

From Field Visits to Mobile Apps: Evolving Extension Approaches in Fishery Advisory Systems

Maitarambum Wartung Monsang^{1*}, Suari Debbarma², Sahid Ahmad Tampakmayum¹
and Reihana Tampakmayum¹

¹Department of Fisheries Extension, Economics and Statistics, College of Fisheries, Lembucherra, Central Agricultural University, Imphal, India

²Department of Fisheries Resource Management, College of Fisheries, Lembucherra, Central Agricultural University, Imphal, India

*Corresponding author

Email address: atungmonsang@gmail.com

How to cite this article:

Monsang, M. W., Debbarma, S., Tampakmayum, S. A., & Tampakmayum, R. (2026). From Field Visits to Mobile Apps: Evolving Extension Approaches in Fishery Advisory Systems., 1(2), 1-10.

Abstract

Fishery advisory systems play a vital role in improving productivity, sustainability and livelihoods in the fisheries sector by enabling fishers to access timely and relevant information. Traditionally, fisheries extension has relied on field visits, demonstrations and training programmes to disseminate scientific knowledge. While effective in building trust and facilitating adoption, these approaches often face limitations related to reach, cost and timeliness. In recent years, participatory extension models and digital technologies such as mobile phones, apps and online platforms have transformed the way advisory services are delivered. This article traces the evolution of fishery extension from conventional field-based approaches to ICT-enabled advisory systems, highlighting emerging tools, changing roles of extension professionals, key challenges and future directions. The article emphasizes the need for integrated, inclusive and adaptive advisory systems to support sustainable and resilient fisheries.

Keywords: Fishery extension, ICTs, mobile advisory, participatory extension, digital fisheries

Introduction

Fisheries constitute an important pillar of India's food system and rural economy, supporting livelihoods, nutrition and income for millions of small-scale fishers and fish farmers (Jadhav, 2017). The performance of fisheries enterprises is closely linked to access to reliable information on production practices, fish health management, water quality, weather variability and market trends. Fishery Advisory Systems (FAS) serve as a crucial interface between research institutions and fishing communities by facilitating informed decision-making at the grassroots level (Kundu, & Santhanam, 2025).

Traditionally, fisheries advisory services were delivered through direct extension methods such as field visits, group meetings, demonstrations and training programmes organized by fisheries departments, Krishi Vigyan Kendras (KVKs) and research institutions (Geetha et al., 2024; Bhat et al., 2023; Singh et al., 2016). These approaches have been effective in fostering interpersonal relationships and encouraging technology adoption. However, their effectiveness has often been constrained by limited manpower, high operational costs and delays in information dissemination, particularly in remote and geographically dispersed regions (Verma et al., 2025).

In the fisheries sector, information gaps often translate directly into economic losses and ecological risks. Delayed advisories on disease outbreaks, water quality deterioration or adverse weather events can severely affect production outcomes, especially for small-scale fishers operating with limited safety nets (Hossain et al., 2025). Extension services, therefore, are not merely support mechanisms but function as risk-mitigation tools that enhance resilience at the farm and community levels. As fisheries systems become more market-oriented and climate-sensitive, the demand for timely, location-specific and actionable information has increased substantially (Amjath-Babu et al., 2025; Bhat et al., 2024).

At the same time, changes in communication patterns, widespread mobile phone penetration and increasing digital awareness among rural populations have created new opportunities for transforming advisory delivery (Singh et al., 2023). The challenge before fisheries extension today is not only to adopt new tools, but to ensure that these tools are embedded within inclusive and responsive extension frameworks. Understanding how extension approaches have evolved and how they can be strengthened further—is essential for designing future-ready fishery advisory systems (Bhat et al., 2024).

