**WORKFLOWS AND GENDER GAPS: A STUDY OF AQUATIC AND HOUSEHOLD LABOUR DIVISION**

**ABSTRACT**

This study investigates gender-based participation in fishery and household management activities among farm men and women, focusing on four key value indicators to highlight disparities. The study to examine and compare the participation of farm men and women in various fishery and household management activities. In fishery operations, men exhibited dominant participation, scoring the maximum mean value of 4.00 in both pond preparation and fish selling, whereas women scored much lower (1.00 and 2.00, respectively), indicating limited involvement in strategic tasks. In terms of household management activities were led primarily by women, with notably high scores in cleaning and kitchen gardening, compared to men’s significantly lower score in kitchen gardening, demonstrating the disproportionate domestic burden on women. Statistical analysis revealed clear gender differences in both fishery and household management. In fisheries, men had a higher mean participation score compared to women, while in household activities, women scored higher than men. These differences were statistically significant (*p* < 0.001) as confirmed by the Mann-Whitney U test, with strong effect sizes (1.00 in fisheries and 0.842 in household tasks), leading to the rejection of both null hypotheses (H₀₁ and H₀₂). These findings reveal a clear gendered division of labour, farm men dominate technical fishery roles while farm women manage the bulk of household and supportive fishery tasks. The study underscores the need for gender-sensitive rural policies that recognise women’s contributions and promote equitable distribution of roles to support inclusive and balanced development.

**Keywords:** Aquatic labour,Gender gaps, Gender-sensitive policies, household management, Mann-Whitney U test

**INTRODUCTION**

In fisheries, gender dynamics often appear through unequal access, labour divisions, and managerial perceptions of user groups. These divisions reflect broader societal values and are evident in how participation is recorded and recognized (Szymkowiak and Rhodes-Reese., 2020). Analyzing agriculture through a gender-specific lens reveals key disparities in resource access and labour participation, emphasizing the need to understand men’s and women’s distinct roles in fishery, farming, and household management to address gender imbalances effectively (Rudrapal et al., 2025). Experts emphasize the urgent need to integrate gender considerations into fisheries policy and governance by recognizing the socio-ecological roles of women. Enhancing visibility, access, and targeted initiatives such as gender-specific programs and inclusive recreational approaches can help close the gender gap in marine recreational fisheries (MRF) (Pita et al., 2023). Gender-based division of labour in rice farming, with men leading in technical tasks and women in labour-intensive, post-harvest roles. These disparities, confirmed by statistical analysis, call for gender-responsive policies and extension efforts that empower women and promote equitable participation across all farming activities. (Rudrapal et al., 2025). In Finnish small-scale fisheries, household roles have shifted over time, with women playing a central yet often unrecognized part, especially in processing and marketing fish. While only 9% of fishers are women, their economic and supportive contributions are vital to sustaining fishing livelihoods. The study explores how gender roles in fisheries households and communities have evolved, and how they are reflected in statistics, policy, and research (Salmi and Sonck-Rautio., 2018). Vegetable cultivation has become commercialized, yet significant production gaps persist, with most growers being middle-aged, moderately educated, and facing key challenges like lack of training access and awareness of modern techniques, highlighting the need to promote low-cost cultivation practices (Sonkar and Yadav., 2025). Women are essential contributors to national progress, and their potential is gaining growing recognition. Despite encountering various obstacles, many have excelled in entrepreneurship, showcasing strength, perseverance, and a strong drive for success (Rudrapal et al., 2024). The effective use of ICTs in paddy farming is hindered by barriers such as unclear messaging, content reliability issues, high gadget costs, and limited training or practical exposure (Priyanka et al., 2025). Value addition enhances crop quality and economic return by assessing market channels for efficiency, revealing that increased intermediaries reduce farmers' share and raise costs, with key challenges including transport expenses and lack of market information (Vishnuprabu et al., 2025).

