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Socio-Economic Analysis of Different Size Groups of Fish Farmers under PM Matsya Sampada Yojana in Ayodhya division of Uttar Pradesh, India

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ABSTRACT

This study examines the socio-economic characteristics of fish farmers under PM Matsya Sampada Yojana in Ayodhya Division of Uttar Pradesh, focusing on Ayodhya and Ambedkar Nagar two districts. Ninety responders from each district thus total 180 fish farmers were chosen. To study farmers were categorized based on pond size into marginal (0–0.5 ha) and small (0.5–1 ha) groups. It was observed category 40% of farmers have marginal holdings, while the majority (60%) fall into the category. the age composition shows that the majority of respondents (63.33%) were middle-aged (40–60 years) with an average age of 48.80 years, indicating a population that is active and economically productive. Scheduled Castes/ Scheduled Tribes predominate category in the division (44.44%), followed by Other Backward Classes (38.33%), the contribution of fishing to the well-being of socially disadvantaged people. It was also found terms of employment, 40% of farmers work in the private sector in addition to farming, while others rely on agriculture in conjunction with government or other private jobs. A substantial percentage of farmers have completed high school and intermediate education, according to educational analysis, behavers 15.56% of them were illiterate. With an average annual income of ₹6.91 lakh, the income distribution shows that most farmers were in the ₹6–8 lakh income range. While female involvement (34.44%) is gender participation reveals male (65.56%). Overall, the study shows how important fish farming is for raising socio-economic status, revenue and livelihoods in the area.

Keywords Socio economics farm size, Influences income, Livelihood security, Access to resources, Overall economic beneficiaries.

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INTRODUCTION

One of the most active and quickly growing sectors of the global food economy is fisheries and aquaculture, which is essential to maintaining food security, creating jobs in rural areas, and raising household incomes, especially in developing countries. Over the past 20 years, India, the second-largest aquaculture producer after China and the third-largest fish producer in the world, has seen tremendous expansion in this industry. (FAO 2024). In 2023–2024, India produced more over 17 million tons of fish, supporting over 28 million fishermen and fish growers and making up around 1.24% of the country's GDP. Millions of rural residents nationwide depend heavily on the inland fisheries subsector, particularly in landlocked, river-rich states like Uttar Pradesh. (Duarah *et al.* 2020).

The most populous state in India, Uttar Pradesh, has a wealth of freshwater resources, including communal ponds, tanks, rivers, and reservoirs that span around 10 lakh hectares. Aquaculture production increased from 740,000 metric tonnes in 2020–2021 to 940,000 tonnes in 2023, and there are about 1.25 lakh fish farmers in the state, with numbers growing by at least 10,000 per year. Freshwater aquaculture in Uttar Pradesh is still dominated by small and marginal farmers using conventional technology despite this remarkable development trajectory, which limits production and the socioeconomic advancement of fish farming households. (Gautam *et al.* 2020). Over 90% of all inland aquaculture productivity in the state comes from carp culture, which is the foundation of freshwater aquaculture. (Gautam *et al.* 2020).

The Government of India started the Pradhan Mantri Matsya Sampada Yojana (PMMSY) in September 2020 as its most ambitious and comprehensive fisheries development program to date after realizing the potential of the fishing industry and its importance for rural welfare. With a projected expenditure of Rs. 20,050 crores for its implementation in all States and Union Territories between FY 2020–21 and FY 2024–25, the initiative was introduced with the ultimate goal of doubling fishermen's wages and addressing the sector's difficulties. Improving fish output, modernizing the value chain, lowering post-harvest losses, guaranteeing social security for fishermen, and creating new jobs are among PMMSY's main goals. By 2024–2025, specific goals include raising domestic fish consumption from 5 kg to 12 kg per person, increasing fish production to 22 million metric tonnes, increasing aquaculture productivity to 5 tonnes per hectare, and creating 55 lakh direct and indirect job opportunities along the value chain. (Government of India 2020).

