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COMMUNICATION PRACTICES, TECHNOLOGY ACCEPTANCE, AND ADOPTION OF FISHERIES TRACEABILITY SYSTEMS AMONG SMALL-SCALE FISHERIES AND AQUACULTURE STAKEHOLDERS IN BATAAN, PHILIPPINES

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Acceptance Page

This paper prepared by **CHERRY MURILLON-CUBACUB** with the title: **"Communication Practices, Technology Acceptance, and Adoption of Fisheries Traceability Systems among Small-Scale Fisheries and Aquaculture Stakeholders in Bataan, Philippines",** is hereby accepted by the Faculty of Information and Communication Studies, U.P. Open University, in partial fulfillment of the requirements for the degree, Master of Development Communication.

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Biographical Sketch

Cherry Murillon-Cubacub is a social entrepreneur, innovator, and founder of CAWIL AI Solutions, a technology startup supported by the Department of Science and Technology- Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD) under the Startup Grant Program 2021. She is also the managing director of AiBox Pte. Ltd., Singapore.

She is a seasoned science research specialist from academia, focused on environmental management and risk reduction, utilizing image processing and machine learning. She has over 10 years of experience in project management and business development, focusing on emerging technologies and artificial intelligence.

She has completed the Entrepreneurship Development Program 2017 and the Startup Management Program 2018 at the Asian Institute of Management, as well as a Bachelor of Science in Chemistry from Mapua University, Intramuros, Manila, 1999.

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Dedication

My daughter, Amber Clarisse, for all the encouragement she gave me to finish my Masters in Development Communication. Thank you.

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Abstract

This study examined fisheries traceability practices and stakeholders' acceptance and adoption of traceability systems among small-scale fisheries and aquaculture stakeholders in Bataan. Using the Technology Acceptance Model (TAM), the study assessed Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Behavioral Intention to Adopt (BI), Attitude Toward Use (ATU), and Actual Use, and alongside existing traceability practices and communication resources.

A quantitative descriptive-exploratory research design was implemented using a structured survey questionnaire administered to 102 respondents. Results showed a high overall level of traceability systems practices with a mean score of 3.90. However, the use of digital tools obtained the lowest mean score of 2.67, indicating limited digital traceability use.

The results indicate that stakeholders have established traceability practices and favorable acceptance of traceability systems, but a gap remains between technology acceptance and actual digital use. The study recommends practical capacity building, improved information access, connectivity-responsive solutions, and sustained extension and institutional support to strengthen sustainable fisheries traceability adoption in Bataan.

Keywords: fisheries traceability, Technology Acceptance Model, small-scale fisheries, aquaculture, behavioral intention, communication resources, digital traceability, Bataan

Chapter I

INTRODUCTION

Background of the Study

The Philippines, being an archipelagic region, has approximately two-thirds of its population residing in coastal municipalities, where the marine ecosystem plays a crucial role in their livelihoods. At least two (2) million individuals depend significantly on coastal resources and aquaculture for their food security, employment opportunities, and other incomes (Philippine Fisheries Profile, 2020).

In fisheries, traceability depends on records that connect a product to its origins and document its movement through successive supply-chain activities. These records make it possible to identify the supplier at an earlier stage and the recipient at the next stage, thereby supporting accountability from harvest or farming through distribution (Seafood Watch, 2016).

For seafood, the significance of traceability extends beyond identifying the catch location to the final consumer. A documented chain of custody can support assessments of product safety, responsible sourcing, and sustainability. Such records are useful to fisheries authorities, businesses, and consumers seeking to understand how a product reached the market (FAO, 2020; Borit and Olsen, 2020; BFAR, 2023).

Moreover, traceability acts as a continuous footprint, allowing stakeholders to monitor food as it moves from the farm through processing and into the hands of the consumer. Within a modern food-control system, it serves as a critical safeguard to mitigate safety hazards, verify product claims, and ensure the absolute authenticity of the supply chain (FAO, 2021).

Traceability in fisheries aims to prevent illegal, unreported, and unregulated (IUU) fishing by ensuring transparency and enforcing food safety laws in fisheries management (Borit and Olsen, 2020).

