SALT
SEAFOOD ALLIANCE FOR LEGALITY & TRACEABILITY

OVERCOMING BARRIERS

Solutions for adopting electronic traceability

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Trouble with Technology

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FISH WISE

Trouble with Technology

Introduction

Illegal, unreported, and unregulated (IUU) fishing damages fish stocks around the globe. Additionally, illegal fishing practices can sometimes occur alongside human rights abuses. Now, the world is waking up to these injustices. Government import regulations are working to ensure illegal products don't enter national markets, and some consumers are voicing their preference for certified and sustainably harvested fish[1].

Electronic traceability is the recording and sharing of relevant seafood product information via electronic means[2]. Full chain, electronic traceability entails the electronic capture and sharing of seafood product information from the point of catch until the final point of sale. It has the potential to make it easier for the seafood industry to comply with regulations and meet consumer demands.

Thankfully, companies currently deliberating making the switch to electronic traceability are not the first companies to undergo this conversion. The trailblazers who have piloted electronic traceability—along with their NGO partners—have written case studies, described solutions that helped them overcome obstacles, and created tools to make the process easier for others. The **Seafood Alliance for Legality & Traceability (SALT)** has distilled this information to walk the seafood industry through the barriers to adopting electronic traceability and provide potential solutions to overcoming the challenges a company might face.

This blog is the fourth in the series, "Overcoming Barriers: Solutions for adopting electronic traceability." In three previous blogs, SALT addressed the **indirect benefits for industry when they adopt electronic traceability**, the **direct economic benefits and costs of electronic traceability**, and the **challenges of sharing data seamlessly**. In this blog, we will discuss considerations for developing or selecting a technology system for traceability.

