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# Empowering Women in Aquaculture- Evidences from Jagatsinghpur, Odisha

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**ABSTRACT**

Empowerment levels of women involved in aquaculture-related vocations were measured using the Women Empowerment in Aquaculture Index (WEAI) in Jagatsinghpur, Odisha during 2022-23. Ninety-eight women belonging to 9 randomly chosen women self-help groups were studied using a structured interview schedule. Regression analysis indicated that 53.9 per cent variation in the women empowerment level was attributed to annual income, information source utilization, social participation, participation in extension activity, training, and innovativeness. The empowerment level of 9 SHGs varied from 61-95 per cent, with considerable differences between the domains- access to and control over resources and services, participation in social and economic activities, ability to make independent decisions, control over income usage, knowledge on aquaculture, and attitude towards aquaculture. Non-availability of bigger size fingerlings, lack of financial support from Govt. organizations, and lack of knowledge regarding recommended practices were among the constraints that limit women's participation in aquaculture.

## INTRODUCTION

Aquaculture plays a vital role in addressing global food security challenges and fostering economic growth, particularly in developing nations. The growth in fish production aligns with an overall expansion in fish consumption. Fish consumption has risen by approximately 3 per cent annually since the 1960s, surpassing the growth of other animal protein sources. This trend is evident in both developed and developing countries (FAO, 2020b). Notably, women have increasingly become active participants in the aquaculture sector, engaging as both producers and entrepreneurs. This involvement not only promotes gender equality but also brings positive socio-economic outcomes to households and communities. In Indonesia, women collaboratively make aquaculture decisions with their male partners (Sari et al., 2017). While women's roles vary across countries, cultures, and technologies, their participation along the aquaculture value chain remains significant (Kruijssen et al., 2018; Gonzalez et al., 2021). Therefore, approaches to empower women in this field will differ based on the country, such as India, where distinct strategies may be required. To ensure sustained empowerment, the establishment of Self-Help Groups (SHGs) has emerged as an effective tactic. Empowering women through SHGs in aquaculture demonstrates promising outcomes, enhancing their resource access, decision-making authority and overall livelihoods. This strategy not only bolsters individual women's livelihoods but also contributes to broader community development, aligning with Sustainable Development Goals (SDGs). The Government of Odisha has recognized fish farming as a promising venture for women Self-Help Groups (SHGs). In September 2018, they launched an inter-departmental scheme named "Fish Farming in Gram Panchayat Tanks by Women SHGs." To incentivize SHGs' participation, a significant policy modification was introduced, prioritizing the leasing of Gram Panchayat tanks to women SHGs for duration of 3-5 years. The government offered financial support of Rs. 90,000 per hectare to SHGs, covering 60 per cent of the operational expenses (totalling Rs. 1.5 lakhs/ha/crop) for fish production. This assistance enabled SHGs to adopt modern fish farming techniques, leading to enhanced

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fish yield and higher annual income (Jaysankar et al., 2022). During the span of 1987 to 2016, the Central Institute of Freshwater Aquaculture (CIFA), located in Bhubaneswar, executed several technology transfer projects. These projects either exclusively benefited women in agriculture or included a considerable number of women as beneficiaries (De et al., 2020). Literature on women's contribution to aquaculture and their level of empowerment as a consequence of getting involved in aquaculture is scarce. Measuring and quantifying empowerment of women has also received less research attention (Nain et al., 2010). It is imperative to gauge empowerment so that interventions are made to ensure gender mainstreaming in aquaculture. The present study attempts to quantify empowerment level of women SHGs involved in aquaculture; how empowerment is influenced by socio-economic factors and the constraints that hinder women's involvement in aquaculture.

