. Benign

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married decreases the probability of households' off-farm activity participation by 23%, keeping other factor constant.

Farm income: as hypothesized farm income affects off-farm activity participation negatively, and it is significant at 5% level of significant. The marginal effect from probit model indicates that as the farm income increase by one ETB, the probability off-farm activity participation will decrease approximate to zero (0. 0013%).

4.2.2 Results from Propensity Score Matching

Consistency Testing

Cronbach's alpha is a measure used to assess the reliability, or internal consistency, of a set of scale or test items. In other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency (Torres, 2007).

Cronbach's alpha is computed by correlating the score for each scale item with the total score for each observation (usually individual survey respondents or test takers), and then comparing that to the variance for all individual item scores: In the alpha test before standardizing and the total result Show 8.2%(Reject) and that is less consistence. So to increase the reliability or make more consistence must standardized and the total result 60 % (Good) that explains the more internal consistencies as well as the reliability measurement.

The first step in the application of the PSM model is the estimation of propensity scores. Thus, by including all important pre-intervention observable covariates that are expected to affect both participation in the program and the outcome variable simultaneously, the conditional probability of participating in the program for each household was estimated (see Table (4.5)). After the estimation of propensity scores for both participants and non-participants, the common support condition was checked by focusing on the visual analysis of the density distribution of the propensity score in both groups. The distribution of propensity score for non-participants and participants was found to be skewed to the left and the right respectively. In this paper, to avoid very poor matches the common support condition was imposed using the "minima and maxima" comparison approach. Matching methods such as the nearest neighbor without replacement and with replacement matching (including caliper), the kernel matching, and the radius matching

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were employed to get the control households that have similar characteristics as the treated households. Except the nearest neighbor without replacement matching method, the difference in the balancing results from the rest matching methods is not large (see Table (4.6)). However, among these matching algorithms, the radius matching method with a caliper of 0.1 resulted in the best balancing. Using this matching method, only 2 treated households (0.013% of the whole treated households) were out of the common support group. Therefore, by excluding these 3 treated households, the ATT is redefined as the mean treatment effect for those treated falling within the common support. As indicated in Bryson, Dorsett and Purdon (2002), since the proportion of lost individuals is fairly small, the estimated effect on the remaining households can be viewed as representative.

Table 4.5: Estimation of Propensity Scores using a logit model

Number of obs = 200
LR chi2(11) = 26.46
Prob > chi2 = 0.0055
Log likelihood = -95.817898 Pseudo R2 = 0.1213

Psnpp	Coef.	Z	P>|z|
Sex	.2111797	0.50	0.617
Age	.0005354	0.03	0.978
HHEdulev	-.0626153	-0.73	0.465
MariSta	-1.052701	-1.54	0.123
LASize	-1.206092	-2.17	0.030
ToHHsiz	.3688849	3.29	0.001
deperat	-.4251059	-0.54	0.591
TLU	-.4003931	-1.12	0.261
FARMINCOME	.000151	1.99	0.046
REMITANT	-1.013567	-1.70	0.088
credacces	.0977045	0.21	0.832
_cons |	.1600459	0.13	0.895

Source: Own survey data (2018)

Another important testable condition in the application of the PSM model is the balancing condition. The key idea of PSM is to construct a control group from the group of non-participant individuals. Most importantly, the balancing condition should also be satisfied; the control group should be as similar as possible to the treatment group with respect to pre-intervention observable characteristics. Thus, in this paper, the ability of the matching approach to balance the relevant covariates of these two groups was checked by using standardize bias approach of

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Rousbaum and Rubin (1985). The imbalance between the participant and non-participant households before and after matching was estimated. Accordingly, as indicated in Table (4.6), the overall average bias before and after matching was found to be 16.9% and 8.9%, respectively. This indicates that a significant reduction in bias could be achieved by the matching procedure which in turn implies the improved balancing characteristic in the treatment and the matched comparison group. The matching for each covariate was also very strong; except total household size none of the differences in mean of covariates is statistically significant.

