

## DETERMINANTS OF PARTICIPATION IN SELF-HELP GROUPS AND ITS IMPACT ON LIVELIHOOD

Mary N. Odyuo<sup>1</sup>, Z. Khuvung<sup>2</sup>, Saurabh Sharma<sup>3</sup>, J. Longkumer<sup>4</sup> and Penchen<sup>5</sup>

### ABSTRACT

The present study was conducted during the year 2020 in Nagaland State, India, with the objectives of identifying the factors influencing participation in Self Help Groups (SHGs) under the National Rural Livelihood Mission (NRLM) and assessing the impact of SHG participation on the livelihood status of members. The study covered three districts, six blocks, and twelve villages, with a total sample of 240 respondents selected from NSRLM SHGs. An ex post facto research design was adopted. Participation in SHGs was hypothesised to be influenced by socio-economic factors such as age, marital status, educational qualification, spouses education, family size, spouses occupation, landholding size, access to market, extension contact, and distance to market. A binary logistic regression model was employed to identify the determinants of participation, while the impact of SHG participation on livelihood components was assessed using the Propensity Score Matching (PSM) technique. The results of the logit model revealed that spouses education, spouses occupation, landholding size, and access to market had a positive and significant influence on the decision to join NSRLM SHGs, whereas age and distance to market exerted a negative and significant effect on participation. The PSM results indicated that participation in NSRLM SHGs had a positive and statistically significant impact on all livelihood components, namely human, natural, financial, physical, and social capital. Overall, the results of the logit model and Propensity Score Matching analysis provide strong empirical evidence that participation in NSRLM SHGs had a positive and statistically significant impact on all livelihood components, namely human, natural, financial, physical and social capital. The application of PSM effectively reduced selection bias, thereby enhancing the robustness and reliability of the estimated impacts.

(Key words: Self Help Groups, propensity score matching (PSM), livelihood capital, NSRLM)

### INTRODUCTION

A housewife by the name Temsula Yaden residing in Indisen village, Dimapur, Nagaland had no stable source of income, however, with the intervention of NSRLM, she received a sum of Rs. 60000/- loan along with basic training. Today, she earns at an average of Rs.10000/- month<sup>-1</sup> by designing ladies apparels and wedding gown ever since. Temsula's story finds echoes in the lives of millions of women who are part of SHGs under the National Rural Livelihood Mission (NRLM), a government programme to boost rural incomes. NRLM is a poverty alleviation project launched in 2011 by Ministry of Rural Development, Government of India and is focused on promoting self-employment and organization of rural poor. The basic idea behind this programme is to organize the poor into SHG (Self Help Groups) and make them capable for self-employment. Nagaland State Rural Livelihood Mission (NSRLM) is the implementing agency for NRLM in the state and embodies the principles and vision of NRLM while

keeping in mind the unique features of the state. It was launched in 2012 in Nagaland.

Rural poverty is a serious constraint in India's economic development. The predominantly rural character of India's national economy is reflected in the very high proportion of its population living in the rural areas. It was 89 per cent in 1901, 83 per cent in 1951, 80 per cent in 1971, 74 per cent in 1991, 72 per cent in 2001 and the latest census of 2011 estimates that 72.18 per cent continue to live in rural areas. SHG is now popularly known for its ability in helping the rural women attain their dreams of financial independence and much more. The women experienced feelings of freedom, strength, self identity and increase in levels of confidence and self-esteem. Besides, involvement in SHGs has enabled women to tackle problems and have gained power over decision making in the households (Sihag and Vermani, 2017).

Numerous studies have shown that joining SHG is beneficial to its members (Kumar and Sharma, 1999; Kumar and Singh, 2001; Meena, 2008; Singh, 2012), however, a

- 
- 1&3. Assoc. Professors, Dept. of Agricultural Extension Education, SAS, NU, Medziphema, Nagaland, 797106
  2. Dist. Prog. Manager (RGSA), Dept. of Rural Development, Government of Nagaland, Kohima, 797111
  4. Professor, Dept. of Agricultural Extension Education, SAS, Nagaland University, Medziphema, 797106
  5. Res. Scholar, Dept. of Extension Education, SAS, Nagaland University, Medziphema, 797106

large number of rural people do not participate in SHGs. It therefore becomes important to study the determinants of participation in SHG by its members. In this study, the impact of the mission on the livelihood status of beneficiaries was measured by adopting the UK, DFID framework for livelihood with necessary modifications, whereby, the assets of livelihood components as per DFID framework *viz.*, Human Capital, Natural capital, Financial Capital, Physical Capital and Social Capital of the beneficiaries were assessed to measure the impact of NSRLM on the livelihood status of the beneficiaries. Therefore, this study was undertaken with an objective to study the determinants of participation in SHG by its members and to assess the impact of the NSRLM mission on the livelihood status of beneficiaries.

