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Graduation Determinants of Productive Safety Net Program In Wuchale Woreda of Oromia Regional State, Ethiopia

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Abstract

This paper attempts to assess the effect of the Productive Safety Net Program (PSNP) on household food security. The study employed a mixed approach to meet its objectives. For this study, 187 households and 11 experts and managers total of 198 respondents were selected. To meet study objectives both primary and secondary data sources were used. The primary data were gathered through household interviews and questionnaires. Descriptive statistics employed to assess implementation status and effectiveness of PSNP While binary logistic regression was employed to examine factors affecting the household's PSNP graduation from food insecurity. The overall findings of the study revealed that there are still gaps in the course of implementation and its effectiveness in the program despite the contribution of PSNP to food security. The study found that household-level factors such as gender, educational level of the household head, dependency ratio, nonfarm income, access to credit service, and access to agricultural extension services were significant to affect households' graduation from PSNP. Finally, the study recommends that the program should balance female and male-headed beneficiary households. Also, to improve the problem with the targeting and graduation stand-in with the established criteria and develop accountability is crucial. Finally, to analyze the effects of the program on beneficiary households living in an area regarding food security, this study recommends including a control group of non-beneficiary respondent households is important for future work.

Keywords*: Food Security, Productive Safety Net Program, Household, Graduation Factors, Binary Logit*

1. Introduction

The Productive Safety Net Program (PSNP) is a social protection program by the Government of Ethiopia targeting food-insecure households. It was established in 2005, the program aims to prevent household asset depletion and create community assets. To this end, the program contributes cash or food payments against public works that construct local infrastructure (e.g. roads) or protect the environment (e.g. terracing). Poor and vulnerable households with limited labor capacity receive unconditional (direct support) payments. Moreover, eligible households with pregnant or lactating women or infant children are receiving temporary direct support. PSNP operates in chronically food-insecure districts (woredas) in six Ethiopian regions: Afar, Amhara, Oromia, Somali, Southern Nations, Nationalities, and Peoples' Region, and Tigray [1]

The PSNP has two components, namely Public Work (PW) and Direct Support (DS). The PW component requires 'adult able-bodied' people to do some community work in exchange for transfers. Each person is expected to do public work for five days per month and gets 30 birrs (US$1.70) in total (which increases to 50 birr – US$2.80 – later) or 15kg of grain. Direct Support beneficiaries are those households without labor'. They include mainly the elderly and the disabled. They get the same rate of transfer as those involved in public work [2].

The PSNP includes many interesting features, such as public works activities geared towards improving climate resiliency; a risk financing facility to help poor households and communities to better cope with transitory shocks, including households outside of the core program; and the use of targeting methods that assist the most climate-vulnerable community members to obtain the full benefits of consumption smoothing and asset protection. The program also works through and focuses on strengthening, existing government institutional systems at all levels – rather than creating separate systems. Households leave the program through graduation and households involved in

the program can get support through the Other Food Security Program (includes the provision of credit for farm and non-farm activities) to ensure their graduation (Ibid).

1.1 Statement of the Problem

Ethiopian population, most of which (85.3%) live in rural areas and earn their living from agriculture [3]. Ethiopian rural societies make a contribution to agricultural production and to ensuring food security. They have been struggling to improve agricultural productivity and food security in all aspects of crop and livestock production.

Provision of improved farm inputs such as modern fertilizer and improved seeds and training farmers on better farming practices have been carried out to increase agricultural productivity of smallholder farmers, which predominate the agriculture sector in the country. The productive safety net program on its part was designed to enable poor households to achieve food security by way of getting payments for works that help in the community and household asset building [4].

The Ethiopian productive safety net program, one of the largest social protection programs in the continent [5], is designed to protect people in chronically food-insecure areas from the consequence of economic and environmental shocks. This program aims at making very poor households resilient to such shock by helping them avoid selling their assets and gradually build more assets through transfer in the form of food and/or money. In the end, beneficiary households will have enough resources that enable them to cope with any shock. That is when they are considered ready to exit the program [6]. Graduation is, therefore, the major component and objective of the program.

But there is a poor understanding of the concept of graduation. Below woreda level, the understanding of the concept becomes very loose, at times completely uninformed, and at times completely incorrect. Most disconcertingly, many graduates interviewed had no understanding of why they had been graduated [5].

In Ethiopia, studies are made concerning the Productive Safety Net Program in rural areas. Many pieces of research were conducted on the impact of PSNP on food security but most of the researches mainly concentrated on factors of food insecurity, determinants of graduation from PSNP, determinants of PSNP, and the effect of PSNP on asset accumulation. To mention some, [7] studied graduation determinants of Productive Safety Net Program beneficiary households. [8] had made a study on the Contribution of Urban Productive Safety Net Program to Households' Livelihood Improvement and Environmental Protection.

There are also some studies on factors affecting the graduation of beneficiaries from PSNP [5], [9]. However, these studies did not analyze the effect of dependency ratio, targeting mechanism, and natural factors for graduation through a quantitative approach and overlooked the perception of beneficiaries towards graduation. In addition to this, there is a low level of graduation in the study area and a lot of questions rose regarding the implementation of PSNP graduation. Thus, it is important to include the implementation of the household's graduation from PSNP. Besides, the majority of the investigators tried to analyze at the national or regional level with a larger spatial recommendation and there is no researcher with a similar study in Wuchale Woreda which has its own specific socio-economic and natural contexts.

Hence, this study has been done to fill these gaps. Therefore, the study had an objective to assess graduation determinants of the Productive Safety Net Program of households in Wuchale Woreda. Specifically, the study assessed the implementation status, evaluate the effectiveness, and examine graduation determinants of the Productive Safety Net Program of households in the study area.

2. Review of Related Literature

2.1 Review of the Conceptual foundation of PSNP

2.1.1 The Productive Safety Net Program

According to the PSNP implementation manual, has the objective to enhance resilience to shocks and livelihoods, and improve food security and nutrition, for rural households vulnerable to food insecurity. Since the program has its origin as a response to shock created by one of the major droughts in Ethiopia, the productive safety net was introduced to protect vulnerable households from depleting their assets [6]. The program has two components, public work, and direct transfer components. All able-bodied households and beneficiaries are supposed to provide labor service to public work planned by the *woreda* administration which is also meant to help build community assets. Other vulnerable people, about 15% of the total beneficiaries, like the old, orphans, lactating mothers, malnourished children, and people with disabilities receive the direct cash transfer. For PW participant transfer is made either in cash or food [10].

Frank E, (2013) explained the rudiments of PSNP of Ethiopia, a seasonal social safety net program designed to prevent famine and household assets by anticipating in advance the food access failure of chronically food insecure rural households. In addition to this, The PSNP operates mainly as a workfare program in which transfer was provided in exchange for labor in public works or essential infrastructural projects of the community. The PSNP represents an important logistical achievement, reaching 7.5 million individuals, and is cost-efficient in its delivery of transfers. Furthermore, PSNP prevents the emergence of famine in Ethiopia since 2005. While the PSNP has been successful at addressing the predictable food gaps of the poorest 10 percent of the population, it has been less successful at addressing the basic factors reproducing food insecurity in the long term, and there has been slight effective graduation from the program since its inception.

2.1.2 Graduation from Productive safety net Program

According to ESSP II – EDRI Report (2013), “graduation” describes a process whereby recipients of support move from a position of depending on external assistance to a condition where they no longer need this support, and can, therefore, exit the program. A “graduation guidance note” (GFDRE cited in EDRI Report, 2013) describes graduation from the PSNP as a transition from “chronically food insecure” to “food sufficient,” defined as follows:

> *The graduation of a household takes place when, the households stop receiving transfers from PSNP, and it can meet its food needs for all 12 months and can withstand modest shocks.*

As indicated in the EDRI Report (2013) on Evaluation of Ethiopia's food security program, the PSNP is designed to protect existing assets and ensure a minimum level of food consumption, the HABP is designed to assist households in increasing incomes generated from agricultural activities and to build up assets so that they will be able to “graduate” of the program. The theory has two stages of graduation. From extreme-poor and chronically food-insecure households are targeted with PSNP transfers. At the same time, intensive support in the form of custom-made products and financial literateness and savings facilities is encouraged and provided so that households can stabilize assets and, over time, move out of poverty. As households' level of poverty reduces, extension services, complementary community investment, and business advice (OFSP and HABP) are provided. As households’ economic base develops stronger, they inter in the range of the first threshold for graduation. These households will likely need further support through extension and credit provision, provided under the FSP and this will allow them to accumulate assets. At some point, the households will become strong enough to care for themselves and will graduate off the FSP altogether (this is the second level of graduation).

