



Challenges and Opportunities in Private Extension Services for Shrimp Aquaculture in Andhra Pradesh, India

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Authors' contributions

This work was carried out in collaboration among all authors. Author AD contributed for design and execution of the study. Author ADR contributed for survey, guiding and reviewing the manuscript. Authors SK and OS reviewed the work and manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Shrimp farming has emerged as a significant economic activity in Andhra Pradesh, India, driven by the region's favorable coastal geography and climatic conditions. This study investigates the role of private sector involvement in enhancing extension services for shrimp farmers in the state. Data

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were collected from 400 farmers across four major shrimp-cultivating districts through structured interviews. Findings revealed a positive farmer perception of private sector extension services and their availability across twelve key areas. However, fourteen constraints limiting the utilization of these services were identified. The study further underscores the dominant position of private companies in controlling shrimp farming inputs and services. Involving the private sector is crucial for the successful delivery of extension services that promote aquaculture development. These results provide insights into the potential and challenges of private sector-led extension in the shrimp aquaculture sector of Andhra Pradesh.

Keywords: Aquaculture; private extension services; shrimp farmers; Andhra Pradesh.

1. INTRODUCTION

Shrimp aquaculture has become a pivotal sector in Andhra Pradesh, significantly contributing to the state's economy through employment generation and export earnings. The industry's growth is facilitated by a favourable coastal environment, skilled labour force, and increasing global demand for shrimp produce. However, the rapid expansion of shrimp farming has also brought forth several challenges, particularly in terms of disease management, environmental sustainability, and compliance with international quality standards. *Litopenaeus vannamei* is the primary cultivated shrimp species in the Western Hemisphere, constituting over 90% of its aquaculture output. India, possessing an expansive coastline and ample brackish water bodies for cultivation and occupies the second-largest position in global shrimp production. Among Indian states, Andhra Pradesh holds the leading role due to its extensive coastal region and substantial brackish water resources. In the year, 2020, in spite of COVID-19, Andhra Pradesh which is called as "Aquaculture Hub of India" continued its leading position in shrimp production with 6,34,672MT and with a productivity of 8.82 MT/Ha/Yr [1].

Private extension services have emerged as a crucial component in addressing these challenges, providing farmers with essential knowledge, skills, and technologies to enhance productivity and sustainability. Unlike public extension services, which often face constraints such as limited resources and bureaucratic inefficiencies. Private extension services can offer more specialized and timely support tailored to the needs of shrimp farmers. Despite their potential, private extension services in Andhra Pradesh's shrimp aquaculture sector encounter various obstacles. These include issues related to accessibility, affordability, and trust among farmers, as well as coordination with public extension systems. Additionally, there are

concerns about the quality and consistency of the services provided, given the fragmented nature of the private sector.

Shrimp culture requires high investments, updated technology and continuous supply of various inputs like feed, quality seed and farm machinery. Shrimp farmers were depending on other sources like progressive farmers, friends, relatives, extension workers, mass media, middlemen and banks to meet their requirements [2]. Private Extension Services are motivating the farmers towards sustainable aquaculture. This study aims to explore the challenges and opportunities associated with private extension services in Andhra Pradesh's shrimp aquaculture. In relation to this the study was conducted to find out the availability of the private extension services to the shrimp farmers and the constraints faced by the shrimp farmers in utilizing the private extension services in Andhra Pradesh. The findings are expected to inform policy recommendations and practical interventions to support the sustainable development of shrimp aquaculture in the region. Through a mixed-methods approach, combining qualitative interviews with quantitative surveys, this study provides a comprehensive understanding of the dynamics at play in private extension services for shrimp farming in Andhra Pradesh.

2. MATERIALS AND METHODS

This study focused on the four primary shrimp-producing districts of Andhra Pradesh: viz., SPSR Nellore, West Godavari, Krishna and Guntur. A total of 400 shrimp farmers were randomly selected from these districts based on their shrimp production levels covering small to large area. Data was collected through face-to-face interviews between November 2021 and May 2022. The research used an *ex-post facto* design and analyzed the gathered data using percentages and averages. Data were collected from the selected respondents with the help of

pre-tested structured personal interview schedule. The statistical analysis conducted for the study included percentage analysis and mean using the SPSS software package.

3. RESULTS AND DISCUSSION

3.1 Available Extension Services for Shrimp Farmers

The data in Fig. 1 depicts the extension services for shrimp farming available in the state of Andhra Pradesh. Respondents were given a choice of highly available, available or not available for each of the 12 items pertaining to the availability of extension services for shrimp farming (Fig. 1).

