DMU

Advanced Journal of Interdisciplinary Studies 9(2025) 1708-1719

Journal homepage: www.ajids.dmu.edu.et

AJIDS

Volume 9(1), June 2025

Factors affecting Households'' Graduation from Productive Safety Net Program in Goncha Sisio Enessie Woreda, North Eastern Ethiopia

Yibeltal Bantie Kebie*, Birtualem Getachew Haile

Department of Economics, College of Business and Economics, Debre Markos University, Debre Markos, P.O.Box 269, Ethiopia,

*Corresponding author email: yibeltal.bantie@gmail.com, yibeltal_bantie@dmu.edu.et

Abstract

The major objective of the study was to investigate the factors affecting household graduation from the Productive Safety Net Program (PSNP) in Goncha Siso Enssia Worda, North Eastern Ethiopia. The study used explanatory research design using 353 households selected through multistage sampling techniques in the study area. Binary logistic model was employed to identify the factors affecting graduation from PSNP. The results from binary logistic model revealed that household head age, size of farming land, access to credit and extension services, educational status, targeting mechanisms, total livestock unit, uses of fertilizer by household heads, participation in off-farm activities and family size were some of the factors affecting positively and significantly the probability of households' graduation from PSNP, while drought significantly deter households' graduation from PSNP. Therefore, it is possible to recommend that the local government and other NGOs should provide enough fertilizer to targeted groups, financial institutions need to scale up their outreach by delivering sufficient credit to program beneficiaries and giving priority to the targeted group with longer loan return time and development agents must do field visits(extension services) and provide demonstrations to increase household knowledge that could increase the likelihood of household graduating from PSNP and ensuring sustainable food security. Furthermore, it was also recommended that interventions that enhance non-farm activities in a sustainable manner need to be designed. Besides, to heighten graduation, other non-farm income-generating activities need to be facilitated, and the regional government needs to push smallholder farmers to engage in non-farm activities

Keywords: Safety net, Household, Binary Logit, Graduation, Goncha Siso Enssie, Ethiopia.

1. Introduction

The Productive Safety Net Program (PSNP) was first implemented in 2005, and after being significantly expanded in 2006, it is now regarded as one of the largest social safety net programs in Africa. People who are food insecure could get resources from this program, and long-term solutions in connection to food security (Pain and Levine, 2012). It is aiming to reduce chronic food insecurity in households. A combination of food and cash is provided, often in return for labor on public works. The PSNP has grown

immensely since its inception in 2005-2006 from an allocated budget of US$ 70 million and about 5 million beneficiaries, to $175 million in Phase II (2007–2009), reaching over 7.5 million beneficiaries. Despite, the allocated budget increment to 1.3 billion in phase III (2010–2014), the beneficiaries decreased to 6.9 million. This new approach, which began in 2005 with 5.1 million beneficiaries in four regional states (Amhara, Tigray, Oromiya, and Southern Nations, Nationalities, and Peoples' Region (SNNPR)) is now expanding continuously. In subsequent years, the PSNP extended coverage, and in some places where food insecurity was particularly severe or prolonged, the length of coverage and/or the level of payment were increased (Ministry of Agriculture and Rural Development (MoARD,2009).

Graduation of households from PSNP is the final target, where households will not be beneficiaries of the program after they have achieved a certain level of progress. It refers to the notation that the receipt of social transfers should be time –bound, if possible, often with complimentary intervention put in place that enable recipients to support themselves at some stage. In theory, it explains how recipients of cash or food transfers transition from a state of dependence on outside help to one in which they no longer require the supports. According to Devereux (2008) though seemingly simple at the conceptual level, graduation is extremely difficult to define and implement at an operational level, which made progress towards graduation slow, and at the same time extremely difficult to operationalize.

