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### Identifying and addressing extension service delivery gaps: A study on fish farmers of Andhra Pradesh, India

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#### Abstract

India, with its diverse landscapes and abundant water resources, has witnessed a remarkable growth in the aquaculture sector over the years. Fish farming, a significant contributor to the country's economy, plays a pivotal role in providing livelihoods, ensuring food security, and supporting rural development. However, the effective delivery of services to fish farmers faces challenges, and addressing these service delivery gaps is of paramount importance for the sustainable growth of the sector. The present study was conducted in two coastal districts of Andhra Pradesh to examine the problems faced by fish farmers in accessing extension services from Village Fisheries Assistants (VFAs). The study employed a descriptive research design and utilized a purposive sampling method. Data was collected through semi-structured interviews with 210 fish farmers from six villages spread across the two selected districts. The findings of the Henry Garrett ranking analysis highlighted that the limited fisheries expertise of VFAs, their inability to provide immediate solutions, and inconsistent interactions with the fish farming community were the key challenges faced by farmers. The study specifically showcases a substantial gap in the specialized training of VFAs, which limits their capacity to effectively address the issues faced by farmers. The need for systematic policy reforms in recruitment processes and skill training for VFAs is evident in light of these challenges. In order to bridge the expertise gap, it is crucial to design training programs that integrate theoretical knowledge with practical field experience. These findings have broader implications for transforming the extension delivery services of State Department of Fisheries and other related agencies and fostering the socio-economic development of fish farming communities.

**Keywords:** Fish farmers, extension services, village fisheries assistants (VFAs), Andhra Pradesh, fisheries expertise

#### Introduction

Fisheries sector in India play a significant role in the Indian economy and provide livelihood to millions of fisher folk. More than 20 million fishermen in India and fish farmers depend on the fisheries industry for their livelihoods. India is the 3<sup>rd</sup> largest fish producing and 2<sup>nd</sup> largest aquaculture producing nation in the world.

Consequently, the fisheries sector has emerged as a foundation of economic growth in India and is aptly recognized as the "sunrise sector" (Department of Fisheries, 2023) [6]. Beyond its role in job creation, this sector has substantial export potential, which strengthens the country's economy by providing nutrition, income, and livelihoods to millions of individuals (Singh *et al.* 2023) [28]. India's Blue Revolution has led to the growth of both inland and marine fisheries, leading to a significant increase in fish production. Over the years, India's fish production has grown from a mere 0.75 million metric tons in 1950–51 to a current output of 16.25 million metric tons, contributing a significant 7.96 percent to the world's fish production. In the fiscal year 2022–23 alone, India's estimated fish production reached a staggering 16.25 million metric tons, with inland fisheries contributing 12.12 million metric tons and marine fisheries

contributing 4.13 million metric tons.

This significant progress has propelled India to the third position on the global production leader board. In the state of Andhra Pradesh, fisheries play a crucial role in the livelihood of its populace, with over one million fishermen directly involved in fish production and related activities (CMFRI, 2018) [19]. Andhra Pradesh is the leading state in India for fish production, followed closely by West Bengal. This state alone contributes 42.19 lakh metric tons to inland fish production and 5.94 lakh metric tons to marine fish production (Handbook on Fisheries Statistics, 2022). Fish, hailed as an excellent source of high-quality protein, offers a multitude of health benefits and remains affordable, often being referred to as "poor man's food" (Phogat *et al.*, 2022) [25]. The increasing fish production aims to meet the nutritional needs of a growing population, thereby reducing the pressure on the agriculture sector and promoting sustainable development (Chandana *et al.*, 2022) [5]. However, fish farmers face numerous challenges, including production-related issues, disease outbreaks, post-harvest losses and difficulties in accessing credit, adverse impacts of climate change, environmental degradation, obstacles to value addition and diversification, and the integration of

modern technologies in fish farming practices (Singh *et al.*, 2023) [28]. Timely access to the accurate, reliable and appropriate information is crucial for improving the productivity and production efficiency in agriculture and allied sector (Ansari and Shweta, 2014) [2]. Effective extension services, which encompass the dissemination of information to farmers and their stakeholders, play a crucial role in addressing the challenges encountered by farmers (Joshi, 2022) [12].

In response to overcoming these challenges, the Government of Andhra Pradesh introduced Village Fisheries Assistants (VFAs) in the year 2021, who are responsible for providing extension services to fish farmers, with one VFA assigned to each village. Despite these efforts, the actual conditions on the ground indicate that farmers still encounter obstacles in accessing these extension services, and their socio-economic well-being and economic prosperity are at stake due to the deficiency in service delivery. The present investigation was undertaken to identify and address these challenges faced by fish farmers in accessing extension services from VFAs to ultimately enhance the livelihoods of those dependent on this crucial sector.