[1] Sterling et al., 2015

[2] Future of Fish Seafood Traceability Glossary

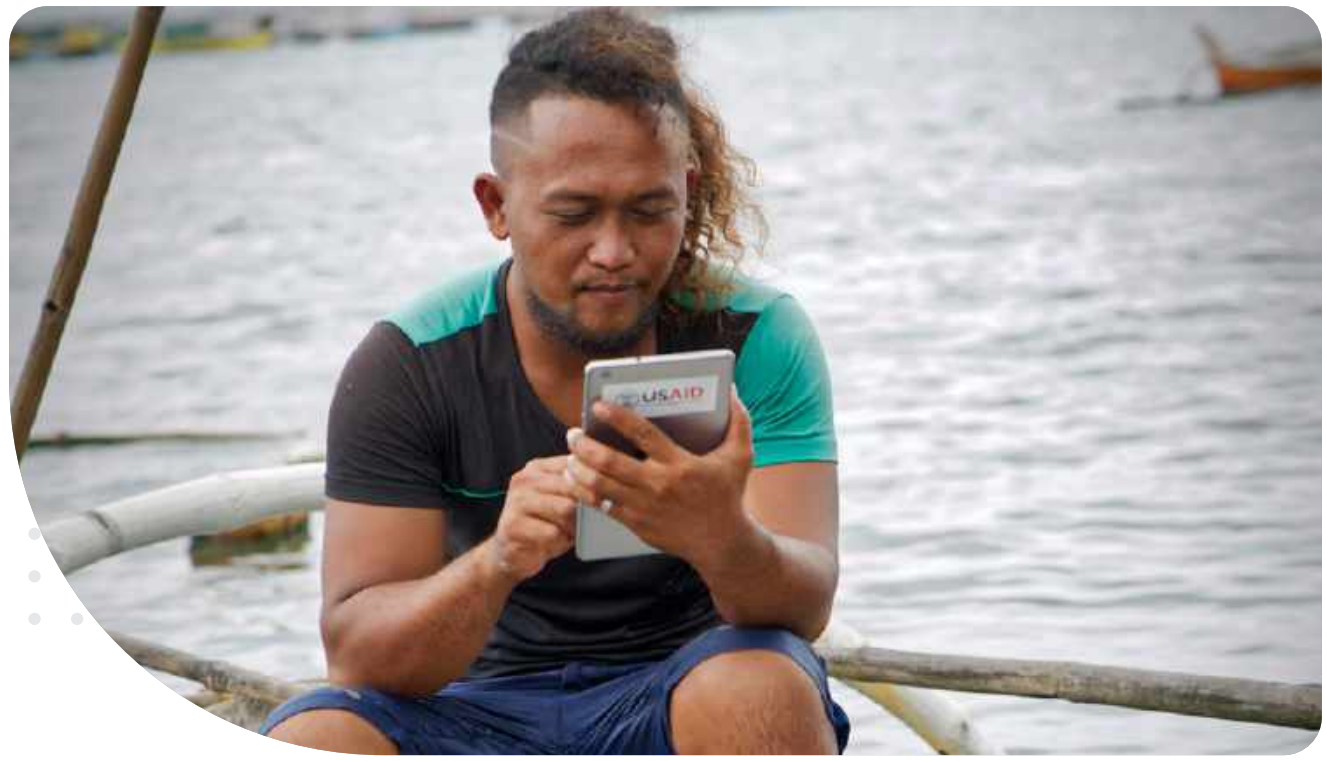


Photo by Farid Maruf, USAID Oceans

Electronic record-keeping and sharing information digitally across the supply chain inevitably requires some form of technology. This technology can come via a range of technology providers and in multiple mediums (e.g., vessel monitoring systems, mobile apps).

Navigating where to start on the journey with technology—or managing it while the journey is already underway—can be intimidating.

In this blog, we address "the trouble with technology" by:

Explaining the role of technology in traceability

Outlining unique technology solutions available to a company

Walking through how to assess technological needs

Sharing points to consider and lessons from electronic traceability pilots across the globe

Going Digital: The 'Electronic ' Side of Traceability

The role of technology varies throughout the seafood industry. Technology use differs across geographies and throughout the supply chain. Many end-buyers, retailers, and distributors already work with technology systems for operational, regulatory, and food safety purposes. On the other hand, those upstream in the supply chain—harvesters and processors—may be newer to the technology landscape.

But regardless of where a company finds themselves geographically or within the supply chain, paper-based tracking and record-keeping are becoming outdated. The seafood industry is moving beyond paper-based systems and towards electronic traceability due to increasing pressures from import regulations and a growing awareness of the potential ecologic, social, and economic benefits of electronic traceability—covered in blogs **one** and **two** of this series. It's no longer a matter of 'if' but 'when' electronic traceability will become the norm throughout the entire seafood industry.

Technology in a Seafood Supply Chain

Full chain, electronic traceability begins with the digital capture of information either on the vessel as the fish leaves the water or when the vessel lands at port. Technology that can capture information at this "harvester level" falls into three primary buckets: **vessel monitoring** systems that track a boat's fishing location, **electronic logbooks** to enter catch information, and **electronic monitoring** to keep an eye on what's coming on deck[3].

By employing one or a combination of these technologies and integrating with an onshore traceability system, the fish (or its batch) is associated with an identifier—often a unique set of numbers and letters or a barcode—that the supply chain can pass along for subsequent steps of the product's journey. This is often referred to as **product-data pairing**, as the product is then physically joined with data[4].

To achieve full chain traceability, that unique identifier associated with the product must continuously be passed on and unaltered as the fish product moves to processing facilities, distributors, and eventually end-buyers/retailers. In a fully traceable supply chain, whenever the product is transformed or is passed along to other actors, key product information is collected, aggregated, and associated with that unique identifier. To keep this key product information digital, companies might use software (e.g., digital data management systems) coupled with hardware (e.g., barcode scanners). To see a video with more information on electronic, full chain traceability, watch the **USAID Oceans 'From Bait-to-Plate' video**.

