

Evaluating Skilling and Empowering Marginalised Tribals in Badwani and Alirajpur Through Sustainable Development Principles

Abishek Sen¹, Dr. Huda Faiz²

¹Research Scholar, Department of Social Science,
RKDF University, Bhopal, Madhya Pradesh

²Assistant Professor, Faculty of Social Sciences
RKDF University, Bhopal, Madhya Pradesh

Abstract

This paper looks at the socio-economic factors of livelihood security among a tribal and rural population based on their demographic, education, land ownership, and institutional aspects in Badwani and Alirajpur region of Madhya Pradesh, India. Descriptive analysis indicates that the sample is male-dominated (58.89%) with moderately educated people (33.33%), with the most significant percentage being illiterate (27.78%), with major livelihoods being mainly informal (24.44%), and primarily a daily wage worker (20.00%). Income distribution focuses on economic susceptibility, in which more than 70 percent of the population earns less than 1 lakh yearly. ANOVA does not reveal any significant correlation between the level of education and the level of livelihood security ($p=0.718$), which means that formal education is not necessarily associated with enhanced economic performance. On the other hand, landholding size significantly affected the livelihood security ($p=0.009$), where small landholders (1-2 ha) had a substantially higher level of livelihood security than landless and marginal farmers. The regression analysis also reveals that the Self-Help Group (SHG) participation is a statistically significant positive predictor ($p=0.018$), further showing collective action's significance in increasing resilience. There is a marginally significant effect on market access ($p=0.073$), but no significance of NGO support or credit access. The findings illustrate that structural resources including land and social resources in form of SHGs are more significant than individual resources, such as education in the determination of livelihood for the tribals in Madhya Pradesh. This necessitates policy measures to be finetuned towards secure tenure of land, building up of community institutions and strengthening market linkages to support sustainable livelihoods.

Keywords: Livelihood security, Landholding, Education, SHG participation, ANOVA, Rural development

1. Introduction

The tribes in India are one of the most historically marginalized groups that are still greatly socio-economically excluded despite decades of planned developments. The Census of India (2011) indicates that the population of the Scheduled Tribes (STs) in the country is 8.6% of the total population, and that the State of Madhya Pradesh has the highest tribal population in the country and makes up almost 21%

of the total population in the state (Soman et al., 2023). The two districts of Badwani and Alirajpur in the state of Madhya Pradesh are tribal-dominated and characterised by multidimensional poverty, low educational achievement, poor health outcomes and lack of livelihood opportunities (Thomas et al., 2021). The above circumstances highlight the necessity of enhancing livelihood security and supporting sustainable development patterns aligned with the socio-cultural context of tribal people.

The concept of skill empowerment has become a key entry point to livelihood empowerment amidst marginalized communities. In 2015, the National Skill Development Mission was initiated to focus on inclusive growth provided by training skills and supporting entrepreneurship (S. et al., 2024). In the case of tribal populations, where subsistence farming, forest products, and informal labor are frequently supplementary sources of income, the skills development intervention can make income streams less seasonal, less reliant on seasonal migration, and self-sufficient (Adriansen, 2016). Nevertheless, skill-based programs are still limited in their effectiveness by structural principles, including insufficient access to quality training, market disconnectivity, financial marginalization, and insufficient awareness of government programmes (Vona, 2023).

These difficulties are vividly described in the context of Badwani and Alirajpur districts. The two districts belong to the tribal belt in western Madhya Pradesh and are occupied mainly by the Bhil and Bhilala tribes. The principal occupation is agriculture, although land tenures are not centralized, are rain-fed, and are susceptible to weather changes (Sharma et al., 2019). Consequently, to defeat the lean periods some households resort to distress migration to Gujarat and Maharashtra to access wage labor. Even though this migration is at once relieving, it demolished the social institutions and the education of the children and exposed the migrants to exploitation (Sarkar et al., 2022). In this case, social work interventions will facilitate alternative livelihoods, access to skill training, and social protection (Nilsen, 2013).