**Methodology**

A descriptive research design was adopted for the study with the aim of identifying the problems encountered by fish farmers in receiving extension services. Two districts - Eluru and West Godavari districts of Andhra Pradesh, India, renowned for their high fish production, were selected purposively, based on their highest contribution to the fisheries sector in the state. Further, three blocks from each district, i.e., Kalidindi, Mandavalli, and Kailkaluru from Eluru district, and Bhimavaram, Narsapuram, and Undi from West Godawari district, were selected using the purposive sampling method (i.e., criteria of highest fish production). Ensuring the selection of one prominent fish farming village per block, a sample of 210 fish farmers was selected for the research, with 35 individuals deliberately chosen (Following convenience sampling) from each of the six villages. The sample size was determined based on the need to obtain a comprehensive and diverse range of insights while also ensuring that the data collection process remains manageable and unbiased. The respondents were

selected based on their active engagement and expertise in the field of fish farming, aiming to gather a wide range of viewpoints on extension services. Data were collected through personal interviews using a semi-structured interview schedule allowing the respondents flexibility to openly share their perspectives and experiences. The schedule was developed with the help of a pilot survey, expert consultations, and a comprehensive review of relevant literature. The central aspect of the data analysis involved using the Henry Garrett ranking technique, which is a highly effective approach for quantifying and prioritizing issues based on their perceived severity. Participants were asked to rank ten identified issues, and these rankings were then converted into scores using the Garrett ranking technique (Garrett, 1981) [9].

$$\text{Percent position} = 100 (R_{ij} - 0.5) / N_j$$

Where  $R_{ij}$  = rank assigned to the  $i$ th variable by the  $j$ th respondents;  $N_j$  = number of variables ranked by the  $j$ th respondents.

To assign scores to each problem, Garrett's Table was used, using the predicted percentage position as a basis. The scores assigned to each respondent were combined for each problem. Subsequently, the sum of these scores and the mean values were computed. The problems with the highest mean value were identified as the most significant within the context of the study. The use of this approach enabled a systematic evaluation of the issues, effectively highlighting the key areas that require attention in fisheries extension services.

**Results**

An attempt was made to identify the problems faced by fish farmers in receiving extension services from VFAs that impact their operations and overall success. Fish farmers face several complex problems from VFAs, including communication gaps, shallow understanding of the subject matter, and the inability to provide immediate solutions, which worsen the problems for both VFAs and fish farmers. Table 1 presents the results of the frequency distribution of farmers' ranks assigned to each of the identified problems. Respondents were asked to rank these problems from most important (1s rank) to least important (10<sup>th</sup> rank).

**Table 1:** Frequency distribution of farmers based on ranks administered towards each constraint.

S. No.	Problems	Rank given by the fishery farmers									
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>
1	Poor communication ability	9	15	32	132	8	2	0	0	1	1
2	Inability to give instant solution	25	83	64	19	5	0	2	2	0	0
3	Cannot build rapport with farmers	10	2	14	5	159	2	0	3	4	1
4	Lack of managerial skills	8	0	2	4	0	29	41	78	0	7
5	Shallow knowledge on subject matter	111	55	28	1	1	1	1	1	0	1
6	Frequent contact with resources rich farmers	19	24	12	8	4	16	48	51	13	5
7	Ignoring farmers opinion	15	9	23	18	0	2	15	3	20	55
8	Irregular visit by VFAs	13	29	91	42	25	0	0	0	0	0
9	Poor behavior of VFAs	21	9	0	12	7	0	21	12	74	0
10	Services provided by VFAs seems sometimes ineffective	8	19	0	7	0	1	25	0	79	24

**Table 2:** Percent position and Garrett table values for ranks assigned.

S. No.	Rank	Percent position		Garrett values from table
1	Rank 1	100 (1-0.5)/10	5	82
2	Rank 2	100 (2-0.5)/10	15	70
3	Rank 3	100 (3-0.5)/10	25	63
4	Rank 4	100 (4-0.5)/10	35	58
5	Rank 5	100 (5-0.5)/10	45	52
6	Rank 6	100 (6-0.5)/10	55	48
7	Rank 7	100 (7-0.5)/10	65	42
8	Rank 8	100 (8-0.5)/10	75	37
9	Rank 9	100 (9-0.5)/10	85	30
10	Rank 10	100 (10-0.5)/10	95	18

In addition, the percentile positions were calculated, and Garrett values for each percentile position were obtained from the Garrett table. The estimated percentage position

and Garrett values of problems in each category are presented in Table 2. The percentage positions indicate the relative ranking of a problem compared to others in the list.