Internal Electronic Traceability

***Internal electronic traceability**—tracking the product digitally throughout any transformations, aggregations, or alterations within a company's own facility[5]—is an important component of electronic traceability. By using internal electronic traceability, the data will be in a digital format that is easier to share with other supply chain partners.*

For larger retailers or those operating in developed countries, internal electronic traceability systems may already be in place. Other companies may have electronic operational or food safety infrastructure that can be slightly tweaked to accommodate internal traceability[6]. Although larger organizations may adapt their existing systems to incorporate traceability components, many organizations don't have the designated information technology (IT) staff for this. To move beyond paper-based tracking by implementing a custom digital solution or to expand existing software would require expertise in database management, a solid foundation of IT skills, and extensive knowledge about traceability. As a result, many seafood companies opt for using third-party traceability software providers instead.

[3] Lewis & Boyle
[4] Taking the First Steps Towards Full-Chain Seafood Traceability: A Preliminary Guide for Industry
[5] Seafood Traceability Glossary
[6] Sterling et al. 2015

Photo by SALT

Choosing a Third-Party Traceability Vendor

A plethora of traceability software and information management tools exist to ease the transmission of data throughout the supply chain. So, where does a company start in selecting what might work best for them? The technology a company would employ depends on where they fall along the supply chain and what their greatest traceability goal is (e.g., comply with import regulations, provide more information to consumers, obtain a certification). But regardless of objective or where a company falls along the supply chain, **"Taking the First Steps Towards Full-Chain Seafood Traceability: A Preliminary Guide for Industry"** from Fishwise, Future of Fish, and other leading NGOs walks companies through how to assess their traceability capacity by appraising their current tracking systems and methods, mapping their supply chain to evaluate external traceability, and deciding what information to collect.

Once a company has evaluated their internal and external traceability needs, they can browse potential third-party technology solutions if they determine that route is the best fit for their company. Hardware solutions might consist of barcodes and scanners or ID tags to help maintain those unique identifiers along the full chain[7]. Software solutions for electronic traceability come in a myriad of forms, such as cloud-based technologies, blockchain technologies, or Application Program Interfaces[8]. **If companies are interested in surveying the landscape of traceability technology providers, SALT has compiled a working list on SALT's Seascape**.

Implementing electronic traceability, especially with a third-party provider, can be a considerable financial investment. SALT's **blog on the "Economic Benefits of Traceability"** covers the potential return on investment and provides tools to help assess the cost of implementing electronic traceability. Since using a third-party traceability provider can be expensive, it's important to choose the best-suited one. Companies will need different technology solutions dependent on company size, product sold, their position along the supply chain, and the geography of their key markets[9]. **The guidance document, "Getting There from Here: A Guide for Companies Implementing Seafood Supply Chain Traceability Technology" breaks down what to look for in a traceability technology provider and how to distinguish between essential and optional features.**

[7] Lewis & Boyle 2017
[8] Hardt et al. 2017
[9] Lewis & Boyle 2017

Electronic, Full Chain Traceability

Building internal tracking systems and practices within a company is no minor feat, but even constructing those may be easier than implementing full chain traceability. Full chain traceability is something the entire supply chain must agree to and requires extensive collaboration from all stakeholders. In order for supply chain partners to get the data they need from each other—for certifications, due diligence, etc.—they all need to come together to understand what data to collect and how to best collect them. SALT's **"Overcoming Barriers: Speaking a Common Language Through Interoperability"** blog discusses challenges and working solutions to the seamless exchange of data across the supply chain. Additionally, SALT will develop **principles to reinforce comprehensive electronic catch and documentation traceability systems**—to ensure these traceability systems collect data to support economic, ecologic, and social well-being.

Considerations When Selecting or Designing Traceability Technology

A traceability system will fail if no one uses it. The target user must be able to use the technology, which means incorporating considerations of both the physical user experience and potential operational limitations into the design.

