



Participation of Fisherwomen in Marine Fisheries in Andhra Pradesh

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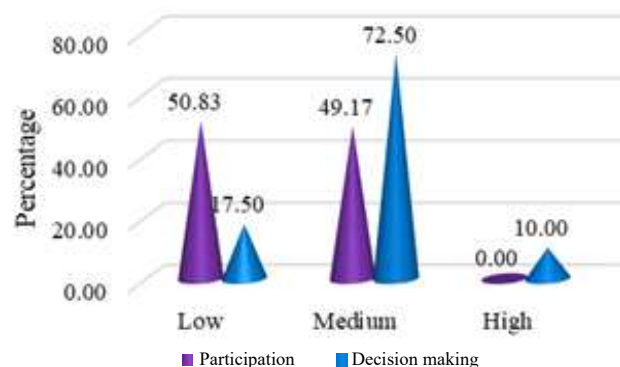
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HIGHLIGHTS

- The fisherwomen play a significant role in post-harvest activities, though their participation is often undervalued.
- Most fisherwomen had a medium level of decision-making power in fisheries and household-related activities, with mass media and contact with fishery agents being key influencers
- Age, mass media participation, and contact with extension agents were significant factors influencing fisherwomen's participation in post-harvest activities.

GRAPHICAL ABSTRACT

Categorisation on participation and decision making of respondents



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ABSTRACT

Context: Active marine fishing was undertaken by men after harvesting women take care of the catch. Women play a crucial role in the fisheries activities particularly in post-harvest activities like grading, drying, salting, cutting and marketing *etc.*, along with the household management. yet their contributions are often undervalued and undercompensated.

Objective: This study investigates the relationship between socio-personal characteristics with participation and decision making of fisherwomen in marine fisheries.

Methodology: The study was conducted in Guntur district of Andhra Pradesh. A sample of 120 women involved in marine fisheries was selected through random sampling method. The data was collected using a pre-tested interview schedule and analysed by using frequency, per centages and correlation.

Results and discussion: The results indicate that half of the women have low participation in post-harvest activities, while the other half are actively involved. The study found that age, mass media participation, and contact with extension agents significantly influence women's participation in these activities. Education, annual income, extension participation, social participation, and organizational participation did not show a significant relationship.

Conclusion: These findings highlight the need for targeted interventions to enhance the participation and recognition of fisherwomen in marine fisheries.

Fisheries, as a renewable resource, provide a substantial contribution to a nation's nutritional and economic prosperity. India is a prominent maritime nation and a significant aquaculture country globally. In addition to contributing to the nutritional security aspect of the country's food supply, fisheries also serve as a source of income and employment for millions of individuals (Kumaran, 2010). India is the third largest country in terms of fish output, accounting for 8 percent of global fish production. Additionally, it ranks second in terms of aquaculture production, contributing 7.56 percent to global production (Kumar *et al.*, 2024).

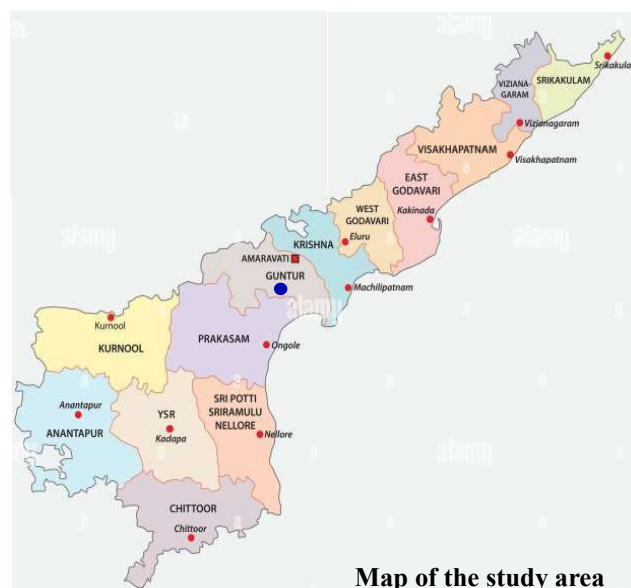
Women play important roles in fishing, especially in the post-harvest sector. Even though fishing is primarily a male activity, only a small number of women participate in passive fishing, such as collecting seaweeds, mussels, clams, and other bivalves from nearshore waters (Reshma and Kalluraya, 2023). Fish is a valuable source of high-quality protein, essential omega-3 fatty acids, vitamins, and minerals that make a vital contribution to the world's food and nutrition security (FAO, 2020; Pal *et al.* 2024). Women accounted for about 50.00 per cent in fisheries and aquaculture workforce (Upadhyay *et al.* 2021), when the secondary elements such as processing and trading are included.

