



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

INTERNATIONAL JOURNAL
OF CURRENT RESEARCH

International Journal of Current Research
Vol. 12, Issue, 09, pp.13466-13477, September, 2020

DOI: <https://doi.org/10.24941/ijcr.39651.09.2020>

RESEARCH ARTICLE

THE EVALUATION THE BURDEN OF REPLACEMENT POPULATIONS ON THE LIVELIHOOD OF SETTLER'S IN SASIGA DISTRICT, EAST WOLLEGA ZONE, OROMIA, ETHIOPIA.

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ARTICLE INFO

Article History:

Received 05th June, 2020
Received in revised form
07th July, 2020
Accepted 24th August, 2020
Published online 30th September, 2020

Key Words:

Replacement Populations, Propensity score matching, Settlers' livelihood, Sasiga District.

ABSTRACT

The study evaluated the burden of Replacement Populations on the settler's livelihood in Sasiga District of East Wollega Zone Oromia, Ethiopia. Some of the Replacement schemes around the world failed, while some others were successful. The objective of the study was to identify factors that cause Replacement and evaluate the burden of Replacement on the settler's annual livelihood in study area. The study was based on cross-sectional data collected from a sample of 146 settlers (86 were Populations participants and 60 were non-Populations participants) using purposive and stratified random sampling techniques. Descriptive statistics and econometric models were employed to analyze the data. The Logit model indicated education status of the settlers, availability of credit access, availability of agricultural inputs, land farm size holding by settler's, farm livelihood of settler's were negatively and significantly related to Populations participation while shocks, livestock holding by settler's, access of extension service, and total asset of settler's were positively affect and significantly associated with Populations participants. Propensity score matching shows, that the average annual livelihood of Replacement Populations participants more than livelihood of non participant by 29,182.6463 ETB. Based on the findings, the study suggests that strengthening the encouragement of Replacement Populations have crucial role towards improving the livelihood of settlers in the study area. Finally, the policy implication of the study is that livelihood sources diversification, incorporated development Populations, practical based extension service delivery, access to credit service for the purchase of agricultural inputs and its preparations are needs policy attention.

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Citation: Lelisa Mamo Abdisa. 2020. "The evaluation of Resettlement Populations on the Income of Settler's in Sasiga District, East Wollega Zone, Oromia, Ethiopia.", *International Journal of Current Research*, 12, (xx), xxx-xx.

INTRODUCTION

Replacement is a population movement planned directly by the government or private developers, where an area is chosen in order to resettle the population (Sherbinin *et al.*, 2010). If Replacement is effectively used, it is a vital to realize these entire notions, and to proactively plan for Replacement as part of equipped protection approach (UNHCR, 2012). The effect of Replacement is more on women than men (Bisht, 2009, Teminski 2013). The resettled settlers have restricted options to rebuild their livelihoods (Wilmsen *et al.* 2011 and 2015) Ogwang *et al.* 2018b). Many African governments to respond to the mismatch of Population numbers and environmental conditions, inter alia, to cope with landscapes that could not sufficiently care for their inhabitants have employed Replacement (Tilt B, 2016). The other way of Replacement scheme would be implemented through centrally planned coordination of the government policy intervention. This was really practiced in Ethiopia at different administrative regimes where the areas were selected by Replacement administering authorities, without consultation of the host communities and assessment of the area (Adugna M. 2012). On the other hand, a change in any one of these assets may result in a difference in the livelihood assets of the settlers either positively or negatively (Zelege, T., 2014, P 36).

STATEMENT OF THE PROBLEMS

As several researchers have tried to assess the Replacement schemes and identified practical evidences on factors affecting success or failure of Replacement Populations, some of the Replacement schemes around the world failed, while some others were successful.

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This is due to the proper planning, site selection, size of land allocated to settlers, land tenure and farming systems, management and administration. (Woldeselassie, 2014, Gebregzihibher, 2014). In China, studies found that Replacement is associated with a range of negative burdens on communities, such as reduced land holdings (Tilt, B.; Gerkey, D, 2016), reduced access to natural resources and ecological services (Wilmsen, B.; Webber, M.; 2015 and Yuefang, D. 2011), declined settler's livelihoods (Sikka, G.; Mathur, V, 2015). Besides, McDonald et al. (2018) investigated different villages after Replacement and found that some villages have higher livelihoods than others. Most existing literature on Replacement in developing regions, including Africa, has focused on the general effects (Quetulo-Navarra et al. 2014; Kyomugasho 2016; Ogwang et al. 2018a). A major cause of Replacement in Africa is the exploitation and transportation of raw materials and the creation or expansion of conservation areas. During the 1970s and 80s, the most drought stricken areas were limited to northern Ethiopia, especially Wallo and Tigray. Previous studies found that Replacement have negative burdens on the socio-economic conditions of the local regions (FAO, 2016). For instance, Desalegn (2018) identified that Replacement would cause disruption by causing impoverishment of host communities, destruction of productive assets, and disruption of the social fabric. Dwivedi (2017) added that Replacement could result in asset and job losses, the breakdown of the social and food security, credit, labor exchanges, networks, social capital and kinship ties. In addition, Heggelund (2010) found that the Replacement in Three Gorges Project displaced local people to dissimilar places, which caused their social networks to become disconnected and also led to potential variation with the new host community. Studies by Kassahun and Shiferaw (2017) shows that relocation was said to have preserve the life and was a dark spot in the settlement history of the country. The suffering brought by displacement and Replacement makes it hard for the women to adapt in the new environment (Teminski 2013). A study by Ogwang et al. (2018b) in the Albertine region of Uganda indicated that shortage of land and exploitation of the cash from compensation on treaties and freedom by men led to family collapse. The resettled settlers have limited options to reconstruct their livelihoods (Wilmsen et al. 2011). A study by Yankson et al. (2018) indicated that several challenges such as water scarcity, decreased access to forest products such as charcoal and firewood, and reduced access to fertile soils constrain the coping strategies of resettled communities. Therefore, this research contributes to fill the gap in the literature in this regard. So the research goal is to respond the following research questions:

RESERCH QUESTIONS

- How the replacement affect the livelihood status of the settlers?
- What are the burden of replacement Populations on the settler's annual income/livelihood?

