Popular Article

Trends in Agriculutre Science (ISSN:2583-7850)

Vol.2, Issue 6, June, 2023, Page: 411-414

Technological Innovations in Fisheries Sector

M.Balaji[1], Soumyabrata Sarkar[1], S. Karunakaran[1*], S. Kavithambika[1], S.A. Shanmugam[2]

[1]TNJFU-Fisheries Business School, DIVA Campus, ECR Chennai, Tamil Nadu (603 112), India
[2]TNJFU-Institute of Fisheries Postgraduate Studies, OMR Campus, Chennai, Tamil Nadu (603 103), India
https://doi.org/10.5281/zenodo.8037283

Abstract

This article examines how technological advancements have revolutionized fisheries management. It showcases breakthroughs in aquaculture and developments in robotics, autonomous systems, electronic monitoring and reporting, big data analytics, remote sensing and satellite monitoring. These technologies are revolutionizing how aquaculture practices are optimized, data collected, and operations in fisheries are monitored. The paper focuses on the technologies potential to improve fisheries' sustainability, effectiveness, and transparency, ultimately opening the path for a time when ethical fishing methods and thriving marine ecosystems coexist.
Keywords: Ecosystem, Fisheries, Innovation, Sustainability

Introduction

Technology breakthroughs that are revolutionizing fisheries management have caused a significant transition in the fishing sector in recent years. These advancements, which range from sophisticated monitoring systems to cutting-edge robotics, are improving productivity, sustainability, and the general health of our oceans. In this article, we examine the innovative technical developments in fisheries management and how those impact to the sector for a sustainable future.

Remote Sensing and Satellite Monitoring

The ability to monitor fishing activity in real-time on a worldwide scale is made possible by satellite-based technologies. To efficiently detect illeagal fishing, prevent overfishing, and enforce rules, vessel monitoring systems (VMS) and satellite imaging are used to track the movement and behavior of fishing vessels. Additionally, the application of remote sensing technology offers relevant information on oceanographic conditions, assisting stakeholders in making decisions regarding the best times and places to fish.

Artificial Intelligence (AI) and Big Data Analytics

The way of gathering fisheries data, examining and its usage has changed because of the combination of AI and big data analytics. Machine learning algorithms can process enormous amounts of data from numerous sources, such as catch reports, environmental sensors, and vessel monitoring. AI can give precise stock evaluations, forecast fish population dynamics, and optimize fishing tactics for sustainable yield by spotting patterns and correlations (Pinsky *et al*., 2018). Adaptive management is possible through this data-driven methodology, which results in more effective resource allocation and diminished environmental impacts.

Robotics and Autonomous Systems

Several facets of fisheries management are transforming n by dint of robotic technologies. Without the human interventions, underwater vehicles (UUVs) with sensors and cameras may scan marine ecosystems, monitor habitats, and evaluate fish stocks (Smith *et al*., 2010). With the ability to autonomously collect data on temperature, salinity, and water quality, autonomous underwater gliders can offer significant insights into the health of marine habitats. Additionally, aerial robotics and drones are employed for airborne surveys, allowing for quick evaluation of fish shoals, spotting unlawful activity, and supporting search and rescue efforts.

Electronic Monitoring (EM) and Electronic Reporting (ER)

The method by that fishing activities are observed and recorded has changed because of electronic monitoring devices. EM systems record fishing activity onboard vessels using cameras, sensors, and GPS technology to ensure compliance with rules and lessen the dependency on human observers (Gutiérrez *et al*., 2012). Electronic reporting of catches by fishermen using ER systems simplifies data collecting, reduces paperwork, and makes reporting possible in close to real-time. These innovations increase data accuracy, transparency, and the ability to make wise judgements about fisheries management.

Aquaculture Innovations

The aquaculture sector has undergone a revolution because of technological advancements, which support effective and sustainable methods (Kroodsma *et al*., 2018). Automated feeders, remote sensing technology, and advanced water quality monitoring systems optimize fish farm operations, reducing waste and minimizing environmental effects. Enhancing disease resistance and growth rates through genetic research and selective breeding programs helps to produce sustainable aquaculture.