According to the 2005 Marine Fisheries Census, the total number of marine fisher folk in nine coastal states and two Union Territories on mainland India is 3,519,116. Notably, of the 756,391 fishermen engaged in fishing-related activities, 365,463 are women (about 48 percent). According to Singh *et al.*, (2013), around 5 lakh women are employed in pre and post-harvest operations in the marine fishing sector alone, out of a total workforce of 12 lakh people. Women's fishing roles are heavily influenced by their household's socioeconomic status. Aside from selling fish, the fisherwomen's function as homemakers is critical for the men to carry out other occupations for income support. Fisherwomen are solely responsible for activities such as cooking, childcare, children's education, family health, and cleanliness (Tripathi *et al.*, 2017) Many fisherwomen participate in post-harvest fisheries activities, particularly those involving the preservation of products over several days (for example, fish drying and salting) (Usha *et al.*, 2024). Women play a significant role in various areas of economic growth, such as managing family affairs,

engaging in agricultural production, and participating in related fields like animal husbandry techniques and fish farming (Roy *et al.* 2006). Fisherwomen's involvement in fisheries-related activities generates additional revenue for their families (Sriharsha *et al.*, 2022). However, their remuneration is not usually the same as men's salary for the same activity, and their function is often overlooked (Das *et al.*, 2024). The study was conducted with the aims to determine the relationship between socio-personal factors with participation of fisherwomen working in marine fisheries, to know the relation between socio personal factors with decision making of the fisherwomen.

METHODOLOGY

The study was conducted in Nizampatnam and Repalle taluks of Guntur district (located at 16.29°N 80.43°E) of Andhra Pradesh during the year 2020-21. Among the fisherfolk communities in Andhra Pradesh, fisherwomen were actively involved in various post-harvest activities as above mentioned, they also work as wage earners in fish and shrimp processing factories in Guntur district. Despite of women involvement in all these activities, they often face conditions of deficiency, affecting their quality of life. The participation and decision making pattern of fisherwomen in the study area has been relatively underexplored, despite of their significant contributions to the fishery sector. Very few/no studies have been conducted to study the involvement of women in post-harvest activities of marine fisheries especially who are having small scale fishery activities along the coastline. Therefore, the present study was conducted to have an insight in to



the roles of fisherwomen’s involvement in post-harvest activities of marine fisheries in Guntur district of Andhra Pradesh. This study tried to understand fisherwomen’s participation and decision making in post-harvest activities of marine fisheries. Hence the results of the study will help to formulate necessary policies and programmes for welfare and to improve fisherwomen’s standard of living in post-harvest activities of marine fisheries. Due to Coved-19 strict lockdown, the student researcher confined the study area to Guntur district with a sample size of 120 fisherwomen in two taluks (from each taluk 60 women) was selected through random sampling method. In spite of these circumstances, the study details of socio-economic characteristics, participation, decision making pattern by them were collected at single point of time using survey method based on the recall memory of the respondents. Pre-tested interview schedule was used to collect the data frequency percentages, indices and correlation was used to analyse the data.

