



Income-Generating Activities and Multidimensional Empowerment of Rural Women in Watrap Block, Tamil Nadu

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HIGHLIGHTS

- Income-generating activities increased overall empowerment by 16.47 percentage points among rural women.
- Psychological empowerment improved most, whereas political empowerment remained comparatively limited.
- Human-rights awareness and technology-related decisions recorded the strongest indicator-level gains.
- Education and landholding were the strongest socioeconomic correlates of overall empowerment.

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ABSTRACT

The study was conducted during 2026 in three villages of Watrap block, Virudhunagar district, Tamil Nadu, to assess multidimensional empowerment among rural women participating in income-generating activities and examine its socioeconomic associations. A descriptive-correlational, cross-sectional design with retrospective pre-post assessment was adopted. Approximately 5% of eligible women were sampled from village-specific lists, yielding 130 respondents from Ammapatti, Kunnur and Vadukapatti; the unequal allocation reflected differences in village sampling-frame sizes. Empowerment was measured using a 30-item, five-dimensional schedule covering psychological, decision-making, social, economic and political domains, adapted with minor modifications from an existing empowerment scale and administered through a pre-tested interview schedule. Retrospectively reported overall empowerment increased by 16.47 percentage points after participation. Psychological empowerment recorded the largest gain (20.46), followed by social (18.08), economic (15.29), decision-making (15.00) and political empowerment (13.54). The largest indicator-level gains were observed in human-rights awareness (30.77), technology-adoption decisions (26.92) and access to modern technology (25.39). Education ($r=0.479$) and landholding ($r=0.532$) were positively associated with overall empowerment ($p<0.01$). Given the retrospective design, absence of a comparison group and restricted study area, findings represent perceived changes and associations rather than causal effects.

INTRODUCTION

Women's empowerment reflects the expansion of agency—the capacity to define goals, make meaningful choices and act upon them. Recent frameworks distinguish intrinsic agency, including confidence and autonomous motivation, from instrumental agency expressed through decisions and control of resources, and collective

agency exercised through groups and public institutions (Donald et al., 2020; Malapit et al., 2019). In agriculture, empowerment is therefore broader than employment or income. It includes participation in production and household decisions, access to productive resources and services, control over income, leadership, mobility and influence within community institutions (Alkire et al., 2013). Because the meaning and quality of decision-making vary

across social settings, multidimensional assessment is preferable to treating a single economic indicator as sufficient evidence of empowerment (Seymour & Peterman, 2018; Yount et al., 2019). Rural women contribute substantially to crop and livestock production, processing, wage employment and household enterprises, but their work frequently coexists with unequal ownership of land, restricted mobility, weak market access and a disproportionate burden of unpaid care. The Food and Agriculture Organization (2023) reported that gender inequalities in agrifood systems constrain women's productivity, income, resilience and institutional voice. Economic opportunities can support agency, but gains depend on whether women control earnings and productive assets and can influence strategic household decisions. Accordingly, higher household income alone may not translate into empowerment when prevailing norms determine who manages resources and represents the household in markets or public institutions (Duflo, 2012). Self-help groups, microenterprises and livelihood collectives have become important channels for rural women to obtain credit, acquire skills, build networks and enter income-generating activities. A systematic review concluded that women's economic self-help programmes generally improved economic and political empowerment, although effects varied according to programme design and local context (Brody et al., 2017; Gupta, et al., 2023). Indian evidence similarly showed that group-based livelihood interventions enhanced savings, enterprise participation and social interaction, but did not automatically transfer control over resources or decisions (Deininger & Liu, 2013; Pertin et al., 2025). Recent extension studies documented empowerment gains among rural women entrepreneurs, fisherwomen and women engaged in aquaculture, while also identifying persistent limitations in market authority, institutional participation and control over income (Das et al., 2023; Kumari et al., 2025a; Rajkumar et al., 2024). Agricultural extension can convert livelihood participation into sustained agency by combining technical instruction with functional literacy, enterprise planning, financial management, market negotiation and leadership development. Gender-sensitive and participatory extension improves the responsiveness of services to women's needs (Nain & Kumar 2010; Amanah et al., 2026; Singh et al., 2022, 2023). Training programmes are more useful when curricula are locally relevant, experiential and connected with follow-up support (Kumari et al., 2025b). Digital platforms may widen access to advice and services (Maurya et al., 2026), while meaningful empowerment also requires confidence and literacy to use information independently (Kumari et al., 2026; Kujur et al., 2026a). Multidimensional tools are important for assessing entrepreneurial capabilities and outcomes among rural women (Tripathy et al., 2024).