Graduation in Ethiopia has two-stage processes. The first is graduation from the PSNP and the second is graduation from the Food Security Program. Therefore, in this study graduation from the PSNP was the focal point of the researcher. The notion of ‘’graduation’’ has been integral to thinking about PSNP since its inception. ‘Graduation’’ describes a process whereby recipients of support move from a position depending on external assistance to a condition where they no longer need this support, and can, therefore, exit the program. A ‘’Graduation Guidance Note’’ describes graduation from PSNP as a transition from ‘’chronically food insecure’’ to ‘’food sufficient’’,

defined as follows: ‘’A household graduated when, in the absence of receiving PSNP transfers, it Can meet its food needs for all 12 months and can withstand modest Shocks’’(Ibid).

However, the manual also states that the graduated households will remain in the PSNP for one more additional year and will continue to receive PSNP transfer for the full year after they are evaluated to graduate (ibid). The objective of graduation has started to dominate discussions with is social protection agenda in Ethiopia as the second phase of PSNP gains pace. Phase two will end in 2014 and the intention is that the majority of public works beneficiaries will have graduated from the program by then [9].

2.1.3 Implementation status of Productive Safety Net Program in Ethiopia

Desalegn et al., (2017) sought to see if PSNP implementation can in improving the graduation from food insecurity of households. They carried out the research using a binary logistic regression model to identify factors influencing graduation from PSNP. Their finding indicates that the safety net program didn't trust the graduated households are food secured rather the respondents contend there is no critical contrast among the present and graduated recipients of PSNP.

In addition, the finding of the study insists the program suffers a lot of setbacks during the implementation process and the household’s potential in accumulating assets is a very low and disproportionate effect in preventing sell off their assets. This leads to the low confidence of households to leave the program, develop a sense of dependency syndrome, and believe the graduation process is a matter of time rather than reaching the food self-sufficiency threshold. Moreover, government support is limited to PSNP and lacks other development. The process of graduating households from PSNP fails to follow the procedures of graduation guidance notes and program implementation manual. This leads to low asset accumulation, low community participation in decision-making, and high interest to stay in the program. Consequently, the beneficiaries leave the program without reaching the appropriate graduation benchmark and remain chronically food insecure (Ibid).

2.2 Review of Empirical Studies on the Graduation Determinants of Productive Safety Net Program

2.2.1 Graduation Determinants of Productive Safety Net Program

Desalegn et al., (2017) analysis of factors affecting household graduation from the Ethiopian Productive Safety Net Program. The study result utilized a binary logistic regression model to identify factors influencing family unit graduation from PSNP. The results showed that eight variables were found to be statistically significant out of twelve variables. Sex, access to irrigation, non-farm participation, targeting mechanism, access to credit, and agricultural farm inputs had a positive and huge effect on graduation and drove program members to have a greater likelihood of graduation, while the family size and drought adversely impact graduation.

Sharp and Brown (2006), finds propose that targeting mechanisms affect the household’s graduation from the productive safety net program. The PSNP implementation manual states each beneficiary household need to receive full family targeting. However, according to Sharp and Brown (2006), in practice the there is the dilution of transfer in all regions. This affects the graduation of households from PSNP because the transfer distributed to households with the smallest amount and affects the ambition of households to be food self-sufficient and dampens the positive effect of OFSP and PSNP. The common form of dilution is cutting the family size which follows inclusion family members who have the able-bodied and neglecting those members unable to participate in public works.

Gebre and Girma (2012), the study indicate drought as the main natural shock that affected PSNP. From the four regions (Tigray, Amhara, Oromiya, and SNNPR) 57% of the clients report that they are forced to lose some assets and food gaps due to subsequent drought. Loss of crops was the second natural factor that affected households during their stay in PSNP which make 36% of beneficiaries vulnerable. Next was frozen which affect the production of crops and other cash crops. 22 of the beneficiaries affected by natural calamities induced by fresh flood is another exogenous factor included under natural factors hampering beneficiaries and their graduation. Finally, serious illness, death of relatives, and family splitting affected more than 32 percent of the beneficiaries.

Devereux et al., (2014), in their study on transforming livelihoods for a resilient future in Bangladesh, Rwanda and Ethiopia try to identify the main factors enabling and constraining graduation by dividing it into program-specific,

market-specific, beneficiary specific and environment-specific enablers and constrainers. Consequently, inappropriate benchmarks, lack of complementary programs, and partial family targeting are the major program-specific constrainers. In addition to this, the study analyzes price change and the lack of market for goods, labor, and credit as market-specific constrainers. Lack of desire to graduate, initial household asset, and business know-how are the beneficiary enablers and constrainers of graduation. Finally, the study also considers natural shocks as an environment-specific constrainer. Thus, solving the constrainers of graduation in this study is considered an enabler to graduate from the program.

In a study by Tadele M. (2011), the result also shows that perceived profitability of using chemical fertilizer and influenced the likelihood of participating in chemical fertilizer positively while off-farm income had a significant negative effect on it. Plot size, livestock ownership had a positive impact on the intensity of chemical fertilizer use whereas age and education of the household head, land holding, distance of a plot, and soil fertility status had a negative influence on it.

Gilligan et al., (2009), using Propensity Score Matching techniques, the study found that the program has little impact on participants on average, due in part to transfer levels that fell far below program targets. Beneficiary households that received at least half of the intended transfers experienced a significant improvement in food security by some measures. However, households with access to both the PSNP and packages of agricultural support were more likely to be food secure, to borrow for productive purposes, use improved agricultural technologies, and operate their nonfarm business activities. For these households, there is no evidence of disincentive effects in terms of labor supply or private transfers. However, estimates show that beneficiaries did not experience faster asset growth as a result of the programs.

Béné et al. (2012), the study indicates drought as the main natural shock that affected PSNP. From the four regions (Tigray, Amhara, Oromiya, and SNNPR) 57% of the clients report that they are forced to lose some assets and food gap due to subsequent drought. Loss of crops was the second natural factor that affected households during their stay in PSNP which make 36% of beneficiaries vulnerable. Next was frozen which affect the production of crops and other cash crops. 22 of the beneficiaries affected by natural calamities induced by fresh flood is another exogenous factor included under natural factors hampering beneficiaries and their graduation. Finally, serious illness, death of relatives, and family splitting affected more than 32 percent of the beneficiaries.

2.3 Conceptual Framework of the Study

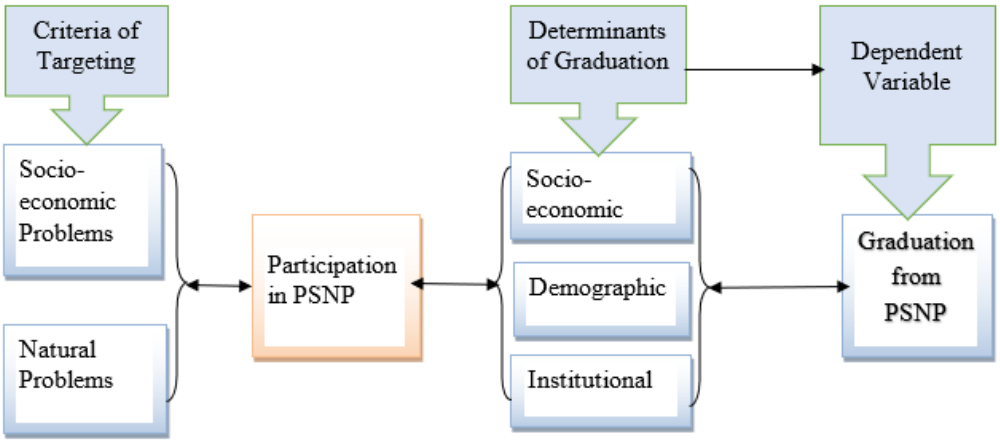

Figure 2.1: Conceptual Framework study
Source: Own draw, 2020

3. Research Method

3.1 Research Design

This study adopted a mixed research design to assess the practice of productive safety net programs in Wuchale Woreda Oromia regional state thereby effect on food security. A cross-sectional research type for both qualitative and quantitative approaches was used in the study design to produce a comprehensive analysis of the study.