Dependent variables of the study

Participation : To identify the activities undertaken by fisherwomen, a list of varied activities was created after talking with specialists and reviewing relevant literature. The responses of each of the fisherwomen respondents were gathered on the activities performed by them, namely: participated by women, participated by men, and participated by both men and women. The correct answer received a "1" score, while the incorrect response received a "0" score. The highest and minimum scores varied from 0 to 30.

The responses were divided into three categories using the class interval algorithm shown below.

$$\text{Class interval} = \frac{\text{Maximum scores} - \text{Minimum scores}}{3} = 10$$

Based on the scores obtained by each individual the respondents were classified as.

Category	Score range
Low	Up to 10
Medium	11-20
High	21-30

Decision making: Decision making is the process of selecting the most favourable option from a range of possibilities related to a certain subject. The level of involvement of women in decision-making processes linked to fisheries and home activities was assessed. The respondents were divided into low, middle, and high categories based on the scores obtained using mean and standard deviation.

Correlation: Correlation is a measure of intensity or

degree of relationship between two variables for ‘n’ pair of observations. Pearson’s correlation test was used to calculate the correlation coefficient between the socio-personal characteristics of women with their participation and decision making of fisherwomen in post-harvest activities of marine fisheries using the Co-efficient of correlation(r) formula.

RESULTS

The participation indices of respondents in marine fisheries' post-harvest activities were disclosed in Table 1. The participation index for women in fish cleaning is 100.00, which is 0.00 for males alone and for men and women together. The salting of fish activity index for women alone was 44.17, while it was 0.00 for men and women combined. The participation index for both men and women was 55.83, followed by 38.34 for women alone and 05.84 for men alone in the grading and categorizing process. The index value for fish handling activity was 44.44 for males alone, and 33.06 for both men and women combined. The participation index for the marketing of fish activity was 30.00 for women alone, 31.39 for both men and women together, and 19.44 for men alone. The results of fish drying indicated that women alone accounted for 29.86 and males alone accounted for 6.94. A significant activity is the icing of fish, which has an index value of 25.83 for women alone, 20.83 for both men and women, and 3.33 for males alone. Harvesting activity exhibited a 0.00 index for women alone, 24.17 for men, and 0.83 for both women and men.

The Table 1 clearly showed that men's and women's engagement in various post-harvest operations of marine fisheries was low. Half (50.83%) of the fisherwomen had low participation. Whereas

Table 1. Participation indices of respondents involved in post-harvest activities of marine fisheries (N=120)

Activities	Average index (%)		
	Women	Men	Both
Harvesting	00.00	24.17	0.83
Icing	25.83	3.33	20.83
Fish handling	22.50	44.44	33.06
Grading /sorting	38.34	5.84	55.83
Cleaning	100.00	00.00	00.00
Drying	29.86	6.94	00.00
Salting	44.17	00.00	00.00
Marketing	30.00	19.44	31.39
Value addition	00.00	00.00	00.00
Overall participation index	32.30	11.57	15.77

Table 2. Decision making of women involved in marine fisheries (N=120)

Decision making	Av. index (%)
Girls marriage	97.82
Children's education	88.00
Purchase of inputs for household	69.00
Purchase of house/land	70.00
Decisions regarding marketing produce	86.67
Decision about purchasing quantity of fish	86.67
Freedom to decide kind of dress they want to wear	77.54
Decision about borrowing loans from money lenders	67.71
Membership in organizations/fishery cooperatives	88.75

Table 3. Relationship between the socio-personal characteristics with participation of women involved in post-harvest activities of marine fisheries (N=120)

Independent variables	Participation ('r' value) of women	Decision making ('r' value) of women
Age	0.182*	0.164 ^{NS}
Education	-0.010 ^{NS}	0.07 ^{NS}
Annual income	0.013 ^{NS}	0.027 ^{NS}
Mass media participation	0.303**	0.238*
Extension participation	0.003 ^{NS}	0.176 ^{NS}
Contact with extension agent	0.214*	0.188*
Social participation	0.140 ^{NS}	0.204*
Organizational participation	0.023 ^{NS}	0.135 ^{NS}

**Significant at 0.01 per cent

*Significant at 0.05 per cent NS-Non-significant

about half of all women (49.17%) of the women were active in post-harvest operations in maritime fisheries. Cent per cent of the men alone and both women & men together had low participation in post harvest activities. As a result, the findings suggest that women play a more significant part in marine fisheries' post-harvest operations than men.