## MATERIALS AND METHODS

The study was conducted during 2020 in the state of Nagaland, India. Three districts, namely Dimapur, Mokokchung and Longleng were purposively selected based on the intensity of implementation of the Nagaland State Rural Livelihood Mission (NSRLM). From these districts, six blocks and twelve villages were selected. A total sample of 240 respondents was drawn, comprising both NSRLM Self Help Group (SHG) members (beneficiaries) and non-members (non-beneficiaries). Respondents were selected using purposive sampling to ensure adequate representation of SHG participants and comparable non-participants.

An ex-post facto research design was adopted, as the variables of interest had already occurred and could not be manipulated by the investigator. Primary data were collected using a structured and pre-tested interview schedule covering socio-economic characteristics, participation status in SHGs, and livelihood indicators.

### Determinants of SHG participation

To identify the socio-economic factors influencing participation in NSRLM SHGs, a binary logistic regression model was employed. The dependent variable was participation status, coded as 1 for SHG members and 0 for non-members. The independent variables included age, marital status, educational qualification, spouse education, family size, spouse occupation, landholding size, access to market, extension contact and distance to market.

The logistic regression model was specified as:

$$P_i = \frac{e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}}{1 + e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}}$$

where  $P_i$  represents the probability of the  $i^{th}$  respondent participating in an SHG,  $X_k$  are the explanatory variables, and  $\beta_k$  are the parameters to be estimated. Marginal effects were computed to interpret the influence of each explanatory variable on the probability of participation.

### Impact assessment using propensity score matching

To assess the impact of SHG participation on livelihood outcomes, Propensity Score Matching (PSM) was applied to address potential selection bias arising from non-random participation. Propensity scores, defined as the probability of participation given observed covariates, were estimated using a logit model (Dahejia and Wahba, 2002; Becker and Ichino, 2002).

The covariates included in the propensity score model were age, education, marital status, family size, spouse occupation and landholding size. These variables were selected based on theoretical relevance and prior empirical studies.

Matching was carried out using three commonly applied techniques: Nearest Neighbour Matching, Kernel Based Matching and Caliper Matching. The Average Treatment Effect on the Treated (ATT) was estimated to measure the impact of SHG participation on five livelihood capitals, namely human, natural, financial, physical and social capital, as conceptualised under the modified DFID Sustainable Livelihood Framework.

The balancing property and common support condition were tested to ensure comparability between treated and control groups. Observations lying outside the region of common support were excluded from the analysis.

## RESULTS AND DISCUSSION

The participation or non-participation of an individual in NSRLM Self-Help Groups (SHGs) is influenced by several socio-economic and institutional factors. In the present study, variables such as age, marital status, educational qualification, spouse s education, family size, spouse s occupation, landholding size, access to market, extension contact and distance to market were hypothesised to influence participation status. To identify the determinants of participation in NSRLM SHGs, a binary logistic regression model was employed, assuming a logistic distribution of the error term. The estimated coefficients and marginal effects of the logit model are presented in Table 1.

The results revealed that age of the respondent and distance to market had a negative and statistically significant influence on the probability of participation in NSRLM SHGs. This implies that older individuals and those residing farther from market centres were less likely to become members. The marginal effects indicated that, holding other variables at their mean levels, an increase of one year in age and one kilometre in distance to market reduced the probability of participation by 0.02 and 0.16, respectively. In contrast, spouse s education, spouse s occupation, landholding size and access to market exerted a positive and significant effect on the likelihood of participation. This suggests that respondents whose spouses were better educated, engaged in supplementary occupations, possessed larger landholdings and had easier access to markets had a higher probability of joining NSRLM SHGs. Similar findings on the role of household and institutional factors in SHG participation have been reported in earlier studies (Sihag and Vermani, 2017).

Following the identification of participation determinants, the impact of NSRLM SHG participation on different livelihood components was assessed using the Propensity Score Matching (PSM) technique. The use of PSM helps in minimising selection bias by ensuring comparability between beneficiary and non-beneficiary households based on observable characteristics (Rosenbaum and Rubin, 1983).

In this study, a logit model was employed to generate propensity scores using socio-economic and farm-level covariates, with SHG participation status as the dependent variable. The estimated propensity scores were subsequently tested for the balancing property, which requires that individuals with similar propensity scores exhibit comparable observable characteristics irrespective of treatment status. The results of the logit specification used for generating propensity scores are presented in Table 2, which indicate that education, family size and the square of family size significantly influenced the likelihood of participation in NSRLM SHGs.