A qualitative approach was conducive to study the research to gain a deep understanding of the safety net program: its main activities, its contribution to improving households 'livelihood, and limitations. A quantitative approach is used to quantify and see the relationship among variables. The survey was carried out to conduct a cross-sectional study to collect data on the socio-economic, demographic characteristics, and natural factors of households, livelihood conditions (food security and income status) of beneficiary households, and the perception of respondents towards the program among others.

3.2 Target Population and Sampling Strategy

The target populations for the study are beneficiaries and stakeholders of 3rd round productive safety net programs such as households, development agents, Woreda agriculture office, and risk and disaster office. Regarding the qualitative data, unlike the quantitative case, the sample cannot be predetermined by the researcher, rather it can be accepted up to when the saturation point is reached.

Both probability and non-probability sampling methods were employed to match with the selected approach. For the survey method, both probability and nonprobability sampling was used to select a sample. And for the qualitative part, non-probability sampling was used to select respondents.

According to WAO (2020), administratively, the woreda encompasses 24 rural kebeles with 4 kebeles PSNP have been employed and all 4 kebeles (namely, Welanso Aroji, Iticho Kura, Bole Becho, and Nono) were included in the study. The sampling frame for this particular study was rural households that are found in 4 kebeles. Of Wuchale woreda two kebeles (Welanso Aroji and Iticho Kura) from Dega and Bole Becho and Nono from woinadega agroecology zone[1].

Based on WAO (2020), the number of beneficiaries' households in 2007 (3rd round of PSNP) was 1,550 of which 1,075 were public work participants and 475 of them were directly supported. From the total household beneficiaries, 38 graduated households and 149 non-graduate households were sampled for the study. The sampling technique employed was a simple random sampling method by considering the proportion from both graduated and non-graduate households.

To sample the respondents, the study employed a simplified formula provided by Yamane (1967) cited in Desalegn et al., 2017) to determine the required sample size at 95% confidence level, degree of variability 0.5, and level of precision = 7% (.07).

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

n = is the sample size, sample drawn from the total households of the selected kebeles

N = is the population size, the total households estimated to benefit from 3rd round of PSNP of the selected kebeles (1550)

e = is the level of precision/sampling error tolerated for the study = 7% was used. The above formula required a minimum of 180 respondents.

$$n = \frac{N}{1 + N(e)^2} = \frac{1550}{1 + 1550(0.07)^2} = 180$$

[1] There is no PSNP in Kolla agroecology zone.

By adding 10% contingency, the samples for this study were 180+180*0.1=198. From these, 187 (36 graduated and 151 nongraduate households) questionnaires were returned properly and shows 94.44% returned.

3.3 Source and Method of Data Collection

Data was collected through primary data collection methods such as surveys, and key informant interviews. Instruments for the methods of data collection were designed and disseminated to the sampled respondents. These multi-response instruments were translated into Afan Oromo with similar meanings for better understanding.

Secondary sources, such as books, journal articles, web sites, were reviewed. Reports and other archival documents such as register books, directives, correspondences of the woreda, and the kebeles under study were used to supplement the primary data.

3.4 Data Analysis

Data were analyzed using logistic regression analysis, and descriptive statistics. The descriptive statistics such as frequency and percentage were used to describe the dummy and categorical variables of sample respondents whereas the descriptive statistics like mean, and standard deviation will be used to describe the continuous variables of the sample respondents. Generally, in using descriptive statistics the categorical and continuous variables of sample respondents were described.

Besides descriptive statistics, this study involved the use of binary Regression models to analyze graduation determinants of PSNP. The binary logistic regression was used to determine the factors of some socio-economic characteristics of the households on their PSNP graduation. The parameter of the logistic regression model has been estimated with the Maximum Likelihood Estimation (MLE) technique. A binary response function is specified and estimated by the logistic procedure. The binary logistic specification is suited to models where the endogenous variable is dichotomous, which in this case are the households who are graduated and those who are not graduated.

A binary logistic regression model was employed for this study, where Y is graduation from PSNP and independent variables are depicted by X's. To explain the model, the following logistic distribution function was used [18]

Variables:

- Let Y be a binary response variable

  $Y_i = 1$ if the Households were graduated in a community i

  $Y_i = 0$ if Otherwise

- X = (X_1, X_2, ..., Xk) be a set of explanatory variables that can be discrete, continuous, or a combination. x_i is the observed value of the explanatory variables for observation i.

$$P_i = Pr\,(y=1|X=x_i) = \frac{\exp\,(\beta o+\beta 1 xi)}{1+\exp\,(\beta o+\beta 1 xi)} \ldots\ldots\ldots\ldots\ldots(2)$$

$$logit(P_i) = log\left(\frac{Pi}{1-Pi}\right) = logit(P_i) = \beta_0 + \beta_1 X_i \ldots\ldots\ldots\ldots(3)$$

$$= \beta_0 + \beta_1 X_{1i} + \ldots + \beta_k X_k \ldots\ldots\ldots\ldots(4)$$

***Assumptions*:**

- The conditional mean of logistic regression has a value between 0 and 1
- It does NOT assume a linear relationship between the dependent variable and the independent variables, but it does assume a linear relationship between the logit of the response and the explanatory variables; $logit(\pi) = \beta_0 + \beta X$.
- The data Y_1, Y_2, ..., Y_n are independently distributed, i.e., cases are independent.

- No multi-collinearity among the independent variables
- Errors need to be independent but NOT normally distributed.

3.5 Study Variables

The dependent variable in this study is graduation from PSNP at the household level; designed to measure the graduation determinants of PSNP in the study area. It's a dummy value in the model. It is represented by 1 if households are graduated and 0 otherwise.

The independent variables expected to have an association with participation in the program are Household head sex, educational level, marital status, total family size, dependency ratio, agro-climate zone, farm size, non-farm income, credit service, use of chemical fertilizer, followed by DAs, use of improved seeds, extension service, and occurrence of drought.

4. Result And Discussion

4.1 Descriptive Statistics Study Variables

4.1.1 Demographic Characteristics of Households

A total number of 187 households had participated in the study: Sex, Age, educational level, marital status, household size, and Dependency ratio were the socio-demographic variables included in the study. The finding in this study showed that, in four kebeles, the majority of the beneficiaries of PSNP households were male-headed (61.0%) and the remaining were female-headed households (39.0%). About 56.3% and 43.7% of non-graduate beneficiaries were male and female-headed households respectively. Similarly, about 80.6% and 19.4% of graduated beneficiary households were male and female-headed households respectively. However, the chi-square test (p-value = 0.007) analysis shows that there is a statistically significant difference in the sex of the household head among the graduated beneficiary and non-graduate beneficiary households. The probability of graduation among male-headed and female-headed households is different. i.e. the likelihood of graduation from the productive safety net program of male household head was greater than female households in the study area.

The next demographic variable in table (4.1) below showed the age of households. Of the sample beneficiary households, 29.9% were above age 50, 27.3% were between the age of 41-50, 23.5% were between the age of 31-41 and 19.3% were at the age of 18-30. As the p-value (0.000) result reveals, there is a significant difference in the age of the household head among the graduated households and non-graduate households. This indicated that households with 31-41 years of age category had the chance of graduation that the other age groups. The adult age group had the probability to graduate from the productive safety net program than older and younger age groups.

Table 4.1: Demographical Characteristics of Households

Variables	Categories		Graduation Status			Chi-Square	P-value
			No	Yes	Total		
Sex of Households	Male	Freq.	85	29	114	7.192	0.007
		%	56.3%	80.6%	61.0%		
	Female	Freq.	66	7	73		
		%	43.7%	19.4%	39.0%		
Age of Households	18-30	Freq.	34	2	36	23.64	0.000
		%	22.5%	5.6%	19.3%		
	31-40	Freq.	32	12	44		
		%	21.2%	33.3%	23.5%		
	41-50	Freq.	49	2	51		
		%	32.5%	5.6%	27.3%		
	Above 50	Freq.	36	20	56		
		%	23.8%	55.6%	29.9%		
The education level of Households	Illiterate	Freq.	77	8	85	33.94	0.000
		%	51.0%	22.2%	45.5%		
	Religious School	Freq.	25	1	26		
		%	16.6%	2.8%	13.9%		
	Grade 1-4	Freq.	47	20	67		
		%	31.1%	55.6%	35.8%		

	Grade 5-8	Freq.	2	7	9		
		%	1.3%	19.4%	4.8%		

Source: Own Survey result, 2020

In terms of education level 45.5% of graduated and non-graduate were household's illiterate, 35.8% were graduated and non-graduate households with the education level of first Cycle (1-4), 13.9% were graduated and non-graduate households who are attended religious school, and the other 4.8% were with secondary (5-8) school. Hence, the majority of the sample household's education level fell in the category of uneducated. Of non-graduate households, the share of illiterate was the majority (51.0%). From the chi-square test, the p-value is 0.000 which is less than the alpha value (0.05), there is a significant association in the education level of the household head between the graduated households and non-graduate households groups. Implies, households with higher education level had the probability to graduate from the productive safety net program than those with lower education level.