Results from Table 2 concluded that, highest decision making was found in girls marriage 97.82, index for membership in organizations/fishery cooperatives was 88.75 followed by children's education 88.00. Index for decisions regarding marketing produce and decision about purchasing quantity of fish was 86.67 followed by freedom to decide kind of dress they want to wear was 77.54, Purchase of house/land 70.00, purchase of inputs for household 69.00, decision about borrowing loans from money lenders 67.71.

Table 2 showed that most (72.50 %) of the respondents had medium level of decision making in fishery related and household related activities, few (17.50 %) had low level of decision making followed by high (10.00 %). The results are in line with the study conducted by Angela *et al.* (2012).

Relationship between socio-personal characteristics with Participation of women involved in post-harvest activities of marine fisheries: Table 3 explains relationship between socio-personal characteristics with participation of women in post-harvest activities of marine fisheries. It revealed that mass media participation (0.303**) was found to be positively and highly significant with participation at 1.00 per cent level of probability. Age (0.182*), contact with

Table 4. Multiple linear regression analysis of the independent variables with participation and decision making of women

Variables	Participation			Decision making		
	Regression coefficient 'b' value	S. E (b)	't' value	Regression coefficient 'b' value	S. E (b)	't' value
Age	.073	.045	1.625	.058	.045	1.294
Education	-.010	.111	-.089	-.040	.113	-.354
Annual income	1.488E-5	.000	1.146	1.279E-5	.000	.979
Mass media participation	.772	.336	2.300*	.410	.315	1.299
Extension participation	-.194	.196	-.990	.183	.180	1.021
Contact with extension agent	.697	.530	1.315	.543	.547	.992
Social participation	.006	.213	.030	.182	.202	.897
Organizational participation	-.049	.381	-.128	.318	.393	.808
R Value		0.377			0.354	
R ² Value		0.142			0.126	
F Value		2.301			1.994	

extension agent (0.214*) were significant at 0.05 per cent level of probability. Education (-0.010^{NS}), annual income (0.013^{NS}), extension participation (0.003^{NS}), social participation (0.140^{NS}), organizational participation (0.023^{NS}) were not related to participation of women in post-harvest activities of marine fisheries.

In decision making behaviour mass media participation (0.238*), contact with fishery agent (0.188*) and social participation (0.204*) were significant at 0.05 per cent level of probability. Age (0.164^{NS}), Education (0.07^{NS}), Annual income (0.027^{NS}), extension participation (0.176^{NS}), organizational participation (0.135^{NS}) were not significant with decision making of women related to fisheries and household related activities. The results are in line with Verma *et al.* (2013), Meetei *et al.* (2015).

Table 4 represents the extent of contribution of selected independent variables on participation and decision making of respondents. Regarding participation only mass media participation (2.300*) was significant at 5.00 per cent level remaining all the variables like age, education, annual income, extension participation, contact with fishery officials, social participation, organizational participation were not significant and all these variables accounted 14.20 per cent of variance with participation in various fisheries activities. In case of Decision-making pattern all the variables were not significant with decision making of women. All these variables accounted 12.60 per cent of variance with decision making

DISCUSSION

Women involvement is more in specific tasks like cleaning, while men involvement is not found in this activity as it is less laborious activity women alone can do these tasks without men help. Women involvement is more in salting activity, with a participation index of 44.17 for women alone. There is no joint participation from both genders in this task, as in this to carry the salt from one place to another they require men help. However, in activities requiring more collaboration, such as grading and categorizing, both genders contribute significantly, This trend highlights that certain tasks in the post-harvest process are viewed as shared responsibilities, although women still carry a substantial portion of the workload. Overall, these findings illustrate the essential yet gendered role of women in marine fisheries, particularly in post-harvest tasks. While men dominate the more

physically intensive activities, women are crucial in roles requiring precision, care, and time, reinforcing the need to recognize and value their contributions to the fisheries sector.

