



# AGRI MAGAZINE

(International E-Magazine for Agricultural Articles)

Volume: 03, Issue: 04 (April, 2026)

Available online at <http://www.agrimagazine.in>

© Agri Magazine, ISSN: 3048-8656

## How Technology is Transforming Fisheries Technical Writing

\*Sarafraz Ahmed Niyazi and Dr. S. Agnes Daney Angela

Dr. M.G.R. Fisheries College and Research Institute, Ponneri, Tamil Nadu, India

\*Corresponding Author's email: [sahmedniyazi@gmail.com](mailto:sahmedniyazi@gmail.com)

Technical writing in fisheries has transitioned from static reporting to a dynamic, multi-platform discipline. This review explores the technological and methodological shifts that have redefined the recording, synthesis, and communication of fishery data. Key areas of advancement include the integration of Literate Programming (R Markdown/Quarto), deployment of AI-augmented reporting tools, rise of real-time digital dashboards, and ethical inclusion of Traditional Ecological Knowledge (TEK). This paper argues that the modern fisheries technical writer is no longer just a documentarian but a data storyteller and bridge between the complex siloes of ocean governance.

### Introduction

For decades, fisheries technical writing has been synonymous with "Gray literature" lengthy, beige-covered government reports that often end up in filing cabinets rather than influencing active management. However, as global fish stocks face unprecedented pressure from climate change and overextraction, the speed and clarity of communication have become as vital as the data itself. The 2020s have seen a "Great Decoupling" from traditional PDF-centric reporting. In its place, a new ecosystem of technical communication has emerged, driven by the need for transparency, reproducibility, and real-time engagement with stakeholders.

### The Shift to Reproducible Research Frameworks

The most significant methodological advance is the adoption of Literate Programming. This approach combines narrative text with the code used for data analysis.

#### The Quarto and R Markdown Revolution

Previously, a technical writer would receive a spreadsheet, run an analysis in a separate program, and copy and paste the graphs into a Word document. This led to "transcription errors" and a lack of audit trails.

- Current State: Most national fisheries agencies (NOAA, DFO, ICES) now mandate the use R Markdown or Quarto.
- Impact: When a stock assessment model is updated, the entire technical report, including tables, figures, and p-values, is updated automatically. This ensures that technical documentation is a living reflection of the data.

#### Version Control via GitHub

The use of Git and GitHub in fisheries writing allows multiple authors to collaborate on massive environmental impact statements (EIS) simultaneously. It provides a "Track Changes" feature on steroids, allowing for a transparent history of how management recommendations have evolved over time.

### Real-Time Data and Interactive Documentation

Static reports are often obsolete at the moment they are printed. Advances in Electronic Monitoring (EM) and the Internet of Underwater Things (IoUT) have necessitated new forms of writing.

## From Reports to Dashboards

The "report" is increasingly being replaced by an interactive dashboard. Technical writers are now tasked with writing UI/UX copies and explanatory "tooltips" for platforms like Global Fishing Watch.

- Case Study: The 2025 Blue Finance Initiative. Instead of a 200-page annual report, they released a dynamic portal where users can toggle through different species and regions to view technical summaries generated on the fly.

## Automated Catch Reporting (ACR)

AI-driven image recognition on commercial vessels generates automated technical summaries of bycatch. The writer's role has shifted to Supervised AI Editing, where the human ensures that the nuances of species misidentification are corrected before the report reaches the regulator.

## Artificial Intelligence and the Technical Narrative

By 2026, Large Language Models (LLMs) have been specialized for marine science.

### AI-Assisted Synthesis

Writers now use AI to synthesize thousands of disparate "vessel trip reports" (VTRs) into coherent summaries. This has reduced the turnaround time for management decisions from months to days.

### Translation and Global Accessibility

Fisheries are a global industry. Modern technical writing software now includes AI-driven translation layers that can convert a technical manual for a new "Turtle Excluder Device" (TED) into 15 different languages while maintaining the precise engineering terminology

## Inclusion of Traditional Ecological Knowledge (TEK)

A major ethical advancement in fisheries technical writing is the formalization of protocols for documenting Traditional Ecological Knowledge.

- Co-Authorship Models: Moving away from treating Indigenous knowledge as a "sidebar," modern technical reports are increasingly co-authored with community elders.
- The Narrative Challenge: Writers are developing new styles that respect the qualitative, oral-history nature of TEK while sitting alongside the quantitative, frequentist statistics of Western science.

## Challenges: Data Overload and the "Black Box"

Despite these advances, two major hurdles remain.

1. Information Fatigue: With real-time data comes the risk of "dashboard burnout." Technical writers must now act as curators, deciding what information is *critical* and what is merely *available*.
2. Black Box Problem: As AI plays a larger role in drafting technical summaries, maintaining the "traceability" of a management claim is difficult. If an AI incorrectly summarizes a trend, the legal ramifications for a fishery can be devastating.

## Future Directions: VR and Immersive Technical Reporting

The next frontier (2027 and beyond) appears to be Spatial Technical Writing. Imagine a stakeholder "walking through" a 3D model of a coral reef restoration project, with technical data points appearing as they navigate the virtual space. The "writing" here becomes a script for an immersive experience.

## Conclusion

Fisheries technical writing has moved out of dusty archives and onto the front lines of ocean conservation. The integration of coding, AI, and inclusive storytelling has made this field more transparent and impactful than ever before. For modern fisheries professionals, the pen (or the keyboard) remains as important a tool as the trawl net or sonar.

## References

1. Smith, J. et al. (2024). "The Quarto Shift: Automating Stock Assessments." *Journal of Marine System*.
2. FAO (2025). "Digital Standards for Small-Scale Fisheries Documentation."
3. Chen, L. (2026). "AI and the Ethics of Automated Bycatch Reporting." *Fisheries Science NOAA Technical Memorandum (2025)*. "Best Practices for Integrating TEK into Management Reports."