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Digital Platforms for Fish Farmer Advisory Services

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Digital platforms are transforming fisheries extension by improving access to technical knowledge, farm-level information and advisory services. In aquaculture, timely advice is essential for maintaining water quality, optimizing feed utilization, preventing disease outbreaks and improving production efficiency. Mobile applications, web portals, short message services and social media facilitate the dissemination of information on pond management, fish health, weather conditions and market trends. The integration of artificial intelligence (AI), the Internet of Things (IoT) and data-driven systems further enable real-time monitoring and farm-specific recommendations. In India, digital initiatives such as the National Fisheries Digital Platform under the Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana are expanding access to fisheries-related services, training and institutional support (Lahiri et al., 2025). However, internet connectivity, digital literacy, language barriers and information reliability remain important challenges. Integrating digital platforms with conventional extension services can strengthen decision-making and promote sustainable aquaculture development.

Role of digital platforms in fisheries extension and advisory services

Digital platforms strengthen fisheries extension by connecting fish farmers with scientific information, technical experts and advisory services. They facilitate the dissemination of guidance on pond preparation, water quality management, feeding, seed selection, disease prevention and farm biosecurity. Mobile applications, SMS alerts, web portals and social media also provide weather forecasts, market prices, government scheme information and early warnings about environmental risks (Haese et al., 2024). Interactive communication tools enable farmers to consult fisheries specialists and receive recommendations suited to their farming systems and local conditions. These services support informed decision-making, improve farm management and encourage the adoption of better aquaculture practices. However, their effectiveness depends on information reliability, digital literacy, language accessibility and internet connectivity. Therefore, digital platforms should complement field-based extension services to ensure inclusive and sustainable fisheries development.

Types of digital platforms for fish farmer advisory services

Mobile applications and SMS-based services

Mobile applications and short message service (SMS)-based systems provide fish farmers with accessible information on pond management, water quality, feeding practices, fish health and disease prevention. These services can deliver timely advisories, weather alerts and information on government schemes directly to farmers' mobile phones. Mobile applications may also include farm record management, diagnostic support and recommendations for improving aquaculture productivity. SMS-based advisories are particularly useful in areas with limited internet connectivity because they can deliver essential information without requiring smartphones or continuous internet access. However, their effectiveness depends on message accuracy, local-language availability and farmers' ability to understand and implement the recommendations.

Web portals and online advisory systems

Web portals and online advisory systems provide centralized access to scientific publications, technical guidelines, training materials and fisheries-related government services. They enable fish farmers to obtain information on species-specific culture practices, seed production, feed management, water quality standards, disease control and sustainable aquaculture. These platforms may also provide weather forecasts, market information and details of financial assistance or government schemes. Online advisory systems can connect farmers with fisheries experts and extension personnel for technical consultation. Their major limitations include internet accessibility, digital literacy and the need for regularly updated, scientifically validated information (Marr et al., 2026).

Social media and messaging platforms

Social media and messaging platforms, including WhatsApp, YouTube and Facebook, facilitate rapid communication between fish farmers, researchers, extension officers and aquaculture experts. WhatsApp groups can support the exchange of farm-level information, photographs of fish health problems and practical management advice. YouTube videos and other educational content can demonstrate pond preparation, feeding methods, water quality management, seed stocking and disease-prevention practices. These platforms also encourage peer learning and farmer-to-farmer knowledge sharing. However, unverified recommendations, misleading information and inappropriate treatment advice may create risks for farm management. Therefore, information disseminated through social media should be supported by credible scientific sources and qualified fisheries professionals (Das et al., 2026).

Call centres and interactive voice response systems

Fisheries call centres and interactive voice response (IVR) systems provide advisory services through telephone calls and automated voice messages. They are particularly useful for farmers who have limited digital literacy or face difficulties accessing text-based information. Farmers can seek guidance on fish health, feeding, water quality, disease outbreaks, weather-related risks and government support services. IVR systems can disseminate recorded advisories in regional languages, while expert-assisted call centres can provide more specific technical guidance. These services can improve the accessibility of fisheries extension, particularly in rural and remote areas. Their effectiveness depends on the availability of trained personnel, the accuracy of advice, regional-language support and timely responses to farmers' queries.

Applications of digital advisory services in aquaculture

Water quality monitoring and management

Digital advisory services support water quality management by providing information on temperature, dissolved oxygen, pH, ammonia and other important water quality parameters. Sensor-based monitoring systems and mobile applications can facilitate real-time data collection and alert farmers when conditions move beyond recommended ranges. These tools help farmers make timely decisions regarding aeration, water exchange and other corrective measures. Effective water quality management can reduce environmental stress, improve fish welfare and maintain suitable conditions for growth and survival. Integrating digital monitoring

with expert guidance can further improve farm-level water management and resource-use efficiency.