Importance of traceability for sustainable fisheries

Seafood fuels both global economies and daily diets, so when supply chains lack proper oversight, the fallout is huge. Part of the problem is that fish don't travel straight from the boat to your plate. They pass through endless hands, processing plants, and foreign ports, creating a complex web that masks their true origin. This tangle of trade makes it incredibly hard to confirm if seafood was sourced legally or ethically. This lack of visibility gives illegal, unreported, and unregulated fishing operations plenty of room to hide (World Bank Annual Report, 2020).

Global efforts to stop illegal, unreported, and unregulated fishing, increasingly emphasize coordination among port authorities, information-sharing mechanisms, and national enforcement systems. FAO initiatives, including the Global Information

Exchange System and guidance on transshipment, seek to strengthen countries' ability to identify and respond to regulatory gaps (FAO, 2024).

For exporting countries, fisheries governance must respond to both sustainability objectives and market rules. FAO capacity-development activities support this process, while the World Trade Organization (WTO) Agreement on Fisheries Subsidies adds a trade-policy dimension to efforts aimed at discouraging harmful fishing practices (FAO, 2024).

The FAO supports member nations in meeting rigorous trade and market requirements to ensure aquatic food systems remain sustainable and profitable. Central to this effort is the implementation of robust management systems designed to combat IUU fishing. These measures are critical for compliance with the World Trade Organization (WTO) Agreement on Fisheries Subsidies, which strictly forbids financial support for overfished stocks and unauthorized fishing activities (FAO, 2024).

Countries do not apply one uniform model of traceability. Regulatory priorities differ, with some systems primarily serving food-safety needs and others addressing illegal, unreported, and unregulated (IUU) fishing. Nevertheless, the literature identifies interoperable electronic records and continuity of information across supply chain stages as important design objectives (Blaha, Borit, and Thompson, 2015).

A traceability system can lose effectiveness when one participant fails to record or transmit required information. Accordingly, coordination across businesses and

regulatory bodies is as important as the technical design. Data captured at fishing and at national entry or exit points are especially relevant to tracing products across territory and landing ports (Blaha and Katafono, 2020).

In Southeast Asia, the Southeast Asian Fisheries Development Center (SEAFDEC) work on the ASEAN Catch Documentation Scheme (ACDS) illustrates an approach to documenting legally harvested fish as products enter trade. Its goal is to assess whether fishing activities comply with national, regional, and international conservation management measures, as well as applicable global standards (Hosch, 2016; FAO, 2022).

Philippine context of traceability systems

The Bureau of Fisheries and Aquatic Resources (BFAR) released an Administrative Circular 251 in 2014 to establish a traceability system for wild-caught and farmed fish and aquatic products (BFAR, BAC 251, 2014).

Responsibility for coastal and fisheries governance in the Philippines is distributed across several levels of government. Municipal and city authorities administer local waters, while national agencies have responsibilities relating to commercial fishing, aquaculture, and particular coastal lands. This division makes coordination between LGUs, BFAR, and environmental authorities essential for consistent documentation and enforcement (USAID, 2019).

Beyond the 15-km municipal water boundary, BFAR leads the management and development of all fisheries and aquatic resources. At the local level, primary administrative responsibility lies with the office of the municipal/city agriculturist (OMAG/OCAG). The office of the provincial agriculturist (OPAG) supports municipal LGUs by offering technical assistance for fisheries development, participatory coastal resource appraisals (PCRAs), and the establishment of marine refuges and fish sanctuaries (Philippine Coastal Management Guidebook No. 2, 2001).

At the local level, documentation of fish and fisheries products often remains paper-based. Catch reports and log sheets may be completed manually even where electronic catch documentation initiatives are available. This existence of manual and digital processes creates practical challenges for timely data transfer and consistent supply chain records (BFAR, 2023).

Small-scale fishing operations frequently document catches in logbooks or paper-based forms before information is entered into electronic records, when such facilities are available. The resulting additional step can delay information exchange and demonstrates why digital traceability must be designed around local workflows and resources (BFAR, 2023).