Goncha Siso Enssie woreda is one of the PSNP targeted woreda in the Amhara region and consists of 14 *Kebles*, which is reflected in insufficient food production due to poor soil fertility, scarcity of productive farmland, a high rate of population growth, and limited off- and non-farm economic activities. These conditions are exacerbated by climate variability (Goncha Siso Enessie Woreda office food Security Desk (GSEWOAFSD, 2023). In this woreda, PSNP was started in 2005, and currently reached 10,208 beneficiaries. The ultimate goal of the program is graduation of households from being dependent and ensure food security, but still, there is very low graduation rate in this study area. There were some studies on factors affecting household graduation from the program such as Hailu and Seyoum (2015b) in Emba Alage district, southern Tigray; and Arega (2012) in Lay Gayint district of Amhara Region), and they collectively found that the determinants that affect household graduation from the program were the integrated agricultural package use, gender, educational status of the household heads, access to credit, livestock ownership, and total crop production. However, these studies did not take into consideration other factors such as fertilizer use, targeting mechanisms (full family targeting), and off-farm activities. Moreover, no study was conducted in Goncha Siso Enssie Woreda to identify factors affecting beneficiary graduation from PSNP. Hence, this research designed to fill the above-mentioned gaps. The insights gained from this study would be useful for increasing the number of graduated households and making them food secure across time. Therefore, this study attempted to identify factors affecting household

graduation from PSNP in Goncha Siso Enssia woreda of Amhara region, Northeastern Ethiopia.

2. Methods and Materials

2.1.Description of the Study Area

This study was conducted in Goncha Siso Enessie woreda, which is found in Northeastern Ethiopia, particularly in fourteen selected PSNP beneficiary *Kebles* in the woreda. The woreda is bordered in the north with South Gonder zone, in the south Enarj Enawuga woreda, in the west Hullet Ejju Enssie woreda, and in the east Enebsia Sar Mider woreda. The study area (*Kebele*) covered 55440 hectares, and the study area's total population is 65398 (50.06%) are female and the rest 49.94% are male (Woreda Office Finance and Economic Development (WOFED), 2023).

