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Rawls' difference principle, self-help group, financial inclusion and social cohesion—lore or actuality? Experience of Central Assam

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Microfinance is an alternative banking service available to low-income individuals or organizations for whom no institutional financial services are available. A widely accepted approach to assisting disadvantaged and excluded communities, especially in remote rural areas, is microcredit. The purpose of microfinance is to promote financial equality and inclusion by acting as a substitute for traditional lending methods for the marginalized. In India, Self-Help Groups (SHGs)—Bank Linkage Program that led microfinance—gained maximum popularity. The National Bank for Agriculture and Rural Development architected this model. In this model, Grameen Banks are associated with SHGs. The model is familiar as the SHG-Bank Linkage Program (SBLP). A microfinance program's theoretical foundation is the "Rawls' Difference Principle" embedded in the "Theory of Justice." The microcredit program, through the Self-Help Group-Bank Linkage Program (SBLP), gained maximum popularity in India. These SBLPs are registered with the "Deendayal Antyodaya Yojana—National Rural Livelihoods Mission (DAY-NRLM)" under the scheme Aajeevika. In harmony with "Rawls' Difference Principle," the ultimate goal of Aajeevika is social cohesion for all. The current study aims to assess the effectiveness of the SBLP-driven microfinance program in promoting financial inclusion. Furthermore, unlike earlier studies, the present study also considers whether or not involvement in SBLP increases social cohesion, which is a crucial component of the Difference Principle. The empirical research is conducted using novel data collected through a field survey of 335 participants and 490 non-participants from Nagaon, Morigaon, and Hojai districts of Central Assam. The "Propensity Score Matching" method facilitates the impact analysis of SBLP. The participation decision in the SBLP is positively influenced by the level of education. Empirical results also indicate that Hindus and low-caste women are interested in participating in SBLP. Contrarily, distance from the bank and operational land holdings are negatively influencing the participation decision. The empirical findings support higher financial inclusion through SBLP involvement but do not support greater social cohesion. Based on the empirical results, we suggest that more SBLPs be enrolled with DAY-NRLP under "Aajeevika." Simultaneously, social cohesion may be achieved only by guaranteeing participation for every deserving individual, irrespective of religion, caste, and class.

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Introduction

Financial literacy is crucial for households to make effective financial decisions, which are responsible for their economic well-being, particularly for the marginalized and vulnerable segments of society (Angrisani et al. 2023). Financial illiteracy among women is prominent worldwide. Thus, making women financially literate and equipping them properly so that they can make appropriate financial decisions has become the top priority of policymakers (Bucher-Koenen et al. 2017). A sturdy and practical financial system can ensure sustainable economic development and growth. To achieve universal financial inclusion, the Indian government has implemented various policy measures and relied on the SHG model (Kandpal 2020). A widely accepted approach to assisting disadvantaged and excluded communities, especially in remote rural areas, is microcredit. Muhammad Yunus of Bangladesh is the founder of this microcredit model. It is a process of group lending. The repayment of loans by the group members makes them eligible for further loans. In a nutshell, the mechanism uses the mechanism of trust to overcome the problem of asymmetric information (Armendàriz and Morduch 2005; Yunus 2003). Either the Bank Linkage Program or the microfinance institutions demonstrate the microfinance operations. In India, Self-Help Groups (SHGs)—Bank Linkage Program that led microfinance gained maximum popularity. The National Bank for Agriculture and Rural Development (NABARD) architected this model. In this model, Grameen Banks are associated with SHGs. The model is familiar as the SHG-Bank Linkage Model (SBLP).

Interestingly, rural women based on their mutual trust for each other form the SHGs. The Government of India introduced the "*Swarnjayanti Gram Swarojgar Yojana (SGSY)*" in 1999. Under this program, SBLP was introduced with the idea of group financing. The "Ministry of Rural Development", the Government of India, performed modifications to the SGSY program in June 2011. The program was introduced with a new name, "*National Rural Livelihoods Mission (NRLM),*" under the new sub-program "*Deendayal Antyodaya Yojana—National Rural Livelihoods Mission (DYA-NRLM)*" in June 2011. The manifesto of the DAY-NRLM is delineated by the term "*Aajeevika*". At present, the operating SHGs in India are registered under "*Aajeevika*" under DYA-NRLM. The programs' stated goal is to build strong institutional frameworks for rural residents, giving them better access to financial services and guaranteeing sustainable livelihoods by raising household income. The efficacy of microfinance in uplifting the poor, vulnerable, and marginalized is debatable. Existing literature documents that debate at both the national and international levels.

Notably, *"Rawls' Difference Principle"* described in his *"Theory of Justice"* serves as the theoretical cornerstone of the SHG model. Rawls embedded in this principle that achieving the *"Difference Principle"* required notable accomplishments by society's least advantaged segment. The *"Theory of justice"* is a holistic approach, and "*social cohesion*" is one of the many dimensions of *"Rawls' Difference Principle"*, and it describes the main objective of the microcredit scheme. This paper mainly focuses on the achievement of "social cohesion" through participation in SHGs in rural Assam.

Literature review and hypotheses

Comprehensive studies documented the success story of the microcredit program in uplifting marginalized rural populations by generating self-employment and income for them. However, there is no consensus among the studies concerning the success story of microfinance in alleviating poverty, ensuring financial inclusion, etc. Financial literacy is crucial for all, specifically marginalized, vulnerable, and women (Lusardi and Mitchell 2014; Damayanti et al. 2018; Angrisani et al. 2023). Globally, women lack financial literacy (Hasler and Lusardi 2017; Roy and Jain 2018; Bucher-Koenen et al. 2017). Women's financial literacy is found to be strongly correlated with their empowerment (Kumari et al. 2020). One of the most trusted models for financial inclusion is the SHG, and the Indian government, along with other policy measures, places emphasis on SHG models to ensure financial inclusion, particularly for rural marginalized and vulnerable people (Sarania and Maity 2014; Kandpal 2020; Kandpal and Khalaf 2020). SHG is recognized as a successful model for poverty alleviation and women's empowerment by Galab and Rao (2003), Vatta (2003), Deshmukh-Ranadive (2004), Maity and Sarania (2017), and Maity (2019). Contrarily, Phan (2012), Fujita and Sato (2013), Weldeslassie (2017) documented the partial success of SHG in poverty alleviation. Deshmukh-Ranadive (2004) also reported low coverage of the most poorest in SHG group formation. Thus, poverty alleviation under such circumstances becomes a myth (Deshmukh-Ranadive 2004). However, almost all studies agreed concerning the positive role of SHGs in self-employment generation (Kumar 2011; Maity and Sarania 2017; Sangvikar et al. 2019; Maity 2019). SHG results in higher financial inclusion for its participants (Dev 2006; Pokhriyal and Ghildiyal 2011; Garg and Agarwal 2014; Maity 2019; Kandpal and Khalaf 2020). SHGs are recognized to achieve several goals, like women empowerment (Kumar et al. 2021; Reshi and Sudha 2021; Mahato et al. 2022), the formation of health-related social capital (Nichols 2021), stimulating rural entrepreneurship (Robert et al. 2021) and linking to micro, small and medium enterprises (MSME) (Siddhartha et al. 2021). SHG loans become a substitute for informal credit, encouraging SHG participation and reducing the interest rate of informal credit in rural Bihar (Hoffmann et al. 2021). SHG participation is also helpful in mitigating seasonal income and consumption shocks (Demont 2022). Two recent studies explore the significance of SHGs on social cohesion and financial inclusion, and both studies conclude the positive part of SHG participation in achieving both goals (Maity 2023a).

The reality is that the outcome of such a program depends on its implementation, location, participants' characteristics, etc. Although studies vary concerning the aftermath of microfinance programs, one thing is common to all: microfinance aims to promote *development for all*. The class and caste systems in India create barriers to social cohesion for all. The question is whether SBLP-led microfinance opens avenues for social cohesion or not. Social justice is only ensured through achieving the goal of "*development for all*". Evidently, this specific goal of microcredit qualifies it as a tool for achieving the "Rawls' Difference Principle" of his "Theory of Justice". The realization of "Rawls' Difference Principle" requires significant achievements by the "*least-advantaged group in society*" (Maity 2023a). Notably, Rawls' "*Theory of Social Justice*" is a holistic approach, and this paper will not explore the "*Theory of Social Justice*". The microfinance model is recognized worldwide as the most accepted model for uplifting the vulnerable. The "*Rawls' Difference Principle*" is the microcredit program's foundational theory. Accordingly, it will be interesting to scrutinize how far microfinance models successfully achieve their theoretical base.