Among all the above mentioned 12 different extension services soil, water and health management can be done on reliable time, solving the user's problems in time, providing timely market information, providing information on shrimp seed availability, providing timely information on weather reports and timely availability of inputs and services were found to be highly available extension services. This positive result indicated that private extension services are timely providing possible solutions and are meeting the demands to the farmers to eliminate the risk. The results are supported by previous studies [3,4,5].

According to [3], shrimp farmers primarily rely on private extension services, such as those offered by feed companies and independent consultants. This preference is due to their convenient access, regular farm visits, and ability to provide necessary inputs and services. In contrast, public

extension services are often limited by insufficient staff and administrative responsibilities, hindering their capacity to offer frequent technical advice to farmers.

3.2 Constraints Faced by the Shrimp Farmers in Utilizing Private Extension Services

Analysis of constraints in fishery extension services: This analysis examines the significant constraints impacting fishery extension services, particularly focusing on private extension services (Table 1). The data highlights the frequency of each challenge its percentage relative to the total responses, and its rank in terms of severity or prevalence. The high cost of innovations emerges as the most critical constraint, affecting 85.50% of respondents. This underscores the financial barriers that limit the adoption of new technologies and practices, essential for modernizing shrimp and improving productivity. The absence of government regulation on private extension services is the second most significant constraint, identified by 82.00% of participants. This lack of oversight can lead to inconsistencies in service quality and accountability, undermining the effectiveness of extension programs. Wrong guidance by input dealers is reported by 71.00% of respondents, ranking third. Misinformation from input suppliers can lead to suboptimal farming practices, resulting in economic losses and reduced shrimp productivity. Lack of financial assistance is a major barrier for 62.25% of respondents. Financial constraints hinder farmers' ability to invest in necessary inputs, technologies, and innovations, which are crucial for sustainable shrimp development.

Table 1. Constraints faced by the shrimp farmers in utilizing private extension services

Sl. No.	Constraints	n	Percentage	Rank
1.	High cost of innovations	342	85.50	I
2.	Lack of government regulation on Private Extension Services	328	82.00	II
3.	Wrong guidance by input dealers	284	71.00	III
4.	Lack of financial assistance	249	62.25	IV
5.	Purchasing barrier for farm inputs	224	56.00	V
6.	Poor research and extension linkage	216	54.00	VI
7.	Displacement of small and marginal farmers	206	51.50	VII
8.	Focusing on Progressive farmers	163	40.75	VIII
9.	Marketing is their utmost priority	138	34.50	IX
10.	Non-coverage of the rural or remote areas.	130	32.50	X
11.	Substandard / inferior technology due to lack of any regulation	112	28.00	XI
12.	Non-credibility of private Extension personnel	109	27.25	XII
13.	Lack of transport facilities to participate in extension Activities.	84	21.00	XIII
14.	Lack of co-operation among neighbor's	82	20.50	XIV