METHODOLOGY

The study was conducted during 2026 in Virudhunagar district of Tamil Nadu to examine multidimensional empowerment among rural women participating in income-generating activities (IGAs). Virudhunagar district and Watrap block were purposively selected because of substantial participation of rural women in livelihood enterprises. Watrap block comprised 27 villages, of which Ammapatti, Kunnur and Vadukapatti were selected through simple

random sampling. The sampling frame included 2,762 women engaged in IGAs. An approximately 5% sampling fraction was applied to the eligible women in each selected village, resulting in 15 respondents from Ammapatti, 102 from Kunnur and 13 from Vadukapatti, giving a total sample of 130 respondents. The unequal distribution reflected differences in the number of eligible women across the three village sampling frames rather than deliberate oversampling. The sample size followed the operational design of the parent M.Sc. study and was not derived from a prospective statistical power calculation. A descriptive-correlational cross-sectional design with a retrospective pre-post assessment was adopted. During a single interview, respondents reported their current empowerment status and retrospectively assessed their status before participation in IGAs. Consequently, the design measures perceived change and does not establish causal effects because no comparison group, random assignment or prospective baseline assessment was available. Recall bias, response-shift effects and social-desirability bias were therefore considered while interpreting the findings. Primary data were collected through personal interviews using a structured and pre-tested interview schedule, supplemented with relevant district- and block-level secondary records. Women's empowerment was measured using a 30-item schedule adapted with slight modifications from an existing empowerment scale of Tayde and Chole, 2007. The instrument covered psychological (5 items), decision-making (4), social (8), economic (8) and political (5) empowerment. Dimension-wise empowerment indices were calculated as: (obtained score/maximum obtainable score) $\times$ 100. The available study records did not report a sample-specific internal-consistency coefficient, test-retest reliability or separate psychometric validation of the modified instrument; this was therefore treated as a measurement limitation. Data were analysed using frequency, percentage, mean and standard deviation. Pearson's product-moment correlation was used to examine bivariate associations between overall empowerment and 12 selected socioeconomic, psychological and communication characteristics. Because some predictors were categorical or ordinal, their coefficients were interpreted cautiously as exploratory associations rather than causal determinants. Statistical significance was assessed at the 5% and 1% probability levels.

RESULTS

The findings demonstrated a broad positive shift in women's empowerment after participation in income-generating activities. The composite increase across the five dimensions was 16.47 percentage points, indicating that enterprise engagement was associated with changes extending beyond earnings. However, the magnitude of improvement varied considerably across the five dimensions. Psychological empowerment recorded the largest gain of 20.46 percentage points, increasing from 34.30 before participation to 54.76 after participation. Social empowerment increased by 18.08 points, from 45.57 to 63.65, followed by economic empowerment (15.29 points; 37.78 to 53.07) and decision-making empowerment (15.00 points; 36.72 to 51.72). Political empowerment showed the smallest absolute gain of 13.54 points and remained the lowest-scoring domain after participation, increasing from 8.30 to 21.84 (Figure 1).