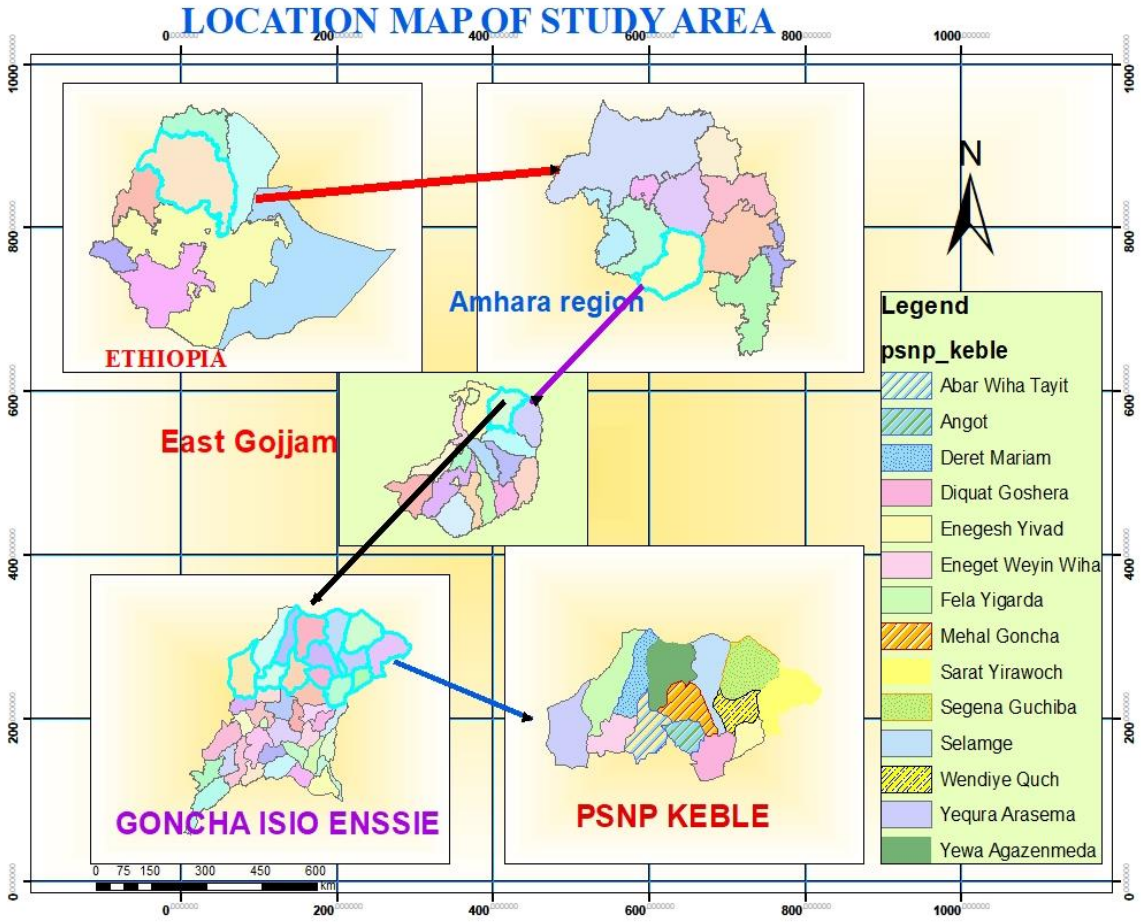

Figure 1: study area map, Source *(own work, 2023)*

2.2.Study Population and Sample

This study used cross-sectional survey data collected from 353 households selected through multistage sampling including stratified, simple random and systematic sampling techniques from the total of 3027 PSNP beneficiary households in the study area. Data for this study were collected from both primary and secondary sources. The primary data were collected using well-

structured questionnaires. Moreover, the information from various related literatures were collected to support the accuracy of the findings from collected primary data.

2.3.Data Management and Analysis

Data were checked for completeness, cleaned and analyzed using STATA version 14. Given the nature of the research questions, a binary logistic regression model was employed to address the likelihood of households' graduation from the PSNP, given that graduation is a dependent and categorical variable, by taking 1 for graduated household heads and 0 for non-graduated ones. The mathematical presentation is specified here below: where Y is graduation from PSNP and X_is are independent variables used.

$$Pi = E(Y = 1 \,/\, Xi) = 1/\,(1 + e^{-\beta 1+\beta 2Xi}) - - - - - - - - - - - - - - (1)$$

Where P_i represents the probability of a household being graduated from PSNP, Y represents the dependent variable and X_i is a set of explanatory variables. The exponential function or number of the numerator above is believed to a latent or unobservable variable that takes all the values in (-∞, +∞).

$$\text{Pi} = \frac{1}{1 + e^{-Zi}} - - - - - - - - - - - - - (2)$$

Where Zi takes the value in between $-\infty \; and \; +\infty$, and Pi is the probability of graduation from PSNP with a value of 1 or 0. If P_i shows the possibility of graduating from PSNP, the possibility not graduating from PSNP is $1 - Pi$ (Harrell & Harrell, 2015). Then the possibility of not graduating can be explained as in equation 3 as follows:

$$1 - Pi = 1/\,(1 + e^{Zi}) - - - - - - - - (3)$$

And equation 4 is obtained by dividing Pi by $1 - Pi$:

$$Pi/(1 - Pi) \;=\; (1 + e^{Zi})/\,(1 + e^{-Zi}) = e^{Zi} - - - - - - - - - (4)$$

While multiplying both sides by the natural logarithm, it will give us equation 5 below:

$$Li = ln\,(Pi/(1 - Pi)) \;= Zi = \beta 1 + \beta 2Xi - - - - (5)$$

Where P_i= is probability of being graduated and i ranges from 0 to 1

Z_i = is function of an explanatory variable (x) which is also expressed as: -

$$Zi \;=\; \beta 0 \;+\; \beta 1Xi \;+\; \beta 2X2 \;+\; \cdots + \;\beta n\, Xn - - - - - - - (6)$$

Where $\beta 0$= is an intercept, $\beta 1, \beta 2 \ldots . \beta n =$ are slopes of the explanatory variables in the model, $Li \;=$ is log of odd ratio, which is not only linear in Xi but also linear in parameters; $Xi \;=$ is vector of explanatory variables. Then, given the inclusion of different explanatory variables $(X1, X2 \ldots\ldots XK)$, the following equation serves for proper transformations:

$$Pi = E(Y = 1/Xi) = 1/(1 + e^{-(\beta 1+\beta 2X1+\beta 3X2+\cdots+\beta KXK}) - - - - - - - - - - - (7)$$

And thus, the variables affecting graduation and all the other explanatory variables affecting graduation is can lastly be estimated using the following equation

$$Zi = \beta 0 + \beta i\; Xi + Ui - - - - - - - \; (8)$$

And thus, the final estimable binary logit function becomes: -

$$Zi = \beta 0 + \beta 1\, Sexhh + \beta 2\, Agehh + \beta 3\, Eduhh + \beta 4\, Maritalhh + \beta 5\, FLsize + \beta 6\, TLU + \beta 7 Accr + \beta 8\, Tartgetm + \beta 9\, Dght + \beta 10\, Tincome + \beta 11\, NFpartic + \beta 12\, Accexs + \beta 13 UFerti + \beta 14 Fsize + Ui --(9)$$

Where $Zi =$ the dependent variable, probability of being graduated from PSNP, a vector of explanatory variables was assigned as represented in the following sub-section, $\beta 0 =$ intercept coefficient, $\beta 1 - 14$ = a vector of estimated coefficient of the explanatory variables (parameters), ui = error term.