RELATED LITRACTURE REVIEW

Replacement at the international level: Replacement is a lifeline open to some of the world's most vulnerable refugees (InaStröm, 2017). According to the WBED report, transportation was the cause of 24.6 percent of Replacement projects between financed by World Bank and active in 1993. Replacement is recognized today as a vital instrument of international protection, integral to comprehensive protection and durable solutions strategies (UNHCR, 2011, 2017). In 2010, a massive earthquake in Haiti displaced over 1.5 million people. By 2012, more than 100,000 transitional shelters had been built across Haiti and 420,000 individuals had resettled in the United States of America. Extreme weather events in 2015 and 2016 further affected food access and agricultural production (NMUN.NY, 2016).

Replacement in Africa: In Africa, Replacement is a serious matter of current as well as future concern. Africa's share of displaced people has been exceptionally high (Ohta and Gebre 2005). In some cases, local congestion was so serious that people were no longer able to produce enough food to feed their families and had to be assisted with food by the government (Mwiza, 2010). Resource redistribution is also another factor for displacement. The contested land reform and Replacement Populations me of Zimbabwe and Namibia is a typical example (Chimhowu and Hulme 2006).

Replacement in Ethiopia: Replacement under the Imperial regime: The major objective of the plan was not food insecurity and famine as they were principal causes in the later government rather to relieve population pressures in the highlands (Desalegn, 2003b). Nevertheless, these were habitually small in size, informal in nature, and were mainly designed to achieve specific and limited objectives (Berhane 2003). Replacement under the Derge: The basic rationale to design the policy of the Derg in relation to Replacements was the defective estimate of unutilized and underutilized land resources found particularly in the southwestern parts, and south of Ethiopia. Replacement under the EPRDF: The basic assumptions behind the current Replacement Populations me remain similar to those made during previous periods (Imperial and Derg regime). Official declaration, voluntary Replacement is view as a main and essential factor of endeavors aimed at addressing the paramount problem of food insecurity in Ethiopia (GFDRE 2001).

Cause of the Replacement in Ethiopia: The official objective of Replacement plans in Ethiopia, both in the past and current regimes, as stated in various documents, was to prevent famine or attain food security) by moving people from drought-prone and overloaded areas to lightly populated regions and unoccupied virgin lands (Yntiso 2002). The rapid population growth particularly in rural areas has decreased the size of land holding leading to landlessness and deterioration of the environment which were considered as causes of migration and Replacement (Ahmed Mohammed, 2005).

Functions of Replacement: States are not obliged to accept refugees for Replacement, but rather voluntarily offer Replacement places as a tangible expression of international solidarity (UNHCR, 2014). Following the Replacement Populations there is

considerable damage to the natural vegetation of the study area. Large areas are cleared of their vegetation for crop production, to build homesteads and to acquire fuel wood (Haile, 2007).

METHODS AND MATERIALS

The researcher was used qualitative and quantitative data and cross-sectional design. The data had been collected using open ended and closed ended questionnaires. For the analysis of the data both descriptive and econometric analyses was employed. The sampling frame for this study was rural resettled and non settled settlers that are living in lowland/kola. The study was employed different sampling techniques to select the representative samples due to obtain both residents. Sasiga District has 27 kebeles of which 26 was rural and one (1) were Town kebeles having Replacement dwellers. Firstly, the Sasiga District was purposively selected. In addition to this, three kebeles which had settler's and non-settler's populations namely, Gudina, Bareda, Shonkora had been selected from 27 kebeles of the District purposively and by simple random sampling. The selection of these kebeles are due to the majority of the settlers dwellers are new resettlers, which were settled in 1995EC/2003GC coming from Western Harargeh and the origin populations were less than these settlers. The total populations survive in the selected kebeles were 13145. The sample frame of the settlers and non-settlers from the three kebeles were 13,142 from these (5764) settler populations and (7378) original populations of which 2657 male and 4721 female non-settlers and 2567 male and 3197 settlers). From the total population 13142 of the three kebeles 5,224 are male and 7,918 female. Thirdly, adequate Respondent settlers had been selected from both settlers and non-settlers by using systematic Random sampling techniques from selected kebeles. Hence, 146 settlers had selected randomly for the study from these sample kebeles including both male and female-headed settlers (Source: Sasiga District office, 2020).

Methods of Data Analysis

The study was employed both descriptive statistics and Econometric model. Statistical descriptions like table, graph, frequency descriptive, inferential statistical methods and percentages, Logit model and Propensity Score Matching method (PSM) were employed for analyzing and interpreting the data. Conventionally, linear regression analysis was widely used in most economic and social investigation because of availability of simple computer packages, as well as ease of interpreting the results. However, according to Amemiya (1981), Maddala (1997) and Gujarati (2004) the linear probability model has an obvious defect in that the estimated probability values can lie outside the normal 0-1 range and that it models the probability of $Y=1$ as being linear: $\Pr(Y=1|X) = \beta_0 + \beta_1 X$.

