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# EVALUATING AQUACULTURE TRAINING INTERVENTIONS: A STUDY ON INLAND FISH FARMERS IN CENTRAL TELANGANA, INDIA

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## ABSTRACT

The fisheries sector is globally recognized as a vital "sunrise sector" capable of driving rural employment, securing livelihoods, and ensuring food security. However, transitioning from low-input traditional methods to highly productive, commercially viable aquaculture requires bridging a persistent technology-adoption gap at the field level. This study evaluates the effectiveness of a specialized five days residential capacity building program conducted at Krishi Vigyan Kendra, Mamnoor for 300 inland fish farmers across four strategically selected aquaculture-dense districts in Central Telangana. Using a structured pre- and post-training evaluation framework, changes in technical competencies were statistically analysed alongside subsequent technology adoption behaviours. The empirical data reveals a highly significant 168.45% increase in the overall mean knowledge score post-intervention, highlighting the success of context specific, modular training in flattening historical knowledge deficits. While vulnerable and resource-poor demographics (such as landless and illiterate participants) achieved the highest percentage growth rates, literate and asset-secure farmers maintained the highest absolute technical scores. Field level tracking showed strong behavioural updates with proper feed application emerging as the most widely adopted technology (81.67%) due to its immediate cost-saving impacts. Furthermore, Chi-square analyses confirmed a statistically significant association between formal literacy levels and subsequent technology adoption rates ($p < 0.05$). These findings underscore that targeted, hands-on extension training functions as an essential structural equalizer effectively altering farmer psychology, reducing technological hesitation, and providing a scalable model to build financial resilience within semi-arid inland farming communities.

**KEYWORDS:** Capacity building, Inland aquaculture, Technology adoption, Knowledge gain, Central Telangana.

## INTRODUCTION

The fisheries sector serves as a vital instrument of livelihood for India economically vulnerable populations, securing the sustenance of nearly 28 million individuals (PRS Legislative Research, 2021) and ensuring nutritional security by providing essential fatty acids and proteins to undernourished and tribal communities through targeted government interventions (PIB, 2020). Although global capture fisheries have historically been dominated by marine production (Lynch et al., 2016) issues such as overexploitation, marine pollution, and climatic variability increasingly threaten marine ecosystems (Mmanda, 2026), thereby shifting pressure onto inland systems. As a cornerstone for rural economies, inland fisheries and aquaculture account for over 40 percent of the world reported finfish production (Cooke et al., 2016). However, despite numerous studies highlighting the socioeconomic benefits (Youn et al., 2014) and ecological importance of these inland resources (Lynch et al., 2016), accurate catch records remain scarce (Welcomme et al., 2010). This data deficit persists largely because a significant portion of the harvest directly enters local supply chains for domestic consumption, bypassing formal reporting channels (Welcomme et al., 2010). Driven largely by this robust inland expansion, India has secured the third position globally in total fisheries production and ranks second in aquaculture production.

Due to its extremely diverse and highly dynamic nature the inland fisheries sector is widely recognized as an indispensable source of food and income that benefits several resource-poor rural households (Thilsted, 2014). Despite its immense potential and an abundance of freshwater resources, the inland aquaculture sector frequently operates below its optimum capacity (Sarkar et al., 2015) due to management challenges such as changing fish catch compositions, habitat destruction, and unsustainable field practices (Kaur and Tewari, 2023). Furthermore,

the presence of traditional, low-input farming methods still dominates many rural landscapes which indicates that limited extension contacts and lack of technical knowledge among fish farmers negatively influences the commercial viability of the enterprise either by overfeed or underfeed (Sandeep & Kumar, 2023). Transforming these traditional systems into highly productive, sustainable and commercially viable enterprises requires a distinct shift toward scientifically validated practices, including structured stock management, balanced supplementary feeding, consistent water quality monitoring and effective disease management.

However, the transition from traditional to scientific aquaculture is heavily bottlenecked by limited extension personnel and a widening technology adoption gap. Rural fish farmers often lack access to timely, reliable information networks and formal technical training. Consequently, their awareness regarding modern composite carp culture or integrated farming systems remains limited. This disparity highlights a critical need for structured capacity development. Human resource development through targeted training interventions is not merely an educational necessity; it is a strategic tool to alter farmer psychology, enhance technical knowledge (Swetha et al., 2020; Das et al., 2024) and increase income by reducing fish mortality (Ragasa et al., 2022).