2.4.Description of Explanatory Variables and Hypothesis

The explanatory variables, which are supposed to influence household graduation from PSNP in the study area would be hypothesized as follows.

Sexhh: -Sex of household head: was dummy variable by taking 1 for male and 0 for their counterpart. Since males have the capability to participate in various income-generating activities, and positively correlated with the probability of graduating from PSNP, but not females, because they are often limited to certain income-earning activities and overloaded. Therefore, it is hypothesized that, there is positive relation between male head households and graduation from PSNP (Hayalu, 2014).

Agehh: -Age of household head: It was continuous variable and as the age of the household head increases, the amount of cumulative asset increases as a result of an increase in live capital like livestock. Therefore, it is expected that households with a higher age level are more likely to graduate from PSNP than those with a lower age level, so that positive relation was expected **(**Tesfaye, 2018).

Eduhh: -Education Status of Household head: It was considered as dummy variable and taking 1 for literate household heads and 0 otherwise. According to the study conducted by Berhanu & Fufa, (2017), better-educated farmers tend to be more innovative and are therefore more likely to adopt improved farm technologies and thus hypothesized to have a positive relationship with the graduation of the household from PSNP.

Maritalhh: -Household head marital status- It was dummy variable and taking 1 for married household head and 0, otherwise. According to Gilligan, Hoddinott, Taffesse, & Bui, (2009), married household heads are more likely to graduate from the PSNP. Therefore, it is hypothesized that married household heads are more probability to graduate from PSNP than others and thus positive sign was expected.

FLsize: -Farm land size: -It is the total hectare of land owned by household heads. According to Devereux & Sabates-Wheeler, (2004), households with more land are closer to graduation than those less hectare of land, showing that positive relation was expected between total land size and graduation from PSNP.

TLU: -Livestock owned by the household head (TLU): It is the total amount of live

stocks measured in numbers and it was expected that possession of large livestock increases the probability of graduation (Hoddinott, & Yohannes, (2002)

Accr: -Accesses to credit: it was taken as dummy variable and taking 1 for those household heads who had access to credit, 0 otherwise. Gilligan, Hoddinott, & Taffesse, (2009) concluded that households with credit access would have a higher likelihood of graduating from PSNP and thus positive sign was expected.

Targetm: - Targeting mechanism: It was taken as dummy variable with taking 1 for full family targeting and 0 otherwise. A study conducted by Berhane, Hoddinott, & Gilligan, (2011) showed that full family targeting would have a higher probability of graduating from PSNP and thus targeting mechanism expected to have positive effect on household graduation from PSNP.

Dght: -Drought. It was dummy variable and taking 1 for those household heads having a risk of drought, and 0 for their counterpart. It is showed that households at risk of drought will have lower graduation rates (Gilligan, Hoddinott, & Taffesse, 2009). As a result, this study's hypothesis is that there is a negative relationship between graduation from PSNP and drought.

Tincome: -Total income- it was continuous variable in this study. Previous studies conducted by Berhane, Hoddinott, & Gilligan, (2011) showed that better farm income positively influences household graduation from PSNP and thus expected to have positive effect on household graduation from PSNP.

NFpartic: -non-farm participation: It was taken as dummy variable by taking 1 for those households participating in non-farm activities and 0 otherwise. Devereux & Sabates-Wheeler, (2004) explored how off-farm income sources improve household resilience and enable households to build assets, ultimately leading to a higher likelihood of graduation from the PSNP. Therefore, it is hypothesized that households that engage in off-farm activity could be more likely to graduate from PSNP than households that do not engage in off-farm activity and thus positive relationship was expected.

Accexs: -Accesses to extension services -It is dummy variable, taking 1 for those households having access to extension services and 0, otherwise. Crawford, & Shively, (2008),showed that households receiving agricultural support, such as extension services, are more likely to improve their income and food security to graduate from PSNP and thus it is hypothesized that households with better extension service could be more likely to graduate from PSNP than those that couldn't have extension service, showing that, access to extension service and graduation from PSNP to have positive expected relationship.