Table 4.2: Demographical Characteristics of Households (Two)

Variables	Categories		Graduation Status			Chi-Square	P-value
			No	Yes	Total		
Marital Status of Households	Married	Freq.	103	27	130	10.676	0.005
		%	68.2%	75.0%	69.5%		
	Divorced	Freq.	38	2	40		
		%	25.2%	5.6%	21.4%		
	Widowed	Freq.	10	7	17		
		%	6.6%	19.4%	9.1%		
Household family Size	1-2	Freq.	14	0	14	15.406	0.002
		%	9.3%	0.0%	7.5%		
	3-4	Freq.	94	14	108		
		%	62.3%	38.9%	57.8%		
	5 and above	Freq.	43	22	65		
		%	28.5%	61.1%	34.8%		
Dependency ratio (Number of dependent households' member/total household size)	0.0-0.25	Freq.	64	26	90	31.030	0.000
		%	42.4%	72.2%	48.1%		
	0.26-0.5	Freq.	85	8	89		
		%	56.3%	22.2%	49.7%		
	0.51and above	Freq.	2	2	4		
		%	1.3%	5.6%	2.1%		

Source: Own Survey result, 2020

From table 4.2 above the marital status of the survey, the result showed, the majority of the respondent households were married 130(69.5%), divorced 40 (21.4%), and widowed 17(9.1%). Out of the graduated households, the majority of 27(75.0%) were married, 19.4% widowed and 5.6% were divorced households. Similarly, the share of married was higher than divorced and widowed for nongraduate households (68.2% were married, 25.2% divorced and 6.6% widowed). Regarding the association of marital status with graduation status, the p-value =0.005 implies there is a significant relationship between marital status and graduation status. Whereas out of the female-headed households, 23 (31.5%) were divorced and no widowed in the study areas. The survey shows a large proportion of divorced among the female-headed households in the study areas. From the result, female-headed households are relatively single mothers which could have contributed to their vulnerability to poverty. As Girma 's (2012) finding showed, food insecurity was worse in female-headed households implying that males are to some extent more engaged in income-generating activities than females. Similarly, this study's single female heads could not engage in intense income-generating activities that could expose their households to have an insecure livelihood.

As shown in Table 4.2 above, the household size ranged from 1 to 5 persons and had a mean of 3.86. The majority of 108 (57.8%) had 3-4 household members, 65 (34.8%) had above 5 household members, and (7.5%) had 1-2 members. Of non-graduate 62.3%, 28.5%, and 9.3% from beneficiaries were household size with 3-4, 5 and above, and 1-2 respectively. From the chi-square test, the p-value is 0.002 which is less than the alpha value (0.05), there is a significant association in the household size between the graduated household and non-graduate household groups. This is similar to the study conducted in Dessie by Tesfaye (2016) where 57.14% of respondents had 3-4 family members. As studies showed, household size and poverty have inverse relations which means that as the size of household increases the households will tend to be poor.

The other variable is the dependency ratio, which is the ratio of the number of dependent household members (household members less than age 15 and above age 65) to total household family size. Based on this, the result indicated that the majority of households 93 (49.7%) and 90 (48.1%) had a dependency ratio of 0.26-0.5 and 0.0-

0.25 respectively. And the remaining 4(2.1%) households had a 0.51 and above dependency ratio. From the chi-square test, the p-value is 0.00 which is less than the alpha value (0.05), there is a significant association in the dependency ratio between the graduated household and non-graduate household groups.

4.1.2 Socio-Economic Factors

Table 4.3: Socio-Economic Factors of PSNP Graduation

Variables	Categories		Graduation Status			Mean Difference	P-value
			No	Yes	Total		
Farm size of households	Less than 2 hectares	Freq.	67	4	71	-.58643	0.001
		%	44.7%	11.4%	38.4%		
	2-4 hectares	Freq.	80	31	111		
		%	53.3%	88.6%	60.0%		
	4 & above hectares	Freq.	3	0	3		
		%	2.0%	0.0%	1.6%		
Households non-farm income	200-400 birr	Freq.	38	2	40	-119.19	0.003
		%	59.4%	7.1%	43.5%		
	401-600 birr	Freq.	17	21	38		
		%	26.6%	75.0%	41.3%		
	More than 600 birrs	Freq.	9	5	14		
		%	14.1%	17.9%	15.2%		

Source: Own Survey result, 2020

Based on the results in table 4.3 above, of 187 sample households, a majority (60.0%) of them had farm size 2-4 hectares, 38.4% less than a hectare, and the remaining 1.6% of them had 4 and above hectares. The mean land size of the graduated beneficiary and the non-graduate beneficiary is 2.57 and 1.99 respectively in a hectare. The mean comparison of the two groups in terms of mean farm size reveals that there is a significant difference between graduated and non-graduate households in farm size. i.e. graduated households hold more farm size than non-graduate households.

Non-farm income is also another determinant factor of households. The data was computed only for households with nonfarm income (92 of 187 households). Based on this, of households with non-farm income, 43.5% of them earn 200-400 birr, 41.3% earn 401-600 birr, and the remaining 15.2% earn above 600 birrs per month. Non-graduated households earned nearly 1.3 times more than non-graduated households for this study. The standard deviation for a non-farm income of graduated household's 123.3 Br. less than that of non-graduated households (180.4). This difference, therefore, has contributed to the significant association of the nonfarm income to the graduation status of households. The p-value of 0.003 shows there is a significant mean difference among graduated and non-graduated households in terms of non-farm income and implies that non-farm income is an important predictor.

4.1.3 Institutional Factors

Continuous Institutional Factors

Table 4.4: Continuous Institutional Factors of PSNP Graduation

Variables	Categories		Graduation Status			Mean Difference	P-value
			No	Yes	Total		
Continuous duration of households in the current place	≤15 years	Freq.	10	0	10	2.774	0.250
		%	6.7%	0.0%	5.4%		
	15-30 years	Freq.	32	7	39		
		%	21.5%	19.4%	21.1%		
	>30 years	Freq.	107	29	136		
		%	71.8%	80.6%	73.5%		
Per Month contact with DAs	Less than 4 times per month	Freq.	51	0	51	-0.53801	0.000
		%	33.8%	0.0%	27.3%		
	4-8 times per month	Freq.	94	30	124		
		%	62.3%	83.3%	66.3%		
	More than 8 per month	Freq.	6	6	12		
		%	4.0%	16.7%	6.4%		

Source: Own Survey result, 2020

From table 4.4 above**,** of the sample households, their duration in the current place was 73.5% above 30 years, 21.1% 15-30 years, and the remaining less than 15 years. the mean continuous duration of the graduated households and the non-graduate households is 39.19 and 32.79 respectively in years. The mean comparison of the two groups in terms of mean continuous duration reveals that there is no significant difference between the graduated households hold and non-graduate households. Implies the duration of the current place doesn't matter for graduation status.

Regarding the per month contact, the mean per month contact with DAs of the surveyed households was 1.12. The results also show that the mean per month contact with DAs was 1.56 and 1.0175 for graduated and nongraduated households respectively. The comparisons of the mean per month contact with DAs of the two groups may seem that graduated households have more contact than nongraduate. However, the statistical P-value for the equality of the mean per month contact with DAs of the two groups shows a statistically significant difference. Nongraduate households have less contact than graduates.