Econometric Model Specification

The study was affected by the independent variables such as demographic factors, social factors, Economic factors, and sources of livelihood factors, settler's education, and factors causes' Replacement. The major pillars of this model are individuals, treatment and potential outcomes. The treated settlers were from the Replacement Populations participants and the control group will from the non-participants for comparison. In order to overcome the problem Propensity score matching method will be applied for burden evaluation in the absence of baseline survey data. Imbens (2000) and Lechner (2001) when leaving the binary treatment case the choice of multinomial logit is quite easier to analyze dichotomous variables and approaches relatively preferable mathematical performance to estimate. In the cause of binary treatment the treatment indication D_i equals 1 if individual i received treatment and 0 otherwise.

The potential outcomes were then defined as $Y_i(D_i)$ for each individual i , where $i = 1, \dots, N$ and N denoted the total population. The treatment effect for an individual i was written as:

$$T = Y(1) - Y \quad (0)$$

A logit model would be used to estimate propensity scores using a composite of pre-intervention characteristics of the sample settlers (Rosenbaum and Rubin, 1983) and matching was then performed using propensity scores of each observation. In estimating the logit model, the dependent variable was Replacement Populations me participation, which took the value of 1 if a settler's participate in Replacement and 0 otherwise. The specification of the logit model was as follows:
We begin from the linear probability model of the form:

$$P(y = 1/x_i) = Z_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad (1)$$

$P_i = \frac{1}{1+e^{-z_i}}$ is simplified to:

$$P_i = \frac{e^{z_i}}{1+e^{z_i}} \quad (2)$$

Where, P_i is the probability that the i^{th} settlers will participate in Replacement, z_i is a linear function of 'n' explanatory variables (x) and will be expressed as:

$$Z_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + U_i \quad (3)$$

Where, β_0 -intercept, β_i - regression coefficients to estimate, U_i is an error term.

$$1 - P_i = \frac{1}{1+e^{-z_i}} \text{ is simplified to: } 1 - P_i = \frac{1}{1+e^{z_i}}$$

Evaluation the burden of Replacement on livelihood of settler population

Propensity scores and PSM: Prior to analyzing the burden of Replacement Populations by employ PSM matching algorithms, logit regression model is used as a necessity to identify the Populations participant's annual livelihood in order to understand the importance of Replacement Populations. The model is estimated with STATA software using the propensity score-matching algorithm developed by Leuven and Sianesi (2003). Propensity score matching (PSM) build a statistical evaluation group that is based on a model of the probability of participating in the treatment, using observed characteristics. Population's participants are then matched on the basis of this probability, or propensity score, to nonparticipants of the Populations. The average treatment effect of the Populations is then deliberate as the mean distinction in outcomes across these two groups. The validity of PSM depends on two circumstances: (a) conditional independence (namely, that unseen factors do not affect participation) and (b) sizable common support or overlap in propensity scores across the participant and nonparticipant samples (Shahidur R. Khandker, Gayatri B. Koolwal & Hussain A. Samad, 2010). Relocated people suffer from the loss of farmland, forestland, houses and other properties, which may then reduce their livelihood (Wang, P, 2013, Tilt and Gerkey 2016). McDonald et al. (2018) found Replacement could have positive burdens on maintaining and raising the livelihood level of the resettled community. Galipeau et al. (2013) compared the distinction between a resettled community and a non-resettled community in term of livelihood and landholding, showing that resettled communities have a higher livelihood level.

The establishment of this counterfactual often creates problems where before intervention situation remains missing. Burden through this outcome variable was obtained by matching an ideal comparative group (non-settler farmers) to the treatment group (settler farmers) based on propensity scores (P-scores) of X. X was the set of observable characteristics that determine settlement participation. By so doing, the selectivity bias was largely eliminated.

Equation 1 below presented the basic evaluation problem comparing outcomes Y across treated and non-treated individuals i:

$$Y_i = \alpha X_i + \beta T_i + \epsilon_i \tag{1}$$

Here, T is a dummy equal to 1 for those who participate in Replacement Populations and 0 for those who do not participate in the Populations. X was set of other observed characteristics that determine participation in Replacement and 'ε' is an error term reflecting unobserved characteristics that also affect Y. To develop the PSM model, let Y_i be the outcome variable of settler's i, such that Y_{1i} and Y_{0i} denote settler's outcomes with and without participating in livelihood, respectively. A dummy variable T_i denotes livelihood participation by settler's i, where $T_i = 1$ if the settler's had participated in Replacement and, $T_0 = 0$, otherwise. The outcome observed for settler's i, Y_i was defined by the switching regression (Quandt, 1972).

$$1 - P_i = \frac{1}{1+e^{z_i}} \tag{4}$$

Where $1 - P_i$ is the probability that a settler's belongs to the non-Populations participant.

$$\frac{P_i}{1-P_i} = \left(\frac{1+e^{z_i}}{1+e^{-z_i}} \right) = e^{z_i} \text{ or}$$

$$\text{Or } \left(\frac{P_i}{1-P_i} \right) = \left(\frac{e^{z_i}}{1+e^{-z_i}} \right) = e^{\left(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \right)} \tag{5}$$

This is known as Odds ratio. Taking the natural logarithm of the Odds ratio, the logit model is:

$$Li = \ln \left[\frac{P_i}{1-P_i} \right] = \ln e^{\left(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \right)} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \tag{6}$$

Where x_1, x_2, \dots, x_k are demographic, social and Economic factors that cause Replacement which will be included in the above econometric model.