## METHODOLOGY

One of the 30 districts in Odisha, Jagatsinghpur, was purposively chosen for the study. All eight blocks-Tirtol, Balikuda, Naugaon, Biridi, Erasama, Raghunathpur, Jagatsinghpur, and Kujangawere surveyed. Two SHGs were selected at random from Tirtol, the biggest block and one from each of the remaining seven blocks. A structured interview schedule that included socio-personal and socioeconomic characteristics as well as an index to measure the degree of empowerment among women involved in aquaculture was used to interview all the members of the nine SHGs (n=98). Data were gathered between 2022 and 2023. The level of women's empowerment in aquaculture was measured using the Women Empowerment in Aquaculture Index (WEAI) developed by De et al., (2023). This index comprises six domains, namely access to and control over resources and services, participation in social and economic activities, ability to make independent decisions, control over income usage, knowledge on aquaculture, and attitude towards aquaculture. Raj et al., (2022) assessed empowerment in cassava cultivation using 5 Domains of Empowerment (5DE) viz., agricultural production decision-making, access to productive resources, control over use of income, community leadership and time allocation. Additionally, the study assessed different constraints faced by rural women in practicing fish farming. These constraints were ranked based on their severity, as indicated by SHG members during interview. By employing Henry Garrett's Ranking Technique, the rankings assigned by respondents were examined. The respondents' rankings were transformed into scores using a standard formula proposed by Garrett (1979).

## RESULTS AND DISCUSSION

In relation to the socio-demographic characteristics of the Women Self-Help Groups (WSHGs), a majority of 59.9 per cent fall within the age range of 30 to 50 years. Regarding education, 28.6 per cent of the members had successfully completed their matriculation. Within the group, 22.4 per cent of female members belong to the SC/ST and OBC categories. Among the members, 39.5 per cent are part of joint families. Moreover, 62.6 per cent of individuals have less than 5 years of experience in fish farming. Notably, 87.8 per cent members have taken part in various training programmes focused on aquaculture. Concerning their annual income, 53.1 per cent of members were able to generate a moderate level of income from farming and other sources, ranging between (Rs. 95,312-2,30,994). In terms of their innovativeness, 42.9 per cent of respondents expressed their willingness to adopt new fish farming technologies.

Association between socio-personal/economic variables with the level of empowerment was carried out and the following variables such as participation in extension activity, training and innovativeness with 'r' person correlation coefficient value 0.338, 0.543 and 0.523 respectively were found to be significant at 1% level of significance. The findings revealed that women who are innovative and actively participate in different extension activities and training programmes were more empowered than others. Additionally, the variable "social participation" exhibited a significant association at a 5% level of significance with an 'r' Pearson correlation coefficient value of 0.246 in relation to the level of empowerment. Similarly Yadav & Ghosh (2023) reported that monthly income, annual family income, farming expenditure, resource position, total land, cultivated land, financial safety, and information availability are significantly and positively correlated with the perceived effectiveness of technological adaptation of farmers in flood prone areas.

Results given in Table 1, reveals that all of the selected independent variables together determined 53.9 per cent variation in level of empowerment. Out of the 13 attributes regression coefficients of six attributes namely annual income, information source utilization, social participation, participation in extension activity, Training and innovativeness were found to be positively significant. For each of these attributes, a one-unit increase corresponded to empowerment level changes of 0.175, 0.212, 0.384, 0.424, 0.384, and 0.398 units, respectively. Roy and Ghosh (2022) reported that regression coefficients of four attributes such as family size, use of personal cosmopolite information sources, use of mass media source and knowledge level were found to be positively significant with perceived marketing system effectiveness (MSE). These findings are in line with the findings of Banerjee et al., (2022) and Chandra et al., (2023).

Table 2 presents a comprehensive overview of women's empowerment levels in aquaculture, segmented across different domains and Self-Help Groups (SHGs). Among the listed SHGs, Trinath Matsya Utpadak Gosti leads with the highest Women's Empowerment in Aquaculture Index (WEAI) score of (19.16) followed by Maa Manisa SHG with a score of (17.50) and Maa Durga SHG with a score of (16.66) in terms of accessing and controlling resources and services. These top-performing SHGs have effectively established collaborations with local organizations, government bodies and stakeholders like Krishi Vigyan Kendra (KVK) Jagatsinghpur and the District Fisheries Office. This collaborative approach has resulted in increased resource access, knowledge sharing, and enhanced service provision in the aquaculture sector. In the aspect of participation in social and economic activities, Trinath Matsya Utpadak Gosti achieves the highest score of (14.18) followed by Gorekhgadi SHG (8.08) which showcasing their strong leadership and group dynamics that actively encourage engagement in various economic and social