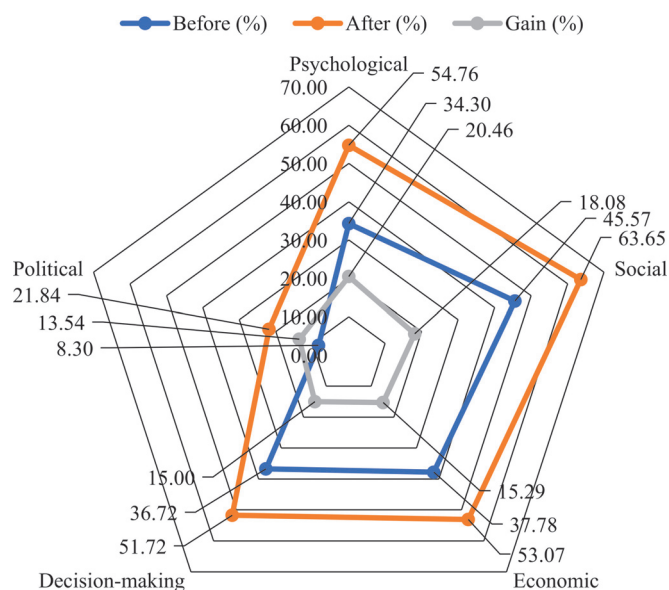
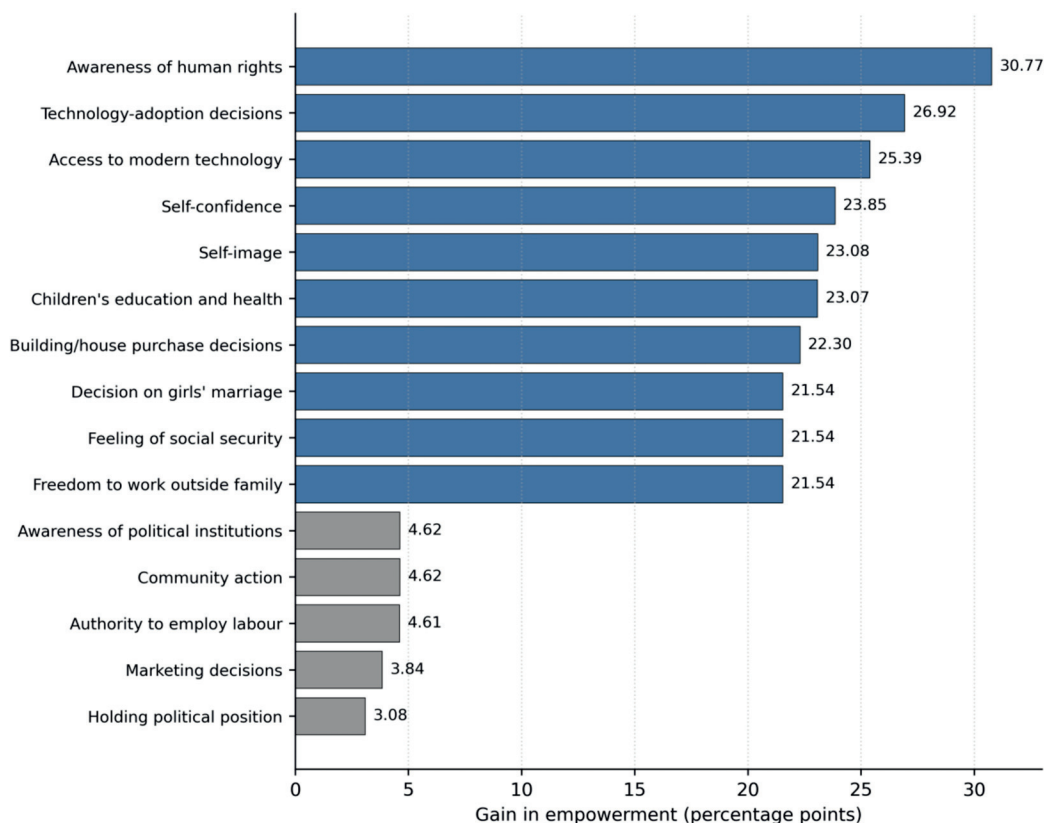