Table 4.6: Balancing test on differences between treated and control households in mean of observed variables before and after matching for the full sample by using radius matching

	Unmatched	Mean		%reduct		t-test		V(T)/
Variable	Matched	Treated	Control	%bias	bias	T	p>|t|	V(C)
Sex	U	.5817	.51064	14.2	-	0.86	0.393	.
	M	.57616	.5198	11.3	20.7	0.98	0.327	.
Age	U	42.83	43.234	-3.5	-	-0.23	0.822	0.62*
	M	42.735	43.178	-3.9	-9.6	-0.37	0.708	0.92
HHEdulev	U	1.1242	1.234	-4.9	-0.30	0.767	0.92	
	M	1.1391	.80432	14.9	-204.7	1.41	0.160	1.34
MariSta	U	.88235	.91489	-10.7	-	-0.62	0.535	.
	M	.88079	.8772	1.2	89.0	0.10	0.924	.
LASize	U	.51176	.65479	-26.3	-	-1.81	0.072	0.38*
	M	.51026	.53222	-4.0	84.7	-0.42	0.675	0.66*
ToHHsiz	U	6.0392	5.0638	50.0	-	2.95	0.004	1.12
	M	5.9934	5.5312	23.7	52.6	2.10	0.036	1.16
Deperat	U	.54262	.52748	6.1	-	0.37	0.712	0.88
	M	.54141	.50557	14.4	-136.8	1.37	0.172	1.33
TLU	U	.31868	.45789	-21.8	-	-1.47	0.144	0.45*
	M	.32256	.23691	13.4	38.5	1.47	0.143	0.98
FARM INCOME	U	6806.5	6451.1	10.0	-	0.58	0.559	1.22
	M	6759.3	6781.6	-0.6	93.7	-0.06	0.953	1.84*
REMITANT	U	.05882	.14894	-29.6	-	-2.00	0.047	.
	M	.0596	.067	-2.4	91.8	-0.26	0.793	.
Credacces	U	.22876	.19149	9.1	-	0.54	0.592	.
	M	.23179	.26306	-7.6	16.1	-0.63	0.531	.

* if variance ratio outside [0.73; 1.38] for U and [0.73; 1.38] for M

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.122	26.71	0.005	16.9	10.7	88.2*	0.81	43
Matched	0.029	11.96	0.366	8.9	7.6	40.2*	1.52	29

* if B>25%, R outside [0.5; 2]

Source: Own survey data(2018)

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Table (4.7) presents summary balancing test using various matching methods. It indicates that the imbalance between the treated and non-treated is not significantly lowered after matching. However, the balancing test from the radius matching with a caliper of 0.1 resulted in the best balancing.

Table 4.7: Robustness Checks for Balancing Test

Radius matching with a Caliber of 0.1								
Sample	Ps R2	LR chi2	p>chi2	Mean Bias	Med Bias	B	R	% Var
Unmatched	0.122	26.71	0.005	16.9	10.7	88.2*	0.81	43
Matched	0.029	11.96	0.366	8.9	7.6	40.2*	1.52	29
Kernel matching method with a bandwidth of 0.25								
Unmatched	0.122	26.71	0.005	16.9	10.7	88.2*	0.81	43
Matched	0.045	18.87	0.063	9.5	5.8	50.9*	1.91	29
NN matching without replacement								
Unmatched	0.122	26.71	0.005	16.9	10.7	88.2*	0.81	43
Matched	0.036	14.89	0.188	12.2	11.8	44.8*	0.95	43
NN matching method using 5 nearest neighbors								
Unmatched	0.122	26.71	0.005	16.9	10.7	88.2*	0.81	43
Matched	0.030	12.57	0.322	9.4	11.4	41.1*	1.30	14
* if B>25%, R outside [0.5; 2]								

Source: Own survey data (2018)

Table (4.8) presents the effect of PSNP on off-farm income from various matching methods. It shows that the differences in the effect of the program among the employed matching methods are not large, except the NN matching without replacement. However, since the radius matching resulted in the best balancing, the interpretation is done only from this matching algorithm. Hence, the result portrays that participation in PSNP decrease off-farm income by 183 birr. Nevertheless, the effect is very low and it was not statistically significant.