**Statement of the Problem**

An increasing global population alongside reduced agricultural crop productivity often exacerbated by rising pest and disease resistance underscores the importance of aquaculture as an alternate, emerging sector that ensures food and nutritional security. This shift has exerted intense pressure on inland fisheries due to the growing domestic demand for aquatic food. Though government initiatives have successfully expanded the number of operating inland fisheries units, the technical knowledge and practical skills of fish farmers must be consistently upgraded through targeted training. Therefore, the present study aims to evaluate the effectiveness of aquaculture training interventions provided to inland fish farmers in the Central Telangana region of India.

## METHODOLOGY

The present study was conducted in Telangana State, which was recognized as the "Best Inland State" by the National Fisheries Development Board (2024). Within Telangana, four strategically significant districts namely Warangal, Hanmakonda, Jayashankar Bhupalpally, and Mulugu were purposively selected owing to their high aquaculture potential, marked by the presence of perennial irrigation tanks, community ponds and farm dug tanks supporting composite carp-based aquaculture systems. This Agro-climatic suitability facilitates year-round fish production and promotes livelihood diversification within rural communities.

In this regard, a total of 300 inland fish farmers were selected in coordination with the respective District Fisheries Departments and local Farmer Producer Organizations (FPO). A purposive sampling method was employed with the sample size distributed across the four selected districts proportional to the density of active inland fish farming households in each respective region. The selected fish farmers were organized into 10 batches with each batch comprising 30 participants who attended a five days residential training programme. These programmes were conducted at the Krishi Vigyan Kendra, Mamnoor, under the technical guidance of ICAR-ATARI, Zone X and with financial support from the National Fisheries Development Board, Hyderabad. The training curriculum was developed using a need based and competency-oriented approach. It was delivered by blending theoretical concepts with practical hands-on demonstrations, leveraging domain specific expertise from KVK Mamnoor, the Fisheries Research Station at Palair, the Department of Fisheries (Government of Telangana) and the College of Fishery Science at Pebbair.

To evaluate the effectiveness of this training intervention, a structured evaluation framework was utilized. Each participant was administered identical pre and post training questionnaires consisting of 20 close ended items that measured technical knowledge across several dimensions of aquaculture: seed selection, stocking density, feeding protocols, pond preparation, water quality management and fish disease diagnostics. For every correct response, a score of one (1) was assigned, while an incorrect response received a score of zero (0), resulting in a total possible knowledge score range of 0 to 20.

The collected data were statistically analysed using SPSS version 26.0. Percentage knowledge gain was computed to quantify individual and group level improvements. Paired t-tests were executed to determine the statistical significance of the changes in knowledge scores before and after the training intervention. Additionally, Chi-square ($\chi^2$) tests of independence were applied to assess the associations between socio demographic factors (such as age, education and prior farming experience) with the observed knowledge gains and subsequent adoption behaviour. To ensure the reliability, validity, and replicability of the evaluation outcomes, the research design followed validated methodologies established in recent aquaculture extension impact studies (Das et al., 2024; Giri et al., 2024; Mondal et al., 2025; Swetha et al., 2020).

## RESULTS AND DISCUSSION

**Profile Characteristics of Inland fish farmers**

The knowledge scores of the participants before and after the training intervention, categorized by their individual profile characteristics are presented in (Table 1). The empirical data demonstrates that structured capacity-building interventions resulted in a highly significant enhancement in the technical knowledge level of the fish farmers. Across the entire cohort, the participants achieved an average absolute knowledge gain of 8.49 points, which corresponds to a substantial 168.45 percent increase from their initial baseline scores. Among the four studied

districts of Telangana, participants from Warangal recorded the highest post training knowledge score of 8.50, whereas those from Mulugu district achieved the highest relative improvement, logging a 172.91 percent knowledge gain. Age wise analysis revealed that participants between 30 and 60 years of age secured the highest absolute knowledge score of 8.50 while the oldest demographic group (above 60 years) demonstrated the most pronounced relative growth, increasing their knowledge by 180.43 percent post-intervention.