Among the many facets of "*Rawls' Difference Principle*", "*social cohesion*" defines the microcredit program's overarching goal. In India, two well-accepted models for microfinance are the Self-Help Group-Bank Linkage Program (SBLP) and the Self-Help Group-Microfinance Institution. The NABARD-architected SBLP is the most popular model of microfinance in India. These SHGs are currently enrolled in DAY-NRLM. From the beginning, the target group was BPL families, mainly women, and particular

emphasis was given to SC, ST, and people with disabilities. Consequently, the members of SHGs are predominantly women, including SC and ST. Thus, it will be appropriate to scrutinize the consequences of microfinance participation in *social cohesion* and, accordingly, the achievement of "*Rawls' Difference Principle*".

Diverse studies are documented on the effectiveness of SBLPs in achieving various objectives, such as women empowerment, rural entrepreneurship development, social capital generation, etc. The efficacy of the microfinance schemes in realizing their potential is still in a quandary, notwithstanding their enormous leaps. Even though the ongoing impact assessment research has significantly contributed to comprehending the intricate relationships among SHG interventions and the various objectives, there is still a sizable gap concerning the geographical and spatial aspects. The studies are different regarding technique, magnitude, and sample size. Region-specific research at the minuscule scale is extremely commended for assessing the potential of the microfinance initiative.

Moreover, only two recent studies, Maity (2023a, b) explore the role of SBLP on social cohesion. Both studies conclude that financial inclusion contributes to social cohesion. However, the result of such empirical analysis largely depends on the study area, sample size, and, more specifically, the characteristics of the sampled households. An increased sample size with diversified sampled households may end with a different conclusion. Thus, only two studies are insufficient to conclude the implication of SBLP participation on *social cohesion*.

Therefore, there is a *literature gap* that has to be addressed as part of ongoing research. The *social impact* of SBPL may also be recognized by filling this *research gap*, which ultimately aids in the formation of effective policy. The existence of the *research gap* motivates us to explore the unexplored aftermath of microfinance in the Indian context. Accordingly, the study concentrates on exploring a single research hypothesis:

H_0: SHG-led microfinance fails to corroborate social cohesion for the "*least-advantaged group in society*."

In many cases, SHG-led microfinance results in financial inclusion. However, the question is whether SHG results in social cohesion for the vulnerable and backward rural classes, with which objective SHG was architected by NABARD 1990 onwards (www.nabard.org). Accordingly, the twin objectives of the study are to examine how far financial inclusion is achieved through SBLP participation. Moreover, unlike an earlier study, the present study also analyzes the effectiveness of SHG-led microfinance in achieving "Rawls (1971), *Difference Principle*", that is, whether participation in SHG results in more social cohesion or not. Thus, the study is an addition to the existing literature, but beyond that, it involves exploring the fulfillment of the original objective of establishing the SHG model. This attempt makes the study novel in this field. The non-availability of the secondary data of the participants and non-participants forces the researchers to conduct such a study based on a primary survey for a particular locality.

We consider Assam to be our study area. There are substantial numbers of such location-based studies. However, there is still a sizable gap concerning various geographical and location-based studies. Given the diverse socio-economic and cultural milieu, their differences lie in applied methodology, sample size, and volume. The paper is structured in the way mentioned above. After a brief introduction in the initial section, the concept of social cohesion and the rationale for the choice of study area are presented. After that, the theoretical foundation, data sources, sample design, and methodology for this empirical study are presented. Next, the study's results are discussed, and the section is followed by a discussion. Finally, the conclusion and policy implications of the study are presented.

Concept of social cohesion

Irrespective of the economic and social scenarios of different countries, in every country, some groups of people face obstacles that prevent them from participating fully in social, economic, and political life. The main reason for their exclusion is the attitudes, perceptions, and beliefs of the rest of the population about them. The exclusion may sometimes be enforced by the application of legal caveats. Such exclusion also extends to the land and labor markets, which hampers their livelihood activities. Such disadvantages are frequently determined by a person's age, gender, race, religion, ethnicity, sexual orientation, and gender identity. This type of social marginalization causes people to lose their sense of security, worth, and opportunity for a better life. It will be challenging to support inclusive growth under such scenario. A distributive paradigm can be used to understand social justice. For a better understanding of the concept, we need to encompass different thoughts, like "Justice as Fairness" (Rawls 1971), entitlement (Nozick 1974), and democracy (Beilharz 1989). Sustainable Development Goals aim to reduce poverty and inequality, protect people from any form of injustice, ensure planet protection, etc. All the signatories to the SDGs adopted various policies to achieve the targets of the SDGs by 2030 (United Nations, https://sdgs.un.org/goals). In essence, the achievements of SDGs mean social cohesion for all. There is no concrete definition of *social cohesion*. We consider the United Nations' (2016) definition of social cohesion here. Maity (2023a) defined *social cohesion as* "*…social exclusion as a state in which individuals are unable to participate fully in economic, social, political and cultural life, as well as the process leading to and sustaining such a state*" (Maity 2023a). NABARD architected the SBLP to promote self-employment (swarozgaries) and *Aajeevika*, particularly for the rural poor and vulnerable, and emphasis was given to the upliftment of women from rural BPL families through their participation. According to NABARD (2022), 84% of SHGs are solely comprised of women. Under such a scenario, examining whether SBLP is a successful model in achieving its primal goal of "Rawls (1971) Difference Principle", that is, social cohesion, will be appropriate.

Rationale of the study area

The microfinance program is well-recognized for the upliftment of marginalized and vulnerable people. In the Indian context, there are two well-accepted models of microfinance: Microfinance Institutions (MFI) and the Self-Help-Group-Bank Linkage Program (SBLP). The NABARD architected SBLP gained maximum popularity in India. Swarnajayanti Gram Swarozgar Yojana (SGSY) was introduced in India in 1999 to encourage self-employment and ensure assistance to every BPL household. The scheme entrusts Self-Help Groups (SHGs) to operate as financial intermediaries. In many situations, women's SHGs are anticipated to serve as a platform for women's emancipation. Contrarily, the National Rural Livelihood Mission (NRLM) entrusted SBLP to achieve the goals embedded in *Aajeevika- the visionary aim of NRLM*. In fact, for the financial inclusion of the rural poor, vulnerable, and marginalized, SBLP has become the most trusted model (Maity 2023a, b). The Ministry of Rural Development (MoRD), Government of India, in June 2011, implemented the Deendayal Antyodaya Yojana-National Livelihoods Mission (DAY-NRLM) as a refined version of SGSY. All the operative SBLPs all over India are enrolled with DAY-NRLM currently. SHG formation has had a long history in Assam since 1990.

Assam's only operative microfinance model is the SBLP (Maity 2023a, b).

The study areas, Nagaon, Morigaon, and Hojai, are in *Central Assam*, and these three plain districts are different in social, demographic, and economic conditions from the rest of Assam (Table 8 in appendices). *Central Assam* consists of many operative SHGs currently enrolled in DAY-NRLM (https://daynrlmbl.aajeevika.gov.in/). The maximum number of operative SBLP in intensive blocks is recorded for Nagaon, 19795 (https://nrlm.gov.in/shgOuterReports.do?methodName=showShgreport). The same report also mentioned that Morigaon and Hojai ranked 19th and 23rd in all of Assam concerning the number of operative SBPLs in intensive blocks. Considering these three districts together, the total number of operative SBLPs in intensive blocks is 36610, with 9087 SBLPs in Morigaon and 7728 in Hojai. Almost 74% of the operative SBLPs in *eastern Assam* are concentrated in these three districts. The diverse population structure, Hindu, Muslim, Dimasa, etc., and the presence of lower class, lower caste rural poor encourage us to focus on the aforementioned three plain districts of *Central Assam* (Fig. 1).

The research is unique in several respects. The selection of the research area is what makes it distinct. Simultaneous consideration of the three districts of *Central Assam* makes the study interesting. Secondly, the study's stated objectives render it non-parallel. The exploration of the efficacy of SHGs in achieving the goal of *financial inclusion* is a common phenomenon. Beyond that, this study involves exploring the role of SBLP in three marginalized districts in achieving *social cohesion*. The government's tagline is "*Sabka Vikas Sabka Saath*," and as a signatory to the SDGs the government of India is also targeted to achieve development for all within 2030. From this perspective, this paper examines the SBLP's role in attaining the central goal.

Material and methods

This section concentrates on presenting the theoretical foundation, data, sampling, and econometric model to explore the stated objectives of the study.

Conceptual framework: research design. The theoretical underpinning of microcredit is credited to "Rawls' Difference Principle of Theory of Justice, (1971)". In "Theory of Justice," Rawls (1971) made an effort to formulate social justice principles. Rawls referred to his idea of social fairness as "Justice as Fairness". The first principle focuses on political institutions, and the second one concentrates on social and economic institutions. According to this theory, social equality is achieved only by ensuring the "greatest advantage for the most vulnerable segments of society." This is referred to as the "Rawls Difference Principle." According to Rawls (1971), if social-political-economic fairness conditions are satisfied, then the society we reach is a "just society."