With the increasing complexity of fisheries systems and changing socio-economic conditions, extension approaches have gradually shifted towards participatory and pluralistic models involving multiple stakeholders (Bhat et al., 2024). More recently, advances in information and communication technologies (ICTs) have further transformed fisheries extension by enabling faster, wider and more cost-effective dissemination of advisories (Zahedi & Zahedi, 2012). Digital platforms such as mobile apps, SMS alerts and online portals now complement conventional extension methods, offering new opportunities to strengthen advisory services (Klerkx, 2021). Against this background, the present article examines the evolution of extension approaches in fishery advisory systems and explores pathways for building inclusive and resilient advisory services.

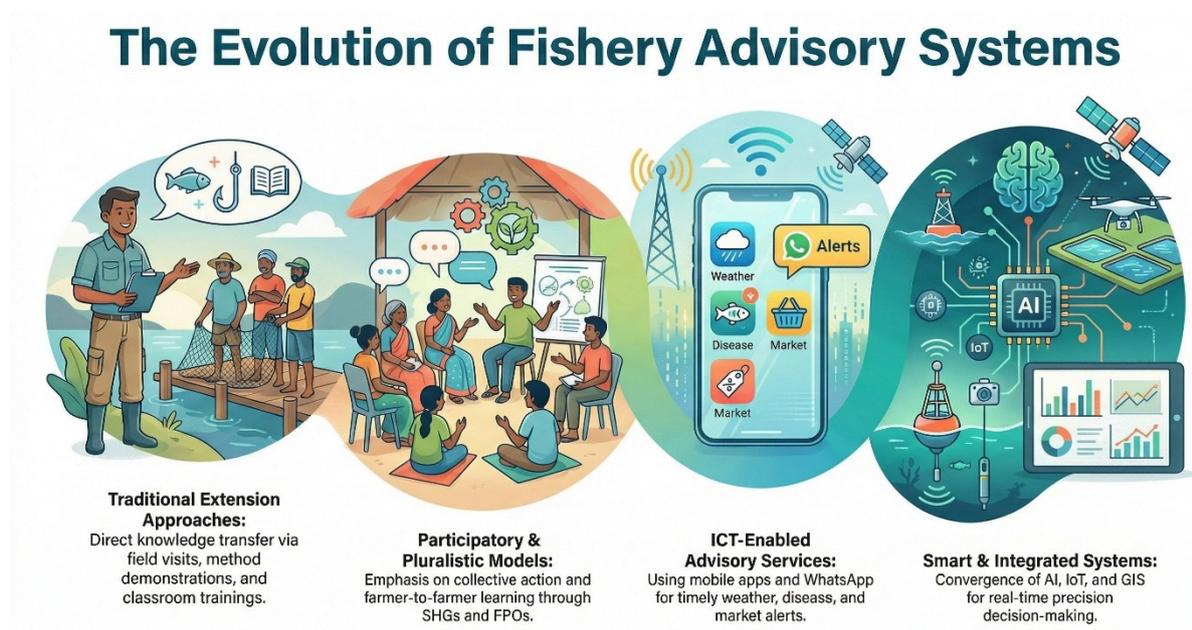


Fig. 1 Evolution of Fishery Advisory Systems from Traditional to Smart and Integrated Models

Traditional Extension Approaches in Fisheries

Conventional fisheries extension has historically focused on transferring scientific knowledge from research institutions to fishers through field-based interactions. Common approaches include personal visits, method demonstrations, group meetings and structured training programmes aimed at enhancing awareness, skills and adoption of improved practices (Singh et al., 2016).

In India, these activities are largely implemented by state fisheries departments, KVKs, fisheries colleges and national research institutes. Fisheries departments play a frontline role in outreach and programme implementation, while KVKs function as important intermediaries

by conducting on-farm demonstrations, farmer–scientist interactions and capacity-building activities. Research institutions support these efforts by generating location-specific technologies and advisories (Varshney et al., 2022).

A key strength of traditional extension lies in its personal and interactive nature. Direct engagement enables extension personnel to understand local conditions, build trust and encourage behavioural change. Hands-on demonstrations further support learning by allowing fishers to observe and practice recommended techniques under real field conditions (Bhat et al., 2024).