**Table 1.** Multiple regression analysis of socio-personal/economic variables with the level of empowerment

| Variables | Regression coefficient | Standard error | Standardized Coefficients β | 't' value | P value |
|---|---|---|---|---|---|
| (Constant) | 92.420 | 8.246 | - | 11.208 | 0.000 |
| Age | 0.592 | 2.260 | 0.021 | 0.262 | 0.794 |
| Education | 0.480 | 0.597 | 0.070 | 0.804 | 0.424 |
| caste | -0.806 | 0.871 | -0.074 | -0.925 | 0.358 |
| Family type | 1.459 | 1.687 | 0.081 | 0.865 | 0.389 |
| Family size | 1.111 | 1.134 | 0.083 | 0.980 | 0.330 |
| Experience | -0.738 | 3.024 | -0.020 | -0.244 | 0.808 |
| Land area | -1.189 | 1.088 | -0.094 | -1.093 | 0.278 |
| Annual income | 2.292E-5* | 0.000 | 0.175 | 2.127 | 0.036 |
| Information Source Utilization | 0.628* | 0.294 | 0.212 | 2.134 | 0.036 |
| Social participation | 7.501** | 2.083 | 0.384 | 3.600 | 0.001 |
| Participation in Extension activity | 1.173** | 0.311 | 0.424 | 3.773 | 0.000 |
| Training | 3.650** | 0.830 | 0.384 | 4.398 | 0.000 |
| Innovativeness | 3.278** | 0.775 | 0.398 | 4.228 | 0.000 |

R square = 0.539, F value = 7.565, **Significant at the 0.01 level, *Significant at the 0.05 level

**Table 2.** Comparison of empowerment level of 9 women SHGs

| Domains | Gorekhgadi SHG (n=14) | Baba Trinath (n=14) | Trinath Matsya Utpadak Gosti (n=10) | Tarak-eswar Matsya Utpatak Gosti (n=10) | Jay Hanuman SHG (n=10) | Maa Manisa SHG (n=10) | Bajara-ngabali SHG (n=10) | Maa Durga SHG (n=10) | Baba Shiv Shambhu SHG (n=10) |
|---|---|---|---|---|---|---|---|---|---|
| Access to and control over resources and services | 11.90 | 10.51 | 19.16 | 3.88 | 5.55 | 17.50 | 8.33 | 16.66 | 8.05 |
| Participation in social and economic activities | 8.08 | 6.03 | 14.18 | 2.45 | 1.90 | 6.95 | 7.36 | 7.36 | 6.95 |
| Ability to decide independently | 7.05 | 6.07 | 3.25 | 4.50 | 3.12 | 3.12 | 4.00 | 5.25 | 4.87 |
| Control over use of income | 36.50 | 27.38 | 27.5 | 33.33 | 40.55 | 33.61 | 45.83 | 34.72 | 40.55 |
| Knowledge on aquaculture | 3.29 | 4.12 | 4.07 | 2.46 | 3.23 | 3.23 | 2.84 | 1.53 | 2.46 |
| Attitude towards aquaculture | 28.27 | 21.42 | 17.08 | 15.16 | 12.83 | 27.25 | 21.33 | 15.16 | 14.91 |
| Overall WEAI (%) | 95.09 | 75.53 | 85.24 | 61.78 | 67.18 | 91.66 | 89.69 | 80.68 | 77.79 |