Uferti: -Use of fertilizer-It was also considered as dummy variable, taking with 1 for those household heads who used fertilizer, and 0 otherwise. Bezabih, & Hassen, (2017) clearly showed that how fertilizer use can significantly improve agricultural productivity, which in turn contributes to a household's food security and ability to graduate from safety net

programs like the PSNP, and thus positive relationship was expected.

Fsize: -Family size- It was measured in terms of the total number of household members. Woldehanna, & Oumer, (2012) **s**tudy revealed that larger families may have a higher probability of graduation if they are able to leverage available labor for more successful agricultural production and thus positive relation was expected.

3. Results and Discussion

These binary logistic regression estimates provide light on the relationship between the significant explanatory factors as well as how households in the study area graduate from the productive safety net program. As shown below in table 1, from the logit regression result, eleven of the fourteen explanatory variables were found to have significant effects on household heads' graduation from PSNP. These include household age, farm land size, access to credit service, access to extension services, household education, targeting mechanism, drought, livestock ownership, use of fertilizer, participation in off-farm activities, family size.

As shown in table 1, The age of the household head positively and significantly affects the likelihood of graduating from the Productive Safety Net Program (PSNP). Specifically, for each additional year of age, the odds of a household head graduating from PSNP are 1.036 times higher than those of a household head who is one year younger. This means that older household heads are more likely to graduate from the program, and the relationship is statistically significant at the 5% significance level, which is in line with the findings of Hayalu, (2014).

The farm land size owned by the household had a positive and significant effect on households' graduation from PSNP. The odds ratio of 57.299 showed that, the odds of graduating from PSNP for households owning large hectare of farm land size is 57.299 times greater than the odds of households possessing small hectare of farm land size. This finding was in contrast to the finding of the research done in Lay Gayint woreda south Gonder zone by Getnet and Debretabor,(2021).

The other significant variable that had positive effect on household graduation from PSNP at 10 % level of significance was access to credit. The positive relationship indicated that households who have greater access to credits are more likely to graduate from PSNP compared to those who didn't get access to credit. The odds ratio of 5.955 confirmed that, the odds of being graduated from PSNP, was 5.955 times more likely for those household heads having credit access, comparing to their counterpart. This result was consistent with the study of Hayalu, (2014), who affirmed that households with access to credit have a greater likelihood of graduating from PSNP than households who have no access to credit in the eastern zone of Tigray region, Ethiopia.

Households' access to extension services had positive and significant effect (at 5% significance level) on graduation of the household from PSNP. As shown in table 1, the odds ratio was 13.934, indicating that, the odds of being graduated from PSNP for

households who had access to extension services is 13.934 times greater than the odds of graduation from PSNP, for those households who had no access to extension services. This indicates that households with higher extension advice are more likely to graduate than households with low extension advice. This result aligned with previous studies, such as the one by Wasie (2018), which found a positive impact of agricultural extension services on household graduation from PSNP in northern Ethiopia.

Table 1. Binary Logistic Regression Results of Factors affecting Graduation from PSNP

Variable	Coef.	Robust std. Err.	$P > \|Z\|$	Odds Ratio
Agehh	.095	.035	2.71**	1.036
Tincome	.001	.040	.025	1.001
Sexhh	-.916	.844	1.09	0.400
FLsize	4.048	1.703	1.34*	57.299
Accr	1.784	.901	1.98*	5.955
Accexs	2.634	.970	2.77**	13.934
Eduhh	.648	.329	1.97*	1.912
Targetm	2.257	.946	2.39**	9.558
Dght	-1.882	.927	2.03**	0.152
TLU	1.546	.409	3.78***	4.694
UFerti	3.156	1.093	2.89**	3.474
NFpartic	2.207	1.042	2.12**	9.086
Maritalhh	.551	.459	1.20	1.735
Fsize	.827	.407	2.03**	2.287
_cons	-29.621	5.774	5.13	.000
Sensitivity = 79.51%		Pseudo R2 = 0.6900		
No of observation = 353		Specificity 96.91%		
Wald $chi^2(14)$ = 107.23		Log likelihood =-87.734261		
Prob>chi^2=0.000				

***, ** and * shows the significance level at 1%, 5% and 10% respectively.

Source: Own computation

Household head educational status has a positive and significant effect on the likelihood of graduating from the Productive Safety Net Program (PSNP), with the significance level of 10%. Specifically, the odds ratio of 1.912 indicates that households with literate heads are almost 1.912 times more likely to graduate from the PSNP compared to those with illiterate heads. This finding was consistent with Berhanu & Fufa, (2017), who confirmed that better-educated farmers tend to be more innovative and are therefore more likely to adopt improved farm technologies and thus graduation of the household from PSNP.