Dummy Institutional Factors

The categorical variables measured in the nominal scale can be seen in Table 4.5 below are tested for significance of association with the dependent variable. From the total of sample respondents, 63.6% of the households had access to credit services in the study area. Among the graduated households, 77.8% used credit service while 60.3% of respondents from non-graduate households used a credit service. The chi-square test result (p-value = 0.05) showed that there was a statistically significant association in access to credit service among graduation status of households.

Table 4.5: Dummy Institutional Factors of PSNP Graduation

Variables	Categories		Graduation Status			Chi-square	P-value
			No	Yes	Total		
Access to credit service	No	Freq.	60	8	68	3.853	0.050
		%	39.7%	22.2%	36.4%		
	Yes	Freq.	91	28	119		
		%	60.3%	77.8%	63.6%		
Use of chemical fertilizer	No	Freq.	59	2	61	14.858	0.000
		%	39.1%	5.6%	32.6%		
	Yes	Freq.	92	34	126		
		%	60.9%	94.4%	67.4%		
Use of improved seed to improve productivity	No	Freq.	63	5	68	9.732	0.002
		%	41.7%	13.9%	36.4%		
	Yes	Freq.	88	31	119		
		%	58.3%	86.1%	63.6%		
Use irrigation for your farm's productivity	No	Freq.	112	12	124	21.702	0.000
		%	74.2%	33.3%	66.3%		
	Yes	Freq.	39	24	63		
		%	25.8%	66.7%	33.7%		
Get agricultural extension service	No	Freq.	80	5	85	18.203	0.000
		%	53.3%	13.9%	45.7%		
	Yes	Freq.	70	31	101		
		%	46.7%	86.1%	54.3%		

Source: Own Survey result, 2020

In the use of chemical fertilizer: most of the respondents, 126 households used chemical fertilizer and the remaining 61 households didn't use fertilizer. Of those who didn't use fertilizer, 39.1% were non-graduate households and only 5.6% were graduated and of those who used fertilizer, 60.9% were non-graduate households and 94.4% were graduated. For this reason, the application of fertilizer to a farm is found to have a significant association with graduation. The p-value for the chi-square test is 0.000 which is less than 1% of the level of significance.

Improved seed though, the application of improved seed does not become the norm in the agricultural production process like a fertilizer does, it still has considerable popularity among farmers. Of the total 187 respondents 119 (63.6%) households use improved seeds while the remaining 68 (36.4) households do not use improved seeds. Among those users, improved seeds 58.3% belong to the non-gradated while the graduated constitute 86.1%. Among the who don't use improved seeds, the proportion is 41.7% for non-graduated and only 13.9%% for graduates. The chi-square test result shows that there was a statistically significant association among the and access

of using improved seed. This implies that the application of improved seeds has a determinant effect on graduation. As it is, the p-value confirms with 0.002 significance.

*For access to irrigation, a*bout 33.7% of the total sampled households have access to irrigation and 66.3% of households don't have access to irrigation. Concerning access to irrigation within the graduation status, about 25.8% were from the non-graduate whereas 66.7% were from graduated households. The p-value shows a statistically significant association between graduated and non-graduated households in their access to irrigation use.

From the total of sample respondents, 101 (54.01%) of the households had got agricultural extension services in the study area. Among the graduated households, 86.1% got agricultural extension services while 46.7% of respondents from non-graduate households got agricultural extension services. The chi-square test result shows that there was a statistically significant association between graduation status and access to agricultural extension service (p-value =0.000).

4.1.4 Natural Factors

The occurrence of Drought can be an important natural factor of graduation. In this study the variable's relationship to the dependent variable is significant. Of 187 households 35.3% response no to the occurrence of drought and 64.7 "yes" to the occurrence of drought. Of those who didn't experience the drought, 27.2% were non-graduate households and 69.4% were graduated and of those who experienced occurrences of drought, 72.8% were non-graduate households and 30.6% were graduated. The chi-square test result shows that there was a statistically significant association between graduation status and access to agricultural extension service (p-value =0.000).

Table 4.6: Natural Factors of PSNP Graduation

Variables	Categories		Graduation Status			Chi-square	P-value
			No	Yes	Total		
Occurrence of Drought	No	Freq.	41	25	66	22.767	0.000
		%	27.2%	69.4%	35.3%		
	Yes	Freq.	110	11	121		
		%	72.8%	30.6%	64.7%		

Source: Own Survey result, 2020

4.2 Results and Discussions

In this section, the data obtained by different data collection instruments and from respondents were presented and analyzed according to the research objectives through different illustration mechanisms and statistical tools that are relevant to the nature of research objectives and data collected.

4.2.1 Implementation Status of Productive Safety Net Program

In this subsection, this study analyzed how the implementation of a productive safety net program takes place. This can be accessed through how targeting was done (major criteria of targeting, engagement in decision making, participatory and accountability in targeting and a whom group of individuals is targeted), how was the transparency of targeting mechanisms, and know-how of community their inclusion and exclusion from the program in the study area. Besides, the data from the interview and wuchale Woreda agriculture office report document also present in this sub-section.

Targeting

The PSNP is a targeted program where the targeting methods are used to embody a mixed set of approaches that include both administrative and community components. How is targeting supposed to work in the PSNP? How is this understood and implemented at the regional, woreda, and kebele levels? How is targeting understood at the household level? Who participates in the PSNP? How consistent is this with the Project Implement Manual (PIM)? Should be considered (ESSP II, 2013).

Based on the targeting mechanism, in table 4.7 below households' perception on the major criteria of targeting in the study area: 44.4% of the respondents indicate that generally the poorest are targeted; 26.2% attribute it to aged and

disabled of the household heads; 11.8% to family size; 9.6% to political orientation; and the rest 8.0% to the farm size.

Regarding engagement in decision making about targeting or appeals, the study finding indicated that: 40.1% of households responded decisions were made by FSTF (Food Security Task Force), 34.2% by both FSTF and woreda cabinet and 25.7% by woreda cabinets.

The other variable is assessing how the targeting process in particular kebele participatory or not. Based on this the study reveals 79.1% of households in the study area the targeting was fair while only 15.0% and 5.9% of households from the survey responded good and non-participatory, respectively. In accountability of decision-makers within the PSNP process, a majority (62.6%) of the households that participated in this study said that accountability of decision-makers within the PSNP is downward to members of the community while the rest of respondent responded upward to the higher-level government (Table 4.7 below).

The last for targeting variables for this study are particular groups of individuals within a community marginalized from PSNP? Based on this of 187 respondents who participated in this study, the majority (95.2%) responded there is no group of individuals marginalized, and only 4.8% responded yes there is a group of individuals marginalized from the PSNP.

Table 4.7: Implementation Status of Targeting in Productive Safety Net Program

Variables	Categories	Frequency	Percent
Major Criteria for Targeting Households' in PSNP	Poorest	83	44.4
	Political attitude	18	9.6
	Farm size	15	8.0
	Family size	22	11.8
	Aged and disabled	49	26.2
Who engages in decision-making about targeting or appeals?	FSTF	75	40.1
	Woreda Cabinet	48	25.7
	Both	64	34.2
How 'participatory' is the targeting process in a particular community/kebele?	Non-participatory	11	5.9
	Fair	148	79.1
	Good	28	15.0
Accountability of decision-makers within the PSNP process	Upward to higher-level gov't	70	37.4
	Downward to members of the community	117	62.6
Groups of individuals marginalized from this process	No	179	95.2
	Yes	9	4.8

Source: Own Survey result, 2020

Mechanisms Targeting Transparent

In this subsection data presented concerning how the mechanism of targeting was transparent for the households for both participants and non-participants of the productive safety net program. In this subsection, there are four (table 4.8 below) items administered to households. The respondents were asked to express their level of agreement with the statements.

As shown in Table 4.8 below, the majority of respondent households 56.1% has no idea, and 24.6% of them respond sure to the statement "*Do beneficiaries know why and how they were selected for participation in the PSNP?*" and the remaining (19.3%) not sure or neutral on the issue. The next item included in the questionnaire was "are the names of beneficiaries posted at the local level?" in the statement the larger frequency covered by having no idea and accounts 49.7%, 26.2% not sure, and 24.1% sure on the statement.