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Table 4.8: Effect of Productive Safety net Program on Off-farm Income

ATT estimation with the Kernel Matching method				
Bootstrapped standard errors				
n. treat.	n. contr.	ATT	Std. Err.	T
153	45	-409.229	713.439	-0.574
ATT estimation with the Stratification method				
Analytical standard errors				
n. treat.	n. contr.	ATT	Std. Err.	T
153	45	-617.673	931.548	-0.663
ATT estimation with the Radius Matching method				
Analytical standard errors				
n. treat.	n.contr.	ATT	Std. Err.	T
153	45	-183.044	976.006	-0.188
ATT estimation with Nearest Neighbor Matching method				
(random draw version)				
Analytical standard errors				
n. treat.	n. contr.	ATT	Std. Err.	T
153	38	84.059	1326.268	0.063

Source: own survey data (2018)

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CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATION

5.1. Conclusion

The study was set out to investigate the effect of Ethiopia's PSNP on off-farm income of the rural households. Specifically, the study sought to answer the following research questions: 1) does PSNP participation have a significant effect on off-farm income? 2) What are determinants of off-farm activity participation? 3) What are the main off-farm activates adopted by program participants.

Agriculture is the dominant economic activity and the primary source of livelihoods for the rural households of the study area with its problems of high population growth, diminishing farm land size, erratic nature of drought, deteriorating production of agriculture through over time. The income contributions and the participation of non-farm and off-farm activities were determined and constrained by unexamined factors. Based on these, the primary and secondary sources of data were collected from 200 rural household heads by using multistage randomly sampled techniques for structured question interviewed and assessing and interviewing published data and unpublished data.

Thus, descriptive statistics result revealed that, from the sampled respondents the majority (66.5 %) of households was participated in off-farm activity. From the total sampled respondents almost all were got their livelihoods from agricultural activities, which account on average (50 %) of the total annual income. The remaining 27% of incomes of the rural household head were off-farm activities. The result of logit model regression also indicates that, out of twelve variables included in the model six independent variables were found to be significant. Gender (sex of household head), farming land size and total household size were found out significantly and positively affect the off-farm activity participation, while, age of household head, farm income and marital status were found out negative and significant factors. Whereas, PSNP participation, remittance, credit access, livestock holding, dependency ratio and house hold hade education level were insignificant.

Propensity score matching techniques was used to analyzes the effect of PSNP participation on off-farm activity income. Various matching methods such as, nearest neighbor matching using 5

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nearest neighbors with a caliper of 0.05, radius matching with a caliper of 0.1, and the kernel matching methods were used for the purpose of robustness check. Albeit the result from the PSM was not statistically significant, it indicates that participation in PSNP program had negative effect on the off-farm activity income.

5.2. Recommendation

The empirical results reported in this thesis leads to forward the following recommendations.

- Livelihood diversification to off-farm activities should be encouraged and implemented in a border sense through expanding training programs and access to opportunities.

- Older household heads are less likely to participate in off-farm wage and earn less in case they participate. Thus, the governmental and non governmental agencies should find sustainable aid to old ages because they cannot supplement their agricultural produce with other sources.
- Female headed households participate lower than their counterparts in off-farm activities. Thus, they should be provide with skill enhancing training in order to improve the quality of commodities they provide and get attractive return from these activities. Besides, they should also be provide with low interest rate credit which can help them to enlarge the scale of their enterprises, hence could reduce costs related with those activities and make them profitable.

- Current Behavioral change trainings provided by PSNP, should also focus to help farmers have attitudinal changes towards work and creativity. Especially the behavioral change programs should focus on off-farm income generating activities to which helps households to get more income than seasonal farming.

- PSNP participation decreases off-farm income. This not good indication for household's food security approval and graduation from the program. In order to increase off-farm income and off-farm activity participation Government and NGOs should provide training on more profitable off-farm activities for PSNP beneficiaries to support household's participation on off-farm income generating activities.

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- Finally, additional research should be carried out at different locations to acquire more empirical findings on the role of productive safety net program on community and country level.

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Annexes

Annex1

Research Questioner

This questionnaire is prepared by Redwan Kedir. I am a student of wolkite University, in Developmental Economics. The questionnaire is prepared as an instrument for a thesis paper to be submitted as partial fulfillment of master's degree in developmental economics. The aim of this questionnaire is to collect data about the role of productive safety net program in households' participation on off farm activities.

I would like to get your consent to participate in this study. Please be aware that participation is voluntary and you have the freedom to withdraw from the study at any time without any problem. I would also like to inform you that your identity will be fully protected. I promise not to reveal your identity in any of my report. All the information given will be kept confidential and the research report will not identify your response specifically. I also assure you that your responses will not fall into the hands of any third party other than me. Information received will be kept private and used for the purposes of the study alone.