**Table 3:** Ranking of problems based on fish farmer responses.

S. No.	Problems	Mean score	Rank
1	Poor communication ability	60.10	4
2	Inability to give instant solution	67.06	2
3	Cannot build rapport with farmers	53.73	5
4	Lack of managerial skills	42.25	9
5	Shallow knowledge on subject matter	74.86	1
6	Frequent contact with resources rich farmers	49.09	6
7	Ignoring farmers opinion	42.38	8
8	Irregular visit by VFAs	62.83	3
9	Poor behavior of VFAs	38.60	10
10	Services provided by VFAs seems sometimes ineffective	44.60	7

The key findings related to the problems encountered by farmers in the context of VFAs are presented in Table 3. The most notable finding that ranked first is "shallow knowledge on the subject matter," with a mean score of 74.86, indicating a need for improvement in understanding the subject matter about fish farming practices. The second-ranked problem is "inability to give instant solutions," with a mean score of 67.06, which indicates a lacking in the ability of VFAs to provide immediate responses. The third ranked problem is "irregular visits by VFAs," with a mean score of 53.73, which signals a potential area for improvement in terms of consistent and timely engagement with farmers. The fourth and fifth ranks were "poor communication ability" (mean score: 60.10) and "cannot build rapport with farmers" (mean score: 53.73), respectively. This emphasizes the crucial role of effective communication and relationship-building skills for VFAs. "Frequent contact with resource-rich farmers" is the sixth rank with a mean score of 49.09, indicating a bias in the involvement of VFAs with specific farmers. The seventh-ranked issue was "services provided by VFAs sometimes seem ineffective," with a mean score of 44.60, indicating a need to improve the effectiveness of the services provided. "Ignoring farmers' opinions" ranked eighth with a mean score of 42.38, highlighting the importance of VFAs by facilitating active farmer participation in extension programs. The ninth and tenth ranks were "lack of managerial skills" (mean score: 42.25) and "poor behavior of VFAs" (mean score: 38.60), respectively, pointing the need for skill development and professional conduct among VFAs.

## Discussion

The primary constraint identified by fish farmers in accessing extension services from VFAs was shallow knowledge of the subject matter. Many VFAs lack formal education in fisheries, which is a critical factor contributing to this issue. This educational gap significantly impacts understanding of key aspects of fish farming, including essential technologies, skills, and practices. The lack of specialized education among VFAs highlights the need for systemic changes in the recruitment and training processes within the extension services system. Fisheries require knowledge of technologies and skills to enhance fish farming, site selection, seed production, fish diseases and their remedies, harvesting, post-harvest procedures, and marketing as well. The field experience is also essential for addressing the issues faced by farmers (Kumaran *et al.*, 2012) <sup>[15]</sup>. The study conducted by Manikanta (2023), focused on information sources, suggested that there is a crucial need to promote frequent interactions between researchers and extension personnel, this collaborative strategy can help bridge the gap in the knowledge of extension personnel regarding subjects, innovations, and best practices.

Table 3 shows that the second constraint identified was the inability of VFAs to give instant solutions. This was due to a lack of technical knowledge among some VFAs and the limited access of VFAs to advanced technologies, which hinders their ability to stay updated and offer comprehensive and immediate support. Developing a strong support system with access to the latest research and technology could significantly improve their problem-solving abilities (Antwi-Agyei and Stringer, 2021) <sup>[3]</sup>. The

third most important constraint identified was irregular visits by VFAs, suggesting a potential shortage of staff in government departments and the need for expanding their jurisdiction to cover more areas. Lack of commitment to work and irresponsible behavior may also contribute to irregular visits by fish farmers. Many extension agents are unable to visit the farmers due to reasons such as implementing government schemes, additional office work, and recording tasks (Agricultural Extension in South Asia (AESAs) Network, 2019). To address this, a systemic review and potential restructuring of the extension services framework are required to ensure consistent and effective engagement with fish farmers. The fourth constraint faced by the farmers was the poor communication ability of the VFAs, as effective communication skills are crucial for open dialogue, allowing farmers to express concerns and enabling VFAs to tailor advice to specific needs. Often, VFAs use technical jargon that farmers find challenging to understand. Therefore, it is essential to use clear and simple language to convey technical knowledge to farmers and promote mutual understanding. A study conducted in Ethiopia by (Petros *et al.* 2017) [24] found that the major issue faced by farmers was the inability of extension agents to sustain long conversations with them. Enhancing communication training for extension agents can improve interaction with farmers, leading to better delivery of extension services (Apata *et al.*, 2018, Antwi-Agyei and Stringer, 2021) [4, 3]. The fifth limitation, as indicated in Table 3, was the VFAs' inability to build rapport with farmers, suggests that VFAs were unable to connect with farmers on a personal level, preventing farmers from feeling that the agents genuinely cared about their circumstances and that interacting with them would help solve their specific problems. The reason for this could be that the VFAs are not well-versed in the local context, particularly in terms of cultural and social dynamics that are crucial for building rapport. Establishing personal contact (Farm and home visits) rather than relying on mass contact methods helps to build a better rapport with farmers (Pandey *et al.*, 2014 and Maulu *et al.*, 2021) [23, 17]. The sixth problem faced by the farmers was that VFAs had frequent contact with resource-rich farmers. This suggests that the selection of farmers by extension agents may be biased, as those with ample resources are more likely to adopt and invest in new technologies. Extension personals need to adopt a balanced approach, which is supported by a study conducted by the FAO (2008) [7], that revealed extension resources are mainly focused on commercial farmers and less supportive for small and marginal farmers.