For such developmental interventions to be effectively designed, targeted, and evaluated, socioeconomic study of fish farming households is necessary. Numerous scholars have examined the socioeconomic characteristics of fish growers in various Indian states. According to studies conducted in the Amethi district of Uttar Pradesh, the majority of fish farmers are between the ages of 45 and 50, have completed primary to secondary school, and have worked in the fishing industry for 15 to 20 years. The majority of cultured species are Indian major carps and exotic major carps. The socioeconomic traits of fish farmers in connection to farm ownership and production patterns have also been established by research conducted in the Uttar Pradesh districts of Gonda and Basti. (Verma and Singh 2020). Freshwater aquaculture is one of India's fastest-growing industries, according to studies from other states, although it is dominated by tiny and marginal fish farmers using conventional technology, which has little effect on their livelihoods and low production. (Maurya *et al.* 2018).

In aquaculture systems, the size of the farm has a significant impact on both economic results and the adoption of new technologies. Differential access to resources, financing, government subsidies, and extension services can be better understood by classifying fish farmers into small, medium, and large size groups according to pond size or water-spread area. Socioeconomic research is essential before any initiative, training, demonstration, or government development program can be properly created and implemented, according to studies on the economic profiling of inland fish farmers. These size-group-based studies assist policymakers in identifying resource-poor farmers' constraints and creating focused assistance measures that can improve the efficiency and equality of scheme benefit distribution. (Jha *et al.* 2015).

The districts of Ayodhya (Faizabad), Ambedkar Nagar, Amethi, Barabanki, and Sultanpur make up the Ayodhya division of Uttar Pradesh, which is situated in the fertile Gangetic plain and has substantial aquacultural potential. The division is distinguished by a large fishing community, traditional fish farming methods, and a wealth of natural waterbodies. However, it also has structural limitations, such as insufficient awareness of contemporary aquaculture technologies, poor marketing infrastructure, and restricted access to institutional credit. The economic productivity of inland aquaculture systems in Uttar Pradesh is still limited by issues like erratic monsoon conditions, issues with marketing, storage, and transportation, and insufficient research and extension services. (Kumar and Upadhyay 2023).

In light of this, the PMMSY's cluster-based strategy, financial incentives, and infrastructure development provisions present a game-changing policy potential. Since 2020–21, PMMSY has created 44,408 cage units, 20,849 hectares of inland aquaculture pond area, 11,940 Recirculatory Aquaculture Systems (RAS), 3,995 biofloc units, and 788 fish hatcheries nationwide. However, there is still a lack of research, especially at the divisional level in Uttar Pradesh, about the degree to which these advantages have spread to fish farmers of different operating sizes and the differing socioeconomic impact across small, medium, and big farm categories. (Verma and Singh 2020).

The analysis revealed that the annual growth rate of fisheries production was 10.34% in FY 2021–2022, whereas the growth rate of the agricultural sector was only 4.18% in FY 2022–2023. This suggests that farmers are increasingly drawn to the fisheries sector due to its contribution to nutritional food security as well as its potential as a source of income. The distributional results at the farm level—particularly the disparate welfare impacts among size groups—remain understudied in the literature despite this macroeconomic impetus. In order to assess the equity of scheme implementation and determine who gains most from public spending, the majority of previous research have looked at socioeconomic profiles in aggregate without breaking down findings by farm size category (Ministry of Fisheries 2023).

RESULTS AND DISCUSSION

The distribution of fish farmers in the districts of Ayodhya and Ambedkarnagar, Uttar Pradesh, according to pond size categories is shown in the Table 1. A total of 180 farmers—90 from each district—were polled. According to the statistics, 60% (108 farmers) of pond owners belong to the small size category (0.5–1 ha), whilst 40% (72 farmers) are marginal farmers (0–0.5 ha). Compared to 55.56% in Ambedkarnagar, 64.44% of farmers in Ayodhya fall into the small category, indicating a comparatively higher percentage of small pond owners in Ayodhya. On the other hand, Ambedkarnagar has a higher percentage of marginal farmers (44.44%) than Ayodhya (35.56%). In both

Table 1. Distribution of Fish Farmers in Ayodhya Division of Uttar Pradesh.

Size groups of Pond (ha.)	Farmer Distribution		Total
	Ayodhya	Ambedkar-nagar	
Marginal (0-0.5 ha.)	32 (35.56%) 0.42 ha.	40 (44.44%) 0.43 ha.	72 (40%) 0.42 ha
Small (0.5-1 ha)	58 (64.44%) 0.68 ha.	50 (55.56%) 0.65 ha.	108 (60%) 0.67 ha.
Total	90 (100%) 0.59 ha	90 (100%) 0.55 ha	180 (100%) 0.56 ha

Note: Figure in parameters respondents % to total.