I believe that the study will benefit all those stakeholders who are engaged in food security; policy makers and implementers in the area of food security particularly donor assistance group and the Ethiopian government. This study will inform the food insecurity situation in the family, the role of productive safety net program in helping households participation on off farm activities.

Thank you.

Household Identification

ID	Name	Code
1.Kebele		

Personal information

2. Name of Household _____

3. Sex Male ☐ Female ☐

4. Age _____

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5. Marital Status

a) Single b) Married c) Divorced d) Widow

7. Educational Status

a) Illiterate b) Read and write c) Church School d) Other specify: _____

8. Is the head of the household economically active?

a) Yes b) No

9. If not active, why?

a)Sick b)Aged c)Disabled d)Others specify:_____

10. How many children do you have? _____

11. Total Family size_____

12. Number of total dependents

Less than 14_____ Over 65_____

13. How many members of the family are economically active?

_____

26. Apart from PSNP, has your household received assistance from any friend or relative living outside the household?

a) Yes b) No

27. If yes, what items did you receive? Please select that apply

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a) Remittances (from relative living elsewhere b) Other cash gift c) Cash loan with no interest

d) Food/grain gift e) Grain loan with no interest f) Seed gift

g) Seed loan h) Free labor i) Free use of oxen or plough for farming

j) Free use of pack animals for transport k) Other, specify_____

29. Do you have access to land for agricultural use?

a) Yes b) No

30. What is the total size of the land you use?

Land Type	Amount in Hectare
Cultivated land	
Grazing land	
Other	

31. What types of assets do you have now?

Asset Type	**Number**
Cows	
Oxen	
Heifers	
Calves	
Sheep	
Goats	
Mules	
Horses	
Donkey	
Chicken	
Beehive	

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36. Did you or your household members work in activities apart from crop production and livestock rearing?

a) Yes b) No

37. If yes, would you tell us about the types of activities your family members are engaged in and the main purpose for which you used the money? (eg. tannery, pottery, weaving etc.)

Activity type	Member Participated	Days spent on work per month	Estimated daily income from the job	Earning used for

I. : To assess the role of PSNP in helping households' participation on off farm activities

44. How long have you been a beneficiary of PSNP?_____ Years

47. What benefits do you get from PSNP (Circle those that apply)

a) Food b) Cash c) Supplementary food d) Seed e) Farm tools

f) Credit loan g) Fertilizer h) Other specify_____

48. Do you have to work for it? a) Yes b) No

50. Do you think that the food/cash transfers you get from PSNP help you on off farm activity participation?

a) Yes b) No

54. As PSNP participant, have you been given skills training and education by the government?

a) Yes b) No

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55. What kinds of education and skills trainings have you received from PSNP so far? Tick that applies.

a) Training on nutrition (sufficient and quality foods for family)

b) Bee hiving

c) Improved varieties of seeds

d) Irrigation

e) Soil conservation

f) Business planning-livestock fattening

g) Business planning-non-farm business

h) Business planning-vegetables and fruits

i) Other, specify_____

56. Are you given support from the government agents when you need assistance or advice on how to proceed with your business?

a) Yes b) No

57. As PSNP participant, have you received microfinance services such as microcredit loans?

a) Yes b) No

58. If yes, how much are you given? _____birr.

59. If yes, what did you do with it?

_____

60. If no, why have you not been given credit?

a) Interest on loan is a lot

b) I am not selected

c) I have another loan which I didn't pay

d) I am not interested to do business

e) Other, specify_____

23. Has the project intervention increased your capacity to participate on off farm activity?

a. Yes b. No

24. If yes, in what way?

1. _____

2. _____

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3. _____

25. If no, why?

1. _____

2._____

3._____

30. What is the average Yearly income for the last Three Years? _____

31. For the last three years, what has been the trend in the level of your overall income?

a. Increased significantly b. increased c. remained the same d. Decreased

e. Decreased significantly

32. Why did your income increased (if increased)? a. Able to buy inputs b. Able to purchase

Of business assets c. Working capital from credit d. diversifying existing business

e. Got jobs f. Good agricultural season

g. Others (specify)_____

33. Why your income did stay the same or decreased (if stayed same or decreased)?

a. Lack of credit b. Crop failure c. Family member lost employment

d. Illness or death in the family e. No opportunities for diversification

f. Others (specify) _____

_____

36) What are the major cash incomes?

a. On farm; b. Animals c. off farm; Trading of crops d. trading of animals

e. Others (Specify)

f. Nonfarm activities: Pity commodity_____ House making_____ Toiler_____

Weaving_____ making Local drinking _____ metal and wood working_____

others_____

_____

37) Did you make diversification or improvement of your production activities in the last three years? a. Yes b. No

38) If yes, why?