With respect to socio cultural variables, Hindu participants gained the highest absolute score points (8.40), whereas Muslim participants reported the highest relative knowledge gain (170.10%). Similarly, General and Other Backward Caste (OBC) categories led with an absolute score of 8.50, but Scheduled Caste (SC) participants registered the highest relative gain of 172.34 percent compared to their baseline knowledge. When evaluating the socio-economic and institutional dynamics of the participants, distinct variations emerged across marital status, occupation, education, and asset ownership. Married individuals achieved the highest absolute score of 8.40, while widowed participants marked the highest relative progress at 175.27 percent. In terms of primary occupation, business owners and active farmers secured the highest final score points (8.60), whereas agricultural labourers demonstrated the highest percentage improvement (177.78%).

Regarding educational qualifications, participants who completed high school achieved the highest absolute knowledge score of 8.70; however, illiterate participants experienced the most dramatic turnaround, boosting their post-training knowledge by 192.86 percent. Analysis of family structures indicated that individuals from small, nuclear families achieved the highest absolute score of 8.50, while those from large, joint families logged a higher relative gain (171.43%) than their nuclear family counterparts (170.00%). Finally, asset and land ownership heavily influenced the final outcomes. Participants residing in permanent (pucca) houses scored the highest absolute points (8.70), while those living in huts marked the highest percentage growth (186.36%). Similarly, while landowners possessing up to or above 2 acres of land tied for the highest final scores (8.40), landless participants showed the highest overall percentage growth, increasing their baseline knowledge by 186.05 percent. Collectively, these findings underscore that while literate and resource rich farmers maintain higher absolute technical knowledge, the training intervention yielded the maximum relative benefit for the most vulnerable and marginalized segments of the rural community.

The aforementioned findings clearly demonstrated that structured capacity-building interventions are highly effective tools for bridging the technology adoption gap in inland aquaculture. Further, these findings are in agreement with the studies of Swetha et al. (2020), Islam (2024) and Misra et al. (2024), which concluded that short-term institutional training interventions and capacity building initiatives led to a major transition from low to high scientific orientation among fish farmers in Telangana. Similarly, these trends mirror the findings of Argade et al. (2023) regarding the accelerated adoption of improved aquaculture practices in Maharashtra. The variations across the four studied districts can be attributed to differences in baseline extension contact, as corroborated by earlier studies such as Ujjania et al. (2025) ; Mondal et al. (2025). Warangal highest absolute post-training score (8.50) indicates a stronger pre-existing institutional exposure, while Mulugu leading relative knowledge gain (172.91%) showcases the immense potential of targeted interventions in remote underserved clusters where baseline aquaculture exposure is historically low.

A critical finding of this study is the inverse relationship between initial resource endowments and relative knowledge growth. Socio-economically vulnerable segments such as illiterate individuals (192.86%), landless participants (186.05%), those residing in huts (186.36%) and elderly farmers above 60 years (180.43%) consistently registered the highest percentage gains. This trend occurs because resource-poor and marginalized populations often experience a severe deficit in formal extension contact and entry level technical training. On the other hand, established entrepreneurial fish farmers often possess a higher baseline receptivity to technological innovations due to lower risk aversion (Sheheli et al., 2024; Singh et al., 2024). Interestingly, among the asset-owning cohort, participants with small landholdings of up to two acres showed excellent responsiveness to the capacity building intervention. This response aligns closely with the observations of Kiruba-Sankar et al. (2021), who advocated for targeted institutional training support to strengthen small scale and semi-intensive aquaculture systems.

Conversely, the higher absolute scores maintained by high school graduates (8.70), individuals with permanent houses (8.70) and established active farmers (8.60) reflect the role of formal literacy and existing asset bases in supporting learning retention and conceptual understanding. Literate and economically secure farmers possess a greater capability to process technical written materials and absorb scientific complexities, such as disease diagnostics and precise feed-conversion ratios. As established by Das et al. (2024) education and prior farming experience positively correlate with higher baseline scores and absolute knowledge retention.