Figure 1. Empowerment scores before and after income-generating activities

The dimension-wise pattern shown in Figure 1 was further examined at the indicator level to identify the specific areas contributing most and least to the observed gains (Figure 2). Within psychological empowerment, self-confidence showed the largest gain of 23.85 percentage points, followed by self-image (23.08 points) and self-reliance (21.54 points). Career ambition increased by 17.69 points, while courage improved by 16.15 points. These findings indicate that participation in income-generating activities

was particularly associated with improvements in women's perceived competence, self-worth and independence. Decision-making empowerment showed greater variation across individual indicators. Participation in decisions concerning children's education and health recorded a gain of 23.07 percentage points, representing the highest improvement within this dimension. Independent decisions related to personal and economic activities increased by 15.39 points, while participation in livelihood and enterprise decisions increased by 14.61 points. In contrast, participation in household expenditure decisions increased by only 6.92 points. Thus, the gains were more pronounced in welfare-oriented and livelihood-related decisions than in routine household financial decisions. A similar variation was observed in the social and economic dimensions. Within social empowerment, access to modern technology recorded the largest gain of 25.39 percentage points. Freedom to work outside the family, feeling of social security, and participation in decisions regarding girls' marriage each increased by 21.54 points. Self-education improved by 20.00 points, whereas participation in community action increased by only 4.62 points. Economic empowerment showed stronger gains in technology- and asset-related decisions than in market and labour control. Participation in decisions concerning adoption of modern technology in the home or enterprise increased by 26.92 percentage points, followed by decisions regarding purchase of a building or house (22.30 points), operation of a personal bank account (18.46 points), freedom to select a job (17.69 points), and personal savings in fixed deposits (16.92 points). In contrast, authority to employ labourers increased by only 4.61 points and participation in marketing decisions by 3.84 points. Political empowerment showed the greatest contrast between awareness-related and participation-

Figure 2. Selected highest and lowest indicator-level empowerment gains



related indicators. Awareness of human rights increased by 30.77 percentage points, representing the largest indicator-level gain observed in the study. Awareness of legislation for women and freedom to participate in active politics each increased by 14.61 points. However, awareness of political institutions increased by only 4.62 points, while holding a political position improved by merely 3.08 points. Overall, Figure 2 indicates that the strongest indicator-level improvements were concentrated in human-rights awareness, technology-related decision-making, access to modern technology and psychological attributes, whereas marketing authority, community action, labour supervision and formal political representation showed comparatively limited gains.

Bivariate correlation analysis identified education and landholding as the strongest correlates of overall empowerment. Education had a positive and highly significant relationship with empowerment ($r=0.479$, $p<0.01$). Educated women are generally better positioned to understand financial records, use information, interact with institutions and assess enterprise opportunities. Education may also strengthen confidence in communication and awareness of rights. Landholding showed the highest coefficient ($r=0.532$, $p<0.01$), suggesting that control of or access to productive assets substantially conditions women's ability to benefit from income-generating activities. Land can provide a production base, collateral, status and greater influence in household economic decisions. Family occupation ($r=0.185$, $p<0.05$) and economic motivation ($r=0.175$, $p<0.05$) were positively and significantly related to empowerment. Although these coefficients were modest, they indicate that livelihood context and the desire for economic advancement supported women's agency. Families already connected with agriculture, trade or enterprise may provide knowledge, networks and acceptance of productive roles. Economic motivation may encourage women to seek information, persist through constraints and reinvest in their activities. Age ($r=0.139$), marital status ($r=0.086$), family size ($r=0.117$), annual income