Targeting mechanism is also another determinant factor which affects the probability of households' graduation from PSNP positively at 5% level of significance. The odds ratio of 9.558 indicates that

households with full targeting mechanism are almost 5.558 times more likely to graduate from PSNP comparing to their counterpart. This result is similar to the findings of Berhane et al., (2011), who showed that full family targeting would have a higher probability of graduating from PSNP

Drought is a significant factor negatively affecting household graduation from the PSNP (Productive Safety Net Program) at a less than 5% significance level. According to Table 1, the odds ratio is 0.152 indicates that households living in drought-prone areas were less likely to graduate from PSNP by 0.152 , when compared to those not affected by drought. Drought can severely reduce the productive potential of land, which is crucial for PSNP graduates. As a result, households in drought-affected areas tend to stay longer in the program rather than graduating. This finding aligns with Hailu & Ali's (2018) study, which showed that drought-prone households took longer to graduate from the PSNP.

Households'' Livestock ownership measured in total livestock unit (TLU) was another significant variable which affects households' likelihood of graduating from PSNP positively and significantly at 1% significant level. The odds ratio of 4.694 indicated that, comparing to household heads with small number of TLU, the odds of graduating from PSNP is 4.694 times more likely for those households who owned large number of total livestock unit (TLU). This result is in agreement with the findings of Hayalu, (2014), which clearly showed that program participants who have more livestock in terms of TLU have a higher probability of graduating from the PSNP.

Use of fertilizer had a positive and significant effect on the probability of households (at 5% significance level). The odds ratio of 3.474 showed that indicates that household heads who used fertilizer are almost 3.474 times more likely to graduate from PSNP comparing to those who did not use fertilizer. This result aligns the findings of Bezabih, & Hassen, (2017) clearly showed that how fertilizer use can significantly improve agricultural productivity, which in turn contributes to a household's food security and ability to graduate from safety net programs like the PSNP.

Non-farm activity participation is another determinant factor that affects households' graduation positively and significantly in the study area at 5% significant level. The odds ratio of 9.086 for this variable indicates the odds of being graduated from PSNP increases by a factor of 9.086 for those household heads that participated in non-farm activity, comparing to their counterpart. The reason could be non- farm activity gives households to earn additional income, which may increase their probability of graduating from PSNP. This study agrees with the study conducted by Mulugeta et al.,(2019) that stated households who engaged in non-farm activities increases their income received from these non-farm activities has a strong positive relationship with graduation from PSNP.

Family size had positive and significant effect on the household's graduation from PSNP in the study area at 5% significant

level. The odds ratio of 2.29 indicates that, the odds of graduating from PSNP is 2.29 times more likely for those household heads with one more family member. This clearly showed that when households' family size increases by one individual, there may have a higher probability of work division between them in order to maximize their income and higher probability of graduation from PSNP. This result is consistent with the finding of Getnet & Debretabor, (2021), who clearly shows that the family size of the household head increases the likelihood of graduating from PSNP in the Lay Gayint woreda, South Gonder zone.

4. Conclusion and Recommendations

4.1.Conclusion

The binary logistic regression model result revealed that there was significant variation between graduated and non-graduated households in terms of family size, livestock ownership in TLU, off-farm activity participation, access to credit, agricultural extension services, vulnerability to drought, total farm land size and targeting mechanism. Household head age, family size, livestock ownership in TLU, off-farm activity participation, access to credit, agricultural extension services, total farm land size, household educational status, targeting mechanism, and fertilizer usage were affecting households' graduation from the productive safety net program in a positive and significant way, while drought affected negatively households' graduation from PSNP.

4.2.Recommendations

Based on the finding of this study, the following specific recommendations were forwarded. All necessary efforts should be made to improve livestock through the provision of adequate veterinary services, improved water supply, the introduction of artificial insemination, and proper grazing. Financial institutions need to scale up their outreach by delivering sufficient credit to program beneficiaries and giving priority to the targeted group with less interest and a longer loan return time. Accordingly, the local government, microfinance institutions like Amhara credit and saving institution (ACSI), and the other non-governmental organization (NGO), in the study, Woreda, should expand their provision of loans to households to purchase materials and inputs for increasing beneficiary households; graduation from PSNP. Interventions that enhance non-farm activities in a sustainable manner need to be designed. Besides, to heighten graduation, other non-farm income-generating activities need to be facilitated, and the regional government needs to push smallholder farmers to engage in non-farm activities, basically by providing startup capital, or credit. The local government and NGO should supply of enough fertilizer to increase farmers' agricultural productivity and enhancing their graduation from PSNP.