$$Y_i = T_i Y_{1i} + (1-T_i) Y_{0i} \tag{2}$$

The burden of Replacement on livelihood of settler i's is given by;

$$\Delta_i Y_i = Y_{1i} - Y_{0i} \tag{3}$$

Where, $\Delta_i Y_i$ denotes the change in the outcome variable of farmer i, resulting from participation in Replacement. A farmer cannot be both ways, therefore, at any time, either Y_{1i} (resettling farmer) or Y_{0i} (non-resettling farmer) is observed for that farmer. This

gives rise to the selectivity bias problem (Heckman et al., 1997). For this study, ATT was used to estimate the burden of livelihood on livelihood of settler population and it was represented as follows:

$$ATT = \{E(\Delta_i|I_i=1)\} = E\{Y_{1i} - Y_{0i}|I_i=1\} = E\{Y_{1i}|I_i=1\} - E\{Y_{0i}|I_i=1\} \quad (4)$$

From equation (4), $E\{Y_{0i}|I_i=1\}$ was the missed data representing the outcomes of non-resettling group. The outcomes of non-resettling farmers could be rewritten as:

$$E\{\Delta_i|I_i=1\} = E\{Y_{1i}|I_i=1\} - E\{Y_{0i}|I_i=1\} \quad (5)$$

However, a bias of the magnitude indicated in equation (6) below results when non-resettling farmers were selected for comparison with settling farmers, without controlled for the non-random Replacement assignment (Namara, 2014).

$$\text{Bias} = E\{\Delta_i|I_i=1\} + \{E\{Y_{0i}|I_i=1\} - E\{Y_{0i}|I_i=0\}\} \quad (6)$$

Finally, upon establishing common support for the livelihood farmers, the ATT of Replacement on settlers' livelihood can then be estimated using the following equation:

$$ATT = [E(\Delta_i|I_i = 1)] = \frac{1}{I_i} \sum (Y_{0i}) I_i = \frac{1}{I_i} \sum \Delta_i I_i \quad (7)$$

Table 3.1: Summary of Variables included in the models

S/n	Variable	Units of measurement	Expected Sign
1	Progptn	participation in Replacement Populationsme	Dummy (Populations participant=1, not participant=0)
2	Totinc	Total annual livelihood(outcome variable)	Continuous: Measured in Birr or total annual livelihood in birr.
3	Gen	Gender of settler's	Dummy: 1 if male, 0 otherwise
4	Age	Age of house hold head	Continuous Measured in year
5	Educ	Educated settler's	Dummy: 1 if Literate, 0 Otherwise (Illiterate)
6	Famsize	Family size of settler's	Continuous
7	Farm size	Farm size	Continuous in hectare
8	Shoc	Shocks	Dummy, 1(if there is drought & famine), 0 otherwise (shortage of land)
9	Nfarminc	Total Non-fam livelihood	Continuous: measured in br.
10	Farm inc	Total fam livelihood	Continuous in Ku or Kg
11	Craa	Credit access	Dummy (No=0, Yes=1)
12	Extns	Extension service	Dummy (access=1, no access=0)
13	Acoirrin	Access of irrigation	Dummy 1 If irrigation access, 0 if no access
14	Dismark	Distance to market	Continuous: Walk hours
15	Livestock	Livestock holding	Continuous measured in TLU
16	Totasset	Total settler's asset	Continuous Measured in br/number/hectare
17	Agrinp	Access of agricultural input	Dummy: 1 if access to agri. input, 0 otherwise.

Source: Own Estimation, 2020.

RESULT AND DISCUSSION

Descriptive Analysis of Sample Settlers Characteristics: The results of descriptive analyses were presented in the form of mean, mean difference, standard deviation, frequency distributions and percentage. The descriptive statistics was runned to observe the distribution of the independent variables. The socio-demographic, socio-economic and institutional characteristics of the respondents' settler's heads were analyzed. The sample under consideration consists of 146 both host and settlers. Of the total, sample respondents 86 (59%) were participants of the Populations and 60 (41%) were non-participants of the Populations. Chi-square (χ^2) and t – statistics tests were used to identify whether the explanatory variables are statistically significant or not significant. The t-test was used to test the significance of the mean value of continuous variables of the two groups of participants and non-participants and chi-square (χ^2) was used to test the significance of the mean value of the potential discrete (dummy) explanatory variables. Generally, in this section socio-demographic characteristic of sample settlers such as gender of settler's heads, age of settler's heads and total family size; economic characteristics of sample settlers such as livestock holding, farm land size and inputs of production used; settlers characteristics or attributes such as education status of settler's heads and accessibility to information; institutional characteristics such as availability of extension services and credit services characteristics of sample settlers and distance of settler's residence from nearest to water source, nearest to health, nearest to school and nearest market center for discrete as well as continuous variables were analyzed.

Settlers Socio-Economic Characteristics

Settler's farmland size holding: The average mean of land holding of the surveyed settlers equal to 3.69 ha with a minimum of 2 and a maximum of 12 ha. This figure is larger than the average national figure, which is 1.2ha (CSA, 2008) indicating the existence of relatively higher land holdings in the study area. Even though this figure is over than the national average, there exists a high gap among farmers based on their farmland holdings.

The average mean of land size for Populations participants and non-participants were 5.54 and 2.35 respectively with the mean difference of 3.197. The average family size of the surveyed farm settlers equals to 8.06. This is slightly higher than the national average of 6 members (CSA, 2008).