User Experience

Harvesters and processors typically face more challenges with user experience than the end-buyers, as they are often exposed to more uncontrollable elements. When fishing, harvesters are exposed to water, wind, and salt—the perfect medley to encourage corrosion of electronic software. The temperature and humidity of processing rooms can also create periodic system failures in the technology. In addition, hardware in warehouses, such as scanners, can unintentionally use buttons too small for large, gloved hands to enter codes and product information accurately. **Taking into consideration user experiences when designing and implementing traceability systems can promote uptake and sustainability.** For instance, this human-centered design could entail replacing text with images and graphics for illiterate fishers or processors[10], or using larger than normal buttons on mobile applications or tablets. **Abalobi**, a suite of mobile apps designed for small-scale fishers, took into account that South African fishers work in cold waters and develop calluses on their hands by including large checkboxes and clickable icons in their traceability software[11].

[10] SALT Feature: What's in the way? Clearing Barriers to Seafood Traceability

[11] Abalobi: case study by UNESCO-Pearson Initiative for Literacy

Operational Limitations

Technology must also be functional within the existing infrastructure—of both the company and the region. New technology should be complementary to existing internal processes and workflows. If technology doesn't easily fit into workflows, it's more difficult to secure buy-in, training will take more time, and improvements to operational efficiency can be delayed. To address this concern, Norpac, a seafood processing and distribution company, had IT staff monitor how employees did their jobs:

"We spent considerable time looking at the ways that processes theoretically would be executed, but didn't necessarily go down that way because of [employee actions] that couldn't be quantified," says Norpac IT specialist Curtis McCullough. "It's kind of like being a surgeon—you have an idea of what you want to do going in, but once you open up the patient, you see what really needs to be done[12]."

Companies should also take the infrastructure of the region into consideration (e.g., availability of electricity, voltage requirements, reliability of internet connectivity). In fact, the reliance of many traceability technologies on internet connectivity may be a weakness overall. Some traceability technologies are getting around this connection issue by creating applications that can store data until the users are back in reach of signal.

Field example:

It's unsurprising that remote fisheries may have connection issues. However, connection issues arise not only around the availability of Wi-Fi and cellular signal, but also occur when airtime credits (cellular data, text, and calls) are overused. In a Thai Union pilot, fishers quickly ran out of the airtime credits needed to operate the traceability app. They had used the communication features on the app for personal communications instead of using their own phone credits. Running out of airtime credits was so prevalent in this pilot that it dampened the enthusiasm of fishers to take part in future pilots. From this experience, Thai Union created recommendations for future pilots—such as limiting bandwidth for communications features—which you can read about in the USAID Oceans ***"Thai Union eCDT and Crew Communications Pilot: Assessment Report."***