endeavours. Gorekhgadi SHG secures the highest score of (7.05) in the ability to decide independently domain, while both Jay Hanuman and Maa Manisa SHGs exhibit lower scores of (3.12). This difference can be attributed to the supportive atmosphere within Gorekhgadi SHG, where strong unity among members fosters an environment conducive to decision-making. Concerning control over income utilization, Bajarangabali SHG obtained a high score (45.83), while Baba Trinath SHG trails behind with (27.38), indicating diverse income-generating activities within Bajarangabali SHG that facilitate greater control over income allocation. In terms of knowledge about aquaculture, Baba Trinath SHG claims the highest score of (4.12), closely followed by Trinath Matsya Utpadak Gosti with a score of (4.07). On the other hand, Maa Durga SHG scores the lowest with (1.53). This discrepancy arises from Baba Trinath SHG's active participation in extension activities and training programs related to aquaculture. Lastly, attitudes toward aquaculture demonstrate that Gorekhgadi SHG shines with a score of (28.27), while Jay Hanuman SHG records the lowest score of (12.83). The positive attitude of Gorekhgadi SHG members can be attributed to the strong support they receive from their society for aquaculture activities. The Overall Women's Empowerment in Aquaculture Index (OWEAI), a comprehensive measure combining scores across all domains, ranks "Gorekhgadi SHG" at the forefront with the highest score of (95.09%), followed by "Maa Manisa SHG" at (91.66%) and "Bajarangabali SHG" at (89.69%) among the listed SHGs. De et al., (2023) in his study reported that the district Khordha had the highest overall empowerment (79.8%), followed by Puri (74%) and Kendrapara (69.2%). Roy et al., (2022) had constructed an empowerment index for SHG women and applied the same on 290 SHG members of North 24 Praganas, West Bengal and worked out the empowerment score that ranges from 0.6-0.8. SHG group leaders in rural West Bengal are true examples of empowerment. The investigator's assessment underscores the significant impact of collaboration, leadership, and supportive environments in fostering women's empowerment in the aquaculture sector, as indicated by the Overall Women's Empowerment in Aquaculture Index (OWEAI) score.

Non-availability of bigger size fingerlings was ranked as (I), while, lack of financial support from Govt. organizations was ranked (II) and lack of knowledge regarding recommended practices is ranked (III) the corresponding Garrett mean scores for these

**Table 3.** Constraints encountered by the rural women in practicing aquaculture

| S.No. | Constraints | Garrett mean score | Ranks |
|---|---|---|---|
| 1 | Non-availability of bigger size fingerlings | 68.87 | I |
| 2 | Disease outbreak | 32.95 | XIV |
| 3 | Lack of knowledge regarding the recommended practices | 60.46 | III |
| 4 | Seasonality of pond | 44.11 | XI |
| 5 | High cost of feed | 58.72 | IV |
| 6 | High cost of fertilizer | 32.90 | XV |
| 7 | Lack of financial support from the Govt. organisations | 65.88 | II |
| 8 | Poaching & Poisoning | 50.32 | VIII |
| 9 | Lack of family support and encouragement | 41.06 | XII |
| 10 | Inadequate time after household work | 39.30 | XIII |
| 11 | Lack of need based training programme | 52.95 | VI |
| 12 | Lack of farm and home visit by the extension workers | 47.46 | IX |
| 13 | Lack of facility for soil and water testing | 51.75 | VII |
| 14 | Lack of water management during flood | 45.44 | X |
| 15 | Lack of fishery input supplier in the locality | 57.73 | V |

constraints were 68.87, 65.88, and 60.46 respectively. De and Pandey (2014) reported that Lack of access to credit and finance was the major constraints to women's participation in aquaculture. Mohanty et al., (2020) reported barriers to women's engagement in aquaculture as a lack of literacy. Women still face significant economic, social and cultural barriers that affect their participation in aquaculture, their access to, and control over assets and resources, and the income and benefits derived from these activities (Johnson et al., 2016; Kruijssen et al., 2018; Morgan et al., 2017; Phillips et al., 2016; Ramírez & Ruben, 2015). As reported by Githukia et al., (2020), access to productive resources is a major constraint among women in aquaculture in Kenya, which also limits their ability to access loans due to lack of collateral. Likewise, Agbebi et al., (2016) noted that women in Rwanda face constraints in accessing technical skills in fish production systems.

## CONCLUSION

Empowerment level of women in aquaculture in Jagatsinghpur, Odisha has been quantified. Empowerment levels among 9 Women Self-Help Groups (WSHGs), varies from 61 per cent to 95 per cent, across 6 domains of WEAI. Socio-economic variables like participation in extension activities, training and innovativeness and social participation has had positive correlation with women empowerment level. Variables like annual income, information source utilization, social participation, participation in extension activity, Training and innovativeness significantly affects the empowerment level with coefficient of determination worked out as 0.539. Government initiatives aimed at enhancing women's participation in aquaculture through several interventions are resulting in positive outcomes. These findings underline the importance of tailored policies to overcome challenges and promote women's active role in aquaculture for sustainable development.

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