As a profession and a discipline, social work endeavors to empower marginalized groups through addressing systemic inequalities and developing resiliency within communities. Social workers play an essential role in the tribes since they contribute to the process of negotiating state-driven development initiatives with the residents (Swanson et al., 2021). They organize communities and sensitize about rights and access to credit, self-help groups (SHGs) and involvement in sustainable livelihood programs (Wanvik & Caine, 2017). NGOs and grassroots agencies in Badwani and Alirajpur have tried various forms of livelihood promotion, including women's cooperatives in handicrafts, tailoring, weaving, and agro-processing training programs. With the backing of a good social work practice, these initiatives have shown a possibility of positively influencing economic security and increasing the social capital (Brogan & Dooley, 2023).

Moreover, ecological, cultural appropriateness, and skill development should be united in developing sustainable development in tribal areas. The global way to inclusive development is Goal 1 (No Poverty), Goal 8 (Decent Work and Economic Growth), and Goal 10 (Reduced Inequalities) of the SDGs (Lubis et al., 2024). As in the case of tribal communities, these goals ought to be in regard to traditional knowledge systems, community-based planning, and environmental sustainability. However, the skill training programs should be adjusted to the local resource base and cultural setting, but not based on standard models, which might be unrelated to the indigenous reality (Kandal et al., 2021).

Gender is another important dimension as women in the Bon Constance of Badwani and Alirajpur usually hold the household and economic duties of agricultural labor, handicrafts, or informal employment. Nevertheless, they face overlapping obstacles, including their inability to move freely, receive formal education, or be included in decision-making (Acharya & Naranjo, 2019). Interventions in social work that empower and target women in terms of SHGs, microfinance, and skill-oriented training have been reported to positively impact household incomes and social status (Singh & Seema, 2022). These gender-sensitive strategies are critical to ensure that livelihood empowerment programs result in sustainable community development.

Research points out that many skill development programs fail to match these regions in Madhya Pradesh. This is resulting in underemployment or a lack of correlation between the learnt skills and the real livelihood opportunities (Carranza & McKenzie, 2023). Despite this, there are still significant academic gaps. In addition, the success of training programs is constrained by the absence of proper monitoring, mentorship, and follow-up. This creates a need for a more holistic, social work-based model that combines skill training with market access, credit facilities, and institutional support systems.

This research on the role of social work in improving livelihood opportunities in tribal communities of Badwani and Alirajpur districts is thus aimed at contributing to the academic and policy discourse. Its objective is to examine the social work practices that help empower skills, structural barriers, and sustainable livelihood pathways in marginalized settings. The study puts the discussion in the larger context of tribal development and sustainable development objectives to highlight the potential transformation of the community-based and skill-based interventions.

2. Research Methodology

Study Design and Data Collection

A cross-sectional survey design was used to evaluate the socio-economic and livelihood situation of tribal and marginalized communities 'Badwani and Alirajpur'. The primary data were collected through structured interviews given to a representative sample of people in Badwani and Alirajpur villages. The data contained the tribal demographic factors, their education, ownership of land, their occupation, level of income, acquisition of skills, access to institutional support, and the perception of security of livelihood.

Variables and Measurement

The variables were studied both categorical and continuous. The major independent variables were gender, education (Illiterate, Primary, Secondary, Higher), tribe (Bhil, Bhilala, Other), landholding (Landless, Marginal <1 ha, Small 1-2 ha, Medium 2-5 ha), and source of livelihoods. Livelihood security was the dependent variable in inferential analyses; it was categorized as an ordinal outcome in regression analyses and transformed into a numerical score in ANOVA due to a set of predetermined rankings. Other variables like SHG participation, credit availability, market access, NGO role, and skills-based income came as predictors in multivariate analysis.

Descriptive Analysis

The descriptive statistics were calculated to describe the distribution of the main variables. The categorical variables, such as gender, education level, tribes, and occupation, were calculated regarding

frequencies and percentages. The age and income profile of the tribal respondents were described using measures of central tendency (mean, median) and dispersion (standard deviation, range). In order to make these results easy to interpret, they were presented in tables and in the form of bar charts and histograms.

Comparative Analysis Using One-way ANOVA

One-way analysis of variance (ANOVA) was used to measure the difference in livelihood security between groups. Two ANOVAs were conducted, one involving 'education level' and the other involving 'landholding category' as the independent variables, and livelihood security (numerically coded) was the dependent variable. The assumptions of a normal distribution and homogeneity of variances were also visually evaluated, and the 'Levene test' was used where necessary. Non-significant values in the education model did not necessitate post-hoc comparisons, but instead, effect sizes and group means were provided as a means of exposition.