Furthermore, the higher relative gains observed among Scheduled Caste (SC) communities (172.34%) and large joint families (171.43%) highlight the strategic value of family labour networks and targeted government schemes in rural aquaculture. In joint family ecosystems, the availability of shared family labour lowers the opportunity cost of attending a five-day residential program, allowing for greater participant focus. When combined with targeted support from networks like the National Fisheries Development Board, these interventions shift farmer psychology from low input, subsistence level habits toward scientifically validated, commercial practices. Ultimately, this economic turnaround echoes the global cluster randomized trial evaluations by Ragasa et al. (2022) which proved that upgrading the capacities of vulnerable rural populations drastically reduces fish mortality, enhances production efficiency and fosters long term financial resilience for the household.

**Table 1. Knowledge Score (Mean ± SEM) of the Fish Farmers of Four Districts of Telangana State After Trainings (N = 300).**

| Category | Different Factors | Knowledge Score (Mean+ SEM) | | Average Knowledge Gain | |
|---|---|---|---|---|---|
| Overall 300 | | Pre training (Mean+ SEM) | Post training (Mean+ SEM) | Gain | Percentage |
| | | 5.04 ± 0.13 | 13.53 ± 0.19 | 8.49 | 168.45 |
| Districts | Warangal | 5.10 ± 0.12 | 13.60 ± 0.18 | 8.50 | 166.67 |
| | Hanmakonda | 5.35 ± 0.15 | 13.80 ± 0.20 | 8.45 | 157.94 |
| | Jayashankar Bhupalpally | 4.90 ± 0.10 | 13.20 ± 0.22 | 8.30 | 169.39 |
| | Mulugu | 4.80 ± 0.13 | 13.10 ± 0.21 | 8.30 | 172.91 |
| Age | Up to 30 Years | 4.75 ± 0.14 | 12.80 ± 0.25 | 8.05 | 169.47 |
| | 30–60 Years | 5.20 ± 0.12 | 13.70 ± 0.19 | 8.50 | 163.46 |
| | Above 60 Years | 4.60 ± 0.16 | 12.90 ± 0.23 | 8.30 | 180.43 |
| Religion | Hindu | 5.15 ± 0.10 | 13.55 ± 0.17 | 8.40 | 163.11 |
| | Muslim | 4.85 ± 0.11 | 13.10 ± 0.18 | 8.25 | 170.10 |
| | Christian | 4.90 ± 0.13 | 13.20 ± 0.20 | 8.30 | 169.39 |
| Marital Status | Married | 5.00 ± 0.11 | 13.40 ± 0.19 | 8.40 | 168.00 |
| | Unmarried | 4.85 ± 0.12 | 13.00 ± 0.18 | 8.15 | 167.53 |
| | Widow/Widower | 4.65 ± 0.10 | 12.80 ± 0.17 | 8.15 | 175.27 |
| Occupation | Labour | 4.50 ± 0.14 | 12.50 ± 0.22 | 8.00 | 177.78 |
| | Caste-based Occupation | 4.70 ± 0.13 | 12.90 ± 0.19 | 8.20 | 174.47 |
| | Migrant Labour | 4.60 ± 0.12 | 12.60 ± 0.20 | 8.00 | 173.91 |
| | Business | 5.20 ± 0.15 | 13.80 ± 0.21 | 8.60 | 165.38 |
| | Cultivation | 5.30 ± 0.13 | 13.90 ± 0.19 | 8.60 | 162.26 |
| Caste | General | 5.50 ± 0.14 | 14.00 ± 0.21 | 8.50 | 154.55 |
| | Scheduled Caste | 4.70 ± 0.11 | 12.80 ± 0.18 | 8.10 | 172.34 |
| | Other Backward Caste (OBC) | 5.00 ± 0.12 | 13.50 ± 0.20 | 8.50 | 170.00 |
| Education | Illiterate | 4.20 ± 0.15 | 12.30 ± 0.20 | 8.10 | 192.86 |
| | Can Read Only | 4.50 ± 0.13 | 12.60 ± 0.19 | 8.10 | 180.00 |
| | Can Read & Write | 4.70 ± 0.11 | 12.80 ± 0.17 | 8.10 | 172.34 |
| | Primary School | 4.80 ± 0.12 | 13.00 ± 0.18 | 8.20 | 170.83 |
| | Middle School | 5.10 ± 0.13 | 13.50 ± 0.20 | 8.40 | 164.71 |
| | High School | 5.40 ± 0.14 | 14.10 ± 0.22 | 8.70 | 161.11 |
| | Graduate | 5.80 ± 0.13 | 14.30 ± 0.19 | 8.50 | 146.55 |
| Family Type | Nuclear Family | 5.00 ± 0.12 | 13.50 ± 0.19 | 8.50 | 170.00 |
| | Joint Family | 4.90 ± 0.13 | 13.30 ± 0.20 | 8.40 | 171.43 |
| Family Size | Small (1–3) | 5.10 ± 0.12 | 13.60 ± 0.18 | 8.50 | 166.67 |
| | Medium (4–6) | 5.00 ± 0.13 | 13.40 ± 0.20 | 8.40 | 168.00 |
| | Large (>6) | 4.80 ± 0.14 | 13.00 ± 0.21 | 8.20 | 170.83 |
| House Type | Hut | 4.40 ± 0.12 | 12.60 ± 0.19 | 8.20 | 186.36 |
| | Kutcha | 4.60 ± 0.13 | 12.80 ± 0.18 | 8.20 | 178.26 |
| | Mixed | 5.00 ± 0.12 | 13.40 ± 0.19 | 8.40 | 168.00 |
| | Pucca | 5.30 ± 0.13 | 14.00 ± 0.21 | 8.70 | 164.15 |
| | Mansion | 5.50 ± 0.14 | 14.10 ± 0.22 | 8.60 | 156.36 |
| Landholding | Landless | 4.30 ± 0.14 | 12.30 ± 0.20 | 8.00 | 186.05 |
| | Up to 1 Acre | 4.70 ± 0.13 | 12.80 ± 0.19 | 8.10 | 172.34 |
| | Up to 2 Acres | 5.10 ± 0.12 | 13.50 ± 0.18 | 8.40 | 164.71 |
| | Above 2 Acres | 5.60 ± 0.13 | 14.00 ± 0.21 | 8.40 | 150.00 |