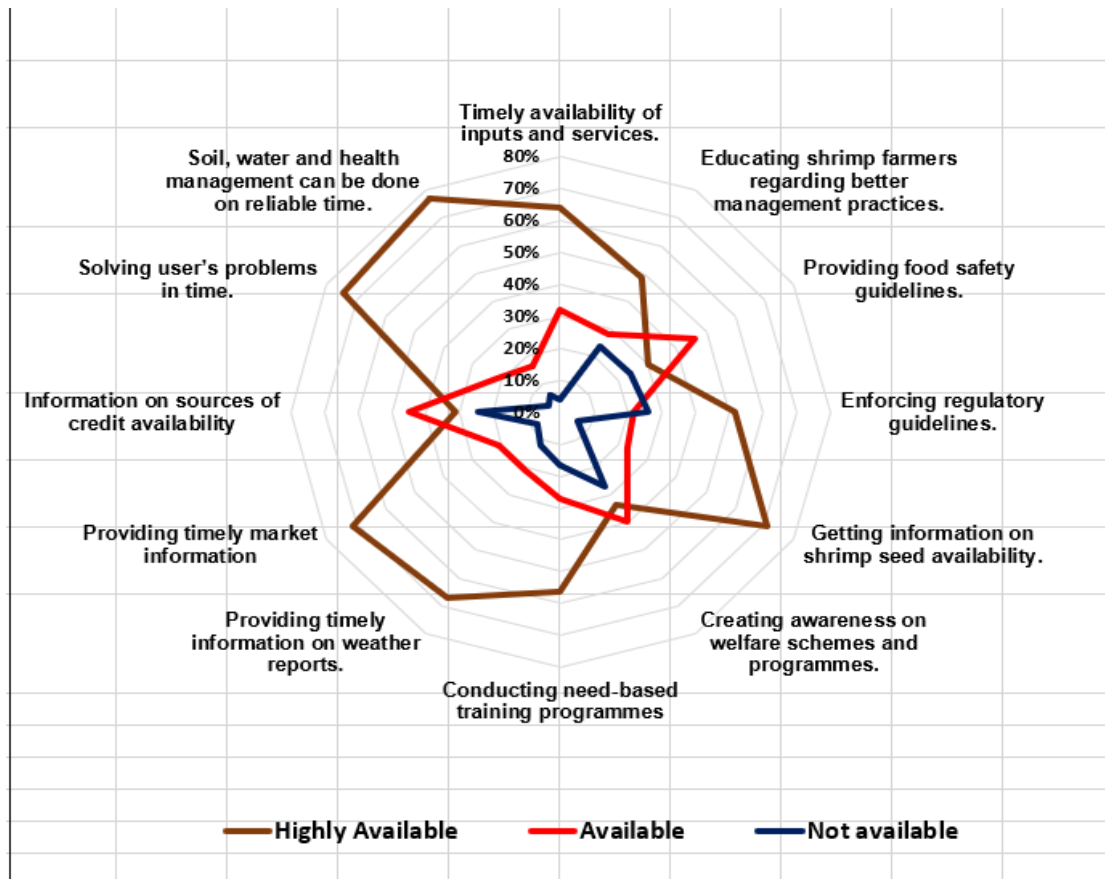


Fig. 1. Available private extension services

Purchasing barriers for farm inputs, noted by 56.00% of participants, further exacerbate the financial difficulties faced by farmers. This constraint affects their capacity to acquire essential resources needed for effective farming operations. Poor research and extension linkage, identified by 54.00% of respondents, highlights the gap between research institutions and field-level extension services. Bridging this gap is essential for transferring knowledge and innovations to farmers effectively. The displacement of small and marginal farmers is a significant concern for 51.50% of respondents. This issue points to the vulnerabilities faced by these farmers in the face of changing agricultural practices and market dynamics. The focus on progressive farmers, noted by 40.75% of participants, indicates a bias in extension services towards more advanced farmers, potentially neglecting those who are less developed but equally in need of support.

The emphasis on marketing as the utmost priority for 34.50% of respondents reflects the challenges in ensuring that farmers receive adequate extension support while also navigating

market demands. Non-coverage of rural or remote areas, affecting 32.50% of respondents, underscores the geographical disparities in the availability of extension services, leaving many farmers without essential support. The prevalence of substandard or inferior technology, reported by 28.00% of participants, points to the consequences of insufficient regulation, leading to the dissemination of ineffective or outdated agricultural technologies.

Non-credibility of private extension personnel, affecting 27.25% of respondents, raises concerns about the trustworthiness and reliability of private extension agents, which can undermine their effectiveness. The lack of transport facilities, noted by 21.00% of respondents, highlights logistical challenges that restrict farmers' ability to engage in extension activities, thereby limiting their access to vital knowledge and support. Finally, the lack of cooperation among neighbours, reported by 20.50% of respondents, indicates social barriers that can impede collective action and the sharing of knowledge and resources among farmers.

Lack of transportation facilities to participate in extension activities was indicated by 21 per cent of respondents, while 20.50 per cent of respondents had reported that there was little cooperation from neighbours. All reported similar findings in their studies [6,7,8].

The analysis reveals a complex array of constraints affecting the effectiveness of agricultural extension services, particularly within the private sector. Addressing these challenges requires a multifaceted approach involving financial support, regulatory frameworks, improved research-extension linkages, and enhanced accessibility to services across all regions.

Ahmed et al. [6] identified several constraints faced by farmers, including inequitable access to extension services, inadequate performance of local extension agents, ineffective technology dissemination, and a bias towards resource-rich farmers. Kavyashree [9] further emphasized the challenges posed by insufficient local infrastructure for input-intensive technologies and exploitative practices among input dealers. Kushawaha [10] highlighted the weak linkage between research and extension, the prevalence of exploitative middlemen, and a disproportionate focus on large-scale farmers. The lack of government regulation of private extension services was a significant constraint for 60.47% of shrimp farmers [11]. The primary constraint reported by 75.86% of farmers was the marketing-oriented focus of private extension services, while 24.71% expressed concerns regarding the credibility of private extension personnel [12,13].

4. CONCLUSION

Effective extension services are important for providing technical advice and for supply of necessary inputs to the shrimp farmers. The present available private extension services are farmer participatory and are oriented towards the needs of the farmers. This indicates that the farmers in general have realized the advantages of interventions made by the personnel of private extension services in shrimp culture especially in seed production and supply of inputs.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image

generators have been used during writing or editing of manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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