Based on the estimated propensity scores, the region of common support was identified as the range over which both beneficiary (treated) and non-beneficiary (control) observations overlapped. Observations lying outside this region were excluded from the impact estimation. In the case of Nearest Neighbour and Kernel matching techniques, all beneficiary observations found suitable matches, resulting in no treated units lying outside the region of common support (Figure 1).

The data regarding impact of NSRLM SHG participation on human capital are presented in Table 3.1. After matching, the estimated Average Treatment Effect on the Treated (ATT) was 1.486, 1.481 and 1.476 under Nearest Neighbour, Kernel and Caliper matching techniques, respectively. These estimates were statistically significant, indicating that participation in NSRLM SHGs had a positive and significant impact on human capital formation among beneficiaries. Improvements in skills, knowledge and capacity building among SHG members have also been highlighted in earlier impact studies (Kumar and Sharma, 2019).

The data regarding impact of NSRLM SHG participation on natural capital are presented in Table 3.2. The estimated ATT values after matching were 0.054, 0.531 and 0.521 under Nearest Neighbour, Kernel and Caliper matching techniques, respectively. The results were statistically significant across all matching estimators, indicating that participation in NSRLM SHGs positively influenced access to and management of natural resources. These findings are consistent with earlier empirical evidence on SHG-led livelihood interventions (Singh *et al.*, 2020).

The effect of NSRLM SHG participation on financial capital is reported in Table 3.3. The estimated ATT values were 2.047, 1.903 and 2.260 under Nearest Neighbour, Kernel and Caliper matching techniques, respectively, and were statistically significant. These results indicate that participation in NSRLM SHGs substantially enhanced household income, savings and access to financial services.

The impact of NSRLM SHG participation on physical capital is presented in Table 3.4. The estimated ATT values after matching were 0.064, 0.070 and 0.072 under Nearest Neighbour, Kernel and Caliper matching techniques, respectively. The results were significant at the one per cent level, confirming the positive effect of NSRLM SHGs on physical asset creation and infrastructure-related outcomes.

The impact of NSRLM SHG participation on social capital is presented in Table 3.5. The estimated ATT values were 0.829, 0.845 and 0.847 under Nearest Neighbour, Kernel and Caliper matching techniques, respectively. These estimates were statistically significant, indicating that participation in NSRLM SHGs strengthened social networks, collective action and institutional linkages among beneficiaries.

Overall, the results of the logit model and Propensity Score Matching analysis provide strong empirical evidence that participation in NSRLM SHGs had a positive and statistically significant impact on all livelihood components, namely human, natural, financial, physical and social capital. The application of PSM effectively reduced selection bias, thereby enhancing the robustness and reliability of the estimated impacts.

**Table 1. Determinants of participation in NSRLM Self Help Groups: Binary logit estimates and marginal effects**

Membership	Coef. (Std.error)	Marginal effect (dy dx <sup>-1</sup> )
Age	-0.100** (0.028)	-0.022
Marital status	-2.074 (1.296)	-0.473
Educational qualification	0.058 (0.230)	0.013
Spouse education	0.522** (214)	0.117
Family size	0.255 (0.133)	0.057
Spouse occupation	1.456* (0.595)	0.302
Land holding (ha)	0.396** (0.081)	0.089
Access to market	1.194* (0.600)	0.270
Extension contact	0.467 (0.263)	0.105
Dist. To market (in km)	-0.737** (0.117)	-0.165
_cons	4.184 (1.943)	
Number of obs =	240	
LR chi <sup>2</sup> (10) =	209.90	
Prob > chi <sup>2</sup> =	0.0000	
Pseudo R <sup>2</sup> =	0.6309	
Log likelihood =	-61.403297	

\*Significant at 5%, \*\*significant at 1%

**Table 2. Logit estimates for propensity score generation for SHG participation**

Membership	Coef. (std error)
Age	-0.01 (0.01)
Marital status	-0.73 (0.60)
Education	0.34 (0.12)**
Family size	0.69 (0.27)**
Family size <sup>2</sup>	-0.05 (0.02)**
Spouse occupation	0.26 (0.33)
Land holding	0.11 (0.10)
Land holding <sup>2</sup>	0.00 (0.01)
_Cons	-2.82 (1.09)
Number of obs =	240
LR chi <sup>2</sup> (8) =	32.99
Prob > chi <sup>2</sup> =	0.0001
Pseudo R <sup>2</sup> =	0.0992
Log likelihood =	-149.8606