 Middle-aged women tend to show greater participation in dairy farming than those in younger or older age groups, reflecting their stronger inclination and commitment to this livelihood. As key agents of national development, women's contributions are increasingly acknowledged. Despite facing multiple challenges, many have thrived in entrepreneurial pursuits, demonstrating resilience, determination, and unwavering ambition (Rudrapal et al., 2023).

**MATERIALS AND METHODS**

The present research was undertaken in the districts of Sepahijala and South Tripura in the state of Tripura, chosen specifically for their strong involvement in fishery management and household related activities. These districts were identified as ideal study areas due to their high dependence on inland fisheries as a key component of rural livelihoods. In these regions, fish farming is crucial in enhancing household food security and contributing significantly to income generation and employment, particularly among small and marginal farming households. Additionally, both districts exhibit active community participation in household and resource management, making them suitable for examining gender-based roles and responsibilities in fishery related tasks. The selection was further supported by the availability of traditional knowledge, widespread engagement in aquaculture practices, and the increasing focus on integrated farming systems in these areas. Thus, these districts provided a relevant and practical context for exploring the extent and pattern of farm men and farm women participation in fishery and household management. A total of 320 respondents were chosen, 160 farm men and 160 farm women were selected by using simple random sampling. This method ensured equal chances of selection and minimized selection bias, allowing for a diverse and representative sample of participation patterns across gender lines.

Data were gathered through personal interviews using a structured, pre-tested questionnaire. The pre-testing phase confirmed that the questions were clear, relevant, and culturally appropriate. The structured format facilitated consistent data collection, while face-to-face interactions allowed for clarification and more comprehensive responses from participants. The research focused on fishery and household management activities, each evaluated using a four-point scale to determine the level and mode of participation. The scale ranges from activities carried out alone by farm men or farm women (4), jointly by both farm men and farm women (3), jointly undertaken with family members (2), jointly performed with the help of family members, labourers, machinery & contractual support (partial involvement) (1). To examine the statistical properties of the dataset, the Shapiro-Wilk test for normality was applied. The test yielded *p*-values below 0.05, indicating that the data did not follow a normal distribution. This finding necessitated the use of non-parametric analytical techniques. As a result, the Mann-Whitney U test was employed to compare differences in participation between the two gender groups. A significance threshold of 0.05 was used, with p-values below this level indicating statistically significant gender-based differences in participation. This rigorous methodological approach enabled a comprehensive understanding of gender roles in fishery and household management within the selected districts.

**RESULTS AND DISCUSSION**

The bar graph 1.1 illustrates gender-based participation in various fishery-related activities among farm men and farm women, highlighting a clear division of labour. Farm men exhibit significantly higher involvement across all activities, particularly in pond preparation and selling of fish, both of which received the maximum score of 4.00. In contrast, farm women’s participation in pond preparation is minimal, scoring only 1.00, and similarly low in fishing (1.38) and net or equipment making (1.72), indicating limited engagement in physically intensive and technical tasks. Farm women show relatively higher involvement in feeding (3.01) and fish processing (3.03), suggesting their stronger role in routine and post-harvest activities. The activity of collecting fingerlings shows a moderate gender gap, with men scoring 3.59 and women 2.59. Among all tasks, fish processing stands out as the most balanced area, reflecting shared responsibilities. Overall, the chart reveals a pronounced gender disparity in fisheries, with men dominating strategic and market-oriented roles, while women are more involved in supportive and maintenance tasks. This underscores the need for targeted interventions to promote equitable participation and empower women in all stages of aquaculture.

**Figure 1: Mean value of fishery management activities of farm men and farm women**

**Hypothesis testing**

H01: There is no significant difference in the extent of participation of farm men and farm women in fishery management

H11: There is a significant difference in the extent of participation of farm men and farm women in fishery management

Figure 2 illustrates the mean and median differences in fishery management activities between farm men and farm women. The graph presents a comparative analysis of the involvement levels of both genders across various fishery management tasks. Each activity is represented with markers indicating the mean (●) and median (▬) values for farm men and farm women separately. This visual comparison highlights the central tendency and distribution of participation in fishery management, revealing any skewness or consistency in the data. Generally, higher mean and median values for men suggest greater involvement or responsibility in specific aspects of fishery management.