Regression Analysis

A fitted ordinal logistic regression model considered the role of socioeconomic and institutional factors on livelihood outcomes. Examples of predictors were the SHG participation, access to the market, access to credit, the role of NGOs, earnings on acquired skills, and even the effect of social work interventions. Dummy-coded categorical variables were defined, and contrasts were made between adjacent levels using ordinal predictors. The maximum likelihood estimation was used to evaluate model significance and parameter estimates.

Data Processing and Software

Python (version 3.10) was used in the Google Colab environment to enter, clean, and analyze all the data. Data manipulation, statistical testing, and visualization were done using pandas, numpy, stats models, and seaborn libraries. Frequent tables, boxplots, bar graphs, and regression summaries were created to aid data interpretation and reporting. All the analyses were carried out using the standard statistical analyses and documented to be reproducible.

3. Results

3.1 Descriptive Statistics

Frequencies & Percentages

It is represented by a male dominated population of 53 males (58.89) and 37 females (41.11) which shows that there is a strong balance of gender in the data set. On education, most people have been found to have achieved higher education (30; 33.33%), secondary education (28; 31.11%), and still a substantial number of people remain at the primary and illiterate (18; 20.00% and 14; 15.56% respectively), indicating disparity in educational access and attainment. In terms of tribal affiliation, the most significant group was the "Other" category (36; 40.00%), then Bhil (29; 32.22%), and Bhilala (25; 27.78%), which means that the representation of tribal communities was not even. Occupation wise, other (25; 27.78) which may be either informal or unclassified work is the most common followed by daily wage labor (22; 24.44), migration to work (18; 20.00), forest produce collection (13; 14.44), and agriculture (12; 13.33). This appeals to the idea that the population depends more on informal, seasonal, or subsistence sources of income, and there is little participation in stable or formal jobs. Combined,

these results indicate that a community with a moderate level of education, an imbalanced gender distribution, tribal diversity, and weakness is represented by the reliance on unsteady livelihoods.