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a. Access of credit b. sold the assets c. others (specify) _____

_____

_____

39) If no, why?

a. Lack of access to credit b. Lack of land c. Low level of income

d. Others (specify) _____

40) If diversify, what are the new source of income you had for the last two years?

a. On farm b. Off farm, (Specify)

c. Non-farm, (Specify) _____

_____

41) As a results of diversification your income; a. Increased b. Same c. Decreased

42) if increased how? _____

_____

_____

43) If remain the same or /decreased/, why? _____

_____

_____

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Annex 2

. probit OFFfarmactipart Psnpp Sex Age HHEdulev MariSta LASize ToHHsiz deperat TLU FARMINCOME REMITANT credacces

Iteration 0: log likelihood = -127.53263
Iteration 1: log likelihood = -113.41729
Iteration 2: log likelihood = -113.20688
Iteration 3: log likelihood = -113.20638
Iteration 4: log likelihood = -113.20638

Probit regression — Number of obs = 200
LR chi2(12) = 28.65
Prob > chi2 = 0.0044
Log likelihood = -113.20638 — Pseudo R2 = 0.1123

OFFfarmactipart	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Psnpp	-.3375725	.2523977	-1.34	0.181	-.8322629	.1571179
Sex	.4260727	.2260739	1.88	0.059	-.017024	.8691694
Age	-.0216784	.0109283	-1.98	0.047	-.0430974	-.0002593
HHEdulev	.0745026	.051512	1.45	0.148	-.0264591	.1754643
MariSta	-.7779151	.3605308	-2.16	0.031	-1.484542	-.0712878
LASize	1.041793	.3718958	2.80	0.005	.3128902	1.770695
ToHHsiz	.1579779	.058709	2.69	0.007	.0429104	.2730455
deperat	-.1773299	.441504	-0.40	0.688	-1.042662	.6880019
TLU	-.2359411	.2075386	-1.14	0.256	-.6427093	.1708271
FARMINCOME	-.0000885	.000041	-2.16	0.031	-.0001688	-8.20e-06
REMITANTS	.1792327	.3954861	0.45	0.650	-.5959059	.9543713
credacces	-.1901673	.2354334	-0.81	0.419	-.6516084	.2712737
_cons	1.354157	.6824482	1.98	0.047	.0165828	2.691731

WKULISDL

. mfx

Marginal effects after probit

y = Pr(OFFfarmactipart) (predict)

= .68602647

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
Psnpp*|	-.1138498	.08017	-1.42	0.156	-.270978	.043279	.765
Sex*|	.1522174	.08073	1.89	0.059	-.006019	.310454	.565
Age |	-.0076902	.00388	-1.98	0.047	-.01529	-.000091	42.925
HHEdulev |	.0264292	.01824	1.45	0.147	-.009318	.062176	1.15
MariSta*|	-.2253238	.0798	-2.82	0.005	-.381728	-.068919	.89
LASize |	.369567	.13047	2.83	0.005	.113855	.625279	.545375
ToHHsiz |	.0560413	.02085	2.69	0.007	.015184	.096899	5.81
deperat |	-.0629063	.15659	-0.40	0.688	-.369822	.24401	.53906
TLU |	-.0836981	.07338	-1.14	0.254	-.227519	.060123	.351395
FARMIN~E |	-.0000314	.00001	-2.17	0.030	-.00006	-3.1e-06	6723
REMITA~S*|	.061074	.12871	0.47	0.635	-.191203	.313351	.08
credac~s*|	-.0690409	.08717	-0.79	0.428	-.239894	.101813	.22

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

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. corr Psnpp Sex Age HHEdulev MariSta LASize ToHHsiz deperat OFFfarminc TLU FARMINCOME REMITANTS credacces

(obs=200)

| Psnpp Sex Age HHEdulev MariSta LASize ToHHsiz deperat OFFfar~c TLU FARMIN~E REMITA~S credac~s