5. References

Arega, D. (2012). The Role of the Productive Safety Net Programme (PSNP) in Promoting Food Security and Graduation: Evidence from the Lay Gaynit District of Amhara Region.

Berhane, G., Hoddinott, J., & Gilligan, D. O. (2011). "The Impact of the Productive Safety Net Program on Household Food Security." International Food Policy Research Institute (IFPRI).

Berhanu, K., & Fufa, B. (2017). Determinants of Household Graduation from the Productive Safety Net Program (PSNP) in Ethiopia: Evidence from Tigray Region. African Journal of Agricultural Economics and Rural Development, 5(2), 100-112.

Bezabih, M., & Hassen, S. (2017). The Role of Fertilizer Use and Its Impact on Food Security in Ethiopia.

Crawford, E., & Shively, G. (2008). Social Networks and Households' Graduation from Safety Net Programs.

Devereux, (2008). Social Protection for the Poor: An Overview of the Ethiopian Productive Safety Net Programme (PSNP)"

Devereux, S., & Sabates-Wheeler, R. (2004). "Transforming livelihoods: The impact of the Productive Safety Net Programme in Ethiopia." *Development Policy Review*.

Getnet, G., & Debretabor, E. (2021). Faculity Of Social Science And Humanities Department Of Geography And Environ Mental Studies Ma Thesis On: Determinants Of Households Graduation From.

Gilligan, D., Hoddinott, J., Taffesse, A. S., & Bui, H. T. (2009). The Impact of Ethiopia's Productive Safety Net Program and its Linkages. International Food Policy Research Institute (IFPRI).

Goncha Siso Enessie Woreda office food Security Desk (GSEWOAFSD) (2023). Annual Report

Hailu, B. K., & Seyoum, H. G. (2015a). Determinants of farm households' graduation from productive safety net program (PSNP) in Emba Alage District, Northern Ethiopia. Full Length Research Paper.

Hailu, B. K., & Seyoum, H. G. (2015b). Determinants of farm households' graduation from productive safety net program (PSNP) in Emba Alage District, Northern Ethiopia. Research Journal of Agricultural Science and Review, 4(1), 31-38.

Hailu, G., & Ali, S. (2018). Review of the Impact of Productive Safety Net Program (PSNP) on Rural Welfare in Ethiopia.

Harrell, J., Frank E, & Harrell, F. E. (2015). Binary logistic regression. Regression modeling strategies: With applications to linear models, logistic and ordinal regression, and survival analysis, 219-274.

Hayalu, G. (2014). Assessment of Factors Affecting Household Level Graduation from Productive Safety Net Program (PSNP): Evidence from Emba-Alaje District Southern Tigray, Northern Ethiopia. Mekelle University.

Hoddinott, J., & Yohannes, Y. (2002). "Dietary diversity as a food security indicator." Food and Nutrition Technical Assistance Project.

MoARD. (2009). Food Security Programme, 2010–2014: Ministry of Agriculture and Rural Development (MoARD) Addis Ababa.

Mulugeta, M., Mekonnen, T., & Tesfaye, B. (2019). Achievements and challenges of productive safety net program in overcoming chronic food insecurity in Ethiopia: a reflection. Ethiopian Journal of Development Research, 41(1), 127-156.

Pain, A., & Levine, S. (2012). A conceptual analysis of livelihoods and resilience: Addressing the'insecurity of agency': ODI.

Tesfaye, M. (2018). Determinants of Households' Graduation from the Productive Safety Net Program in Ethiopia: The Case of Bale Zone. Agriculture & Food Security, 7(1)

Wasie, M. (2018). Determinants Of Household Graduation From Productive Safety Net Program (Psnp): The Case Of West Belesa District, Northern Ethiopia.

Woldehanna, T., & Oumer, A. (2012). The Impact of the Productive Safety Net Program on Household Welfare in Ethiopia.

Woreda Office Finance and Economic Development (WOFED) (2023). Annual Report