Settlers Livestock Holding: This reveals the total livestock the farmers own in tropical livestock unit. It is a proxy variable for the wealth position of the farmers. The study area was known by mixed crop- livestock farming. Average livestock owned in TLU by each farm settler's equals to 7.79. The minimum and maximum livestock owned is 1 and 20, respectively. The draught power used for different farming activities was taken as major source of production in the study area. The settler's farmers with higher number of oxen would be more confident to produce more crop grains rather than counterparts because they had one of the most important factors of production, which creates confidence in hearts of the settler's farmer for crops production. Majority of farmer settlers attained their livelihood from mixed farming (like beef cattle rearing for commercialization and production, rarely dairy farming, grain crop production and others). The average number of livestock owned by each farmer was equal to 7.79 in TLU with standard error of 0.245 and a 95% confidence interval of [7.308 - 8.278].

Settler's heads access to Agricultural input (agrinp): Regarding to agricultural inputs from the total sampled settlers 90(61.64%) access to agricultural inputs while 56 (38.36%) farmers were not access to agricultural inputs. The mean difference between those gained agricultural inputs in the Populations participation and non-participation were 0.27. Generally, the null hypothesis' was rejected, due to our variable, access to agricultural input was more important in our study.

Institutional Factors: From the total 146 farm settlers 88 (60.27%) settlers had been credit access while the remaining 58(39.73 %) settlers did not have access to credit. The mean difference between Populations participants and non-participants on credit access was 0.56. It is statistically significant at a significance level 1%, 5% and 10% [2.624, 1.761, and 1.345] respectively. Therefore Ho: is rejected. It means that our variable was important in our study. Of the total respondents, 110 (75.34%) settlers had access to extension while the rest 36 (24.66%) did not have access to extension. The average mean of credit access of those participating in Replacement Populations were 0.73 while non-Populations participants mean average of access to credit were 0.78. Usually, the null hypothesis' was rejected, due to our variables (access to credit, and access to extension services) were more vital in our study.

Hypothesis testing and econometric model results

Hypothesis Testing

Table 4.1: Summary results of LR test of hypotheses for the aforementioned results

Null hypothesis	Calculated LR ratio	Critical LR at 5% level	Decision rule
$\beta_1 = \beta_2 = \dots \beta_{14} = 0$	139.66	6.57	Reject Ho
$\delta_1 = \delta_2 = 0$	8.36	0.013	Reject Ho
$\beta_1 = \beta_2 = \dots = \beta_6 = 0$	34.56	1.635	Reject Ho

Source: Own computation from survey data (2020)

Results of Logit model for Replacement Populations participation decision of the sample settlers: As already mentioned, this study employed the logit model to estimate and conclude the parameters of the determinants of farmers' Replacement Populations participation decision in the study area. The frequency distribution of Replacement Populations participation reveals that out of the 146 total sampled settlers, 86 settlers (59%) were participants in the Populations while the remaining 60 (41 %) were non-participants of Replacement Populations. Thus, the result expose that more than half of the sampled respondents were Populations participants.

Table 4.2. Estimates of Maximum-likelihood logit model on the determinants of Replacement Populations participation.

Prognptn	Coef.	Std. Err.	Z	P>z	[95% Conf.Interval]	
Gen	-.1659368	1.805019	-0.09	0.927	-3.703709	3.371835
Educ	-2.098819	.9166884	-2.29	0.022**	-3.895496	-.3021432
Craa	-1.884239	1.010618	-1.86	0.062*	-3.865014	.0965356
Extns	2.453423	1.123667	2.18	0.029**	.2510768	4.65577
Agrinp	-1.697162	.86886	-1.95	0.051*	-3.400097	.0057718
Shoc	3.157063	1.2286	2.57	0.010**	.7490517	5.565074
Famsizæ	.3221672	.2140418	1.51	0.132	-.097347	.7416813
Age	-.0125211	.0564392	-0.22	0.824	-.1231399	.0980976
Dismark	-.0623245	.0576121	-1.08	0.279	-.1752422	.0505932
Livestock	.3418422	.1365745	2.50	0.012**	.0741612	.6095233
Farm size	-1.26825	.3594521	-3.53	0.000***	-1.972763	-.5637372
Nfarminc	3.50e-06	9.65e-06	0.36	0.717	-.0000154	.0000224
Farm inc	-.0000226	7.93e-06	-2.85	0.004***	-.0000382	-7.08e-06
Totasset	.0000279	.0000117	2.38	0.017**	4.95e-06	.0000508
Constant	.1390963	3.129724	0.04	0.965	-5.99505	6.273242
Logit Regression						
				Number of observation	146.000	
Mean of dependent Var.		0.579		LR chi2(14)	139.67	
SD of dependent Var.		0.496		Prob > chi2	0.0000	
Log likelihood		-95.304848		Pseudo R2	0.7328	
***p<0.01, ** p<0.05, * p<0.1						

Source: Own computation from survey data using stata 14.2 (2020)

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

Out of the total 14 explanatory variables, 9 variables of which 5 were dummies and 4 continues variables were found to be significantly creating variation on the probability of farmers' Replacement Populations participation. The coefficients of gender of settler's head, age of settler's heads in years, family size of settler's heads in number, distance from market in kilometers and non-farm livelihood were not statistically significant at all 1%, 5% and 10% significance levels implying that they were less important in affecting the probability of participation in Replacement Populations. Nevertheless, under logit model coefficient of the variable have no direct interpretation; as a result, we can use Marginal effect. Logit is all about prediction for interpretation and hence, we must find predicted probabilities to interpret the significant variables. Therefore, interpretation can be derived from the marginal effects after logit.