Based on the observed differences in mean and median values, supported by statistical analysis, the null hypothesis (H₀₁), which states that there is no significant difference in the extent of participation of farm men and farm women in fishery management, is rejected. Accordingly, the alternative hypothesis (H₁₁), which posits a significant difference in their participation, is accepted. This outcome reinforces the presence of a gender-based variation in fishery management roles, emphasizing the need for gender-sensitive planning and inclusive development strategies in the fisheries sector. The disparities observed in the figure provide insight into gender-based differences in participation in fishery management activities. Such analysis is useful for understanding the division of labour and can guide policy and program interventions aimed at promoting gender equity in the fisheries sector.



**Figure 2: Mean and median difference between fishery management of farm men and farm women**

Table 1 presents the results of the Mann-Whitney U test comparing the participation of farm men and farm women in fishery management activities. The sample consists of 160 farm men and 160 farm women. The mean participation score for farm men is 25.9 with a median of 26.0, while farm women have a significantly lower mean score of 14.4 and a median of 14.0. The standard deviation for farm men is 1.29, indicating relatively low variability in their participation, whereas farm women show greater variability with a standard deviation of 2.85. The statistical analysis reveals a highly significant difference between the two groups, with a *p*-value of 0.00 (*p* < 0.001). Furthermore, the effect size, measured by the rank biserial correlation, is 1.00, suggesting a very strong difference in fishery management participation between farm men and farm women. These results indicate that farm men are substantially more involved in fishery management activities compared to their farm women.

Table 1: Mann-Whitney U test analysis on fishery management of farm men and farm women

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Participation** | **Group** | **N** | **Mean** | **Median** | **SD** | **SE** |
| **Fishery Management activities** | Male | 160 | **25.9** | **26.0** | 1.29 | 0.102 |
| female | 160 | 14.4 | 14.0 | 2.85 | 0.225 |
| **Statistics** | **P** |  | **Effect size** |
| 0.00 | <0.001 | Rank biserial correlation | 1.00 |

Figure 3 illustrates the mean level of involvement of farm men and farm women in various household management activities. The results indicate that farm men are more actively engaged in activities such as the purchase of food items (mean value 3.85) and purchase of household materials (3.86), while farm women show slightly lower but still substantial involvement in these areas (3.65 and 3.68 respectively). In contrast, farm women take a leading role in domestic and caregiving tasks. Their involvement is higher in the care of children (3.08), care of elderly family members (3.06), collection of water (3.68), and cleaning activities (3.69), whereas farm men’s participation in these tasks is lower, with mean values ranging from 2.41 to 3.00. In financial matters such as savings, farm men report a higher mean value (3.72) compared to farm women (3.34). Both groups show nearly equal participation in arranging funds for household needs and managing the housing budget, with only slight differences in their mean values. Notably, backyard or kitchen gardening is predominantly managed by farm women, who have a mean value of 3.74, compared to a significantly lower value of 1.29 reported by farm men. Overall, the figure highlights a clear gender-based division of labour in household management, where farm men are more engaged in financial and procurement roles, while farm women contribute more intensively to routine domestic and caregiving activities

**Figure 3: Mean value of household management activities of farm men and farm women**

**Hypothesis testing**

H02: There is no significant difference in the extent of participation of farm men and farm women in household management

H12: There is a significant difference in the extent of participation of farm men and farm women in household management

Figure 4 visually compares the mean and median values of household management involvement between farm men and farm women. The chart clearly shows that both the mean and median scores for household management activities are higher for farm women than for farm men. This indicates that farm women are more consistently and actively engaged in managing household responsibilities compared to their male counterparts. The greater height of the bars for farm women in both the mean and median categories reflects not only a higher average level of participation but also suggests that this pattern is consistent across the wider sample and not driven by a few outliers. In contrast, the comparatively lower values for farm men indicate limited involvement in household tasks.