Table 2. Age Composition of Fish Farmers in Ayodhya Division of Uttar Pradesh.

Age (in Years)	Size group of Ponds		Total
	Ayodhya	Ambedkarnagar	
Young Age group	17 (18.89%) 33.89 year	24 (26.67%) 34.37 year	41 (22.78%) 34.05 year
Medium Age group (40-60)	61 (67.78%) 50.47 year	53 (58.89%) 51.83 year	114 (63.33%) 51.10 year
Old Age group (60 & Above)	12 (13.33%) 62.42 year	13 (14.44%) 62.53 year	25 (13.89%) 62.48 year
Total	90 (100%) 48.87 year	90 (100%) 48.72 year	180 (100%) 48.80 year

Table 3. Cast Composition of Distribution of Fish Farmers in Ayodhya Division of Uttar Pradesh.

Cast Composition	Size group of Ponds Ayodhya	Ambedkarnagar	Overall
Gen	16 (17.78%)	15 (16.67%)	31 (17.22%)
OBC	40 (44.44%)	29 (32.22%)	69 (38.33%)
Sc/ St	34 (37.78%)	46 (51.11%)	80 (44.44%)
Total	90 (100%)	90 (100%)	180 (100%)

districts, the average pond size of marginal farmers is almost the same (0.42 ha in Ayodhya and 0.43 ha in Ambedkarnagar). The average pond size for small farmers is 0.68 ha in Ayodhya compared to 0.65 ha in Ambedkarnagar. All categories have an average pond size of 0.56 ha, with Ayodhya having a little larger average (0.59 ha) than Ambedkarnagar (0.55 ha).

The age distribution of fish farmers in Uttar Pradesh's Ayodhya Division is seen in the Table 2. There were 180 responders in all, equally distributed between the two districts. According to the results, 63.33% (114 respondents) of pond owners are in the medium age range (40–60 years). This group makes up the majority in both Ambedkarnagar (58.89%) and Ayodhya (67.78%), suggesting that pond ownership is mostly concentrated among experienced and economically engaged people. This group's average age is approximately 51.10 years. the sample as a whole, 41 respondents, or 22.78%, are young pond

Table 4. Occupation of Pond's Owners in Ayodhya and Ambedkarnagar District of Uttar Pradesh.

Occupation	Size group of Ponds Ayodhya	Ambedkarnagar	Overall
Agriculture	24 (26.67%)	35 (38.89%)	59 (32.78%)
Private + Agriculture	40 (44.44%)	32 (35.56%)	72 (40.00%)
Government + Agriculture	26 (28.89%)	23 (25.56%)	49 (27.22%)
Total	90 (100%)	90 (100%)	180 (100)

Table 5. Educational Status of Distribution of Fish Farmers in Ayodhya Division of Uttar Pradesh.

Education	Size group of ponds Ayodhya	Ambedkarnagar	Overall
Illetrate	17 (18.89%)	11 (12.22%)	28 (15.56%)
Primary	15 (16.67%)	14 (15.56%)	29 (16.11%)
High School	23 (25.56%)	26 (28.89%)	49 (27.22%)
Intermediate	18 (20.00%)	26 (28.89%)	44 (24.44%)
Graduation	17 (18.89%)	13 (14.44%)	30 (16.67%)
Total	90 (100%)	90 (100%)	180 (100%)

owners (less than 40 years old). Their percentage is comparatively larger in Ambedkarnagar (26.67%) than in Ayodhya (18.89%), indicating a little higher level of young involvement in pond ownership in Ambedkarnagar. This group's average age is roughly 34.05 years. The smallest percentage of pond owners are those who are older than 60, making only 13.89% (25 responses), with practically identical percentages in both districts. In this category, the average age is almost 62.48 years. The average age of pond owners in both districts is 48.80 years, with no difference between Ambedkarnagar (48.72 years) and Ayodhya (48.87 years). In conclusion, the statistics show that middle-aged people own ponds at a higher rate than younger and older age groups.