Table 4.3: Estimation of Marginal effects after logit regression

Marginal effects after logit

$$y = \text{Pr}(\text{progptn}) (\text{predict})$$

$$= 0.76763364$$

Variable	dy/dx	Std. Err.	Z	P>z	[95% C.I.]		X-bar/mean
gen*	-.0283911	.29758	-0.10	0.924	-.611638	.554856	.957143
educ*	-.3821786	.14572	-2.62	0.009	-.667778	-.096579	.457143
craa*	-.3045143	.15859	-1.92	0.055	-.615346	.006317	.592857
extns*	.5150614	.20673	2.49	0.013	.109879	.920244	.75
agrinp*	-.2734329	.13802	-1.98	0.048	-.543953	-.002913	.607143
shoc*	.4686937	.12067	3.88	0.000	.232194	.705193	.392857
Famsize	.0574657	.04044	1.42	0.155	-.021805	.136736	8.06429
Age	-.0022334	.01015	-0.22	0.826	-.02213	.017663	45.3857
Dismark	-.011117	.00989	-1.12	0.261	-.030497	.008263	17.6214
livest~k	.0609752	.02561	2.38	0.017	.010785	.111165	7.79286
Farm size	-.2262206	.07985	-2.83	0.005	-.382727	-.069714	3.69286
Nfarminc	6.24e-07	.00000	0.37	0.711	-2.7e-06	3.9e-06	22201.4
Farm inc	-4.03e-06	.00000	-3.25	0.001	-6.5e-06	-1.6e-06	124758
Totasset	4.98e-06	.00000	2.29	0.022	7.1e-07	9.2e-06	181864

(*) dy/dx is for discrete change of dummy variable from 0 to 1 Source: Own computation from survey data using stata (2020)

Interpretation of Significant Variables

Education status of settler's head (educ): The coefficient of this variable was significant at 5% level of significance and it is influencing Replacement Populations participation negatively. Our result was showed that educated settler's heads did not more involve in Replacement Populations. Educational attainment by the settler's head could lead to awareness of the possible advantages of Replacement Populations in order to innovation of new site due to enhance settler's livelihoods.

The marginal effect of the variable shows that keeping all other variables constant at their mean value, educated settler's heads have 38.2% times less probability of participation in Replacement Populations than those illiterate settler's heads. It is agreed by the finding of Vande Walle (2000) and Melaku (2014).

Credit access (craa): Farmers who have credit access are fewer participants in Replacement Populations. Therefore, access to credit influences the farm settler's participation in Replacement negatively. The study result also reveals that credit access is statistically significant at 10% level of significance and a change from no credit access to access decreases the probability of the decision to join Replacement Populations other things remain constant, settlers those had access to credit has 30.45% less probability to participate in the Populations me than their counterpart. It is supported by Muez (2014) and Adugna, (2012).

Access to extension services (extns): access to extension service influences the farm settlers participation in Replacement Populations is positively associated with settler's total livelihood and statistically significant at 5% of probability level. This result was decided with Adugna, (2012) and Muez (2014). The marginal effect of the variable indicates that settler's access to extension service of the discrete effect change from 0 to 1 in access to extension service decrease the probability of participation in Replacement Populations by 51.51 percentage points than their counterparts others remain constant at their mean value.

Access to agricultural input (agrinp): Farmers who have access to agricultural input can increase their livelihood rather than those who have no access agricultural inputs. So this implies that decrease the participation in Replacement Populations as compared to those who do not have access. The study result also reveals that access to agricultural input is statistically significant at 10% level of significance and a change from no access to access agricultural input decreases the probability of the decision to join the Populations by -27.34% higher than their counterparts, holding other variables constant. It is decided in by the finding of W.Zeweld et, al. (2015).

Shocks (shoc): The coefficient on the shocks (drought & famine) is significant at 5% level of significance with positive sign. The result indicates that being exposed to shocks (droughts and famine) increase the likelihood of settler's participation in the Replacement Populations by 46.87% than settlers not exposed to shocks. It is agreed by A. Arnall (2014).

Livestock: livestock holding, measured in tropical livestock unit, was found to have positive and significant effect at 5% level of significance on the probability to participate in Replacement Populations. The positive relationship indicates that settlers with larger livestock holding may migrate to new site to feeding his/her livestock's.

In the study area marginal effect of this variable shows that as the number of livestock in tropical livestock unit increases from its mean value by one unit, the chance to participate in Replacement Populations increase by 6.098% points, while keeping all covariates constant at their mean value. The evidence of this finding reflected in contrast to the idea that farmers who have enormous number of livestock are wealthier and have sufficient number of oxen to plough their field timely as a result of which they quickly decide to participate in the Replacement Populations. This is in line with the result of Asayehgn et al. (2011) and Hadush (2014).

Farmland size in Hectare (farmsize): This is the total land size owned by each sampled settler's heads given in hectare. The result of this study showed that size of farmland has a negative significant effect at 1% level of significance on the probability of farmers' decision to participate in Replacement Populations. Farmer settlers that had large farm size did not participate in Replacement Populations since he/she has sufficient land used for mixed farming system both crop production and livestock rearing. The marginal effect of this variable reveals that, a marginal change in farm size from the average of 3.693 hectare is associated with a 22.62% points decrease in Populations participation, keeping other variables constant at their mean average. This result against the expectation supported by Asayehgn et al., (2011), as Asayehgn finding settlers having large cultivated land has more livelihood but my finding were against this finding.

Farm livelihood of Settler's (farminc): The coefficient on farm livelihood of the settler's's head is significant at 1% of significance level with negative sign. The marginal effect of this variable shows that as farm livelihood from mixed farming source increases from mean value (124758.2) by one Birr, the probability of participation in Replacement Populations less by 4.03×10^{-6} percentage (-0.000403%) than their counter parts, while other variables were kept constant at their mean value. The result of this finding is in line with the findings of Jamal Haji & Mohammed Aman (2013).