Table 4.8: Transparent Targeting in the Productive Safety Net Program

Variables		Agreement Level			Median
		Not Sure	Have no idea	Sure	
Do beneficiaries know why and how they were selected for participation in the PSNP?	Freq.	36	105	46	1.00
	%	19.3%	56.1%	24.6%	
Are the names of beneficiaries posted at the local level?	Freq.	49	93	45	1.00
	%	26.2%	49.7%	24.1%	
Are names of beneficiaries read out at local meetings?	Freq.	109	26	52	0.00
	%	58.3%	13.9%	27.8%	
Are there other ways transparency mechanisms	Freq.	50	81	56	1.00

operating?	%	26.7%	43.3%	29.9%	
Total	Freq.	244	305	199	1.00
	%	32.63%	40.75%	26.60%	

Source: Own Survey result, 2020

In the item "are names of beneficiaries read out at local meetings?" the majority (58.3%) respondent agreement level showed not sure, (27.8%) sure, and 13.9% have no idea on the statement. In terms of the statement "are there other ways transparency mechanisms operating?" a majority of households responded (43.3%) have no idea, a 29.9% response showed sure which is an agreement, and 26.7% response showed not sure which is disagreement.

Based on this, the overall figure in table 4.8 above indicated that 40.8% of households who participated in the study responded have no idea while 32.6% not sure, and 26.6% of them responded sure about the transparency of the targeting mechanism. The median value of the transparency of the targeting mechanism is 1.00 which is the same to have no idea.

Decision Making and Community Know-how

In Table 4.9 decision-making process and community know-how of targeting and inclusion in and exclusion from benefit as well as food and cash-based assistance were illustrated. Here, in the table, there were five statements included in the questionnaire. The first item "*community understand their exclusion from benefits*" majority (73.3%) agreed and respond sure and, 26.7% neutral or have no idea. In the statement "*community understands their inclusion within the PSNP*" of 187 households 39.0% responded showed that sure which is an agreement, 31.0% response have no idea or neutral, and 29.9% not sure about the issue.

Table 4.9: Decision Making in the Productive Safety Net Program

Variables		Agreement Level			Median
		Not Sure	Have no idea	Sure	
Community understand their exclusion from benefits	Freq.	0	50	137	1.00
	%	0.0%	26.7%	73.3%	
Community understand their inclusion within the PSNP	Freq.	56	58	73	1.00
	%	29.9%	31.0%	39.0%	
The community understand the overall number of beneficiaries selected	Freq.	54	51	82	1.00
	%	28.9%	27.3%	43.9%	
The community understand eligibility for Public work and direct support	Freq.	28	57	102	2.00
	%	15.0%	30.5%	54.5%	
Community understand food and cash-based assistance	Freq.	30	53	104	2.00
	%	16.0%	28.3%	55.6%	
Total	Freq.	168	269	498	2.00
	%	18.0%	28.8%	53.3%	

Source: Own Survey result, 2020

The other statement was "*Community understand the overall number of beneficiaries selected*" in this idea majority (43.9%) sure, 28.9% not sure and 27.3% have no idea on the issue. In the item "*Community understand eligibility for Public work and direct support*" the majority of the respondent (54.5%) sure, 30.5% have no idea, and 15.0% not sure about the statement ideas. Besides, the majority of respondents (55.6%) sure (agreement), 28.3% have no idea or neutral, and 16.0% not sure or disagree with the statement "Community understands food and cash-based assistance".

The overall decision making and community know-how result of the five variables indicated that majority of the household which participated in the study responded 53.3% sure, 28.8% neutral or have no idea, and the rest 18.0% not sure. The median (2.00) value is the same as sure or agreement.

Personnel

In this subsection data presented concerning the number of personnel of the productive safety net program with four indicators (variables) in the study area. The respondents were asked to express the number of personnel with high, medium, and low on the statements.

As showed in Table 4.10 below, the majority of respondent households 72.2% responded medium, and 23.5% of them respond high on the statement "*number of development agents*" and the remaining 4.3% responded low on the issue. The next item included in the questionnaire was "*number of administrators*" in the statement the larger frequency covered by medium and accounts for 70.6% 18.2% high and 11.2% low on the statement.

Table 4.10: Personnel

Variables		Agreement Level			Median
		Low	Medium	High	
Number of Das	Freq.	8	135	44	1.00
	%	4.3%	72.2%	23.5%	
Number of administrators	Freq.	21	132	34	1.00
	%	11.2%	70.6%	18.2%	
Turn-over of kebele staff	Freq.	42	28	117	2.00
	%	22.5%	15.0%	62.6%	
Monitoring and evaluation related to targeting and graduation	Freq.	139	25	23	0.00
	%	74.3%	13.4%	12.3%	
Total	Freq.	210	320	218	1.00
	%	28.1%	42.8%	29.2%	

Source: Own Survey result, 2020

Besides, regarding the turn-over of kebele staff, the majority (62.6%) of households respond high and 27.5% respond low and medium and finally, in item "*Monitoring and evaluation related to targeting and graduation*" 74.3% response reviled that low, 13.4% medium, and 12.3% high.

The personnel result of the 4 variables indicated that majority of the household which participated in the study responded 42.8% medium, 29.2% high, and the rest 28.1% low. The median value of the personnel is 1.00 which is the same as to medium.

Appeal About PSNP Targeting

In theory, the program implementation manual (PIM) asserts that individuals, households, and groups have the right to appeal against targeting decisions. The kebele cabinets and the woreda food security task forces (WFSTFs) are the first and second tier of appeal, respectively. The former is responsible for hearing any complaints, claims, or appeals on the beneficiary selection process and for taking appropriate corrective measures in consultation with the WFSTFs (MoARD, 2009).

Based on this the survey result in table 4.11 is about the appeal to if they have a complaint about PSNP targeting was illustrated. Here, in the table the majority 48.7% responded to kebele authorities, 25.7% to woreda food security task force, 13.9% to social courts, the remaining 11.8% to the community meeting, and religious leader appeal if they have compliant regarding targeting.

ESSP II (2013), report state the several causes of appeal. Of these exclusion from the PSNP is the principal cause of appeals. Partial targeting and delay of transfers are other reasons for appeals and complaints. Appeals are made to the KFSTF, kebele cabinet, the development agents, Kebele Appeal Committees (KAC), village leaders, and others.

Table 4.11: Appeal About PSNP Targeting

Variables	Categories	Frequency	Percent
To whom do you have an appeal if they have a complaint about PSNP targeting?	Kebele Authorities	91	48.7
	Social courts	26	13.9
	Woreda FSTF	48	25.7
	Community meeting	20	10.7
	Religious leaders	2	1.1

Source: Own Survey result, 2020

Transparency of the Graduation Process

Graduation' out of food insecurity is a key goal of the overall Food Security Program. Over time, the PSNP should enable beneficiary households to become food secure and hence graduate. Then the process of graduation should be fair and transparent. Then regarding this, transparency of graduation process indicated in table 4.12 below, the majority (69.5%) of households who participated in this survey responded the graduation process is not fair and

transparent while 30.5% of the households responded there is a fair and transparent process of graduation in the study area.

Table 4.12: Transparency of the Graduation Process

Variables	Categories	Frequency	Percent
Do you think the graduation process has been fair and transparent?	No	130	69.5
	Yes	57	30.5

Source: Own Survey result, 2020

Ranks of Implementation Problems

Regional and woreda public works officials recounted many implementation difficulties that contributed to these problems. These problems are limited capacity, dependency attitude, and the tendency of DAs to work with more successful farmers rather than the poorest (ESSPII–EDRI REPORT, 2013, p121). Based on this the survey result indicated that, the mean rank of the problem 1.7433 for limited capacity, 1.8289 for the tendency of DAs to work with more successful farmers rather than the poorest, and 2.4278 for dependency attitude. Implies limited capacity is ranked as a severe problem in the study area.

Table 4.13: Ranks of Implementation Problems

Problems		Ranks			Mean	Mean Difference	Sign.
		1st	2nd	3rd			
Limited capacity	Freq.	95	45	47	1.7433	-0.5587	0.00
	%	50.8	24.1	25.1			
The tendency of DAs to work with more successful farmers rather than the poorest	Freq.	66	87	34	1.8289	-0.1087	0.412
	%	35.3	46.5	18.2			
Dependency attitude	Freq.	26	55	106	2.4278	0.6674	0.00
	%	13.9	29.4	56.7			

Source: Own Survey result, 2020

To analyze the mean difference among non-graduate and graduate households, the t-test statistics result indicated that there is a significant mean difference between non-graduate and graduate households for limited capacity and dependency problems. But there is no significant difference in the tendency of DAs to work with more successful farmers rather than the poorest among non-graduate and graduate households in the study area (see table 4.13 above)

Major Problems Prevailing in the Process of Households Targeting

Based on the survey result in table 4.14 is about major problems prevailing in the process of household targeting were illustrated. Here, in the table the majority 35.3% responded to lack of community participation, 25.1% to less consideration of aged and disabled, 17.6% to corruption, 11.2% to exclusion of the neediest, the remaining 10.7% to non-poor inclusion, and less consideration of female-headed households' as major problems prevailing in the process of households targeting.