The caste composition of fish farmers in Uttar Pradesh's Ayodhya Division is shown in the Table 3. The SC/ST category accounts for the largest percentage of the 180 respondents (44.44%, or 80 respondents), followed by OBC (38.33%, or 69 respondents) and General (17.22%, or 31 respondents). OBC farmers make up the largest group in Ayodhya (44.44%), followed by SC/ST (37.78%) and General category (17.78%). On the other hand, SC/ST farmers make up the majority in Ambedkar Nagar (51.11%), followed by OBC (32.22%) and General category (16.67%). Overall, the findings show that most pond owners in both districts are members of socially disadvantaged groups, especially SC/ST and OBC categories, with a much higher presence of SC/ST farmers in Ambedkarnagar.

Table 6. Income Distribution of Fish Farmers in Ayodhya Division of Uttar Pradesh.

Average Annual Income (Rs. Lakh)	Size group of Farmers Ayodhya	Ambedkarnagar	Overall
1 to 4 Lakh	9 (10.00%) 3.63 Lakh	8 (8.89%) 3.56 Lakh	17 (9.44%) 3.60 Lakh
4 to 6 Lakh	28 (31.11%) 5.54 Lakh	22 (24.44%) 5.64 Lakh	50 (27.78%) 5.67 Lakh
6 to 8 Lakh	30 (33.33%) 7.48 Lakh	32 (35.56%) 7.14 Lakh	62 (34.44%) 7.36 Lakh
Above 8 Lakh	23 (25.56%) 8.88 Lakh	28 (31.11%) 8.89 Lakh	51 (28.33%) 8.89 Lakh
Total	90 (100%) 6.83 Lakh	90 (100%) 7.00 Lakh	180 (100%) 6.91 Lakh

Table 7. Gender-wise of Distribution of Fish Farmers in Ayodhya Division of Uttar Pradesh.

Gender	Size group of Pond Ayodhya	Ambedkarnagar	Overall
Male	56 (62.22%)	62 (68.89%)	118 (65.56%)
Female	34 (37.78%)	28 (31.11%)	62 (34.44%)
Total	90 (100%)	90 (100%)	180 (100%)

The occupation of fish farmers in Uttar Pradesh's Ayodhya Division is depicted in the Table 4. Of the 180 respondents, the majority (40%) work in both private and agricultural capacities, followed by those who rely just on agriculture (32.78%) and those who combine government employment with agriculture (27.22%). In Ayodhya, 44.44% of pond owners work in the private sector in addition to agriculture 28.89% work for the government in addition to agriculture, and 26.67% rely only on agriculture. Comparably, the most common occupation in Ambedkar Nagar is still private work plus agriculture (35.56%), followed by agriculture alone (38.89%) and government service plus agriculture (25.56%).

The educational status of fish farmers in Uttar Pradesh's Ayodhya division is shown in the Table 5. The majority of the 180 respondents (27.22%) had completed high school, followed by those with intermediate education (24.44%). 16.67% of respondents are graduates, compared to 16.11% and 15.56% of those with only an elementary education and illiteracy, respectively. The largest percentage of pond owners in Ayodhya have completed high school (25.56%), followed by intermediate (20.00%), graduation and illiteracy (18.89% each), and primary education (16.67%). High school and intermediate levels are equally prevalent in Ambedkar Nagar (28.89% each), followed by elementary (15.56%), graduation (14.44%), and illiteracy (12.22%). Overall, the results indicate that the majority of pond owners have basic to moderate levels of education, with comparatively fewer respondents having higher levels of education, suggesting that both districts have moderate levels of educational achievement.

The income distribution of fish farmers in Uttar Pradesh's Ayodhya Division is shown in the Table 6. There were 180 responders in all, split equally between the two districts. The findings show that 34.44% (62 respondents) of pond owners are in the income range of ₹6 to 8 lakh. In comparison to Ayodhya (33.33%), this group is marginally more prevalent in Ambedkarnagar (35.56%). In this category, the average salary is almost ₹7.28 lakh. Farmers making more than ₹8 lakh a year, or 28.33% (51 responses), make up the next important category. With an average income of almost ₹8.89 lakh, Ambedkarnagar has a greater percentage of these high-income farmers (31.11%) than Ayodhya (25.56%). 27.78% (50 respondents) of farmers earn between ₹4 and 6 lakh, with a higher percentage in Ayodhya (31.11%) than in Ambedkarnagar (24.44%). This group's average income is approximately ₹5.58 lakh.There are comparatively fewer low-income pond owners in the research area, with only 9.44% (17 respondents) belonging to the lowest income group (₹1 to 4 lakh). This group makes about ₹3.60 lakh on average. The average yearly income of pond owners is expected to be ₹6.92 lakh overall, with Ambedkarnagar having a little higher average income (₹7.00 lakh) than Ayodhya (₹6.83 lakh).