Despite these strengths, conventional approaches face several limitations. Limited manpower, logistical challenges and high costs restrict outreach, particularly in remote areas. Moreover, delays in organizing visits and trainings often reduce the effectiveness of advisories related to disease outbreaks, weather events and market fluctuations. Recent studies also point to uneven coverage and limited intensity of engagement across regions (Bhat et al., 2023). These constraints highlight the need for complementary approaches to enhance the effectiveness of fisheries advisory systems (Kundu, & Santhanam, 2025).

Shift Towards Participatory and Pluralistic Extension

To overcome the limitations of top-down extension models, fisheries advisory systems have increasingly adopted participatory and pluralistic approaches. These models emphasize active involvement of fishers and other stakeholders in knowledge generation, dissemination and application, recognizing fishers as partners rather than passive recipients (Bhat et al., 2024).

A wide range of actors now contribute to fisheries extension, including Self-Help Groups (SHGs), cooperatives, Farmer Producer Organizations (FPOs/FPCs), NGOs and private sector entities. Such pluralistic arrangements enhance outreach, mobilize communities and improve access to inputs, services and markets (Saha et al., 2025).

Farmer-to-farmer extension and peer learning are important components of participatory models. Progressive fishers often act as local resource persons, sharing experiential knowledge and innovations. These mechanisms foster trust, reduce information asymmetry and accelerate adoption. Participatory approaches also strengthen institutional linkages and promote collective problem-solving, making advisory services more responsive and locally relevant (Sah et al., 2021).