Table 4.14: Major Problems Prevailing in the Process of Households Targeting

Variables	Categories	Frequency	Percent
Major Problems Prevailing in the Process of Households Targeting	Exclusion of the neediest	21	11.2
	Non-poor inclusion	18	9.6
	Lack of community participation	66	35.3
	Corruption	33	17.6
	Less Consideration of aged and disabled	47	25.1
	Less Consideration of female-headed HHs	2	1.1

Source: Own Survey result, 2020

4.2.2 Effectiveness of Productive Safety Net Program

In this subsection, this study analyzed how the effectiveness of a productive safety net program takes place which is the 3rd objective of the study. This can be accessed through the data from questionnaires, interviews, different

reports, and documents. This section mostly concentrated secondary data to measure the productive safety net program effective or not concerning the goals and targets planned to attain.

Achieving key Principles i.e. 'fair and transparent client selection, timely, predictable and appropriate transfers', and 'primacy of transfers' the PSNP is effective (MoARD, 2014). Based on this, table 4.15 below deals with the indicators of productive safety net based on both households and agricultural leaders and experts' responses. Of four indicators, aims and principles of productive safety net program questionnaire were administered for only the experts in the woreda and kebeles due to their familiarity and understanding with the issues. The left two indicators were administered for both households and experts in the study area.

Table 4.15: Indicators for effective Productive Safety Net Program

Variables/Indicators	Categories	Percent	Median
PSNP aims to provide 'predictable transfers to meet predictable needs. Does the actual practice is effective?	Disagree	72.7	1.00
	Have no idea	--	
	Agree	27.3	
Is there any training or awareness creation on graduation from PSNP and its criteria?	No	40.9	Nominal data
	Yes	59.1	
How do you rate the evaluation of regional and district-level officials and experts for the effective program?	Weak	37.4	1.00 P=0.04
	Medium	47.0	
	Good	15.7	
Two principles of the PSNP are predictability and avoiding dependency. In your kebele which principle is effective?	Predictability	27.3	Nominal data
	Avoiding dependency	54.5	
	Both	18.2	

Source: Own Survey result, 2020

Regarding the effectiveness of one PSNP aim which is to *"provide 'predictable transfers to meet predictable needs"* of leaders and experts who participated in the study, 72.7% of them disagree and the rest agree on the effectiveness of the aim of PSNP. The median value falls in the category of disagreeing and the same with the majority of the expert's response. The finding by Devereux et al. (2006) similar to this study's findings which is "PSNP transfers did not provide complete protection against hunger and rationing in 2005 – the transfers were either too small or too unpredictable."

On the statement "training or awareness creation on graduation from PSNP and its criteria," the study result of the aggregate response of households and experts shows 117 (59.1%) of the respondent agree with the issue and responded yes while 81 (40.9%) of the respondent responded no training or awareness creation on graduation from PSNP and its criteria. The qualitative result that support respondent of yes training or awareness creation on graduation from PSNP and its criteria, even if the training and awareness creation is not enough.

Training households in the safety net program is very important in their success to graduation. The importance of training for graduation is also is supported by Girma (2018) by quoting the idea of Sengupta (2013) "training is very important even with a free asset, one can be lost without training". But the findings of other studies also indicated that there is a solid understanding at regional levels of the concepts and mechanisms of graduation; however, there was only one mention of two-tiered graduation. Understanding at the woreda level is also fairly consistent. Below the woreda level, the understanding of the concept becomes very loose, at times completely uninformed, and at times completely incorrect (EDRI, 2013).

The other indicator both respondents participated in was "*how do you rate the evaluation of regional and district level officials and experts for the effective program?*". For this, the majority evaluation of experts and households fall under medium and weak while with a small number of respondents evaluate as effective. Of all respondents 47% evaluate as a medium, 37.4% evaluate as weak and, only 15.7% evaluate as the regional and district level officials and experts for the effective program is good. By measure of central tendency: median value which is 1.00 indicated that households, leaders, and expert's evaluation of the regional and district level experts for effective PSNP is medium.

To test the response of the households and experts' the study used an independent sample Mann-Whitney U test with the null hypothesis: the distribution of evaluation of regional and district level experts for the effective program is the same among the two groups. Based on the result, the study rejects the null hypothesis at a 5% level of significance (p-value=0.004 which less than 0.05) and the study concludes that the response of experts and households not the same. Data from the qualitative part of the questionnaire, *"we can't evaluate the experts at*

woreda and the regional level. The only we know are DAs and managers of the kebeles and sometimes we can meet with woreda agricultural experts and leaders while they came for monitoring and evaluation."

Finally, evaluating the actual practice of the two principles of the PSNP is predictability and avoiding dependency in the study area. The response from the experts of the study area was considered. Of the respondent, 54.5% of the response indicate that avoiding dependency was effective in the study area. While 27.3% responded was predictability as an effective principle, and 18.2% of the response indicate that both principles were effective.

Regarding the effectiveness of PSNP data from qualitative (key informant interview, open-ended questionnaire, and from document analysis) was analyzed as follows. On the principles of PSNP, the data from key informant interviews indicated that none of the two principles wasn't effective in the kebeles. *"Not effective doesn't mean ineffective but didn't' meet the intended goal as expected. This can be observed through the graduation of households from PSNP. Most of the 3rd phase PSNP beneficiaries still haven't graduated."* This is due to a lack of strong follow-up and facilitation.

From the open-ended questionnaire, the response indicated that dependency was relatively effective than predictability. The reason for their response was "*avoiding dependency is almost solving the problem of food security and dependency is the most threat for development*". For those who responded that predictability is effective, their reason was due to predictability is important in forecasting future situations.

The other dimension the study covered was the effectiveness of the program concerning targeting and graduation. From the annual Woreda PSNP plan and observation by the researcher, the woreda PSNP sector plans to increase the beneficiaries by more than 2600 by the next year (2013 E.C), but the plan of graduation is only 3 households with this year (2012 E.C). Implies, incomparable figures observed in targeting and graduation plan and directions. Even if a fair and transparent selection is one of PSNP's core principles, so far in the study area problems regarding the lack of transparency in client selection, and why and how graduation occurs. Problems are related to transparency in targeting and graduation of this finding consistent with the study by Cochrane & Tamiru (2016).

4.2.3 Graduation Determinants of Productive Safety Net Program

This section aimed to examine the factors affecting household PSNP graduation from food insecurity and portray the magnitude of the effect of these factors. 14 potential factors were examined in this study namely, Sex, education level, marital status, household size, dependency ratio, agroecological zone, farm size, nonfarm income, access to credit, use of fertilizer, followed by DAs, the occurrence of drought, improved seed, and agricultural extension service. As indicated earlier the dependent variable in this model is binary whether the household was graduated from PSNP take a value of 1 and 0 otherwise. SPSS version 25 and STATA 14 computing software were used for the estimation purpose.

4.2.3.1 Binary Logistic Regression

Binary logistic regression was employed to see the variables that, to a larger extent, contribute to the food security of the households. The explanatory variables that were selected to measure its association with food security were sex, education level, marital status, family size, dependency ratio, agroecology, farm size, nonfarm income, access to credit services, access to fertilizer, followed by DAs, access to improved seeds, access to extension service, and the occurrence of drought. These variables were entered and processed to measure the effect of these independent variables on the outcome variable.

Table 4.16: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	77.327	.425	.683

a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Under Model Summary, we observed that the -2 Log-Likelihood statistic is 77.327. This statistic measures how poorly the model predicts the decisions**.** The smaller the statistic the better the model. The "Cox & Snell R Square" value is .425. This statistic is referred to as a "pseudo-R" statistic, in that it is designed to tell us something similar to

what R-squared tells us in ordinary least-squares regression, that of the proportion of variance accounted for in the dependent variable based on the predictive power of the explanatory variables in the model [19].