The distribution of pond owners by gender in the Uttar Pradesh districts of Ayodhya and Ambed-

karnagar is shown in the Table 7. Male pond owners make up 65.56% of the 180 respondents, while female pond owners make up 34.44%. This indicates that male participation in pond ownership is clearly dominant. In Ayodhya, 37.78% of pond owners are women and 62.22% are men. In Ambedkar Nagar, the proportion of male respondents is larger (68.89%) than that of female respondents (31.11%). Overall, the results indicate that pond ownership is mostly driven by men in both districts, however a sizable percentage of women are also active, indicating their increasing involvement in such activities.

CONCLUSION

According to the data, 60% of fish farmers in Ayodhya and Ambedkarnagar have PMMSY ponds that are between 0.5 and 1 ha in size. The majority of pond owners are middle-aged (40–60 years old), which suggests that economically productive people are actively involved. SC/ST (44.44%) and OBC (38.33%) communities participate at higher rates, according to social composition. A significant percentage of farmers rely on a combination of agriculture and other work, particularly private jobs alongside farming. With an average yearly income of almost ₹6.92 lakh, the income pattern indicates that the majority of pond owners belong to middle-class to upper-class groups. Small holdings, varied livelihoods, moderate education levels, and a male-dominated but highly engaged female staff are all characteristics of pond ownership.

REFERENCES

Duarah, P., & Mall, A. K. (2020). Diversified fish farming for sustainable livelihood: A case-based study on small and marginal fish farmers in Cachar district of Assam, India. *Aquaculture*, 526, 735397. https://doi.org/10.1016/j.aquaculture.2020.735397

Food and Agriculture Organization. (2024). The state of world fisheries and aquaculture 2024: *Blue Transformation in Action*. FAO. https://doi.org/10.4060/cd0683en

Gautam, R. K., Bhatt, J. P., & Singh, A. K. (2020). Socio-economic status of fish farmers in selected regions of Uttar Pradesh. *International Journal of Fisheries and Aquatic Studies*, 8(2), 112—117.

Government of India. (2020). Operational guidelines: *Pradhan Mantri Matsya Sampada Yojana* (PMMSY). Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying.

Haobijam, J., & Ghosh, S. (2023). Integrated fish farming and its influence on farm livelihoods in Manipur, India. *Aquaculture International*, 31(4), 2011—2034. https://doi.org/10.1007/s10499-023-01067-x

Handbook on Fisheries Statistics. (2023). *Handbook on Fisheries Statistics* 2023. Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India.

Jha, V. K., Pal, A. K., & Kumar, S. (2015). Freshwater aquaculture development and species profile in Uttar Pradesh. *Journal of Indian Fisheries Association*, 42(1), 45—53.

Kumar, A., & Upadhyay, N. (2023). Current pattern of capture and culture fisheries of Azamgarh district, Uttar Pradesh, India. *Uttar Pradesh Journal of Zoology*, 44 (17), 67—79.

Maurya, R., Mishra, A., & Yadav, R. K. (2018). Socio-economic profiles of the fish farmers of district Amethi, Uttar Pradesh, India. *International Journal of Fisheries and Aquatic Studies*, 6 (3), 209—213.

Ministry of Fisheries, Animal Husbandry and Dairying. (2023). *Year end review* 2023: *Department of fisheries*. Press Information Bureau, Government of India.

National Bank for Agriculture and Rural Development. (2023). *Annual Report* 2022—2023. NABARD.

Verma, S., & Singh, R. K. (2020). Socio-economic profile of the fish farmers in the Gonda and Basti districts, Uttar Pradesh. *International Journal of Current Microbiology and Applied Sciences*, 9 (8), 1385—1392. https://doi.org/10.20546/ijcmas.2020.908.159