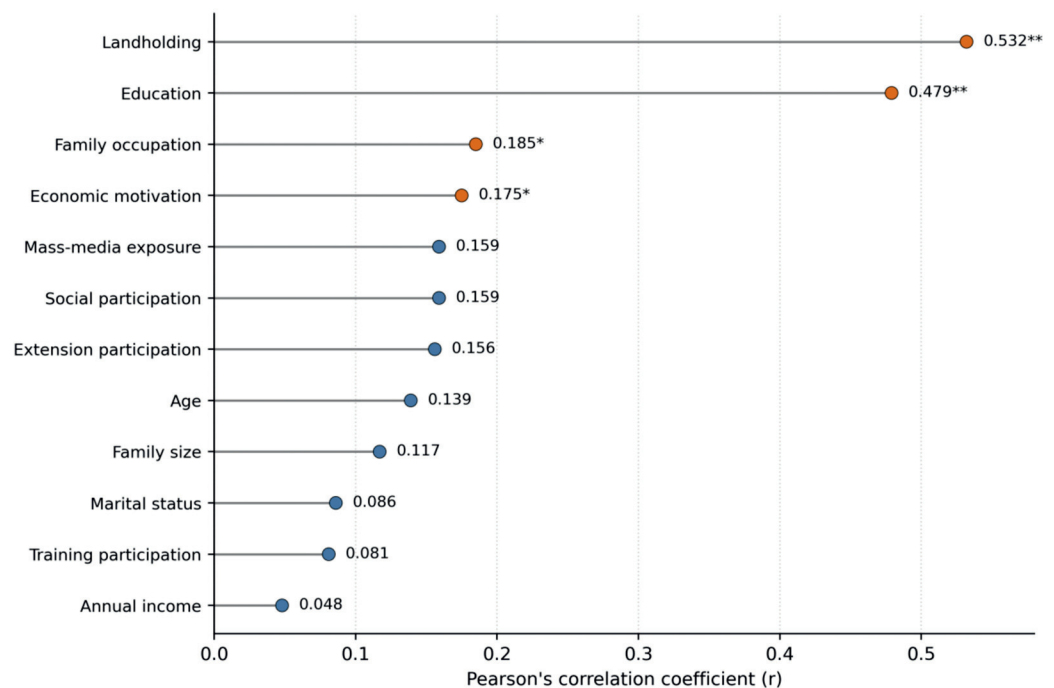
($r=0.048$), extension participation ($r=0.156$), training participation ($r=0.081$), social participation ($r=0.159$) and mass-media exposure ($r=0.159$) were positive but statistically non-significant. The non-significance of annual income reinforces the multidimensional nature of empowerment: a higher household income does not necessarily imply that women control it. Similarly, training and extension contact may have varied in duration, quality or relevance, limiting their measurable association with overall empowerment. The positive directions nevertheless suggest potential value that may become significant when services are more intensive, gender-responsive and linked to enterprise follow-up.

DISCUSSION

The study found higher retrospectively reported empowerment after IGA participation, with the largest difference in the psychological domain. This measured pattern is consistent with studies reporting positive associations between livelihood engagement and women's autonomy, social interaction and economic well-being (Rajkumar et al., 2024; Kumari et al., 2025a) and with evidence that self-help programmes can operate through financial familiarity, peer solidarity and wider social networks (Brody et al., 2017). One possible interpretation is that regular participation in productive activity may strengthen perceived competence and self-recognition before changes become visible in formal institutional roles. However, the present study did not directly measure the mechanisms producing these differences, and its retrospective design cannot demonstrate temporal or causal pathways.

The observed economic pattern also distinguished access from control. Women reported relatively larger gains in technology adoption, banking, savings and selected asset-related decisions, but much smaller gains in marketing and labour-employment decisions. This descriptive contrast suggests that participation in economic activity can coexist with limited authority over commercial decisions. Similar studies have noted that group-based livelihood

Figure 3. Magnitude and significance of socioeconomic correlates
** Significant at $p<0.01$; * significant at $p<0.05$; NS = non-significant.



interventions may improve income and reduce vulnerability without automatically redistributing control over productive resources or sales proceeds (Deininger & Liu, 2013). Agency frameworks likewise distinguish resources, decision-making and collective influence because progress in one domain does not necessarily imply progress in another (Malapit et al., 2019; Yount et al., 2019). The present data did not directly measure who negotiated prices, controlled sales proceeds or decided reinvestment; these mechanisms are therefore plausible explanations rather than study findings and should be examined directly in future research.