Above study concluded that, the global fishing industry is partially caused by the gendered division of work, where males are more involved in fish collecting due to their perceived masculinity. In addition to taking care of their families and raising children, women also must participate in household chores like cleaning and decorating till marketing. They either work from home or as labourers to complete these duties. It follows that compared to men, women play a larger part in the post-harvest operations of maritime fisheries. The results of the study were similar to Rashid and Gao (2012), Meetei *et al.* (2016).

The highest decision-making index was observed in matters of girls' marriage, this is consistent with traditional gender roles where women often hold a central role in ensuring familial harmony and social ties. The decision-making index for children's education was also significant. This active participation likely stems from their awareness of education's potential to break cycles of poverty and improve social mobility. Even though the fisherwomen were illiterates with the changing scenario they wanted their children to educate. In terms of marketing produce and decisions about purchasing fish quantities, the substantial decision-making role suggests that these women are closely involved in the economic aspects of their households, reflecting their hands-on experience and knowledge in fisheries. Decisions regarding the purchase of house/land, inputs for household needs and borrowing loans from money lenders shows a moderate level of involvement, The decision-making power in these areas may be shared with male counterparts or constrained by larger structural factors, such as ownership rights which are often limited for women in many fishing communities. The results are in consistent with Mahesh *et al.*, (2016), Roy and Bhaumik (2013)

Decision making pattern of women in fig 2 revealed that 72.50 per cent of the respondents had medium level of decision making in fishery related and household related activities like they participate in decisions regarding their children's education, participate in decisions regarding girls' marriage, women participate in decision regarding purchasing building/house, marketing of produce and purchase of

input for family. They had freedom to wear a kind of dress they want to wear. The results are in line with the study conducted by Angela *et al.* (2012).

Participation of fisherwomen in post-harvest activities Table 3 revealed that, the more actively participating women generally have orientation towards knowing more information, they contact other people to discuss related to work. This behaviour tends to be more with increasing as age they become free from the family responsibilities. Hence the result might have shown positive relation between mass media participation, age and extension contact. Media likely serves as a key source of information, enhancing their knowledge on topics such as fish preservation techniques, market demands, and value-addition processes, thereby motivating greater participation. As the age of women increases participation increases this might be due to the accumulation of experience and knowledge over time, which makes older women more confident and skilled in performing tasks such as processing, preservation, and marketing of fish products. Furthermore, older women may also bear greater household responsibilities, pushing them to engage more actively in income-generating activities like post-harvest fisheries. The positive relationship between contact with extension agents and participation in post-harvest activities indicates that women who engage with these professionals are better equipped to participate in various stages of the post-harvest process. Extension agents provide technical advice, training, and market insights, which empower women to become more involved. The results are in line with Vipinkumar and Asokan (2014), Singh *et al.* (2012), Weeratunge *et al.*, (2010), Rajeev and Dixit (2021).

Regarding decision making mass media participation, contact with fishery agent and social participation were significant at 5 per cent level of probability. It revealed that women's exposure and interaction with mass media sources play a crucial role in shaping their decision-making behaviour. Mass media likely provides these women with vital information related to fisheries and market trends, which could empower them to make informed decisions in both professional and household contexts. This highlights the importance of communication channels like television, radio, newspapers, and social media in delivering fisheries-related information to women. Extension agents act as key intermediaries in delivering technical advice, market information,

and guidance on sustainable practices. Women who maintain close contact with such agents have access to critical knowledge, thereby enhancing their decision-making capacity. Women who involved in social groups and community-based organizations had stronger decision-making ability. Social participation provides a platform for information sharing and peer learning which boosts their confidence and access to resources might contributed better decision making in both fisheries and household related activities.