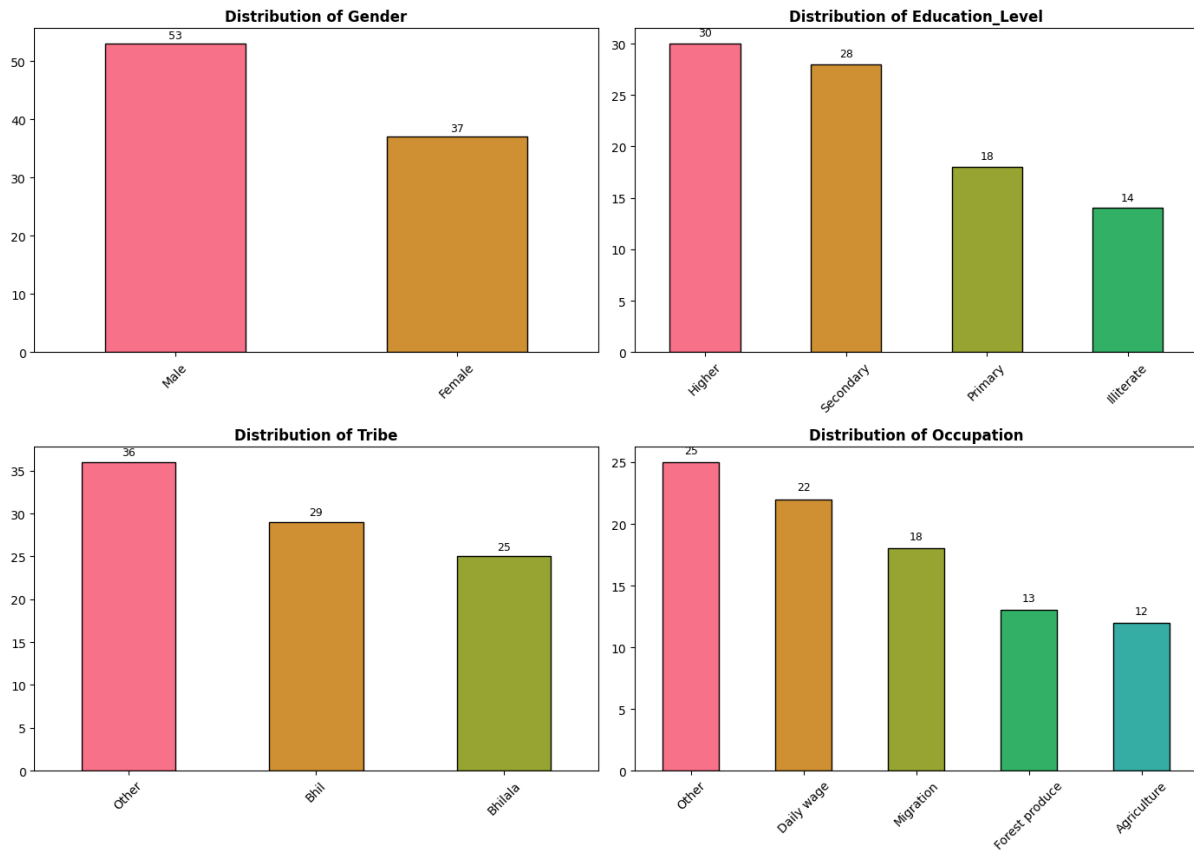


Fig. 1 Measures of Central Tendency & Dispersion

The presented data and visualizations can provide a complete picture of the sample population regarding the age structure and annual income distribution in Table 1. The age distributions indicate that the population's mean (average) age is 40.07 years, and the median age is 41 years, meaning that the numbers are evenly distributed around the mean. The standard age deviation of 11.84 indicates medium-range age variability, where 19 to 60 are the ages. This means the sample consists of younger and middle-aged people with a varied age composition.

The bar chart shows a definite trend of economic vulnerability in terms of the annual distribution of income in Fig. 1. The low-income groups are represented by most of the respondents: 31 of them have less than 50,000 per year, and 33 of them have between 50,000 and 1 lakh and are therefore the most prevalent income groups. Conversely, 15 have incomes within the bracket of 1-2 lakh, whereas 15 have their incomes above 2 lakh per annum. This distribution demonstrates a vast economic inequality, and more than 70 percent of the population has less than 1 lakh annual earnings, indicating financial insecurity among a vast population. The fact that there are not many high-income earners highlights a lack of access to better-paying opportunities for them. Combined, the age and income data suggest a population with most working-age adults struggling with economic hardships, low upward mobility, and low or middle-income livelihoods.

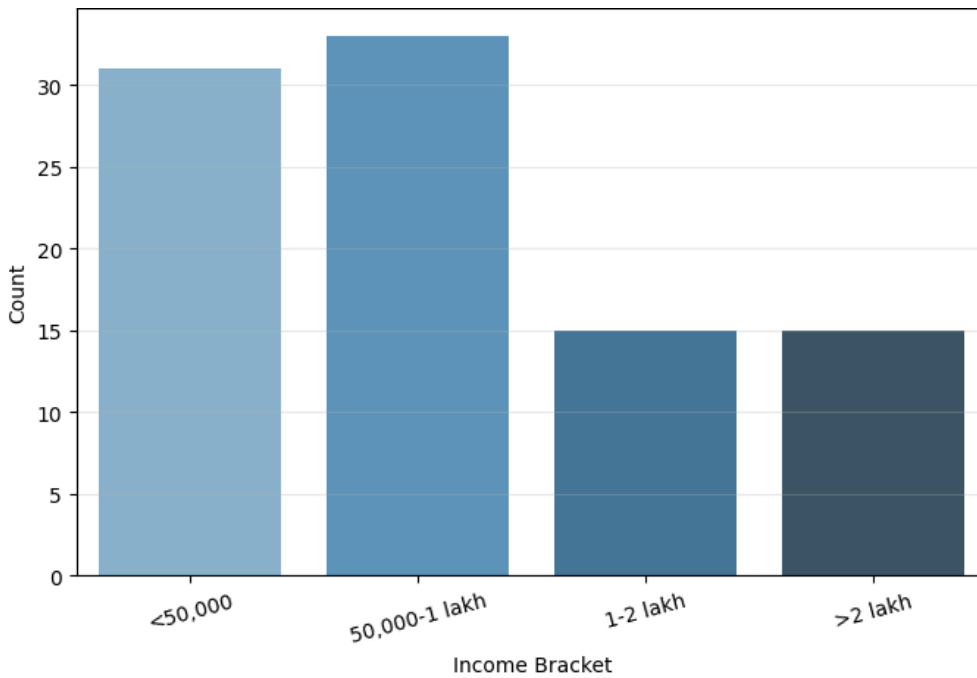


Fig. 2 Annual income distribution

Table 1. Description statistical analysis of age

| Statistic | Age |
|-----------|-------|
| Mean | 40.07 |
| Median | 41.0 |
| Std Dev | 11.84 |
| Min | 19 |
| Max | 60 |