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Psnpp | 1.0000

Sex | 0.0608 1.0000

Age | -0.0161 0.1564 1.0000

HHEdulev | -0.0211 0.2103 -0.2651 1.0000

MariSta | -0.0441 0.3684 -0.1672 0.1469 1.0000

LASize | -0.1274 -0.0385 0.2622 -0.0631 0.0411 1.0000

ToHHsiz | 0.2054 0.2278 -0.0709 0.0604 0.3240 0.1187 1.0000

deperat | 0.0263 0.1607 -0.2105 0.0930 0.2185 0.0894 0.4233 1.0000

OFFfarminc | -0.0089 0.1149 -0.1085 0.0757 0.0578 -0.1784 0.1718 0.0922 1.0000

TLU | -0.1038 0.0165 0.1271 -0.0306 0.0851 0.4552 0.1669 0.1406 -0.0192 1.0000

FARMINCOME | 0.0415 0.0382 0.1823 0.0287 0.0465 0.6748 0.1540 0.0875 -0.1902 0.4272 1.0000

REMITANTS | -0.1408 0.0357 0.0573 0.0134 -0.0141 0.1307 0.0461 0.0925 0.0301 0.1891 0.0697 1.0000

credacces | 0.0381 0.0034 -0.1524 0.0732 0.0324 -0.0440 0.0681 -0.0223 0.0347 0.0636 0.0229 -0.0676 1.0000

WKULISDL

Test scale = mean(unstandardized items)

Item	Obs	Sign	item-test corr.	item-rest corr.	interitem cov.	alpha	Label
Psnpp	200	+	-0.0735	-0.0735	9668.734	0.0831	Psnpp
ACHHME	200	-	0.0202	0.0199	9659.051	0.0830	ACHHME
Age	200	-	-0.1119	-0.1142	9730.853	0.0835	Age
DIpHHMEM	200	+	0.1964	0.1960	9647.43	0.0829	DIpHHMEM
FARMINCOME	200	+	0.8124	0.0860	43.79115	0.0011	FARMINCOME
HHEdulev	200	+	0.1232	0.1227	9652.768	0.0829	HHEdulev
LASize	200	+	0.5661	0.5660	9652.906	0.0829	LASize
MariSta	200	+	0.0584	0.0582	9666.093	0.0830	MariSta
OFFfarmact~t	200	+	-0.0480	-0.0481	9668.292	0.0830	OFFfarmactipart
REMIAM	200	+	0.6510	0.0865	-26.61306	.	REMIAM
Sex	200	+	0.0768	0.0766	9665.063	0.0830	Sex
TLU	200	+	0.3932	0.3931	9655.295	0.0829	TLU
ToHHsiz	200	+	0.1756	0.1751	9648.45	0.0829	ToHHsiz
credacces	200	+	-0.0227	-0.0228	9667.574	0.0830	credacces
deperat	200	+	0.1244	0.1245	9665.5	0.0830	deperat
Test scale					8377.74	0.0826	mean(unstandardized items)

Test scale = mean(standardized items)

WKUISDL

Item	Obs	Sign	item-test corr.	item-rest corr.	interitem corr.	alpha	Label
Psnpp	200	+	0.1582	-0.0129	0.1065	0.6253	Psnpp
ACHHME	200	-	0.1947	0.0245	0.1040	0.6192	ACHHME
Age	200	-	0.2818	0.1147	0.0986	0.6049	Age
DIpHHMEM	200	+	0.7631	0.6755	0.0676	0.5037	DIpHHMEM
FARMINCOME	200	+	0.4330	0.2792	0.0888	0.5771	FARMINCOME
HHEdulev	200	+	0.3614	0.2001	0.0934	0.5907	HHEdulev
LASize	200	+	0.3659	0.2050	0.0931	0.5898	LASize
MariSta	200	+	0.4550	0.3034	0.0875	0.5730	MariSta
OFFfarmact~t	200	+	0.2602	0.0920	0.0999	0.6085	OFFfarmactipart
REMIAM	200	+	0.2934	0.1270	0.0978	0.6028	REMIAM
Sex	200	+	0.3927	0.2343	0.0914	0.5849	Sex
TLU	200	+	0.4077	0.2509	0.0905	0.5820	TLU
ToHHsiz	200	+	0.6115	0.4865	0.0774	0.5400	ToHHsiz
credacces	200	+	0.1974	0.0270	0.1040	0.6190	credacces
deperat	200	+	0.6737	0.5621	0.0733	0.5254	deperat
Test scale					0.0916	0.6020	mean(standardized items)

WKULSDL