Fish health management and disease diagnosis

Digital platforms facilitate the dissemination of information on fish disease symptoms, preventive health management, biosecurity and appropriate treatment practices. Farmers can share photographs, videos and farm observations with fisheries experts for preliminary assessment and guidance. Artificial intelligence-based image analysis and digital diagnostic systems also offer opportunities for early identification of certain fish health problems. Timely advisories can help farmers recognize disease risks, adopt preventive measures and seek professional assistance before problems become severe. However, digital diagnosis should be considered a preliminary support tool, with laboratory confirmation and qualified veterinary or fisheries advice used when necessary.

Feed management and farm productivity

Digital advisory systems can provide recommendations on feeding frequency, feed quantity, feeding schedules and feed selection according to fish species, growth stage, stocking density and culture conditions. Farm management applications can help farmers record feed inputs, fish growth, mortality and production costs. When integrated with automated feeders, biomass estimation and water quality sensors, these systems can support more precise feeding decisions and reduce feed wastage. Improved feed management can enhance growth performance, feed conversion efficiency and farm profitability while limiting nutrient discharge into the surrounding environment. Nevertheless, recommendations should be adapted to the species, production system and locally available feed resources (Mahmad et al., 2026).

Market information and price updates

Digital platforms improve access to information on fish prices, market demand, input costs, seed availability and potential buyers. Mobile applications, online marketplaces and messaging networks can connect farmers with traders, suppliers and consumers, thereby facilitating the exchange of market information. Access to current price trends can support decisions on harvesting time, species selection, production planning and marketing channels. Digital marketing may also reduce dependence on intermediaries and improve transparency in transactions, although these benefits depend on local market conditions and platform accessibility. Reliable market information can strengthen farmers' bargaining capacity and support more informed economic decisions in aquaculture.

Benefits of digital platforms for fish farmers

- Improved access to information and timely advisory services: Provides scientific guidance on feeding, water quality management, fish health, disease prevention and improved aquaculture practices.
- Better farm management and resource utilization: Supports informed decisions on stocking, feeding schedules and production planning while reducing feed wastage, water use and unnecessary production costs.
- Disease prevention and weather risk management: Facilitates early identification of potential health problems and provides weather forecasts and warnings about floods, cyclones and extreme temperatures.
- Improved market access and profitability: Provides information on fish prices, market demand, input costs and potential buyers, helping farmers improve marketing decisions and farm income.
- Access to government services and knowledge sharing: Improves awareness of training programmes, financial assistance, insurance and fisheries schemes while strengthening communication among farmers, researchers, experts and extension personnel.
- Promotion of sustainable aquaculture: Encourages responsible resource use, efficient water quality management and environmentally sound farming practices, contributing to improved production efficiency and long-term sustainability.

Challenges and limitations of digital advisory services

- Limited digital infrastructure: Poor internet connectivity, power interruptions and the high cost of digital devices can restrict access to advisory services, particularly in rural areas.
- Low digital literacy and language barriers: Limited technical skills and a lack of local-language content may prevent fish farmers from understanding and using digital recommendations effectively.
- Reliability of information: Unverified advice and inaccurate disease diagnoses may lead to inappropriate treatment, poor management decisions and economic losses.
- Limited farm-specific guidance: General recommendations may not adequately address differences in fish species, culture systems, water quality and local farming conditions.
- Data privacy and technical limitations: Concerns regarding the security of farm data, platform compatibility and technical failures can reduce farmer confidence and continuity of service.
- Need for expert support and field validation: Digital advisories require scientific validation and integration with field-based extension services to ensure that recommendations are practical, locally relevant and suitable for sustainable aquaculture.

Conclusion

Digital platforms are emerging as important tools for strengthening fisheries extension and advisory services by improving access to scientific information, technical guidance and market-related updates. They support better farm management, timely disease prevention, efficient resource utilization and informed decision-making among fish farmers. However, their effectiveness depends on reliable information, digital literacy, local-language accessibility, internet connectivity and expert support. Integrating digital advisory systems with conventional extension services, field demonstrations and farmer training can improve their accessibility and practical application. The development of affordable, farmer-friendly and scientifically validated digital platforms is essential to promote inclusive, productive and sustainable aquaculture.

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