The "Difference Principle" is one of the cornerstones of microfinance philosophy, which argues for the work of the powerful toward maximum benefits for the "least-advantaged members of society (Rawls 1971)". In fact, this is also an integral part of the "Sustainable Development Goals" in the form of Goal-5 and Goal-10 (United Nations, 2018, https://sdgs.un.org/goals). The Indian government also formulated its development policy, including Goal-5 and Goal-10 of the SDGs specifically and the "Difference Principle" generally. The Indian government manifested the development policy as "Sabka Saath, Sabka Vikas" (Growth for everyone through their participation in the growth process). DAY-NRLM introduced the flagship program "Aajeevika" in June 2011. MoRD in rural areas to reduce poverty by giving low-income households access to opportunities for profitable self-employment and skill enhancement for greater livelihood opportunities introduced the program. The objective of the program was to create varied and sustainable sources of livelihood for the underprivileged. Four key components describe the objectives of DAY-NRLM, "Aajeevika." The major ones are provision for "*swa-rozgaris*" (self-employed), increased financial inclusion, and increased social cohesion. (https://aajeevika.gov.in/about/introduction). Consequently, "social cohesion" is the final aim of DAY-NRLM and "*Aajeevika*" as well.

Two well-accepted models for the execution of microfinance services are the Linkage Programme and Microfinance institutions. In India, the latter framework gains more popularity. Regardless of the microfinance model, the ultimate aim of the program is to achieve benefits for the "least-advantaged members of society (Rawls 1971)". This will be achieved if and only if participation in microfinance corroborates "social cohesion." Therefore, only by evaluating how well microfinance participation contributes to "social cohesion" can its efficacy be determined. This paper executes this precisely. The attempt itself makes the study novel.

Data and variables. Secondary published and unpublished data are used to create the research area's profile. The major secondary data source is the DRDA's unpublished reports of respective districts. Apart from that, the NABARD Report is also utilized for the identification of the study area. However, for the exploration of the said objectives, we primarily rely on the unique data set, which was specifically gathered via the field survey.

Socioeconomic and demographic factors are particularly employed to investigate the profile of the sampled households. In order to create a profile of the sampled households, the research takes into account factors like *Age, Distance of the Bank from the household's residence, Education, Caste, Religion, and Agricultural Land Ownership*. Probit regression is used to get the propensity score using the beforehand specified predictors. The propensity score becomes the source of the impact analysis of the treated and non-treated (control) groups. Using self-conceived indices like the Financial Inclusion Index (FII) and the Social Cohesion Index (SCI), SBLP's influence on financial and social cohesion is assessed. Tables 8 and 9 in the appendices list the variables and matching modalities that are employed to build these two indices.

Instrument: sampling. A multistage stratified random sampling technique is used to conduct the primary survey. The primary survey was conducted by following different stages, and thus the sampling is multistage. Three districts, viz., Hojai, Nagaon, and Morigaon, from Central Assam, are selected in the initial stage of sampling. The stratified sampling technique is followed. District-level stratification was initially performed, then intensive block-wise stratification was conducted. Two intensive blocks from Nagaon and all intensive blocks from Hojai and Morigaon are selected in the second stage for field survey (for details, see Table 10 in the appendices). Notably, Nagaon-intensive blocks with the maximum number of operative SBLPs are selected. By using Krejcie and Morgan's (1970) formula, a specific total of SBLPs is decided to be surveyed in the third stage. Again, using Krejcie and Morgan's (1970) formula for a finite population, we have determined the number of participants to be interviewed in the fourth stage. Notably, the control group consists of double the number of members of the target group. The final phase involves personal interaction with the members of the target and control groups to gather pertinent data. The field survey began at the beginning of April 2019 and ended in January 2020. We have interviewed 335 participants and 490 non-participants, totaling 825. Table 1 presents the sampled SHGs' characteristics.

Table 1 Sampled SHGs characteristics.

District	Blocks	Respondents	SHGs	Members sampled
Nagaon	Barhampur	Participants	29	63
		Non-participants		92
	Dolongghat	Participants	30	65
		Non-participants		95
Morigaon	Laharighat	Participants	48	101
		Non-participants		149
	Mayong	Participants	8	21
		Non-participants		29
Hojai	Binakandi	Participants	40	85
		Non-participants		125
Total			155	825

Source: Authors' own specification based on unpublished secondary data collected from District DRDA Office, up to January 2019.

Analytical procedure. This section outlines the process for conducting an empirical investigation of the stated objectives.

Indexing financial and social cohesion. Both the ideas of financial and social cohesion are multifaceted (Nihinlola 2020). Concerning the indicators of financial inclusion, there is no unanimity among the earlier researchers. Overall, all researchers agreed that financial inclusion is the ability of the marginalized and vulnerable to access basic services, like saving, credit, insurance, etc., from formal institutions. This indicates the ability of poor and low-income households' to avoid informal credit sources. It also depends on the reliability, convenience, and flexibility of the system so that the loans are repaid, repayment of savings is guaranteed, and insurance coverage is settled on time (World Bank 2005; GOI 2008; Prathap 2011). Concisely, the sustainability of households' access to all financial services, like savings, credit, insurance, money transfers, etc., is financial inclusion (Shah and Dubhashi 2015). The corroboration of the financial inclusion of the disadvantaged and underprivileged in rural areas is one of the goals of the microcredit program. A self-conceived multidimensional Financial Inclusion Index (FII) is used to compare the current scenario of financial incorporation between target and control groups. The corresponding modalities for developing the FII are presented in Table 8 in the appendices, and the modalities are selected from earlier studies (Rangappa et al. 2009; Prathap 2011; Maity and Sarania 2017; Maity 2019, 2023a, b).

To prove that one person is socially included, we need to check the person's accessibility to all social activities. Unfortunately, we don't have any acceptable definition for social cohesion. We can conceptualize the thing in the way that the absence of social exclusion for any person or household means that person or household is socially included. Furthermore, social banishment has multifaceted facets. The notion encompasses more than just materialistic exploitation. The inability and unsustainability of people to enjoy comprehensive *economic, social, political, and cultural life* is recognized as social banishment (Peleah 2016, in the UNDP Report, 2016). Three recognized dimensions of social banishment are *isolation from economic activities, public services, and civic and political participation* (United Nations 2016; Maity 2023a, b). Consequently, by incorporating all the modalities representing the three main spheres of social banishment mentioned in Peleah (2016), in the UNDP Report (2016), Maity (2023a, b), a self-conceived social banishment index (SBI) is developed. Table 9 in the appendices presents the modalities utilized for constructing the social banishment index. Initially, three self-conceived indices are calculated, representing "*Economic Exclusion*", "*Exclusion from Public Services*" and "*Exclusion from Civic and Political Participation*". Then by allotting equal weightage to all self-conceived indices, the "*Social Banishment*" index for each sampled household is obtained (Peleah 2016 in UNDP Report, 2016). As the sum of social banishment and social cohesion is equal to "1", the Social Cohesion Index (SCI) is obtained by subtracting the individual's SBI score from "1". The composite SCI score is interpreted as follows: a higher value of the index means higher social cohesion (Alkire and Foster 2009).

The weights of the modalities can be obtained either by the researcher's discretion, called preference indexing, or by applying principal component analysis. The first method suffers from researchers' discretion and is thus not very reliable. Almost all researchers accept indexing by PCA. The applicability of the PCA depends on a number of conditions, including non-categorical modalities. Both Table 8 (for FII) and Table 9 (for SCI) in the appendices reveal that all our modalities are binary. Consequently, PCA is not applicable in our case. We avoided preference indexing by using MCA. The pattern of relationships between many dichotomous variables can be analysed using MCA (Asselin 2002).

By using MCA, we obtain the weights for SBI, and then we calculate the SBI. Since the sum of banishment and cohesion is "1". Consequently, we subtract SBI from "1" to get SCI.

For categorical indicators, the index for kth individual is obtained in the following way:

$$\mathrm{SBI}_k = \frac{1}{m}\left(\omega_1 I_{k1} + \omega_2 I_{k2} + \ldots\ldots + \omega_m I_{km}\right) \quad (1)$$

where W_m = modality m's weight. I_m = dichotomous value, that is, it assumes value either "0" or "1".

The thereby produced index ranges from 0 to 1. In our instance, the FII values "0" and "1" denote total financial inclusion and full financial exclusion, respectively. Furthermore, SCI "0" denotes social exclusion, whereas "1" denotes total inclusion in society.

SHG participation Impact. The widely used propensity score matching (PSM) approach is applied to examine the effects of SBLP participation (Arun et al. 2006; Lyngdoh and Pati 2013; Bhaumik and Bera 2015; Mohapatra and Sahoo 2016). After removing the existential biases within the two categories, the technique enables the researchers to make causal deductions (Rosenbaum and Rubin 1983; Heckman et al. 1998). A conditional probability estimated based on the factual features of a treated individual is called the propensity score [P(X)] (Rosenbaum and Rubin 1983; Maity 2023a, b). The balance score value falls between 0 and 1. Any binary selection model (Logit or Probit) may be used to generate the propensity score (Caliendo and Kopeinig 2008), and the present paper has used the Probit

model. The model is described in the following way:

$$P(Z) = P(T = 1|Z) = \varphi(\alpha_1 Z_1 + ... + \alpha_k Z_k) = \varphi(\beta Z) \quad (2)$$

Where, $0 < \phi(\beta Z) < 1$ for all values of Z and φ. Here φ is the standard normal distribution's cumulative distribution function. The parameters of Eq. (2) are estimated by applying "Maximum Likelihood Estimation" technique.