The age, education, annual income, extension and organizational participation of the respondents were non-significant with decision-making, indicating that women of different age groups may have similar levels of involvement in decision-making processes. This might be due to the established nature of the roles that women play in fisheries and household management, which may be consistent across age groups. The minimal role of education suggests that formal schooling may not be a primary driver of decision-making among women in this sector. It could be that practical experience and traditional knowledge, rather than formal education, are more relevant in the context of fisheries. Annual income of the women is not necessarily dependent on economic status. Women across different income levels may face similar challenges or possess similar opportunities when it comes to fisheries and household decision-making. Extension and organizational participation might play an important role in other agricultural or economic sectors. It is possible that women in fisheries rely more on personal experience, mass media, and direct contact with experts like fishery agents, rather than formal organizational or extension services, for making decisions. Results are in line with Gunakar and Bhatta (2016), Mahesh *et al.*, (2016), Harper *et al.*, (2020), Kusakabe and Sereyvath (2022).

Table 4. we can conclude that access to mass media like television, radio, newspapers, or digital platforms might enhance awareness and encourage women's participation in fisheries-related activities. it may serve as a key source of information on best practices, market trends, and opportunities, empowering women with the knowledge needed to participate more effectively in fisheries. Other variables, such as age, education, annual income, extension participation, and contact with fishery officials, were not significant implies maybe they are influencing the women's participation indirectly. The cumulative variance accounted for by

all variables (14.20%) indicates that other unexamined factors likely contribute to women's participation in fisheries activities. These might include cultural norms, household responsibilities, or community support systems etc., Identifying these hidden factors could offer a more comprehensive understanding of the barriers and enablers for women's involvement in fisheries.

In contrast to participation, none of the independent variables significantly influenced decision-making among women in the fisheries sector. This lack of significance suggests that the factors influencing decision-making may be more complex. The 12.60 per cent variance accounted for by the selected variables implies at the existence of deeper social and cultural factors that were not captured by the current model. It is possible that decision-making in fisheries households is more collective or dictated by traditional gender roles, where women's voices are often mediated through male family members or community leaders. The results are in line with Panda and Sarkar (2020).

CONCLUSION

This study underscores the significant role of fisherwomen in the post-harvest activities of marine fisheries in the Guntur district. The findings reveal that socio-personal factors such as age, mass media participation, and contact with extension agents positively influence women's participation. However, other factors like education, income, and social participation do not significantly impact their involvement. In case of decision-making mass media, social media and contact with fishery agents significantly influence the decision making of fisherwomen in fishery and household related activities. The results suggest that increasing access to information and extension services can enhance women's participation in post-harvest activities. Recognizing and addressing the challenges faced by fisherwomen is essential for promoting gender equity and improving the socio-economic conditions of fishing communities. Further research and policy efforts are needed to support and empower fisherwomen, ensuring their contributions are adequately valued and compensated. The following policy implications are associated with this research outcome:

Women involvement was more in post-harvest activities compared to men. But their extension and organizational participation was found to be low. It is important to create awareness about various extension activities. Extension agents should provide technical

training in sustainable fisheries practices, post-harvest handling, and marketing skills tailored to women's specific needs. Fisherwomen should receive trainings in fisheries-related skills, including financial literacy, and sustainable fishing practices. These programs would help to increase their confidence in making informed decisions related to both fisheries and household management.

The findings of this study raise important questions about the drivers of both participation and decision-making among fisherwomen. While mass media participation has proven to be a positive influence on participation, the lack of significance for other factors points to the need for targeted interventions that enhance women's agency and decision-making power in fisheries. Programs that provide women with access to information, capacity building, and leadership opportunities in fisheries organizations could help bridge this gap.

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Author contribution: Conceptualization, Methodology, Preparing interview schedule, Collecting data, Formal analysis, Writing, original draft, Writing, review & editing.

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