**Knowledge scores of Inland Fish Farmers**

The effectiveness of the training programme across the structured technical modules was analysed and is presented in (Table.2). The highest relative knowledge gains were observed in fundamental technical areas, specifically

pond preparation (226.67%) and pond construction (225.00%), followed by site selection (194.44%), stocking density (194.12%), water quality management (188.89%), supplementary feed management (178.95%) and fish disease diagnostics and management (170.00%) (Figure.1). The mean percentage gain across all specialized training modules was 194.32%, indicating a comprehensive and robust improvement in the participants technical competencies. Furthermore, the consistently low standard errors (±0.07 to ±0.11) observed across both the pre and post training assessments reflect a highly uniform training impact across the diverse socio-economic and demographic groups of the cohort.

The high relative knowledge gains in pond preparation and pond construction reflect the baseline reality that traditional rural fishers typically prepare ponds using conventional methods without scientific procedures. Therefore, when exposed to structured modules detailing the importance of a precise soil water interface, exact slope layouts and scientific pre stocking protocols, fish farmers experience an immediate "knowledge shock" leading to maximum growth. This finding is in line with Ujjania et al. (2025), who reported steep baseline knowledge deficits in foundational pond engineering. Further, rural farmers frequently assume that overstocking fingerlings guarantees higher harvest volumes, an unscientific practice that instead leads to intense resource competition, stunted growth and mass mortality.

As highlighted by Sandeep and Kumar (2023), extension training interventions succeed primarily by correcting these traditional overstocking habits. Because scientific training provides a necessary operational framework for managing critical parameters such as dissolved oxygen levels, pH fluctuations and plankton blooms aquaculture practiced without institutional guidance remains highly vulnerable to sudden crop crashes. This observation is in agreement with the study of Misra et al. (2024), which revealed the vital importance of the feed conversion ratio in transforming subsistence operations into commercially viable enterprises.

Considering the complexity of health management, providing hand on diagnostic demonstrations in fish disease diagnostics and management significantly improves the technical skills of the farmers, directly reducing fish mortality rates, protecting financial investments, and building long term household resilience (Ragasa et al., 2022). Ultimately, these results demonstrate that a structured curriculum effectively flattens initial disparities, aligning closely with previous findings that emphasize the strategic role of modular, hands-on extension training in enhancing technical capacities and accelerating the field level adoption of scientific aquaculture protocols (Misra et al., 2024; Mondal et al., 2025; Swetha et al., 2020).