The impact of SBLP can be assessed by using any outcome indicator.

By contrasting treatment and control groups with accurate matching, it is possible to gauge the influence of SBLP on outcome variables. The propensity score, which acts as an equalizer score, offers accurate matches within the two categories.

Accordingly, if SCI^1 is the social cohesion score for the SBLP participants ($T = 1$), and SCI^0 is the social cohesion score for the control ($T = 0$), then the following is the mean significance:

$$^{ATT}\prod_{PSM} = E_{P(X)}(SCI^1|Z, T = 1) - E_{P(X)}(SCI^0|Z, T = 0) \quad (3)$$

Here, ATT stands for "Average Treatment effect on the Treated". In the present investigation, Nearest Neighbor Matching (NNM) and Kernel Matching (KM), algorithms are used to avoid any flaws and corroborate the robustness of the predicted influence on the findings (Maity and Sanaria 2017; Maity 2019, 2023a, b). Notably, the SHG groups are created depending on the members' previous personal relationships; therefore, the conclusions we reached using samples from these groups may be prone to unintentional bias (Maity 2023a, b). Therefore, sensitivity testing using the "Mantel and Haenszel" (1959) limits test is required to ensure that such a conclusion is legitimate (Maity 2019,2023a, b).

Notably, the list of factors listed in Table 2 is used to generate the propensity score. Additionally, Table 2 shows that there are substantial differences between the participants and non-participants in terms of the list of predictors.

Due to the stark differences between the two groups, it is not possible to compare the effects of SBLP membership without taking into account each group's socioeconomic level. After balancing, the sole distinction between them will be whether one has had treatment or not.

Results

The empirical results of the study are presented in this section.

Calculation of propensity score. The Probit model is employed in this instance to determine the likelihood of participation or treatment. The list of variables mentioned in Table 3 is supposed to determine the participation choice. Table 3 also includes a recount of the Probit model predictors. Notably, treated and control's propensity scores are ascertained using the listed predictors.

The specification's resilience can be ascertained from the pseudo-R-squares value of 0.4281. Moreover, the likelihood ratio chi-squares value is 295.28, with a corresponding p value of 0.0000. Thus, we conclude our fit is good. Age, consumption expenditure, education, caste, religion, and the distance of the bank from the household's residence (KM) meaningfully influence the SBLP participation decision. These exogenous variables significantly determine the likelihood of participation and borrowing from SBLP. Notably, higher age and long distance from the bank discourage participation in the SBLP. Contrarily, the likelihood of participation in SBLP is higher for SC/ST and Hindus. Simultaneously, a higher level of education and increased consumption expenditures encourage participation in SBLP. The predicted propensity scores' limits are shown in Table 4.

The range of the propensity score enables us to identify the region of common support as [0.239–0.672], with a maximum value of 0.672 and a minimum value of 0.239. 0.407 is the average propensity score. This insinuates that in ~41% of cases, all sample units are correctly predicted to participate via probit regression.

Common support checking. The comparison between treated and control, depending on the output indicator, is at the core of the impact analysis of microfinance. Only if there is adequate overlap between the "treatment and control groups" (Maity 2023a, b) is a valid comparison possible. The overlapping histogram of the propensity score gives the common support region (Fig. 2).

The figure evidences a significant overlap of the propensity scores between the treated and control groups. This implies that the standard support requirement has been met. A significantly large number of samples permit us to accomplish "matching without replacement" (Maity 2023a, b). Consequently, 335 treated matched with 335 controls, resulting in the elimination of 155 non-participants from the analysis.

Balancing checking. Table 2 clearly shows the significant disparities between the treatment and control groups based on what

Table 2 Results of *t*-test for quantitative variables.

Variables	Respondents	*N*	Mean	SE	Mean difference	Std. error mean difference	*t*-statistics
Age	Participants	335	30.834	0.055	0.491	0.071	6.933***
	Non-participants	490	30.343	0.045			
Education	Participants	335	5.536	0.055	0.309	0.071	4.359***
	Non-participants	490	5.227	0.045			
Agricultural land ownership (in bigha)	Participants	335	1.925	0.055	0.282	0.071	3.979***
	Non-participants	490	1.643	0.045			
Cast	Participants	335	0.528	0.055	−0.029	0.071	−0.406
	Non-participants	490	0.557	0.045			
Religion	Participants	335	1.010	0.055	0.445	0.071	6.279***
	Non-participants	490	0.565	0.045			
Distance of the Bank from the household's residence (KM)	Participants	335	4.394	0.045	−0.311	0.071	−4.381***
	Non-participants	490	4.704	0.055			
Consumption expenditure	Participants	335	1950.985	0.055	−543.250	0.071	−7.70E + 03
	Non-Participants	490	1407.735	0.045			

Source: Authors' own calculation based on primary data.
***Significant at 1% level.

Table 3 Probit regression model for the estimation of the propensity score.

Dependent variable: SHG participation dummy (1 = participant; 0 = non-participant)

Iteration 0: log likelihood = −556.67753
Iteration 1: log likelihood = −383.15891
Iteration 2: log likelihood = −381.69288
Iteration 3: log likelihood = −381.65979
Iteration 4: log likelihood = −381.65966
Iteration 5: log likelihood = −381.65966
Number of observation = 824
LR $chi^2(7) = 350.04$
Prob > $chi^2 = 0.0000$
Pseudo $R^2 = 0.3144$

Probit regression
log likelihood = −381.65966

Variables	Definition	Coefficient	SE	Z-Statistics	p > |z
Age	Measured in complete years	−0.023***	0.009	−2.59	0.010
Education	Total schooling in completed years	5.222***	0.445	11.75	0.000
Agricultural land ownership (in bigha)	Size of the operational land holding in bigha	0.016	0.128	0.13	0.899
Cast	Cast of the sampled household Dummy, if SC/ ST = 1, 0 otherwise	0.121***	0.034	3.61	0.000
Religion	Dummy, if Hindu = 1, 0 otherwise	0.138**	0.070	1.960	0.053
Distance of the Bank from the household's residence (KM)	Distance of the bank measured in km	−0.098***	0.027	−3.64	0.000
Consumption expenditure	Monthly household consumption expenditures measured in Rs	0.002***	1.50E−04	14.38	0.000
Constant	-	0.006	0.015	0.39	0.696

Source: Authors' own calculation based on primary data.
**Significant at 5% level; ***Significant at 1% level.

Table 4 Ranges of propensity score.

Variable	Observation	Mean	Std. Dev.	Min	Max
P-Score	824	0.407	0.064	0.239	0.672

Source: Authors' own calculation based on primary data.

is immediately observed. However, similarities between two comparable groups that are respectable and observable are the apriori condition for impartial comparison. Theoretically, the PSM method eliminates all the observable dissimilarities between two comparable groups. The balancing covariates are the test for the appropriateness of the theoretical possibilities. The result of the balancing check is presented in Table 5.

Table 5 provides a helpful perspective, showing that almost all of the bias is eliminated by matching. The corresponding *t*-statistics confirm the claim. Additionally, a lower pseudo-R^2 after matching corroborates the claim that the matching technique has balanced the facets of the participant and non-participant groups.

All apriori requirements being fulfilled enable us to conduct an impact analysis using the chosen outcome indicators. The impact analysis will be facilitated by using the average treatment effect on the treated (ATT) and by applying Nearest-Neighbor Matching (NNM) and Kernel Matching (KM) algorithms to avoid ambiguity and ensure robustness in the result.

SBLP and financial inclusion and social cohesion. In this part, the study's lone hypothesis is put to the test. Three indicators of impact analysis are: average treatment effect on the treated (ATT), average treatment effect (ATE), and average treatment effect on the untreated (ATU) (Maity 2023a, b). Because of the non-testability of ATE and ATU results, we confine our attention to ATT estimates for impact assessment of outcomes. NNM and KM, two matching algorithms, are used to prevent ambiguity and guarantee the robustness of the outcome (Table 6).

Concerning financial inclusion, the table discloses a significant positive influence of participation in SBLP-led microfinance. The ATT of the microcredit treated is 0.450 and that of the control's is 0.387, demonstrating that financial inclusion, as assessed by FII, is 6.3% greater for treated than for their control peers, considering NNM. At the 1% level, the empirical finding is statistically significant. KM algorithms conclude in a similar fashion. According to the KM algorithm, the financial inclusion of the treated and controls is 0.450 and 0.385, respectively. This suggests that participants' financial inclusion is 6.5% higher than their non-participating counterparts, and we are 99% confident about the appropriateness of the result.