Total asset owned by settler's (totasset): Settler's total asset was found to have a positive effect on the Populations and significant influence on the probability of participation in Replacement Populations of the settler's heads. Financial and social resources were to some extent available, while natural capital like land resource was the abundant assets for each sampled settlers in the study site as the researcher discussed with respondents. This variable is statistically important at 5% level of significance. The marginal effect results showed that a one Birr increase in total asset of settler's heads from the average/mean 181,864 increases the likelihood of participates in Replacement Populations by 4.98×10^{-6} percentage whereas other factors remaining constant.

Burden Evaluation and Propensity scores: Without information on the counterfactual, the next best alternative is to compare outcomes of treated individuals or settlers with those of a comparison group that has not been treated. In doing so, one attempts to pick a comparison group that is very similar to the treated group, such that those who received treatment would have had outcomes similar to those in the comparison group in absence of treatment. Successful burden evaluations hinge on finding a good comparison group (Shahidur R. Khandker, Gayatri B. Koolwal & Hussain A. Samad, 2010). Prior to analyzing the burden of Replacement Populations by employ PSM matching algorithms, logit regression model was used as a necessity to identify the Populations participant's annual livelihood in order to understand the importance of Replacement Populations. As indicted in the former sections the dependent variable in this model is a two fold variable indicating whether the settler's head was Replacement Populations participant or non-participant. The model was estimated with STATA 14.2.4.7.

Evaluation of Burden of Replacement on Livelihood of Settler settler's by Propensity Score Matching: Under this, Propensity score use logit model to estimate the probability of each group i.e., Replacement participants and non-participants as a function of observable covariates. The result of propensity score matching of Populations participant and their counterpart was used to define the common support region. Supplementary, the quality of matching algorithms also identified in orientation to the propensity scores pseudo R^2 and significance level of each covariates. Table {4.6} shows the logit estimation results or marginal effect after logit of sample settler's head in the Populations were used to create propensity score.

The Pseudo R^2 which makes clear to how well the regressors explain the participation probability is 0.7328 for logit model is larger. A large pseudo- R^2 value shows that Replacement Populations participants' settlers do have some divergent individuality overall and automatically finding a good match between participants and non-participants settlers becomes less challenging. Depending on the propensity score-matching distribution of both Replacement Populations participants and non-Populations participants, the common support region was identified. As shown on table {5} below the estimated propensity scores vary between 0.0442142 to 1 for the Populations participant and 1.36×10^{-15} to 0.908626 for non-participant. The common support region is area, which lies between 0.0442142 up to 1, is larger than that of none Populations participant common support region [1.36×10^{-15} to 0.908626]. Therefore, settler's who estimated propensity score is less than 1.36×10^{-15} and larger than 0.908626 were surplus from common support region. So observations which lie outside this region are discarded from analysis. It is support by (Marco & Sabine Kopeinig, May, 2008). Thus, 56 settlers from Populations participant were out of the common support region while 25 settlers' heads' were involved in common support region.

Table 4.4: Distribution of estimated Propensity Score matching

Replacement Populations	Sample size	Mean	Std. Dev.	Min	Max
Total observation	146	0.5791825	0.4341378	1.36×10^{-15}	1
Participants	86	0.9030572	0.1930847	0.0442142	1
Non-participants	60	0.1345411	0.229484	1.36×10^{-15}	0.908626

(Source: Own computation survey data, 2020)

Matching algorithms: According to Khandker *et al* (2010), comparing different matching methods results is one approach to check robustness of average treatment effect. Four matching algorithms (i.e., Nearest Neighbor matching, Radius matching, Caliper matching, and Kernel matching) were checked to choose the best matching methods. The choice of matching estimators was based on pseudo R², matching sample size; mean test referred to as to balance test and insignificance of variables in analysis after PS matching. Low pseudo R² value and large matched sample size is preferable. In order to accept the findings of PSM, it is suggested that the standardized mean difference needs to be at most 20% and the pseudo R² needs to be low after the matching process (Rosenbaum, 2005; Caliendo and Kopenig, 2008). In line with those authors, the researcher would be obtained the least amount of pseudo R² that was 5.5% and 80 number of matched observation.

Thus depending on the kernel matching criteria, kernel(0.5) was selected in which the mean difference of the two groups explanatory variables were significant, Pseudo R² is the lowest compared to other matching categories and finally balance 80 sample size.

Table 4.5. Performance of Propensity Score Matching Estimators

Matching estimator	Sample size	Balancing test	Pseudo R2	Matched
Kernel matching				
0.01		7.6e+14*	1.000	65
0.1		126.5*	0.255	76
0.25		66.7*	0.078	80
0.5		54.9*	0.055	80

(Source: Own computation survey data, 2020)

Table 4.6. Propensity Score Matching and Covariate balancing

T= Treated group	The whole balance indicators of covariates						C=Control group				
Sample	No. of Observation	T	C	Ps R2	LR	p>chi2	Mean	Med	B	R	%Var
Unmatched	146	64	0	0.717	158.1	0.000	75.4	68.7	206.9*	20.71*	44
Matched	76	17	59	0.255	12.02	0.678	25.4	29.0	126.5*	0.99	11

Source: Own computation from survey data, 2020

As shown in the table 7 above, matching reduce total bias, reduce pseudo R² from 0.717 before match to 0.255 after match and any difference between the two groups covariates mean in the matched sampled has been reduced and after matching nine variables are significant as before matching and were balanced treated and control group.