**Table 2. Fish Farmers Knowledge Scores at Pre and Post Training Programme (N = 300)**

| S. No. | Parameters | Mean Knowledge Score | Mean Knowledge Gain | Standard Error of Mean Knowledge Scores | | Percentage Knowledge Gain | SEM (±) |
|---|---|---|---|---|---|---|---|
| | | Pre-training | Post-training | Before trainings | After trainings | | |
| 1. | Site Selection | 0.90 | 2.65 | ±0.08 | ±0.10 | 1.75 | 194.44% |
| 2. | Pond Construction | 0.80 | 2.60 | ±0.09 | ±0.11 | 1.80 | 225.00% |
| 3. | Pond Preparation | 0.75 | 2.45 | ±0.07 | ±0.09 | 1.70 | 226.67% |
| 4. | Stocking Density | 0.85 | 2.50 | ±0.08 | ±0.10 | 1.65 | 194.12% |
| 5. | Water Quality | 0.90 | 2.60 | ±0.06 | ±0.09 | 1.70 | 188.89% |
| 6 | Feed Management | 0.95 | 2.65 | ±0.07 | ±0.08 | 1.70 | 178.95% |
| 7 | Disease Management | 1.00 | 2.70 | ±0.08 | ±0.09 | 1.70 | 170.00% |
| Overall Average | | 0.88 | 2.59 | ±0.075 | ±0.094 | 1.71 | 194.32% |

Note: All knowledge gains are statistically significant at $p < 0.01$ (paired t-test).




**Figure 1. Knowledge Scores of Fish Farmers at Pre and Post Training Programmes**

**Adoption of scientific aquaculture technologies**

The adoption of scientific aquaculture technologies by participants following the training intervention is presented in (Table3). The empirical data reveals that proper feed application achieved the highest adoption rate (81.67%), followed closely by pond manuring (80.33%), on farm feed preparation (77.50%), lime and zeolite application (76.00%) and regular water quality analysis (72.00%). Furthermore, substantial adoption levels were observed in disease diagnosis and preventive treatment (71.33%) the responsible use of aquatic chemicals (68.67%) and cast net operations for crop monitoring (66.33%) (Figure.2). Value addition of fish-based products recorded the lowest adoption rate at 64.17%. Crucially, the Chi-square test of independence revealed statistically significant associations between the educational levels of the participants and their subsequent technology adoption behaviours ($p < 0.05$).

The high adoption rates for proper feed application, pond manuring, and on farm feed preparation demonstrate that farmers respond rapidly to innovations offering immediate economic returns. Because commercial feed accounts for up to 70% of operational costs, traditional farmers face severe financial strain. Learning to formulate balanced diets from low cost, local raw materials and implementing regulated feeding schedules provides immediate financial relief. Similarly, regular pond manuring boosts natural plankton growth, minimizing reliance on commercial inputs. This aligns with Misra et al. (2024), who observed that small scale fishers prioritize feeding innovations because they directly lower daily production costs.

Conversely, the moderate adoption rates for water quality analysis (72.00%) and disease management (71.33%) highlight operational barriers such as high upfront costs and poor local availability of specialized inputs. As noted by Sheheli et al. (2024), adopting advanced water testing and biosecurity measures is frequently delayed by limited access to digital tools and test kits in rural landscapes. Similarly, the lower adoption rate for fish-based value addition (64.17%) reflects institutional and market bottlenecks. Processing raw fish into pickles or cutlets requires specialized equipment, cold chains and urban market linkages.Without this infrastructure, smallholders prefer selling raw fish directly at the farm gate to avoid post-harvest risks, supporting the arguments of Ujjania et al. (2025) that post-harvest value addition lags behind production technologies unless backed by market linkages.

Finally, the statistically significant association between education levels and technology adoption ($p < 0.05$) highlights the critical role of literacy in modern aquaculture. Literate farmers process technical extension manuals more easily, exhibit lower risk aversion and readily implement precision techniques like calculated chemical dosing or zeolite applications. This finding strongly validates the work of Argade et al. (2023) and Das et al. (2024) both of whom established that formal education reduces technological hesitation and accelerates the shift from traditional subsistence methods to commercial aquaculture systems.