The empirical finding pertaining to social cohesion is the most intriguing. The table reveals that participation in SBLP results in a 22.5% increment in social cohesion, considering NNM. Contrarily, the KM algorithm confirms that SBLP participation corroborates a 21.5% increase in social cohesion. However, both results are statistically insignificant. This signifies that participation in the SBLP may result in financial inclusion but not social cohesion.

Thus, our empirical result does not accredit us to reject the null hypothesis, and thus we accept it. Accordingly, we conclude that "SBLP fails to corroborate social cohesion for the underprivileged in society" (Maity 2023a, b). This result is true with respect to both matching algorithms.

The following section, "Discussion", presents a potential explanation for these empirical findings.

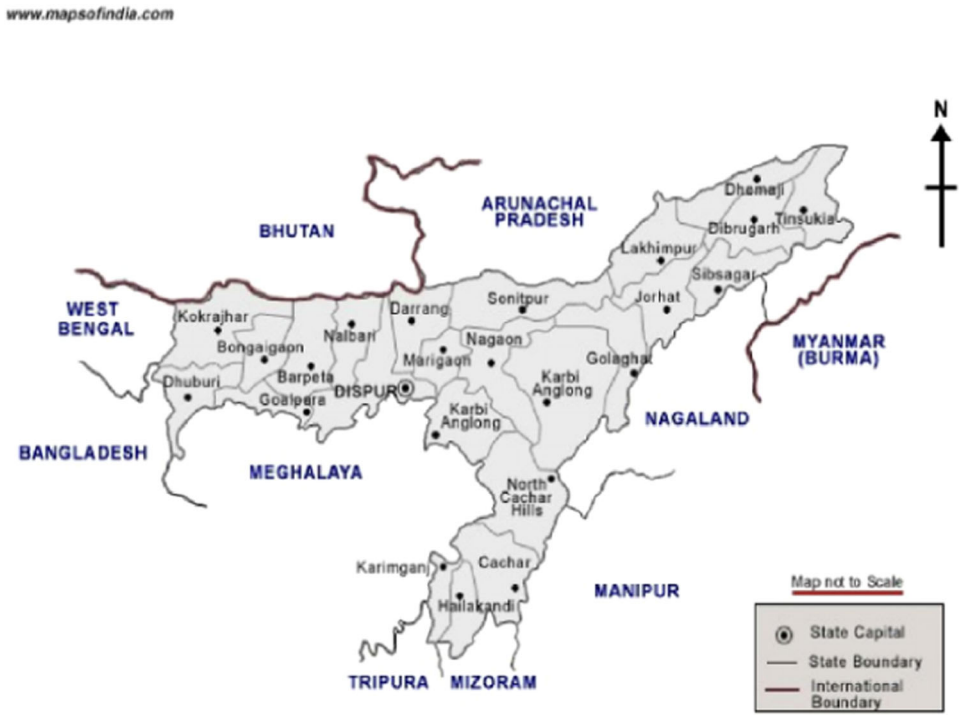

Fig. 1 Map of Assam. District Map of Assam.

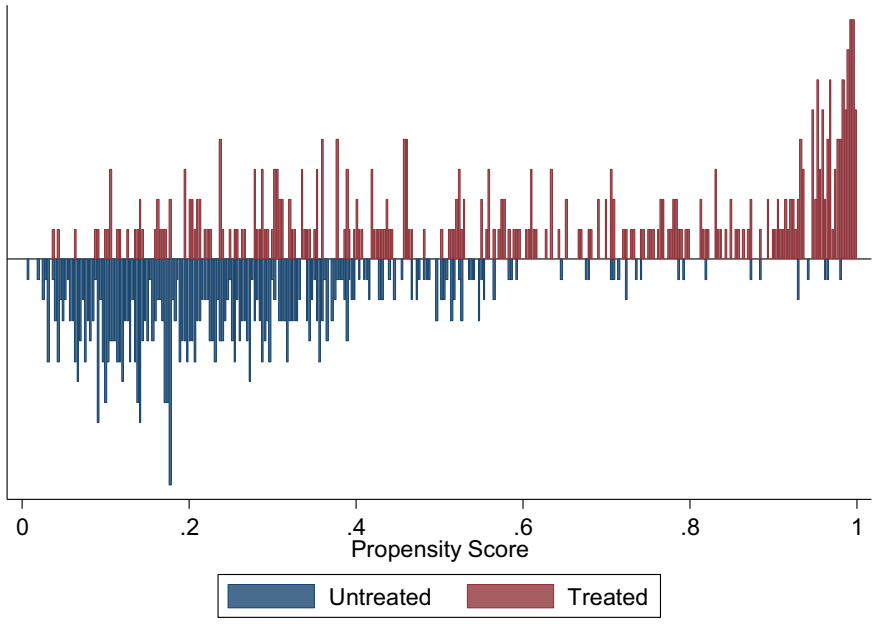

Fig. 2 Common support region.

Sensitivity checking. The validity test of the empirical result is mandatory. Although it is the responsibility of the panchayat members of a particular village to form the SHG groups based on their submitted applications, the reality is that these groups are created depending on their individual familiarities. Accordingly, the possibility of the existence of hidden bias is not unfeasible. The Mantel and Haenszel (1959) bounds test is conducted to check for the possible existence of hidden bias. Assuming there is no implicit bias ($\Gamma = 1$), the Mantel and Haenszel (1959) bounds test statistic confirms that there is no hidden bias in the result (Table 7).

Discussion

The empirical results corroborate that participation in SBLP-led microfinance makes financial inclusion a reality. However, social cohesion remains a myth for them. Participants are more financially included than their non-participants' counterparts, but no improvement is entrusted concerning social cohesion. Patently, participation in SBLP-led microfinance leads to greater financial inclusion. In June 2011, the Ministry of Rural Development (MoRD), Government of India (https://rural.nic.in/) introduced DAY-NRLM. The flagship program was entitled "*Aajeevika*". It serves as a model plan for reducing poverty in rural areas by

giving low-income households access to opportunities for profitable self-employment and skill enhancement for greater livelihood opportunities, generating sustainable and diversified livelihood options for the poor. The objectives of this mission revolve around four key constituents: "(a) social mobilization, promotion, and bolstering of self-managed and financially sustainable community institutions of the rural poor women; (b) financial inclusion; (c) sustainable livelihoods; and (d) social cohesion, social development and access to entitlements through convergence" (https://rural.nic.in/; https://aajeevika.gov.in/about/introduction).

The mission aims to gradually include about ten million rural poor families by 2022–2023 to escalate their livelihoods.

All the operative SBLPs in India are enrolled with DAY-NRLM and thus strive toward achieving the manifested objectives. Therefore, it was mandatory that 80% of "*swa-rozgaris*" (self-employed) be SC/ST and women. Following the embalmed objectives, the group members are rural poor women, mainly housewives, who hardly have bank accounts. However, after joining and forming the groups, they must have a bank account and a loan account in the bank and visit the bank to repay the loan on time. All these activities expand their financial practice and banking habits, motivating them to borrow from banks and not from private lenders for personal emergencies (Hoffmann et al. 2021). Over time, they become more adept at using ATMs, debit cards, and internet banking. In some circumstances, they take out insurance (life or health). Successful utilization of loan amounts makes them successful entrepreneurs (Robert et al. 2021) and empowers them to repay loans on time. Timely repayment of loans escalates their eligibility to receive loans further. All these activities placed the SBLP participants financially more than their non-participants' parallel (Kumar et al. 2021; Reshi and Sudha 2021). This is why the participants' degree of financial inclusion has significantly improved. Our result is very consistent with those of Rangappa et al. (2009), Prathap (2011), Maity and Sarania (2017), Maity (2019, 2023a, b).