**3. The impact of NSRLM participation on different livelihood capitals was analysed using Propensity Score Matching and the results are presented in Tables 3.1 to 3.5**

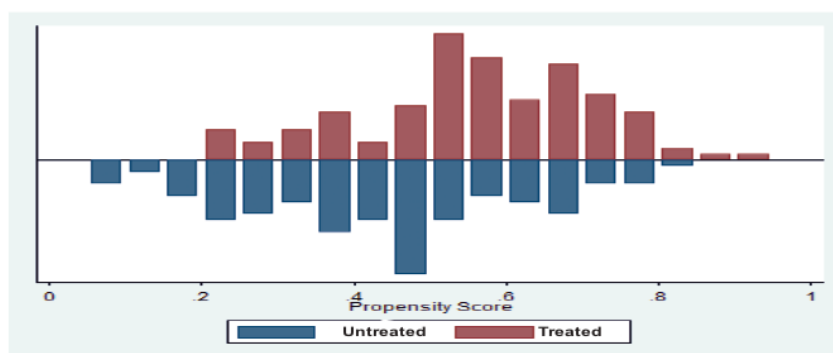
**Table 3.1 Impact of NSRLM participation on human capital**

Matching technique	Sample	Treated	Controlled	Difference	S.E.	T-stat
<b>Nearest Neighbour</b>	Unmatched	1.54125	0.0575	1.48374999	0.0886	16.75**
	ATT	1.54125	0.055	1.48624999	0.09032	16.46**
<b>Kernel</b>	Unmatched	1.54125	0.0575	1.48375	0.0886	16.75**
	ATT	1.54125	0.059782	1.481468	0.08921	16.61**
<b>Caliper</b>	Unmatched	1.54125	0.0575	1.48375	0.0886	16.75**
	ATT	1.532895	0.056579	1.476316	0.093548	15.78**

\*\*Significant at 1 %

Paired t-test critical t-value at  $\alpha=1$  per cent, 239 d.f.

ATT: Average Treatment Effect on the Treated



**Figure 1. Propensity score distribution and region of common support for Nearest Neighbour and Kernel matching.**

Figure 1 shows the propensity score distribution for beneficiary and non-beneficiary households, indicating adequate overlap between the two groups and confirming satisfaction of the common support condition under Propensity Score Matching.

Figure 2 depicts the propensity score distribution under Caliper matching, where a small number of treated observations were excluded due to lack of common support.

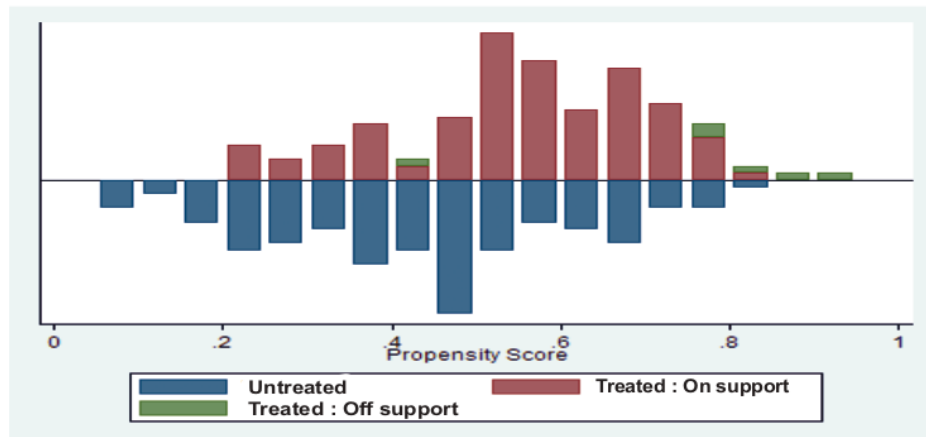


Figure 2. Propensity score distribution and region of common support for Caliper matching.

**Table 3.2. Impact of NSRLM participation on natural capital**

Matching technique	Sample	Treated	Controls	Difference	S.E.	T-stat
<b>Nearest Neighbour</b>	Unmatched	0.861667	0.305417	0.55625	0.050787	10.95**
	ATT	0.861667	0.325833	0.535833	0.054345	9.86**
<b>Kernel</b>	Unmatched	0.86166	0.305417	0.55625	0.050787	10.95**
	ATT	0.86166	0.330812	0.530855	0.051869	10.23**
<b>Caliper</b>	Unmatched	0.861667	0.305417	0.55625	0.050787	10.95**
	ATT	0.844298	0.323246	0.521053	0.052451	9.93**

\*\* significant at 1%

Paired t-test critical t-value at  $\alpha=1$  per cent, 239 d.f.