Political empowerment displayed a similarly uneven pattern: human-rights awareness showed a large reported gain, whereas awareness of political institutions and formal political representation changed comparatively little. A plausible explanation is that awareness can develop through information exchange and group interaction, while formal leadership may additionally depend on institutional opportunities, networks, time and household support. These factors were not directly measured in the present study and should not be inferred as established causes. Research on rural and tribal women nevertheless indicates that education, resource access, economic inclusion and community participation can interact with institutional barriers (Kujur et al., 2026b). Gender-responsive extension may therefore be examined in future intervention studies as a mechanism for linking women's groups with Gram Sabhas, Panchayati Raj Institutions and producer organisations (Amanah et al., 2026).

Landholding and education had the largest positive bivariate coefficients with overall empowerment. These findings indicate association within the study sample, not independent effects. Education may plausibly support functional literacy, communication, record keeping and use of technical, financial and legal information, whereas landholding can represent access to productive resources and household economic security. The Food and Agriculture Organization (2023) similarly identifies unequal resource rights as an important constraint on women in agrifood systems. The weak bivariate association with annual income is also consistent with the conceptual distinction between household economic resources and women's own agency (Donald et al., 2020; Duflo, 2012). Because the present analysis was unadjusted, potential confounding among education, landholding, income and other household characteristics cannot be excluded. The coded family-occupation coefficient is particularly sensitive to the treatment of nominal categories and is therefore not interpreted as evidence of an independent socioeconomic effect.

The non-significant bivariate coefficients for training and extension participation should not be interpreted as evidence that advisory services are ineffective. The study measured participation but did not quantify the duration, content, intensity, quality or follow-up of those services. Thus, explanations based on programme quality remain hypotheses rather than findings. Prior work indicates that locally relevant, experiential training and participatory extension can strengthen learning and enterprise planning (Singh et al., 2022, 2023), while digital platforms may expand access when users possess the literacy and autonomy needed to act on information (Godara et al., 2024; Kumari et al., 2026; Maurya et al., 2026). Future studies should use prospective

longitudinal or matched comparison designs, apply analytical methods appropriate to the measurement level of each predictor, report psychometric evidence for the empowerment scale, and examine differences by enterprise type, duration and scale.

CONCLUSION

Among the 130 women sampled from Ammapatti, Kunnur and Vadukapatti villages of Watrap block, retrospectively reported empowerment was higher after participation in income-generating activities, but the pattern was uneven across dimensions. Psychological and social domains showed larger reported gains than political participation and strategic commercial control. Human-rights awareness, technology-related decisions, self-confidence and access to modern technology showed the largest indicator-level differences, whereas marketing authority, labour supervision, community action and formal political representation showed limited change. Education and landholding had the strongest positive bivariate associations with overall empowerment, but these associations should not be interpreted as causal determinants. For similar rural livelihood settings, extension and enterprise programmes may usefully integrate functional literacy, access to productive assets, market and financial skills, leadership development and institutional participation. Confirmation of these patterns requires prospective studies with validated measurement, suitable comparison groups and analytical methods matched to variable type.

DECLARATIONS

Ethical approval and consent to participate: The study was conducted in accordance with ethical principles applicable to research involving human participants. Before data collection, all respondents were informed about the purpose of the study, the voluntary nature of participation, confidentiality of the information provided and their right to withdraw at any stage. Informed consent was obtained from all participants prior to the personal interviews. The study was approved by Department of Extension Education, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur-482004, Madhya Pradesh, India

Data availability statement: The data supporting the findings of this study may be made available by the corresponding author upon reasonable request.

Conflicts of interest statement: The authors declare that they have no conflict of interest.

Authors' contribution: V. Pavithra contributed to investigation, data collection, data curation, analysis and preparation of the original draft. Sonam Agarwal contributed to conceptualization, methodology, supervision, validation and review and editing of the manuscript. Seema Naberia contributed to methodology, supervision, validation and review and editing. Chandrika Sharma contributed to investigation, data curation and review and editing. Sanjana Srivastava contributed to data curation, validation and review and editing. Prashish Singh contributed to formal analysis, interpretation of findings, visualization and review and editing.

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