Contrarily, social cohesion means providing more opportunities for social, economic, civic, and political participation, irrespective of gender, religion, caste, or class. In Indian society, especially in rural areas, women are generally considered inferior to men (Dyson and Moore 1983; Agarwal 1992, 2000). Men are considered the undisputed leaders of the family (Niaz 2003). Despite their engagement in income-earning activities, women have little or no control over the money they earn (Kabeer 2005; Luke et al. 2014; Klasen and Pieters 2015). Sometimes, although a specific woman is named as a beneficiary of the SBLP, the decision concerning how and for what purpose the received loan will be spent is taken by the chief male member of the family (Kapoor 2019; Hasija 2021; Gupta and Singh 2023). Such viewpoints prevent women from being economically included. Religion determines the food habits and other beliefs of people. Religious differences restrict people from consuming certain foods, like the prohibition against consuming beef for Hindus and Muslims' avoidance of pork (Dugan 1994; Kwon and Tamang 2015; Cohen 2021). Orthodox rural Indian society entrusted strongly to religion, caste, and class. Religious differences do not allow people to participate in one another's celebrations (Deshpande 2010). Upper-caste people in rural India still avoid the participation of lower-caste people on occasions (Jeffrey et al. 2005; Coffey et al. 2017). Perhaps this is why SBPL groups are created depending on their individual familiarities (Maity and Sarania 2017; Maity 2019, 2023a, b). Orthodox rural mentality restricts people from being socially included (Meerman 2005; Roy 2021). Currently, religious beliefs are transmitted according to political choice in India, and rural India is not an exception in this case (Hasan 2010; Kim 2017; Vaishnav 2019). Currently, when casting ballots in the world's largest democracy, religion becomes a significant factor (Kim 2017; Vaishnav 2019). Under such circumstances, political participation is a delusion. Thus, participation in SBLP-led microfinance failed to achieve the goal of "social cohesion". Participants are no better than non-participants in this regard. The effect of SHG involvement in yielding stronger social cohesion than their non-participant counterparts is examined in two recent articles (Maity 2023a, b), and both studies replicate SHGs' success in accomplishing the same. But unlike earlier papers, the present paper concludes differently. The social cohesion of the participants in SBLP depends on various factors, including the research area, sample size, sampling procedure, etc. The phrase "heterogeneity within homogeneity" fits Assam nicely. Therefore, it may be concluded that participation in SBLP fails to achieve social cohesion for the participants, provided an acceptable

Table 5 Balancing between two groups.

	Mean			*t*-test	
Variables	**Treated**	**Control**	**% Bias**	***t***	***p*** **> |t|**
Age	31.47	29.77	3.0	0.26	0.797
Education	5.58	5.97	−7.0	−0.63	0.528
Agricultural land ownership (in bigha)	1.93	2.19	−16.5	−1.73	0.084
Cast	0.53	0.59	−12.2	−1.58	0.115
Religion	0.53	0.56	−7.20	−0.930	0.530
Distance of the Bank from the household's residence (KM)	4.86	4.35	2.5	0.21	0.833
Consumption expenditure	1951.0	1968.1	−4.3	−0.44	0.663
Pseudo-R^2	**0.083**				
LR chi^2	**3.52**				
$p >$ chi^2	**0.966**				

Source: Authors' own calculation based on primary data.
Bold values: The lower value of LR chi^2 and high value of corresponding $p >$ chi^2 also indicates that matching elements balanced almost all of the bias in the covariates.

Table 6 ATT estimates of SHG participation impact on Financial Inclusion and Social Cohesion.

Impact indicators	**Matching method**	**ATT**				
		Treated	**Controls**	**Difference**	**Std. Err.**	***t*-statistics**
Financial inclusion	Nearest Neighbor	0.450	0.387	0.063	0.024	2.63***
	Kernel	0.450	0.385	0.065	0.021	3.07***
Social cohesion	Nearest Neighbor	0.662	0.437	0.225	0.237	0.952
	Kernel	0.662	0.447	0.215	0.159	1.352

Source: Authors' own calculated based on primary data.
***Significant at 1% level.

Table 7 Sensitivity Analysis for Average Treatment Effect.

Outcome variables	Mantel and Haenszel (1959) bounds				
	Gamma	Q_mh+	Q_mh−	p_mh+	p_mh−
Financial inclusion	1	0.788	12.212	0.215	0.000
Social cohesion	1	1.376	13.505	0.084	0.000

Source: Author's own calculation based on primary data.

representative sample is acquired. To reach a broad conclusion, more research on this subject is necessary.

Conclusion, policy implications, limitations and future research pathways

The "Rawls Difference Principle" of the "Theory of Justice (1971)" serves as the theoretical cornerstone of microfinance. In India, SBLP is the most popular model of microfinance. These SHGs are enrolled with DAY-NRLM under "*Aajeevika*". As manifested, "*Aajeevika*" seeks to assist the rurally vulnerable by fostering sustainable livelihoods, ensuring financial inclusion, and, most importantly, achieving social cohesion for all. These objectives align with the ideology of "*Rawls' Difference Principle*" as described in the "Theory of Justice (1971)" (www.ncbi.nlm.nih.gov). Any impact analysis of a microfinance scheme is lacking if it does not also examine the effects of participation on social cohesion. Unfortunately, only two studies have attempted to explore this, so in that sense, this study is an addition to a less explored research issue. The investigation distinguishes the research. The study's uniqueness is a result of its clearly defined objectives, variable selection, and research topic. The study's unique features include the region and social participation in the impact evaluation. The empirical findings support the conclusion that social cohesion is a lore for SBLP participants. Still, financial inclusion becomes a reality for them.

Drawing from the empirical evidence, we propose the subsequent policy recommendations:

Firstly, as SBLP participation results in higher financial inclusion, thus, it is highly recommended that more SBLPs be enrolled with DAY-NRLP under "*Aajeevika*". Moreover, homemakers from SC/ST households in rural areas should be encouraged to participate in this initiative. Before participants received loans, suitable training might have been provided to ensure proper use of the loan amount. NGOs might play a role in this. Simultaneously, another microcredit model, MFI, may be implemented in the area where SBLPs are operating. The economic autonomy of these participating women has strong spillover effects on others. It motivates other homemakers to participate in such microcredit programs. Therefore, the government and NGOs must take proactive measures to expand the scope of this microcredit scheme.

Secondly, the ineffectiveness of SBLP-led microfinance in promoting greater social participation may result from improper group formation. According to the rules, interested candidates must submit their applications to the "*Panchayat*" in this respect. The "Panchayat" members are responsible for forming the groups. However, the reality is that the participants form the group based on their personal familiarity. This protects the scheme from achieving the ultimate goal of such a microcredit program. To ensure social cohesion, SBLP-led microfinance must work a lot on participation. Social cohesion may be achieved only by guaranteeing participation for every deserving individual, irrespective of religion, caste, and class. Particularly, group formation across religion, class, and caste may corroborate social cohesion through SBLP participation. Even though they come from different castes and faiths, the participants must learn to trust and comprehend one another. Only then, will SBLP participation result in social cohesion. In this respect, NGOs may be able to handle the duty of counseling more effectively.

Regarding the contribution of the present paper to the ongoing research, it is noteworthy that this work is the first of its type where SBLP's role in social cohesion is explored. Economic upliftment is only a stepping-stone to the objectives of SHG formation. The theoretical cornerstone of SHGs is the "Rawls' Difference Principle", which outlines the ultimate goal of SHGs as ensuring social cohesion for all. This paper aims to investigate the extent to which SHGs are successful in providing social cohesion for their members. Unlike the earlier two studies (Maity 2023a, b), the paper concludes that financial inclusion does not translate to social cohesion. This outcome pinpoints that the non-achievement of the ultimate goal of SHG may be due to irrationality in-group formation. Personal familiarity is becoming the only criterion for inclusion in the group. SBLP-led microcredit must focus on participation to ensure social cohesion. The "Panchayat" is responsible for handling this managerial issue. Another significant contribution of this study is the redefinition of the function of the "Panchayat" for SHG.

The study is locational, concentrating only on Central Assam, and this can be viewed as one of its weaknesses. The effect assessment could have been more comprehended if Assam as a whole could be included in the research. However, similarities in the social, economic, and demographic situation are preconditions and requirements for such an effect appraisal. This restricts us from choosing areas where this apriori condition is satisfied. Even after this, the increase in sample size may give us a different result. Study area extension and consideration of a dynamic framework for impact analysis are the future courses of extension of the present study. In a dynamic framework, it will be possible to include the level of group maturity and the duration of microfinance participation. These factors are supposed to strongly influence households' ability to avoid poverty. Specifically, the duration of microfinance participation is crucial for examining its impact on a long-run concept like social cohesion[1,2].

Nevertheless, the lack of such information limits our capacity to carry out this study, and it becomes another research limitation. By using dynamic panel modeling in conjunction with data gathering, the study may be furthered in the future. In fact, this is the future research pathway of the study.

Data availability

Primary data are the foundation of the investigation. Only when requested will the pertinent information be disclosed. However, questionnaire to collect data are included with the submission.

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Notes

1 Intensive blocks are those blocks where SHGs are getting complete financial support and capacity building from DAY-NRLM (Maity 2023a, b).

2 The participants are those who received SBLP loans 2 years before the survey took place. They constitute a treatment group. Contrarily, control group members are those who have formed the group but have not received any loans from SBLP at the time of the survey (Maity 2023a, b).

Appendices

Tables 8–10

Table 8 FII indicators and their corresponding weights.