ATT: Average Treatment Effect on the Treated

**Table 3.3. Impact of NSRLM participation on financial capital**

Matching technique	Sample	Treated	Controls	Difference	S.E.	T-stat
<b>Nearest Neighbour</b>	Unmatched	-1.265	-3.58083	2.315833	0.24793	9.34**
	ATT	-1.265	-3.31167	2.046667	0.383648	5.33**
<b>Kernel</b>	Unmatched	-1.265	-3.58083	2.315833	0.24793	9.34**
	ATT	-1.265	-3.16782	1.902818	0.3107	6.12**
<b>Caliper</b>	Unmatched	-1.265	-3.58083	2.315833	0.24793	9.34**
	ATT	-1.25614	-3.51579	2.259649	0.389279	5.8**

\*\* significant at 1%

Paired t-test critical t-value at  $\alpha=1$  per cent, 239 d.f.

ATT: Average Treatment Effect on the Treated

**Table 3.4. Impact of NSRLM participation on physical capital**

Matching technique	Sample	Treated	Controls	Difference	S.E.	T-stat
<b>Nearest Neighbour</b>	Unmatched	0.273333	0.226667	0.046667	0.024064	1.94**
	ATT	0.273333	0.209167	0.064167	0.034509	1.86**
<b>Kernel</b>	Unmatched	0.273333	0.226667	0.046667	0.024064	1.94**
	ATT	0.273333	0.203559	0.069775	0.027797	2.51**
<b>Caliper</b>	Unmatched	0.273333	0.226667	0.046667	0.024064	1.94**
	ATT	0.274561	0.202632	0.07193	0.034936	2.06**

\*\* significant at 1%

Paired t-test critical t-value at  $\alpha=1$  per cent, 239 d.f.

ATT: Average Treatment Effect on the Treated

**Table 3.5 Impact of NSRLM participation on social capital**

Matching technique	Sample	Treated	Controls	Difference	S.E.	T-stat
<b>Nearest Neighbour</b>	Unmatched	0.925833	0.039167	0.886667	0.064068	13.84**
	ATT	0.925833	0.096667	0.829167	0.067652	12.26**
<b>Kernel</b>	Unmatched	0.925833	0.039167	0.886667	0.064068	13.84**
	ATT	0.925833	0.08098	0.844853	0.064757	13.05**
<b>Caliper</b>	Unmatched	0.925833	0.039167	0.886667	0.064068	13.84**
	ATT	0.935965	0.088596	0.847368	0.070192	12.07**

\*\*significant at 1%

Paired t-test critical t-value at  $\alpha=1$  per cent, 239 d.f.

ATT: Average Treatment Effect on the Treated

## REFERENCES

- Becker, S. and A. Ichino, 2002. Estimation of average treatment effects based on propensity scores, *Stata J.* **2** (4) : 358-377.
- Dehejia, R. and S. Wahba, 2002. Propensity score matching methods for non-experimental causal studies, *Rev. Econ. Stat.* **84** (1) : 151-161.
- Kumar, A. and C.B. Singh, 2001. Impact of dairy credit on income and employment generation on milk producer households in Meerut district of Uttar Pradesh – A case study, *J. Dairying Foods Home Sci.* **20** (3 & 4) : 199-203.
- Kumar, R. and A.K. Sharma, 1999. Impact of dairy cooperatives on rural economy in Nalanda district, *J. Dairying Foods Home Sci.* **18** (2) : 92-97.
- Kumar, R. and A.K. Sharma, 2019. Impact of self-help groups on livelihood security of rural households. *J. Soils and Crops.* **29** (2): 245-251.
- Meena, G.L. 2008. Impact of dairy cooperatives on the economy of rural households in Alwar district of Rajasthan. Unpublished Ph.D. Thesis, ICARNational Dairy Research Institute (Deemed University), Karnal, Haryana.
- Rosenbaum, P.R. and D.B. Rubin, 1983. The central role of the propensity score in observational studies for causal effects, *Biometrika.* **70** (1) : 41-55.
- Singh, K.R. 2012. Economic impact of integrated dairy development project on rural households in Meghalaya state. Ph.D. Thesis, ICARNational Dairy Research Institute (Deemed University), Karnal, Haryana.
- Singh, P., R.K. Meena and V. Sharma, 2020. Role of self-help groups in enhancing livelihood assets of rural households. *J. Soils and Crops.* **30** (1): 112-118.
- Sihag, R. and S. Vermani, 2017. A study on empowerment of rural women through self-help groups, *Ann. Agri. Bio Res.* **22** (2) : 258-264.

**Rec. on 13.01.2026 & Acc. on 09.02.2026**