4. Comparative Analysis

One-way ANOVA

To start with, on the issue of education level, the ANOVA test indicates no statistically significant difference in livelihood security among education levels ($F(3, 91) = 0.450, p = 0.718$). The group mean demonstrates that primary education has the highest average score on livelihood security (3.37), followed by secondary education (3.16), illiterate (3.06), and higher education (2.91). The non-statistical significance however, means that the education level does not play a significant role as predictors of differences in livelihood security in this sample in Fig. 2. This is also supported by the boxplot that indicates overlapping distributions across all the education groups and similar variability and central tendencies.

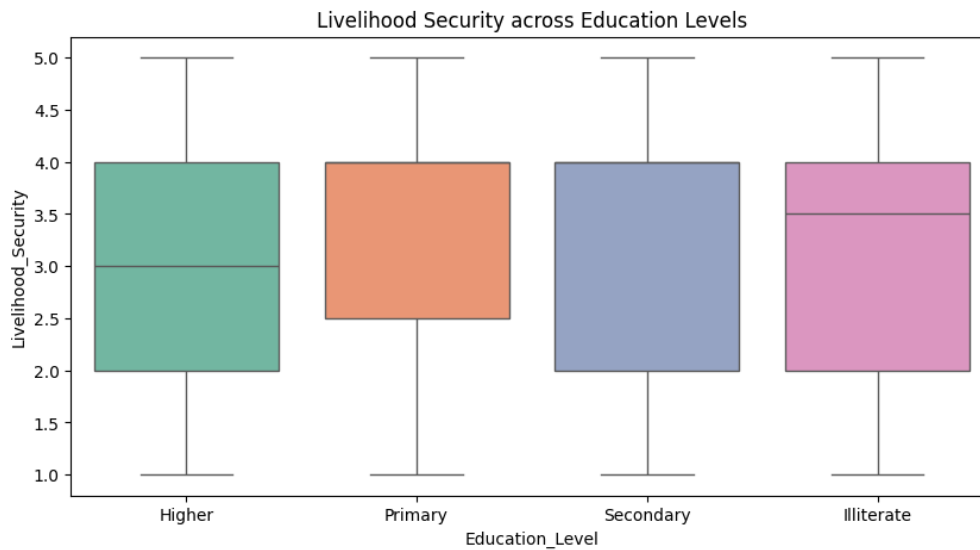


Fig. 3 Livelihood security across education levels

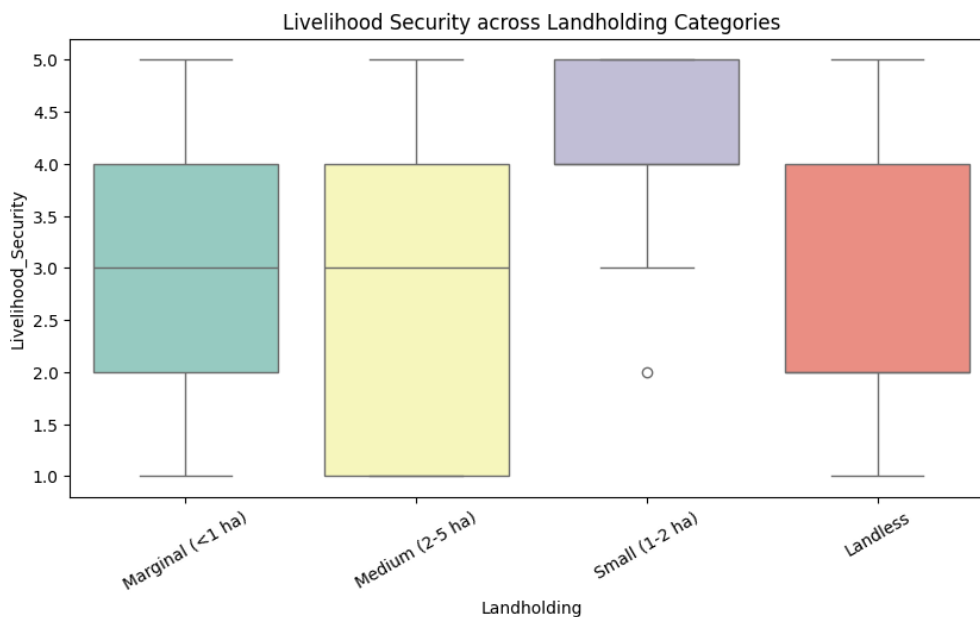


Fig. 4. Livelihood security across landholding categories

On the other hand, the statistically significant effect of the Landholding category on the livelihood security is 4.080, ($F(3, 91) = 4.080, p = 0.009$), which suggests that the size of landholding is a statistically significant predictor of the economic well-being. There is a significant variation in the mean livelihood security scores: small landholders (1-2 ha) have the highest mean (4.05), then medium (2-5 ha) (2.83), marginal (<1 ha) (2.86), and landless people (2.88). The boxplot depicts this trend well, although most landholding groups are represented in the lower ranges in security, small landholders have a bigger median and interquartile range, which indicates higher stability in Fig. 3. Interestingly, the landless and marginal classes have comparably low levels of security, with high variability, which denotes susceptibility because of little or no access to land.

5. Regression analysis

The regression model was used to determine the effect of different socioeconomic and institutional variables on the outcome variable in Table 2. Among the predictors, the participation in the Self-Help Group (SHG) (Coef = 0.9451, p = 0.018) was the statistically significant positive predictor, meaning that the participation in SHGs leads to the outcome more likely than the non-participation. Equally, the categorical contrast 2/3 (Coef = 0.3981, p = 0.016) was also significant, which is the fact that the transition between category 2 and 3 of the underlying variable (e.g., education, income, or participation intensity) is accompanied by an increased likelihood of the outcome. Market Access (Nearby town in Madhya Pradesh) (Coef = 0.8319, p = 0.073) had a positive