From Field Visits to Mobile Apps: New Extension Tools

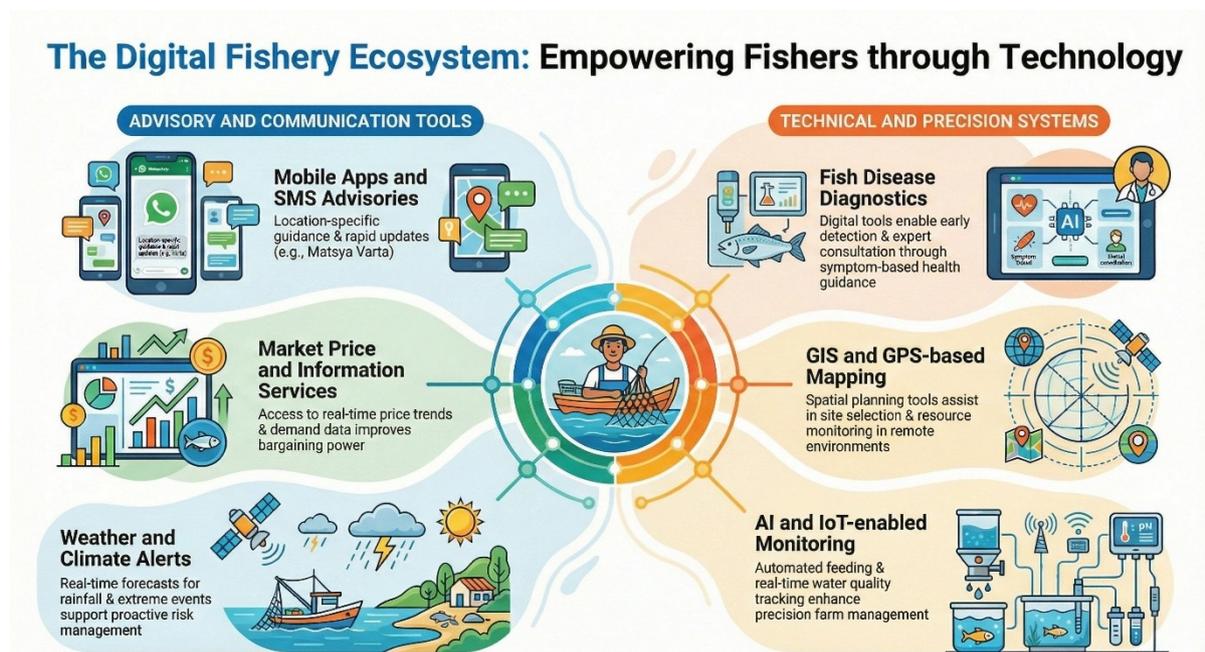


Fig. 2 Digital Extension Tools Supporting Fishery Advisory Services

Digital technologies are increasingly reshaping fisheries extension by complementing traditional field-based methods (Bhat et al., 2024). Mobile phones and internet-based platforms enable rapid, wide and cost-effective dissemination of advisories to fishers and fish farmers (Lahiri et al., 2020).

Mobile apps and SMS-based services are among the most widely used digital tools. SMS alerts provide timely updates on weather, disease outbreaks and management practices, while mobile apps offer interactive features such as decision-support tools, videos and localized recommendations (Jensen, & Thysen, 2003). Government-led initiatives such as Matsya Varta illustrate how digital platforms can improve access to advisories, scheme information and technical guidance (Lahiri, 2020; Debnath et al., 2022).

Informal digital platforms, including WhatsApp groups managed by extension agencies or fisher communities, facilitate rapid information exchange, peer learning and collective problem-solving. These tools have proven particularly valuable during emergencies when timely information is critical (Nain et al., 2019).

Advanced technologies such as GIS, GPS, Artificial Intelligence (AI) and the Internet of Things (IoT) are also finding applications in fisheries. GIS and GPS support spatial planning and resource mapping, while AI and IoT enable real-time monitoring of water quality, disease

risks and farm performance. Together, these tools enhance precision, responsiveness and data-driven decision-making in fisheries management (Idoko et al., 2025; Miller et al., 2025).

Role of Extension Professionals in the Digital Era

The integration of digital tools has significantly altered the role of extension professionals. Rather than acting solely as information transmitters, extension workers increasingly function as facilitators, coordinators and knowledge brokers who help fishers' access, interpret and apply information from multiple sources (Klerkx, 2021; Kundu & Santhanam, 2025).

Digital transformation has created new skill requirements for extension personnel, including digital communication, content curation and data interpretation. Capacity building and continuous training are therefore essential to ensure effective use of digital tools (Geetha et al., 2024; Bhat et al., 2024).

Despite technological advances, human interaction remains central to effective extension. Trust, motivation and behavioural change are still shaped through personal relationships. Digital tools are most effective when they complement face-to-face engagement rather than replace it (Sekhar, 2007; Klerkx, 2021).

Challenges in Adopting Digital Extension

Several challenges limit the effectiveness of digital fisheries extension. The digital divide remains a major constraint, with unequal access to smartphones, internet connectivity and electricity in many fishing communities (Hossain et al., 2025; Kundu & Santhanam, 2025).

Low digital literacy further restricts adoption, particularly among small-scale and elderly fishers. Language barriers and trust issues also affect usage, as many digital advisories are not available in local dialects and may lack validation from trusted sources (Debnath et al., 2022; Singh et al., 2016).

In addition, fisheries are highly location-specific, and generic advisories often fail to address local needs. Region-specific, need-based and participatory content development is therefore critical for sustained adoption of digital tools (Amjath-Babu et al., 2025; Prajapati et al., 2025).

Way Forward: Strengthening Fishery Advisory Systems

The way forward lies in integrating traditional and digital extension approaches. Field-based methods remain essential for trust building and contextual understanding, while digital tools

enhance reach and timeliness. KVKs and local institutions can play a pivotal role by acting as trusted intermediaries and facilitating digital capacity building (Bhat et al., 2023; Geetha et al., 2024).