Indicators	Sources of finance	Nature of the variable	Descriptions	Weights
Formal credit	From formal agencies directly and/or through SHG during Survey (during 2016)	Categorical	Yes = 1	0.124
			Otherwise = 0	0.005
	From formal agencies directly and/or through SHG during Survey (during 2017)	Categorical	Yes = 1	0.105
			Otherwise = 0	0.020
	From formal agencies directly and/or through SHG during Survey (during 2018)	Categorical	Yes = 1	0.079
			Otherwise = 0	0.055
	Regular repayment of loan	Categorical	Yes = 1	0.094
			Otherwise = 0	0.031
	Received loan during emergency	Categorical	Yes = 1	0.087
			Otherwise = 0	0.038
Savings	Operating SB account in bank/post office/co-operative Banks	Categorical	Yes = 1	0.120
			Otherwise = 0	0.024
	Fixed deposit or recurring deposit account with institutional agencies	Categorical	Yes = 1	0.087
			Otherwise = 0	0.015
	Savings in SHG	Categorical	Yes = 1	0.101
			Otherwise = 0	0.040
Insurance	Any source/type of insurance	Categorical	Yes = 1	0.110
			Otherwise = 0	0.011
Transaction services	Usages of ATM/Debit Card/Cheque	Categorical	Yes = 1	0.085
			Otherwise = 0	0.047
Banking knowledge	Knowledge of banking procedure after joining SHG	Categorical	Yes = 1	0.024
			Otherwise = 0	0.004
SHG operation	Facing problem of getting loan through SHG	Categorical	Yes = 0	0.070
			Otherwise = 1	0.118

Source: Authors' own calculation based on primary data.

Table 9 SEI indicators and their corresponding weights.

Broad areas of exclusion	Indicators	Modalities	Weights	
			Yes	Otherwise
Economic exclusion	Subjective basic needs	In the past 1 year household has not able to offered three meal a day or pay bill regularly, or keep the home adequately warm (if yes = 1, 0 otherwise)	0.06	0.017
	Employment	Being unemployed or discouraged worker (if yes = 1, 0 otherwise)	0.010	0.067
	Financial service	Bank accounts owns name (if yes = 0, 1 otherwise)	0.050	0.027
	Material deprivation housing	Can't offered bed for every member (if yes = 1, 0 otherwise)	0.033	0.044
		Constructed toilet (if yes = 0, 1 otherwise)	0.037	0.040
		Has cement roof (if yes = 0, 1 otherwise)	0.075	0.002
		Has cement floor (if yes = 0, 1 otherwise)	0.065	0.012
	Material deprivation amenities	Household cannot afford anyone or all: washing machine microwave and freeze (if yes = 1, 0 otherwise)	0.003	0.074
		Has mobile phone (if yes = 0, 1 otherwise)	0.068	0.009
		Has TV set (if yes = 0, 1 otherwise)	0.061	0.015
		Has bicycle (if yes = 0, 1 otherwise)	0.043	0.034
		Has four wheeler motored vehicle (if yes = 0, 1 otherwise)	0.074	0.003
	Material deprivation ICT	Household needs a computer or internet but cannot afford one (if yes = 1, 0 otherwise)	0.001	0.076
Exclusion from public service	Public utilities	No public water connection (if yes = 1, 0 otherwise)	0.021	0.091
		No sewerage system (if yes = 1, 0 otherwise)	0.004	0.107
		No gas connection (if yes = 1, 0 otherwise)	0.044	0.067
		No electricity (if yes = 1, 0 otherwise)	0.045	0.066
	Education	Could not afford to buy school materials for every child in past 12 months (if yes = 1, 0 otherwise)	0.016	0.095
		Young children not in school or pre-school (if yes = 1, 0 otherwise)	0.022	0.090
	Health	Could not afford medication or dental checks for every child in the past 12 months (if yes = 1, 0 otherwise)	0.035	0.076
		Doctor consulted in case of medical needs (if yes = 0, 1 otherwise)	0.11	0.001
	Social infrastructure	Lack of opportunities to attend events due to distance (if yes = 1, 0 otherwise)	0.051	0.060
Exclusion from civic and political participation	Social contact	Rare or infrequent social contract with family or relatives (if yes = 1, 0 otherwise)	0.052	0.073
		Rare social contract with friends (if yes = 1, 0 otherwise)	0.057	0.068
		lack of support network that could help in the events of emergency (if yes = 1, 0 otherwise)	0.037	0.088
	Social participation	Since last 1 year household has not been able to invite friends or relatives for meal at least once a month (if yes = 1, 0 otherwise)	0.061	0.064
		Has not been able to afford to buy cinema tickets since 12 month (if yes = 1, 0 otherwise)	0.046	0.079
	Civic participation	Inability to vote due to lack of eligibility or distance to polling station (if yes = 1, 0 otherwise)	0.023	0.102
		No participation/membership in associations, teams or clubs (if yes = 1, 0 otherwise)	0.024	0.101

Source: Authors' own calculation based on primary data.

Table 10 Administrative divisions of the selected districts.

District	Geographical area (sq Km)	Population	Literacy (%)	Major occupation	HDI	Revenue circles	Blocks	Intensive blocks	Villages	Towns/ cities
Nagaon	2287	1,892,550	71.00	Agriculture and allied	0.592	7	13	6	1210	4
Marigaon	1450.20	957,423	69.37	Agriculture and allied	0.576	5	7	2	638	2
Hojai	21.219	36,638	81.08	Agriculture and allied	0.695	3	5	1	409	3

Source: DRDA and Municipality Board of Nagaon, Morigaon and Hojai, Census of India, Assam Human Development Report.

References

World Bank (2005) Indicators of financial access—household—level surveys. World Bank, Washington, DC

NABARD (2022) SHG-bank Linkage Programme in India. National Bank for Agriculture and Rural Development, Mumbai

Government of India (2008) Report of the committee on financial inclusion. NABARD, New Delhi

Aajeevika. Deendayal Antyodaya Yojana National Rural Livelihoods Mission, Ministry of Rural Development (MoRD), Government of India. https://aajeevika.gov.in/

Agarwal B (1992) The gender and environment debate: lessons from India. Fem Stud 18(1):119–158

Agarwal B (2000) Conceptualising environmental collective action: why gender matters. Camb J Econ 24(3):283–310

Alkire S, Foster J (2009) Counting and multidimensional poverty measurement (short version) (No. ophiwp007_5). Queen Elizabeth House, University of Oxford, England

Angrisani M, Burke J, Lusardi A, Mottola G (2023) The evolution of financial literacy over time and its predictive power for financial outcomes: evidence from longitudinal data. J Pension Econ Financ 22(4):640–657. https://doi.org/10.1017/S1474747222000154

Armendàriz B, Morduch J (2005) The Economies of Microfinance. Cambridge: MIT

Arun T, Imai K, Sinha F (2006) Does the Microfinance Reduce Poverty in India? Propensity Score Matching based on a National-level Household Data. Economics Discussion Paper, The University of Manchester, September, 1−6

Asselin LM (2002) Composite indicator of multidimensional poverty. In: ICECI, June Asselin LM, Anh VT (eds) Multidimensional poverty in Vietnam 1993-1998 according to CBMS indicators. Vietnam Socio-Economic Development Review Spring 2005

Beilharz P (1989) Social democracy and social justice. Aust N Z J Sociol 25(1):85–99

Bhaumik SK, Bera S (2015) Impact of micro-credit programme on women's empowerment: an evaluation using the propensity score matching method. J Land Rural Stud 3(2):219–236

Bucher-Koenen T, Lusardi A, Alessie R, Van Rooij M (2017) How financially literate are women? An overview and new insights. J Consum Aff 51(2):255–283. https://doi.org/10.1111/joca.12121

Caliendo M, Kopeinig S (2008) Some practical guidance for the implementation of propensity score matching. J Econ Surv 22(1):31–72

Coffey D, Gupta A, Hathi P, Spears D, Srivastav N, Vyas S (2017) Understanding open defecation in rural India: untouchability, pollution, and latrine pits. Econ Polit Wkly 52(1):59–66

Cohen AB (2021) You can learn a lot about religion from food. Curr Opin Psychol 40:1–5

Damayanti SM, Murtaqi I, Pradana HA (2018) The importance of financial literacy in a global economic era. Bus Manag Rev 9(3):435–441

Demont T (2022) Coping with shocks: How Self-Help Groups impact food security and seasonal migration. World Dev 155:105892

Deshmukh-Ranadive J (2004) Women's self-help groups in Andhra Pradesh: participatory poverty alleviation in action. In: Conference on scaling up poverty reduction, Shanghai

Dev SM (2006) Financial inclusion: Issues and challenges. Econ Polit Wkly 41:4310–4313

Dugan B (1994) Religion and food service. Cornell Hotel Restaur Adm Q 35(6):80–85

Dyson T, Moore M (1983) On Kinship Structure, Female Autonomy, and Demographic Behaviour in India. Popul Dev Rev 9, 35-60

Fujita K, Sato K (2013) SHGs for poverty alleviation?: Insights from a Tamil Nadu village under rapid economic development. In: Bhandari Ak, Kundu A (eds) Microfinance, risk-taking behaviour and rural livelihood. Springer, New Delhi, pp 69–85

Galab S, Rao NC (2003) Women's self-help groups, poverty alleviation and empowerment. Econ Polit Wkly 38(12-13):1274–1283