**Table 3. Fish Farmers Adoption of Scientific Aquaculture Technologies Post Training**

| Category | Adoption Level | |
|---|---|---|
| | Frequency | Percentage |
| Pond Manuring | 482 | 80.33% |
| Feed Preparation at Farm | 465 | 77.50% |

| | | |
|---|---|---|
| Proper Feed Application | 490 | 81.67% |
| Water Quality Analysis (pH/DO Testing) | 432 | 72.00% |
| Lime and Zeolite Application | 456 | 76.00% |
| Disease Diagnosis and Preventive Treatment | 428 | 71.33% |
| Responsible Use of Aquatic Chemicals | 412 | 68.67% |
| Cast Net Operation | 398 | 66.33% |

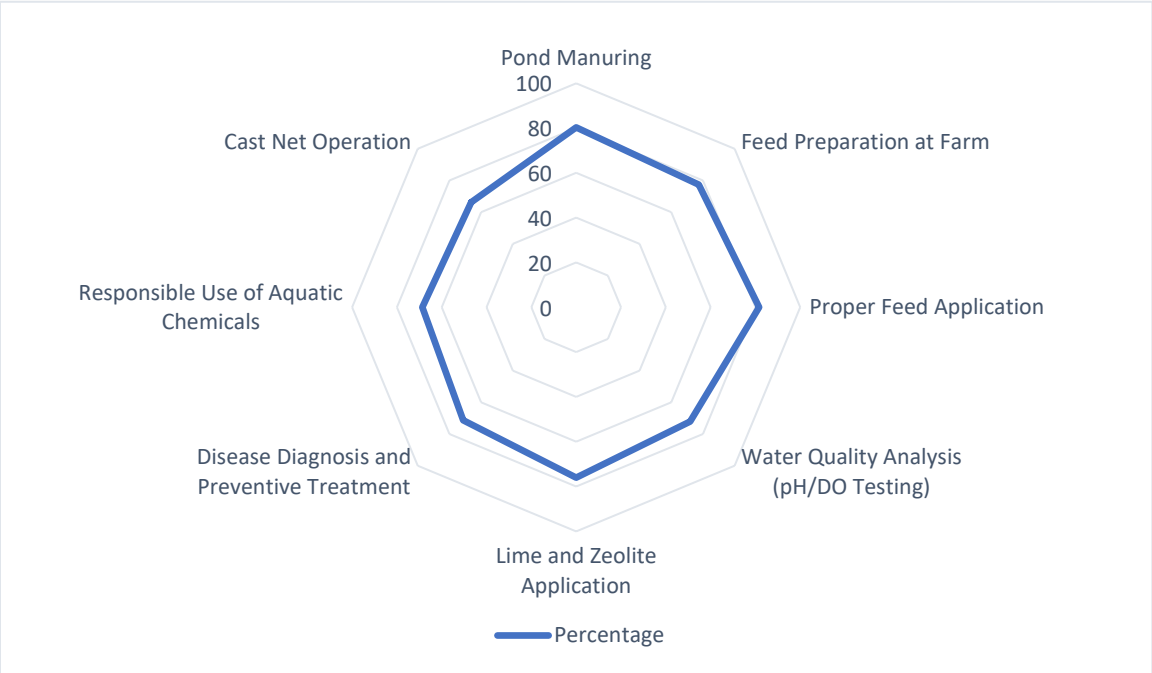



**Figure 2. Fish Farmers Adoption of Scientific Aquaculture Technologies Post Training**

## CONCLUSION

Though government initiatives have successfully expanded the infrastructure of the inland aquaculture sector, maximizing field level productivity depends entirely on the continuous capacity building of fish farmers. This study confirms that structured, participatory training interventions significantly enhance technical knowledge and drive the field adoption of scientific practices among inland fish farmers in Central Telangana, effectively working as a structural level across diverse socio-demographic backgrounds. Furthermore, the statistically significant association established between educational attainment and technology adoption underscores that formal literacy remains a critical catalyst for accelerating the transition from traditional, subsistence level methods to commercial aquaculture systems. Ultimately, decentralizing extension networks, prioritizing low-cost input training, and integrating literacy inclusive visual aids will significantly enhance technical knowledge and drive the sustained field adoption of scientific practices.

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