Inclusive, fisher-centric advisory systems must address diversity in literacy, language and access to technology. Strong policy support and stakeholder collaboration are needed to promote innovation, public–private partnerships and sustainable advisory frameworks (Saha et al., 2025; Singh et al., 2023).

Conclusion: Towards Smarter Fishery Advisory Services

Fishery advisory systems have evolved from field-based interactions to increasingly digital and participatory models. While digital tools offer significant opportunities, their success depends on effective integration with human-centered extension processes. By combining traditional strengths with modern technologies, fisheries extension can contribute to sustainable, resilient and future-ready fisheries that support livelihoods while conserving aquatic resources.

References

- Amjath-Babu, T. S., Hossain, P. R., Anee, S. A., Mohammed, E. Y., & Krupnik, T. J. (2025). Hard and soft climate-smart investments in aquaculture in Bangladesh: Conditioning factors and decision space. *Climate Services*, 37, 100527. <https://doi.org/10.1016/j.cliser.2024.100527>
- Bhat, N. M., Shanmugam, A. P., Ponnusamy, K., Murai, A. S., Argade, S. D., Qureshi, N. W., & Seenivasan, P. (2023). Measuring KVK-led fisheries extension efforts in Haryana and Punjab: Insights and interventions. *Indian Journal of Extension Education*, 59(4), 13-18. <https://doi.org/10.48165/IJEE.2023.59403>
- Bhat, U. A., Verma, H. L., Malik, R., Sofi, N. A., Rather, M., Qayoom, I., & Peerzada, Z. A. (2024). Innovative extension approaches for development of fisheries and allied sectors: A comprehensive review. *International Journal of Agriculture Extension and Social Development*, 7(6S), 16–26. <https://doi.org/10.33545/26180723.2024.v7.i6Sa.682>
- Debnath, R., Ghosh, A., Lahiri, B., Singh, Y. J., Pal, P., Upadhyay, A. D., & Baidya, S. (2022). Advisories on fish farming in Tripura for coping with COVID-19: An outlook. *Fishery Technology*, 59(4), 303–310. <https://doi.org/10.56093/ft.v59i4.120511>

- Geetha, M., Ananthan, P. S., Bhaskaran, A., Argade, S. D., & Bhat, N. M. (2024). Proficiency enhancement of KVK-scientists: Illustrating the capacity development needs in Andhra Pradesh and Tamil Nadu. *Journal of Indian Fisheries Association*, 51(1). <https://doi.org/10.56093/jifa.v51i1.162581>
- Hossain, M. K., Anwar, M., Oliver, G., Frings-Hessami, V., Kanij, T., Alam, R., ... & Humayra, U. (2025). Small-scale fishing community's information needs and access in Bangladesh: An information ecosystem perspective. *Journal of the Association for Information Science and Technology*, 76(12), 1701-1718. <https://doi.org/10.1002/asi.70022>
- Idoko, F. A., Idoko, D. O., & Idoko, F. O. (2025). Exploring the role of IoT, AI, and remote sensing in precision aquaculture: Monitoring, automation, and data-driven decision-making. *Magna Scientia Advanced Biology and Pharmacy*, 14(2), 018–033. <https://doi.org/10.30574/msabp.2025.14.2.0018>
- Jadhav, A. (2017). Undefined small-scale fisheries in India: challenging simplifications and highlighting diversity and value. In *Social wellbeing and the values of small-scale fisheries* (pp. 147-173). Cham: Springer International Publishing.
- Jensen, A. L., & Thysen, I. (2003). Agricultural information and decision support by SMS. In Proceedings of the EFITA 2003 Conference, Debrecen, Hungary. EFITA.
- Klerkx, L. (2021). Digital and virtual spaces as sites of extension and advisory services research: social media, gaming, and digitally integrated and augmented advice. *The Journal of Agricultural Education and Extension*, 27(3), 277-286. <https://doi.org/10.1080/1389224X.2021.1934998>
- Kundu, S. K., & Santhanam, H. (2025). Emergence of Marine Fishery Advisory services and their impact on achieving sustainable fisheries in India: a review. *Explora: Environment and Resource*, 2(4), 025280054. <https://doi.org/10.36922/EER025280054>
- Lahiri, B. (2020). Matsya Varta: An innovation towards advisory services to fish farmers of Tripura, India during COVID-19. *APAARI Newsletter*, 29(1), 13–14. Asia-Pacific Association of Agricultural Research Institutions.