but insignificant impact at the 10% level, suggesting that increased proximity to markets can be better. The rest of the variables, such as income due to skills, availability of credit, influence of NGOs, and various levels of impacts of social work, failed to show statistically significant relationships (p > 0.05). The contrast 1/2 (Coef = -0.1172, p = 0.827) was, however, not significant, meaning that there was no significant difference between categories 1 and 2. In general, the results point to the critical influence of community-based participation (SHGs) and movement through categories (2 to 3) on the formation of outcomes, and access to markets might also be a supporting factor.

Table 2. Regression Output

| Variable | Coef | Std. Err. | z | P> z | [0.025 | 0.975] |
|---------------------------------|---------|-----------|--------|-------|--------|--------|
| Income_from_Skills_Yes | -0.2167 | 0.402 | -0.539 | 0.59 | -1.005 | 0.571 |
| Access_to_Credit_Yes | -0.1812 | 0.415 | -0.437 | 0.662 | -0.994 | 0.631 |
| SHG_Participation_Yes | 0.9451 | 0.401 | 2.359 | 0.018 | 0.16 | 1.73 |
| Market_Access_Nearby town | 0.8319 | 0.464 | 1.792 | 0.073 | -0.078 | 1.742 |
| Role_of_NGOs_Yes | 0.3837 | 0.412 | 0.931 | 0.352 | -0.424 | 1.191 |
| Impact_of_Social_Work_Low | -0.2236 | 0.574 | -0.389 | 0.697 | -1.349 | 0.902 |
| Impact_of_Social_Work_Moderate | -0.1863 | 0.507 | -0.367 | 0.713 | -1.181 | 0.808 |
| Impact_of_Social_Work_No impact | -0.935 | 0.575 | -1.627 | 0.104 | -2.061 | 0.191 |
| 1/2 | -0.1172 | 0.535 | -0.219 | 0.827 | -1.166 | 0.931 |
| 2/3 | 0.3981 | 0.165 | 2.419 | 0.016 | 0.075 | 0.721 |

6. Discussion

The objective of the study was to analyse the socio-economic determinants of livelihood security among marginalised tribal population of Madhya Pradesh, with special focus on the interaction of education, landholding, skill training, institutional support and economic performance. The significant results include the fact that the educational attainment is relatively high in the sample and does not significantly affect livelihood security. Conversely, landholding size, more specifically small holdings (1-2 ha), is one of the main factors in enhancing livelihood resiliency. Also, the engagement in SHGs and access to the neighbouring markets are positively connected with better outcomes which highlights the role of collective action and integration of markets. Though there is massive participation in skills training, the

economic benefit derived through such skills is small, and most households still rely on informal or subsistence-based livelihoods, as they continue to face economic vulnerability.