[12] The Business Wins of Seafood Traceability Technology

Photo by SALT

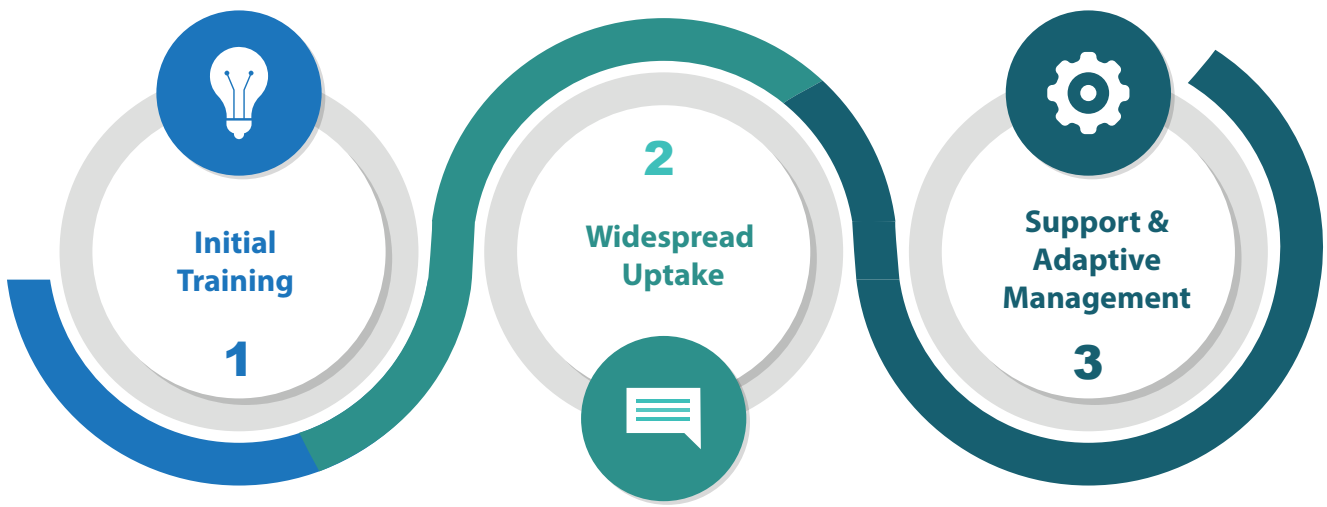
Capacity & Training

Implementing an effective and sustainable traceability system does not happen overnight. **Deciding what technology to use is only half the battle; ensuring uptake and adoption is its own separate challenge.** The process for training and implementing will look different across companies depending on size, capacity, and availability of in-house IT staff to troubleshoot.

Field example:

In 2019, SALT visited an artisanal lobster fishery in Belize. The fishery had recently implemented a new electronic record-keeping system with the help of The Nature Conservancy (TNC) to work towards traceability. For this pilot, the initial training was fast and only took about two days. However, it then took two additional weeks for the staff to feel comfortable using the technology and effectively incorporate it into their workflows. It then took additional time before fishery and TNC staff could analyze how the data were being used and if they were properly meeting the initial objectives of the tracking system.

Once a company has decided on and installed a traceability technology, the extensive process of implementation must then occur, which can be summarized roughly in three primary stages:



Overhauling an existing data management system to make it electronic takes time. Troubleshooting and adaptive management should be expected. Adaptive management of traceability systems can increase efficiency, reliability, and product confidence. Companies should be sure to allocate the financial and human resources needed across all stages of implementation to better guarantee a traceability system that meets the intended goals.

Conclusion

Traceability is a tool and essential industry practice that is strengthened through the use of technology. Despite implementation challenges, technology is ultimately an effective traceability solution. Thankfully, no company has to reinvent the wheel when selecting, building, or enhancing their own electronic traceability system. Companies can start by using the resources and list of traceability technology providers featured in this blog.

Contact Us

For more information on the potential barriers to implementation of traceability systems, stay tuned for our next blog on behavioral challenges. In the meantime, if you are interested in more resources on traceability and technology, check out SALT's traceability resource repository: **Dive Deeper.**

Resources

Like what you've read so far? Here are some great resources to dive deeper into the topic of traceability technology:

GUIDANCE DOCUMENT

Taking the First Steps Towards Full-Chain Seafood Traceability: A Preliminary Guide for Industry

FishWise, Future of Fish, Global Food Traceability Center, World Wildlife Fund
2018

This document provides companies with initial steps for determining which seafood traceability technologies best fit their needs, while understanding the potential return on investment for these technologies set of GDST 1.0 materials.

REPORT

Getting There from Here: A Guide for Companies Implementing Seafood Supply Chain Traceability Technology

Future of fish
2014

This report aims to highlight the compelling market incentives of traceability, while raising awareness of the very real human and technological barriers that hamper broader adoption.

CASE STUDY

Technology Solutions for Electronic Catch Documentation and Traceability (eCDT)

USAID Oceans & Fisheries Partnership (USAID Oceans)
2019

Learn about USAID Oceans-developed and supported technology tools for eCDT. Oceans has worked closely with government, industry, and tech partners to design and develop tools to establish connectivity in remote and at-sea areas, provide a mechanism for data collection and transmission throughout the supply chain, and provide benefits, such as communication, safety, and business tools.