Table 4.7. Burden of Replacement Populations participation decision on settler's livelihood (ATT-Average treatment effect on treated)

Variable	Sample	Treated	Controls	Difference	S.E.	T stat
Totinc	Unmatched	133555.914	115582.22	17973.6932	6351.13923	2.83
	ATT	144465.476	115282.83	29182.6463	15933.3126	1.83

Source: Own computation from survey data, 2020

Average Treatment effect on the Treated (ATT) was estimated depending on Kernel (0.5). The Kernel (0.5) algorithm estimated the average annual livelihood of the matched treated settler's farmers to be 1, 44,465.476ETB and of the matched control of settler's head farmers to be 1, 33,555.914ETB. Hence, the ATT for that reason Replacement Populations participant was received 29, 182.6463ETB annual livelihood. In summary, the empirical findings suggest that involvement of Replacement Populations participation is enhanced settler's annual livelihood for treated settlers in a significant way. This is supported with the finding results of Adugna (2012), Jamal Haji and Mohamed Aman (2013).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Replacement is a recovery liberate to some of the world's most vulnerable displacement. From the research findings, it could be concluded that Replacement Populations is play a fundamental role in increase of settler's livelihood in the study area due to resettled in favorable site. Farmers settlers have confirmed that they were benefit greatly from these Replacement Populations and they had been improved their livelihood living standards. To sustain the positive burdens of the Populations and to enable treated settlers make optimum Replacement participation. Purposely, expansion of new habitat and creating additional access of infrastructures and to obtain fertile/virgin land for agricultural productivity on a sustainable basis and thereby increase smallholder farmers' settler's annual livelihood. The logit regression shows that from the fourteen variables included in the analysis, nine of them were significantly affecting the settlers those participating in the Populations me. Shocks (drought and famine) and farm land size of settler's heads were the more susceptible for the Populations me participation. Settler's heads in the study site were not more educated rather than they were performing agricultural and non agricultural tasks to achieving enough livelihood for stay alive. Generally Replacement Populations me in the study site attained a positive burden on the Replacement Populations participant settlers annual livelihood in improving livelihood like physical asset, natural asset and stipulation of social services like

human health service by constructed health center in the study site, health extension service at each Kebeles, agricultural extension service, veterinary health post service at each Kebeles, and as well as availability of all weather road connecting each rural Kebeles of the study site and other Replacement sites in the study area. This study concluded that, participation in Replacement Populations had been a deep burden on improving the annual livelihood of settler's farmers in the study site.

Recommendations

This study had been indicated that involvement in Replacement Populations enabled farmer settler's to increase their annual livelihood. Even though, the detailed studies selection of non-Populations participants from original places is the best way for comparison as a control group. Regarding the burden of Replacement Populations on settler's livelihood, the following main points needed to be considered as a possible policy implications forwarded in order to improve the goal of Replacement Populations for the rural settler's.

- The study showed that most of the farmers settlers head in this study were depending on agricultural production or obtaining their livelihood from farming activities rather than non-farm livelihood due to low diversification of non-farm activity during comparison with farm livelihood in study area. So it is better if local or regional government giving more attention to improve source of livelihood for rural settler's.
- Farmers need modern agricultural inputs. However not adapting more utilization of all modern agricultural inputs such as improved seed varieties, improved animal breeds for milk, and meat and poultry production for egg, commercial fertilizer and different chemicals. The fact is that the farmers could not have enough money to buy all the required agricultural inputs on cash and lack of habit to use short-term credit from financial institutions in the last cropping seasons. So, it is necessary for the national and regional policy makers to assess and find out ways in which farmers to get the tradition of use credit service for purchase of agricultural inputs in order to produce excess product for food achievement.
- Settler's head's education level was found to be negatively significant determinant of the Replacement Populations participation. This shows that educated settlers had enough potential to changing their environment as it is favorable to survive. Therefore, government will give a great attention as the farmers should be educated by a means that fits with their living condition, such as adult education.
- Shocks is one of the main determinant cause of Replacements Populations participation as the researcher undertook analysis from sampled respondents in the study area; therefore, favorable environment should be improved by concerning body to enable farmers easily stabilize their surroundings to living.
- In each three study kebeles development agents were assigned for peasant association to give extension service. Those assigned DA's were only giving theoretical advice for the farmers which was not practically supported and show. It is obvious that extension service provision in training and practical demonstration of farmers has a great contribution to increase production and productivity of the farmers in order to improve their annual livelihood. As a result, it is more important to redesign policy measures for farmers training centers (FTCs) as a practical training and demonstration center of research outputs support level as per the national level farmers training Populations to build up the producing capacity of the farmers to increase their livelihood.
- Large cultivated land size in the study area were held by economically inactive settlers heads rather than economically active farmer settlers, so it is better if local government or other concerned body readjusting the farm land allocation.
- Livestock were the major source of livelihood in the study area but the farmer settlers were little knowledge about livestock rearing and using modern technology like animal breeding system, it is better if concerning body make awareness regarding to how the farmers increase livestock rearing by the way of modern technology for enhance their annual livelihood.
- During data collecting survey supervision, key informants interview and FGD final result, it was observed that the study area has a potential of commercialization farm land. To increase rural settler's farmer's annual livelihood, it requires the local government, agriculture development office, development center offices, the policy makers and other concerned parties has crucial role interest to aware and building the capacity of the farmers to use these potential resources effectively and efficiently.
- Generally, as the study showed that Replacement Populations is the vital alternative to overwhelm the shortage of livelihood and the rural access of land for agricultural production by providing virgin or unutilized cultivable land and accessing necessary basic infrastructural facilities within the intra-regions. Again to enhancing the settlers total fixed asset in the study area the concerned body would be take appropriate action to design incorporated development strategy by creating common feeling in wise utilization of the existing resources under sustainable way.

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