- Lahiri, B., Anurag, T. S., Marak, B. R., Sangma, A. K., & Sangma, S. M. (2020). Development of mobile based fishery advisory prototype: An experience with fisher tribes of Garo Hills in North-Eastern Himalayan region of India. *Indian Journal of Fisheries*, 67(3), 10-17. [10.21077/ijf.2020.67.3.88288-02](https://doi.org/10.21077/ijf.2020.67.3.88288-02)
- Miller, T., Durlík, I., Kostecka, E., Kozłowska, P., Łobodzińska, A., Sokołowska, S., & Nowy, A. (2025). Integrating artificial intelligence agents with the Internet of Things for enhanced environmental monitoring: Applications in water quality and climate data. *Electronics*, 14(4), 696. <https://doi.org/10.3390/electronics14040696>
- Nain, M. S., Singh, R., & Mishra, J. R. (2019). Social networking of innovative farmers through WhatsApp messenger for learning exchange: A study of content sharing. *The Indian Journal of Agricultural Sciences*, 89(3), 556–558. [10.56093/ijas.v89i3.87605](https://doi.org/10.56093/ijas.v89i3.87605)
- Prajapati, C. S., Priya, N. K., Bishnoi, S., Vishwakarma, S. K., Buvanewari, K., Shastri, S., Tripathi, S. & Jadhav, A. (2025). The role of participatory approaches in modern agricultural extension: bridging knowledge gaps for sustainable farming practices. *Journal of Experimental Agriculture International*, 47(2), 204-222. <https://doi.org/10.9734/jeai/2025/v47i23281>
- Sah, U., Singh, S. K., & Pal, J. K. (2021). Farmer-To-Farmer Extension (F2FE) approach for speedier dissemination of agricultural technologies: A review. *The Indian Journal of Agricultural Sciences*, 91(10), 1419-1425. [10.56093/ijas.v91i10.117403](https://doi.org/10.56093/ijas.v91i10.117403)
- Saha, P., Prusty, A. K., & Nanda, C. (2025). An overview of pluralism in agricultural extension and advisory services. *International Research Journal of Multidisciplinary Scope*, 6(1), 131-138. [10.47857/irjms.2025.v06i01.02074](https://doi.org/10.47857/irjms.2025.v06i01.02074)
- Sekhar, N. U. (2007). Social capital and fisheries management: the case of Chilika Lake in India. *Environmental management*, 39(4), 497-505. [10.1007/s00267-006-0183-0](https://doi.org/10.1007/s00267-006-0183-0)
- Singh, Y. J., Ojha, S. N., Pandey, D. K., Upadhyay, A. D., Ananthan, P. S., Bharati, H., & Mehta, R. K. (2016). Extent of Linkage among Scientists, Extension Personnel and Fish Farmers in Tripura, India. *Indian Research Journal of Extension Education*, 16(2), 55-59.
- Singh, R., Slotznick, W., & Stein, D. (2023). Digital tools for rural agriculture extension: Impacts of mobile-based advisories on agricultural practices in Southern India. *Journal*

of the Agricultural and Applied Economics Association, 2(1), 4-19.

<https://doi.org/10.1002/jaa2.42>Digital Object Identifier (DOI)

Zahedi, S. R., & Zahedi, S. M. (2012). Role of information and communication technologies in modern agriculture. *International Journal of Agriculture and Crop Sciences*, 4(23), 1725–1728.