Table 3 clearly shows that the services provided by VFAs are sometimes ineffective and was ranked seventh among all the problems, which shows the possibility that farmers are not satisfied with the services because they may not align with the requirements, skills, or knowledge useful for fish farmers. Services being provided should be tailored to the local context, taking into account the climate, soil, and cultural practices of the region (Niangti, 2020) [21]. In a study conducted by (Mwamakimbula, 2014) [20] stated that farmers expressed dissatisfaction due to the underutilization of participatory extension methods for delivering extension services. Insufficient governmental support also decreases the effectiveness of extension service delivery. Budget and

timeline for extension service delivery are critical factors that impact the overall outcome. Ignoring farmers' opinions was ranked eighth among all the problems. During the interviews, the researcher observed that farmers relied on their own experiences to learn and adapt their farming practices based on local history and conditions, which suggests that the opinion of farmers must be taken into consideration by the extension agents. The information must not only flow from extension agents to farmers but also back and forth because the information received by farmers through extension services is compared with the information and traditional knowledge held by farmers. The information shared through extension services can only be effectively utilized by farmers when it aligns with their own experiences and understanding (Vanclay, 2004) [29]. Effective managerial skills are essential for the successful delivery of extension services. The ninth-ranked constraint, lack of managerial skills on the part of VFAs, indicates that without proper management, they may encounter difficulties in implementing programs, monitoring progress, and adjusting strategies in response to feedback and evaluation. The findings of the study align with those of Mwamakimbula (2014) [20], who highlighted that inadequate coordination and implementation results in ineffective extension services. The tenth-ranked constraint was identified as poor behaviour by VFAs. It illustrates that farmers may feel disrespected and discriminated due to factors such as ethnicity or socioeconomic status. Inappropriate behaviour by VFAs towards farmers may break trust, making farmers hesitate to approach extension agents. It is essential for extension services to prioritize training and professional development for agents to enhance their interpersonal communication skills and knowledge of social, psychological, and culturally sensitive aspects. In a study conducted by (Khan *et al.* 2019) [14], stated that the friendly behaviour of the extension agent persuaded and motivated farmers to access and utilize extension services.

## Conclusion

The study reveals a substantial lack of expertise among village fisheries assistants (VFAs) in Andhra Pradesh, primarily because many of them don't have specialized education in fisheries. This gap has led to considerable challenges in providing effective extension services to fish farmers, including difficulties in disseminating knowledge, solving problems, and communicating. The research emphasizes the need for systemic changes in the training and recruitment of village fisheries assistants (VFAs), advocating for a curriculum that integrates theoretical knowledge with practical skills. The implications of these findings extend beyond the immediate context, suggesting that similar interventions could be beneficial in other regions facing similar challenges. Ultimately, this study emphasizes the importance of having a well-educated and trained group of VFAs as a foundation for the development of the fisheries sector. It highlights the influence of VFAs on the socio-economic development of fish farming communities.

Finally, the identification and subsequent addressing of extension service delivery gaps are pivotal steps toward the sustainable development of fisheries sector. Moreover, community-based approaches emerge as powerful tools in



addressing service delivery gaps. By involving local communities in the design and implementation of extension programs, these initiatives become more tailored, contextually relevant, and likely to gain acceptance. Empowering local stakeholders fosters a sense of ownership and ensures the sustainability of extension services beyond external interventions.

In practical terms, the findings suggest a need for a holistic approach that combines technological innovations, institutional reforms, and community-based engagement. Policymakers, researchers, and practitioners must collaborate to design and implement interventions that account for the unique challenges faced by different communities and adapt to evolving socio-economic contexts. As agriculture and fisheries continue to play critical roles in global food security and economic stability, addressing extension service delivery gaps becomes not just a necessity but a responsibility. The success of extension services lies in their ability to adapt, innovate, and prioritize inclusivity, thereby fostering a resilient and sustainable foundation for the future of these vital sectors. In this endeavor, ongoing evaluation, feedback mechanisms, and a commitment to continuous improvement will be essential to ensure the relevance and impact of extension services on the ground.

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