In light of this visual representation and supporting statistical evidence, the null hypothesis (H02), which stated that there is no significant difference in the extent of participation of farm men and farm women in household management, is rejected. Consequently, the alternative hypothesis (H12), which asserts that there is a significant difference in their participation, is accepted. Overall, the figure highlights a clear gender disparity in household management, with farm women carrying a significantly larger share of the domestic workload. This emphasizes the need to recognize and value the contributions of farm women in sustaining household and family well-being within agricultural communities.



**Figure 4: Mean and median difference between household management of farm men and farm women**

Table 2 presents the results of a Mann-Whitney U test conducted to assess gender differences in participation in household management activities among farm men and farm women. The findings show that farm women had a higher mean participation score (33.6) and median (34.0) compared to farm men, who recorded a mean of 29.5 and a median of 30.0. This indicates that farm women are more actively involved in household management. The standard deviation for women (1.83) was slightly lower than that for men (2.06), suggesting that women’s responses were more consistent. The statistical analysis yielded a U value of 2021 with a *p*-value of less than 0.001, indicating a highly significant difference between the two groups. The rank biserial correlation, used as a measure of effect size, was 0.842, reflecting a strong effect and confirming that the observed gender difference is both statistically significant and practically meaningful. Overall, the table underscores the greater role of farm women in household management.

Table 2: Mann-Whitney U test analysis on household management of farm men and farm women

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Participation** | **Group** | **N** | **Mean** | **Median** | **SD** | **SE** |
| **Household management** | Male | 160 | 29.5 | 30.0 | 2.06 | 0.163 |
| female | 160 | **33.6** | **34.0** | 1.83 | 0.145 |
| **Statistics** | **P** |  | **Effect size** |
| 2021 | <0.001 | Rank biserial correlation | 0.842 |

**CONCLUSION**

The study reveals a distinct gender-based division of labour in both fishery and household management activities among farm men and farm women. In fishery-related tasks, farm men consistently exhibit higher participation than farm women. Specifically, farm men scored the maximum mean value of 4.00 in both *pond preparation* and *selling of fish*, compared to the significantly lower scores of 1.00 and 2.00, respectively by farm women. Farm women demonstrated greater involvement in *feeding* (3.01) and *fish processing* (3.03), pointing to their significant contributions in routine and post-harvest operations. The activity of *collecting fingerlings* showed a moderate gender gap, with men at 3.59 and women at 2.59. The Mann-Whitney U test confirmed these disparities with a highly significant *p*-value of <0.001, and a large effect size (rank biserial correlation = 1.00), leading to the rejection of the null hypothesis (H₀₁). The mean participation score in fishery management was 25.9 for men and 14.4 for women, establishing a strong gender gap in strategic and technical roles. In contrast, household management activities reflected higher participation by farm women. Women led in areas such as *care of children* (3.08), *care of elderly* (3.06), *cleaning* (3.69), *collection of water* (3.68), and *kitchen gardening* (3.74) compared to significantly lower scores by men (e.g., 1.29 in kitchen gardening). Though men were more involved in *purchasing food* (3.85) and *household materials* (3.86), women remained active in these roles as well (scoring 3.65 and 3.68 respectively). Statistical testing again showed a significant difference with a *p*-value < 0.001 and an effect size of 0.842. Women had a higher mean score of 33.6 compared to 29.5 for men in household management, confirming the rejection of null hypothesis (H₀₂). The findings emphasize a gendered structure of labour, with men dominating fisheries and women carrying the burden of household responsibilities. This necessitates gender-sensitive policies that recognize, redistribute, and support women’s contributions across both domains for more equitable rural development.

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