Garg S, Agarwal P (2014) Financial inclusion in India—a review of initiatives and achievements. IOSR J Bus Manag 16(6):52–61

Gupta T, Singh UB (2023) Does group maturity affect savings and investment behaviour of women: empirical investigation of self-help groups in Uttar Pradesh. J Asian Afr Stud https://doi.org/10.1177/00219096231153156

Hasan Z (2010) Gender, religion and democratic politics in India. Third World Q 31(6):939–954

Hasija N (2021) Small change big changes: women and microfinance in India. LBS J Manag Res 19(1):61–70

Hasler A, Lusardi A (2017) The gender gap in financial literacy: a global perspective. Global Financial Literacy Excellence Center, The George Washington University School of Business, USA

Heckman JJ, Ichimura H, Todd P (1998) Matching as an econometric evaluation estimator. Rev Econ Stud 65(2):261–294

Hoffmann V, Rao V, Surendra V, Datta U (2021) Relief from usury: Impact of a self-help group lending program in rural India. J Dev Econ 148:102567

Jeffrey C, Jeffery P, Jeffery R (2005) When schooling fails: young men, education and low–caste politics in rural north India. Contrib Indian Sociol 39(1):1–38

Kabeer N (2005) Gender equality and women's empowerment: a critical analysis of the third millennium development goal 1. Gend Dev 13(1):13–24

Kandpal V (2020) Reaching sustainable development goals: bringing financial inclusion to reality in India. In: Kandpal V, Khalaf OI (eds) J Public Aff 20(4):e2277. https://doi.org/10.1002/pa.2277

Kandpal V, Khalaf OI (2020) Artificial intelligence and SHGs: enabling financial inclusion in India. In: Deep learning strategies for security enhancement in wireless sensor networks. IGI Global, pp 291–303

Kapoor S (2019) Entrepreneurship for economic and social empowerment of women: a case study of a self help credit program in Nithari Village, Noida, India. Australas Account Bus Finance J 13(2):123–142

Kim H (2017) Understanding Modi and minorities: the BJP-led NDA government in India and religious minorities. India Rev 16(4):357–376

Klasen S, Pieters J (2015) What explains the stagnation of female labor force participation in urban India? World Bank Econ Rev 29(3):449–478

Krejcie RV, Morgan DW (1970) Determining sample size for research activities. Educ psychol meas 30(3):607−610

Kumar SS (2011) SHG linked micro-enterprises—the Kerala experience. J Rural Dev 30(3):331–339

Kumar N, Raghunathan K, Arrieta A, Jilani A, Pandey S (2021) The power of the collective empowers women: Evidence from self-help groups in India. World Dev 146, 105579

Kumari DAT, Ferdous ASM, Klalidah S (2020) The impact of financial literacy on women's economic empowerment in developing countries: a study among the rural poor women in Sri Lanka. Asian Soc Sci 16(2):31–44

Kwon DY, Tamang JP (2015) Religious ethnic foods

Luke N, Xu H, Thampi BV (2014) Husbands' participation in housework and child care in India. J Marriage Fam 76(3):620–637

Lusardi A, Mitchell OS (2014) The economic importance of financial literacy: theory and evidence. J Econ Lit 52(1):5–44

Lyngdoh BF, Pati AP (2013) Impact of microfinance on women empowerment in the matrilineal tribal society of India: An analysis using propensity score matching and difference-in-difference. Int J Rural Manage 9(1):45–69

Mahato J, Jha MK, Verma S (2022) The role of social capital in developing sustainable microentrepreneurshipamong rural women in India: a theoretical framework. Int J of Innov 10(3):504-526

Maity S (2019) Financial inclusion and multidimensional poverty reduction through self-help-group-led microfinance: evidence from Bodoland, Assam, India. Enterp Dev Microfinance 30(3):152–173

Maity S, Sarania R (2017) Does microfinance alleviate poverty and inequality? Studying self-help groups in Bodoland, Assam. Dev Pract 27(7):1006–1019

Maity S (2023a) Financial inclusion also leads to social inclusion—myth or reality? Evidences from self-help groups led microfinance of Assam. J Innov Entrepreneurship 12(1):1–22
Maity S (2023b) Self help groups, microfinance, financial inclusion and social exclusion: Insight from Assam. Heliyon, 9(6)
Mantel N, Haenszel W (1959) Statistical aspects of the analysis of data from retrospective studies of disease. J Natl Cancer Inst 22(4):719–748
Meerman J (2005) Oppressed people: economic mobility of the socially excluded. J Socio-Econo 34(4):542–567
Mohapatra S, Sahoo B (2016) Determinants of participation in self-help-groups (SHG) and its impact on women empowerment. Indian Growth Devt Rev 9(1):53–78
Niaz U (2003) Violence against women in South Asian countries. Arch Womens Ment Health 6:173–184
Nichols C (2021) Self-help groups as platforms for development: The role of social capital. World Dev 146:105575
Nihinlola RM (2020) Evaluating the relationship between financial inclusion, social inclusion and multidimensional poverty reduction (Doctoral dissertation, Walden University)
Nozick R (1974) Anarchy, state, and utopia, vol 5038. Basic Books, New York
Peleah M (2016) The UNDP social exclusion index for Europe and Central Asia. In: Presentation at the Seminar on regional well-being indicators (Development of the Inclusive Society Index, vol 19)
Phan DK (2012) An empirical analysis of accessibility and impact of microcredit: the rural credit market in the Mekong River Delta. Doctoral Dissertation, Lincoln University, Vietnam
Pokhriyal AK, Ghildiyal V (2011) A Comparative Assessment of Banking and Microfinance Interventions in Uttrakhand. Glob J Finance Manag, 3(1), 111−121
Prathap SK (2011) Financial inclusion of fisher households in coastal Kerala—role of microfinance. Dissertation, Cochin University of Science and Technology
Rangappa KB, Bai R, Sandesh AL (2009) Self-help groups and financial inclusion of rural households in dry land villages of Davangere District, Karnataka. Microfinance Rev 1:171–182
Rawls J (1971) A theory of justice: revised edition. Harvard University Press, USA
Reshi IA, Sudha T (2021) Self-Help Group movement has made great strides in the fields of women empowerment. Turk Online J Quql Inq, 12(7)
Robert FC, Frey LM, Sisodia, GS (2021) Village development framework through self-help-group entrepreneurship, microcredit, and anchor customers in solar microgrids for cooperative sustainable rural societies. J Rural Stud 88:432–440
Rosenbaum PR, Rubin DB (1983) The central role of the propensity score in observational studies for causal effects. Biometrika 70(1):41–55
Roy B, Jain R (2018) A study on level of financial literacy among Indian women. IOSR J Bus Manag 20(5):19–24
Roy A (2021) The portrayal of casteism, orthodoxy and social exclusion in Indian society: a study of Ananthamurthy's Samskara. In: Mukherjee S, Sarkar, S (eds) Population health and regional development: challenges and issues
Sangvikar B, Pawar A, Kolte A (2019) The gains of group entrepreneurship development: analyzing the employment dimensions of self help groups in India. Int J Emerg Technol 10(3):345–351
Sarania R, Maity S (2014) Self help groups (SHGS) and financial inclusion—a case study in Baksa district of Assam. Int J Humanit Soc Sci Stud 1(3):137–146
Shah P, Dubhashi M (2015) Review paper on financial inclusion-the means of inclusive growth. Chanakya Int Jof Business Res 1(1):37–48
Deshpande MS (2010) History of the Indian caste system and its impact on India today
Siddhartha T, Nambirajan T, Ganeshkumar C (2021) Self-help group (SHG) production methods: insights from the union territory of Puducherry community. Journal of Enterprising Communities: People Places Glob Econ 16(4):517–539
United Nations (2016) https://www.un.org/esa/socdev/rwss/2016/full-report.pdf
United Nations (2018) Sustainable Development Goals. Retrieve from https://sdgs.un.org/goals. Accessed on 12.08.2020
Vaishnav M (2019) The BJP in power: Indian democracy and religious nationalism. Carnegie Endowment for International Peace, Washington, DC. https://carnegieendowment.org/files/BJP_In_Power_final. pdf
Vatta K (2003) Microfinance and poverty alleviation. Econ Polit Wkly 38:432–433
Weldeslassie HA (2017) Does microfinance help to reduce poverty in Ethiopia? Propensity score matching impact analysis. Enterp Dev Microfinance 28(4):255–283
Yunus M (2003, January) Expanding microcredit outreach to reach: The millennium development goal–some issues for attention. In International seminar on attacking poverty with microcredit, Dhaka (pp. 8−9)

Author contributions

The research conceptualized by S.M. S.M. also performed data collection, design, conceptualized the research and coordination, carried out statistical analysis, and wrote the manuscript. The author then polished the text.

Competing interests

The author declares no competing interests.

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This article does not contain any studies with human participants performed by any of the authors.

Informed consent

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Additional information

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