The discovery that the level of education is not a great predictor of livelihood security is in opposition to traditional developmental accounts that emphasize schooling as a way to escape poverty (Ansell et al., 2020). Nevertheless, this is consistent with research findings with rural areas of India, where formal education is not always associated with job or income because of the incompatibility between the curriculum and the vocation, the absence of vocational fit, and ineffective workforce connections (Clemens, 2021). Literacy and tertiary education in agrarian economies and among tribal communities might not be directly productive or beneficially associated with better jobs unless it is augmented with practical skills and market potential opportunities (Adriansen, 2016). This implies that education cannot be effective without structural enablers, and the suggestion is to have context-based, skill-based, integrated models of education in rural development initiatives.

In comparison, the fact that small land holdings of the tribals in Madhya Pradesh, have a significant positive correlation with livelihood security confirms the veracity of available data that even nominal land ownership can offer a platform of food security, reduction of risks, and income diversification (Botai et al., 2024). In this research, smallholder farmers (1-2 ha) noted stronger security, which could be attributed to having more control over agricultural production and relying less on wage labor. This is echoed by the fact that research indicates that the security of tenure in land increases investment in sustainable practices and household welfare (Zander et al., 2024). Conversely, marginal (less than 1 ha) and landless households are equally insecure. Below a certain level, landholding does not provide much economic benefit and supports the case of targeted land reforms and homestead allocation to the landless poor.

The positive impact of SHG participation on livelihood outcomes is strongly positive, consistent with a large body of literature on community-based financial inclusion and women empowerment in rural India (Malabayabas et al., 2023). SHGs help to access credit and social capital, and enhance collective bargaining power, especially for women and disadvantaged castes. Likewise, the marginally significant market access (nearby town) indicates the criticality of physical connectedness and distance to commercial centres- an extensively documented factor of non-farm jobs and value addition (Abera et al., 2021). These results suggest that institutional and infrastructural support systems are more influential (state and central govt schemes), than individual factors such as education in determining livelihood courses, particularly in remote, resource-deprived areas.

The study is limited in several ways despite these insights. First, a cross-sectional design restricts causation in regression and ANOVA findings. Second, it uses self-reported livelihood security scores, which may be biased, although ordinal proxies are typical of qualitative-heavy contexts. Third, the sample might not be entirely representative of larger tribal groups outside of the area of study. The future research should have longitudinal designs to monitor post-intervention changes, be done using mixed methods to investigate the mechanisms, and be done on a larger geographic scale to be generalized. Also, land rights initiatives, SHG empowerment, and market connectivity programs should be combined in future initiatives to achieve synergistic effects. In order to attain sustainable change,

policymakers must shift away from siloed policies and facilitate integrated livelihoods in rural areas of Madhya Pradesh, which involve a mix of asset ownership, collective institutions, and market access.

7. Conclusion

The results highlight that livelihood security is more defined by asset ownership and social inclusion than individual qualities such as education. Although the educational level was relatively high, there was no substantive association between the level of education and livelihood outcomes, which means that schooling was no longer a factor of economic empowerment. Conversely, landholding in Badwani and Alirajpur region of Madhya Pradesh (and, more importantly, small-scale (1-2 ha) landholding) became a significant security factor, which could provide stability in the face of landlessness and marginality among landless and marginal farmers. Importantly, Self-Help Groups are very effective in improving livelihood opportunities, which is why the importance of collective action, financial inclusivity, and peer-to-peer support is maintainable. Market access is feasible, but its effectiveness is low without the infrastructure complement. The insignificant presence of NGOs in Badwani and Alirajpur region of Madhya Pradesh, and access to credit imply limited coverage or success of the programs. The policies should be based on equity in land allocation, empower the grassroots institutions such as SHGs, and combine skill development, market, and financial connectivity to develop resilient livelihoods. Rural transformation in Badwani and Alirajpur region of Madhya Pradesh, requires a shift towards sustainable approaches, state and central government structural and process base support not based on education but on community, towards neighbourhood inequalities, and empowering marginalized groups with material resources and social capital.

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