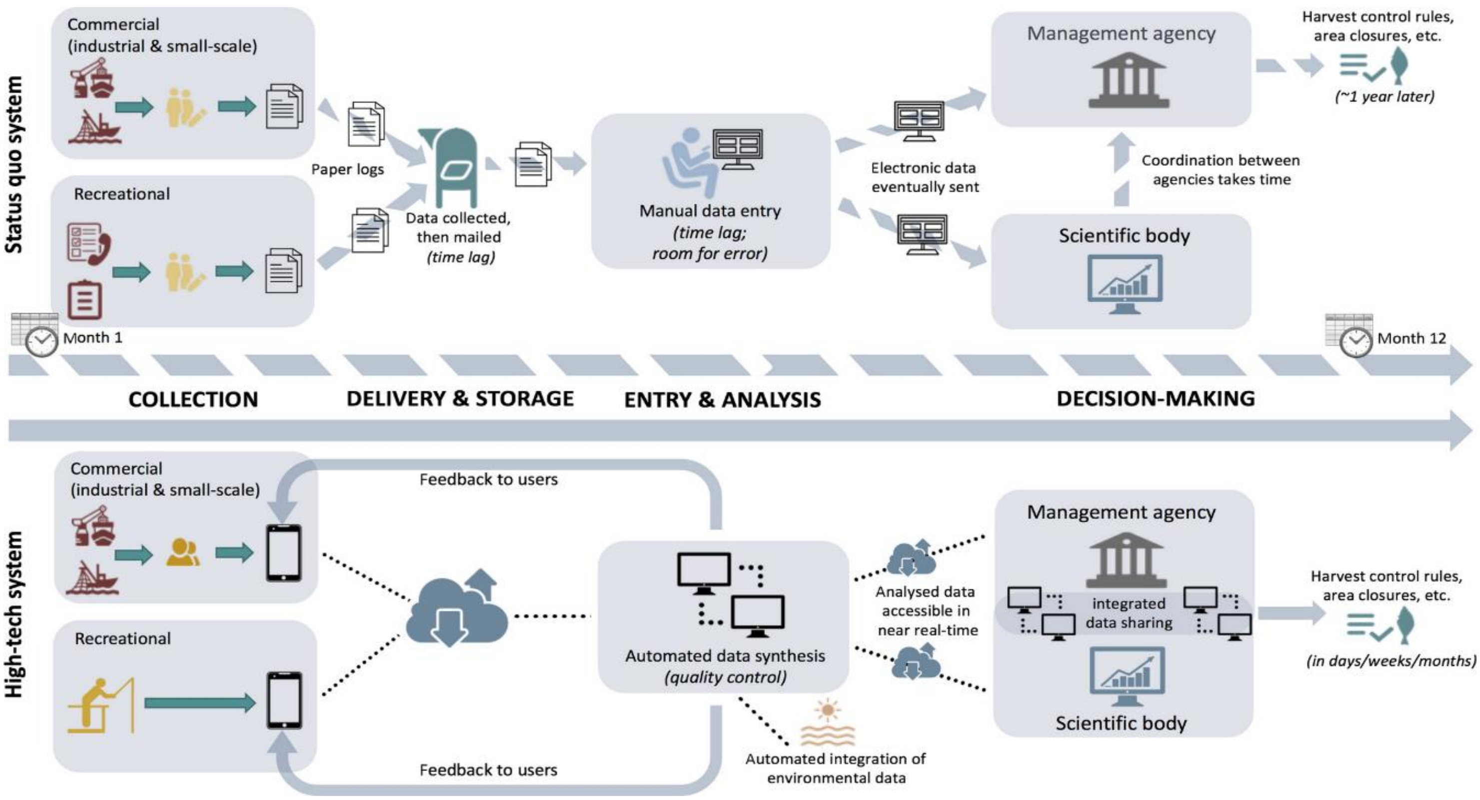

Figure 1. Digital Technology in Fisheries (Source: Maritime Survey, https://onlinelibrary.wiley.com/doi/full/10.1111/faf.12361)

Conclusion

A new era in fisheries management, when sustainability and efficiency go hand in hand, is being ushered in by technological advancements. Advancements in remote sensing, artificial intelligence, robotics, electronic monitoring, and aquaculture are giving fisheries stakeholders the knowledge and resources they need to make wise decisions, safeguard marine ecosystems, and guarantee the long-term survival of the fishing sector. We can create a future in which ethical fishing methods and vibrant seas coexist by embracing new technologies and encouraging collaborations between scientists, industry, and politicians.

Reference

Gutiérrez, N. L., Valencia, S. R., Branch, T. A., Agnew, D. J., Baum, J. K., Bianchi, P. L., -Donoso, J.C., Costello, C., Defeo, O., Essington, T.E., Hilborn, R., Hoggarth, D.D., Larsen, A.E., Ninnes, C., Sainsbury, K., Selden, R.L., Sistla, S., Smith, A.D.M., Pirlot, A.S., Teck, S.J., Thorson, J.T., Williams, N.E Worm, B. 2012. Eco-label conveys reliable information on fish stock health to seafood consumers. PLoS ONE, 7(8), e43765. https://doi.org/10.1371/journal.pone.0043765.

Kroodsma, D. A., Mayorga, J., Hochberg, T., Miller, N. A., Boeder, K., Ferretti, F., Wilson, A., Bergman B., White,T.D., Block,A.B., Woods,P., Sullivan,B., Costello,C., Worm, B., 2018. Tracking the global footprint of fisheries. *Science* 359 (6378), 904-908. https://doi.org/10.1126/science.aao5646.

Pinsky, M. L., Reygondeau, G., Caddell, R., Palacios-Abrantes, J., Spikers, J., Cheung, W.W.L., 2018. Preparing ocean governance for species on the move. *Science* 360 (6394), 1189-1191. https://doi.org/10.1126/science.aat2360.

Smith, M. D., Roheim, C. A., Crowder, L. B., Halpern, B. S., Turnipseed, M., Anderson, J. L., Asche, F., Bourillón, L., Guttormsen, A. G., Khan, A., Liguori, L.A., McNevin, A., O'Connor, M.I., Squires, D., Tyedmers, P., Brownstein, C., Carden, K., Klinger, D.H., Sagarin, R., Selkoe, K.A., 2010. Sustainability and global seafood. *Science* 327 (5967), 784-786. https://doi.org/10.1126/science.1185345.S.

trendsinagriculturescience.com
trendsinagriculturescience@gmail.com
Published: 13 June 2023