Test for Goodness of fit of Model

Table 4.17: Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig.
1	17.685	8	.485

The "Hosmer and Lemeshow Test" is a measure of fit which evaluates the goodness of fit between predicted and observed probabilities in classifying the response variable. Similar to the -2-log likelihood test, we want this chi-squared value ($x^2_{(8,0.005)} = 7.489$) to be low and non-statistically significant (p-value=.485) if the predicted and observed probabilities match up nicely. In this case, we see that the test is statistically insignificant (p >.05), suggesting that the probabilities of predicted versus observed values of the response variable match up as nicely as we would like. Therefore, our fitted logistic regression model is a good fit.

Table 4.18 below contains the estimated coefficients (under the column heading $\hat{\beta}$) and related estimated values of statistics from the logistic regression model that predict the graduation status of households. The standard error of the estimates will help in computing the Wald statistics. The Wald statistic (z), which is the square of the ratio of the coefficient to its standard error, has a chi-square distribution with a single degree of freedom. The significance of the Wald statistic (under the column labeled **P>z**) tells the importance of the predictor variable in the model. The last column of the table, Marginal Effects (dy/dx), is the effect by which the likelihood of graduation status change when the i^{th} independent variable changes by one unit. If $\hat{\beta}_i$ is positive, dy/dx will be positive, which means the likelihood of graduation increases. If $\hat{\beta}_i$ is negative, dy/dx will be negative, which means the likelihood of graduation decreases.

Interpretation of Marginal Effect[2]

The estimated coefficient results of table 4.18 below show that of 13 explanatory variables (sex, education level, marital status, family size, dependency ratio, agro-ecology, farm size, nonfarm income, access to credit service, access to fertilizer, followed by DAs, and improved seed, agricultural extension service) six of them affect households' PSNP graduation from food insecurity. Sex, education level, nonfarm income, access to credit service, and agricultural extension service were positively and significantly influenced household's graduation from PSNP while dependency ratio was found to have a significant and negative influence on households' graduation from the program at 10%, 5%, and 1% level of significance.

Sex of the household head: The sex of the household head has a strong positive relationship with the graduation status of the household with a p-value of 0.033 which is significant at a 5% probability level. Thus, Being other variables remains constant being male-headed increases the likelihood of graduation by 0.162 marginal effects.

Education Level: The model result shows that education level factors in determining household graduation from PSNP. A unit class increase in education level increases the likelihood of graduating from the safety net program by 0.436. This result is statistically significant with a p-value of 0.005 at a 1% level of significance. The sign of the coefficient of this value showed a positive relationship with graduation. The positive relationship implies that households with higher education have high chance to graduate than the households that have less education level. Households with higher education levels have a 43.6% more likelihood of being food self-sufficient.

[2] Models of binary dependent variables often are estimated using logistic regression, but the coefficients expressed as odds ratios are often difficult to interpret. Empirical economic research often reports '**Marginal effects'**, which are more intuitive, simpler to interpret and understand, and are not affected by extreme values (http://econometricsense.blogspot.com/).

Dependency ratio: The binary logistic result indicates dependency ratio negatively and significantly affects household graduation from PSNP. The negative relation indicates that households who have a high dependency ratio have a low probability of graduating from PSNP. The probability of graduating from the program decreases by 0.259 amount when the number of dependents increases by one unit other variables held constant in the model.

Table 4.18: Binary Logistic regression Result

Predictor Variable	Coefficient ($\hat{\beta}$)	Standard. Error	Wald (z)	Sign (P>z)	Marginal Effects (dy/dx)
Sex	2.527919	.10969	2.14	.033**	.1620677
Education level	4.712138	.21657	2.82	.005***	.4357216
Marital status	-.2267143	.05839	-0.19	.853	-.010247
Total household size	.7735308	.02326	1.48	.139	.033493
Dependency ratio	-5.977032	.13066	-2.11	.035**	-.2587985
Agroecology	.2921788	.03149	0.42	.676	.0127209
Farm size	.0076773	.02657	0.01	.990	.0003324
Nonfarm income	1.836704	.06712	1.82	.069*	.0932569
Credit service	1.911598	.04451	2.08	.038**	.0724342
Fertilizers	.6157939	.04587	0.65	.518	.0245445
Followed by Das	1.61099	.03564	1.45	.147	.0649311
Improved Seed	1.482639	.04584	1.51	.130	.057622
Extension service	2.800434	.05592	2.83	.005***	.1337537
Constant	-12.70296	2.26371	-3.69	.000	---

***, **, and * Significant at 1%, 5% and 10% level significance respectively.
Source: Own Survey result, 2020

Non-farm income: in general households who have livelihood other than agriculture show significant difference from farm only households. So, income received from non-farm activities has a strong positive relation with graduation. Non-farm income of household has a strong positive relationship with graduation status of the household with a p-value of 0.069 which is significant at 10% probability level. Thus, being other variables remains constant an increase in birr earned in non-agricultural activities like trade, increases the probability of the household graduating by 0.093 amount.

Access to credit: Credit is one component of the main complimentary program for PSNP in graduating households from PSNP. The model result shows that access to credit is a crucial predictor variable in determining household graduation from PSNP at a 5% level of significance. PSNP beneficiaries who have credit access graduate sooner than these households without credit access. The model result shows that on average households with access to a credit service have the likelihood of graduating from PSNP by 0.072 probability than households who have no access to credit other variables remain constant in the model.

Similarly, the ***access to agricultural extension service*** affects the graduation households from PSNP positively and significantly (p-value = 0.001<0.01). Implies, the likelihood/probability of graduation of households from PSNP highly affected by access to agricultural extension service by 0.134 probability than those households with no access to agricultural extension service. A study by Mesfin (2018) that supports the result of this study indicated that agricultural extension use has a significant effect on food security at a 10 percent level of significance.

5. Conclusion, and Recommendations

5.1 Conclusion

Based on the indicators of implementations, the implementation status of PSNP in the study area was ranked as medium level but still problematic. This can happens due to there are many problems regarding the monitoring and evaluation of targeting and graduation. However, even difficulties faced in targeting and graduation; there were relatively good practices in decision making and community know-how, mechanisms targeting transparency, and decision making about an appeal.

Effectiveness of PSNP

On evaluating the principles of the PSNP, those are predictability and avoiding dependency in the study area. The majority response to avoiding dependency was effective. The reason for minimizing dependency as effective was

because stakeholders of the program understood the dependency threat for development, and focusing on dependency by itself is solving the problem of food security.

Factors affecting household PSNP graduation from Food insecurity

The finding of the study shows that total household graduation status is significantly affected by six variables. Of the significant variables, the study reveals sex can significantly affect graduation status. The study results were similar to any other study. Sex had a positive and significant effect on graduation and drove program members to have a greater likelihood of graduation (Desalegn et al., 2017; Hayalu, 2014). Of the significant variables education level, nonfarm income, access to credit, and access to agricultural extension services were affected PSNP positively while dependency ratio the only variable that can affect significantly and negatively the likelihood of graduation.

5.2 Recommendations

Based on the findings obtained from the study, the following recommendations are put forward. In this regard, the study findings showed that of both graduated and non-graduate beneficiary households, their level of education mostly categorized as illiterate (i.e. majority informal). So, for better understanding and innovative ideas as well as for technology adoption capacity building for households is crucial.

The study identified problems related to community participation in how decisions are made, fairness, and transparency in targeting and graduation process. To improve the problem targeting, and graduation stand-in with the established criteria and develop accountability is crucial. The other issue the study is concerned with is implementation problems. Of the problems stated in this study limited capacity measured in terms of lack of training and technical knowledge, limited access to vehicles, shortage of funds, …, etc. ranked as a critical problem. So, the concerned government body should due consideration for an effective program through capacity building and providing necessary budgets. Regarding the number of personnel in the study area too small as compared to the total households in the district/kebele level so, the number of experts has played a significant role in effective and efficient PSNP.

Finally, this study restricted the beneficiary of the PSNP and limited consideration of a control group in the study area. To analyze the effects of the programs' beneficiary households; this study recommends obtaining information from non-beneficiary households with similar characteristics to the PSNP beneficiaries but living in an area without the program specifically, villages and kebeles that have not benefited from the program.

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