Given the unequal access to appropriate technologies and internet connectivity, alongside regulatory misalignments, promoting traceability systems for sustainable fisheries through inclusive communication is essential to driving growth of the blue

economy. Literature on fisheries traceability in the Philippines remains limited due to the sparse implementation of traceability systems.Existing initiatives are largely in pilot phases and often lack the complete documentation necessary for full catch-to-plate tracking.

Traceability as a communication and information system

Communication processes are the foundational element enabling technology-driven traceability, shifting supply chains from fragmented, manual record-keeping to transparent, real-time, digital ecosystems. By facilitating the seamless exchange of information between partners, these processes enable technologies to track and trace products, ensuring safety, quality, and regulatory compliance

Communication processes play a central role in enabling effective traceability in fisheries by ensuring that accurate, timely, and standardized information flows across the supply chain. Reliable traceability requires agreement about what information should be recorded, when it should be collected, and who receives it. For example, information about species, harvest locations, and fishing methods must be communicated between harvesters and later supply chain actors. Inconsistent data capture at any stage can undermine the ability to reconstruct a product's history. These processes reduce errors and improve interoperability, which are essential for reliable traceability systems(Thompson, Sylvia, and Morrisey, 2006).

From a development communication perspective, the challenge involves how fisheries stakeholders encounter, interpret, and act on information about new recording practices. Locally relevant training and opportunities for feedback may help users judge whether these practices fit their working conditions (Cromwell, Turkson, Dora, Yamoah, 2025).

Research gap

Despite increasing attention to fisheries traceability in the Philippines, significant gaps remain in both empirical research and system implementation. Existing studies highlight that traceability systems are still largely underdeveloped and unevenly adopted, especially among small-scale fishers and aquafarmers. For instance, traceability initiatives in the country remain “elusive… due to slow adoption and fragmented implementation across value chains (Macusi,Nallos, Borazon, Castro, 2024).

Moreover, existing local studies tend to focus predominantly on capture fisheries, with limited attention to aquaculture systems, despite their growing economic importance. This creates a fragmented understanding of traceability across aquatic food systems and overlooks opportunities for integrated approaches. The lack of interoperability between fisheries and aquaculture traceability systems further complicates data sharing and coordination among stakeholders.

The role of communication and stakeholder engagement in enabling traceability adoption is a critical dimension identified in the literature. A development communication perspective directs attention to participation, access, and circumstances under which stakeholders receive technical guidance. These concerns complement regulatory and engineering analyses, particularly in communities where connectivity, training opportunities, and institutional support are uneven (Tassetti, et al., 2022).

As a result, there is limited research on how small-scale fisheries and aquaculture stakeholders in the Philippines adopt traceability systems. Existing studies often focus on the technical, regulatory, food safety, and supply-chain aspects of traceability, with less attention to stakeholders' access to communication resources, technical information, and institutional or extension support.

Specifically, little is known about how access to information and support influences small-scale fisheries and aquaculture stakeholders' perceived usefulness and perceived ease of use of traceability systems, and how these factors drive adoption intent. There is a clear need for more integrated, user-centered, and communication-driven approaches that bridge the gap between innovation and adoption.

Statement of the Problem

Traceability systems play an essential role in driving transparency, food safety, and sustainability across fisheries and aquaculture. In the Philippines, small-scale fishers and aquafarmers' key challenges lie in unequal access to information and limited exposure to traceability innovations. For small-scale fishers and aquaculture operators, the decision to use traceability practices is shaped partly by whether relevant information and assistance are accessible. Limited connectivity, infrastructure, and extension services may restrict opportunities to learn about documentation requirements and evaluate available technologies.

Beyond access to information, communication processes within fisheries communities play a critical role in shaping how innovations are introduced, interpreted, and adopted. Adoption also depends on the channels through which stakeholders encounter new practices. Weak or fragmented communication processes can lead to misinformation, uncertainty, and low trust, thereby hindering adoption.

This study hopes to examine the communication dynamics and adoption of traceability systems among small-scale fisheries and aquaculture stakeholders in Bataan, focusing on how information access, communication processes, and perceived innovation attributes influence adoption behavior.

Research Questions

In general, this study hopes to answer the question, "How do stakeholders' perceptions of traceability systems, particularly Perceived Usefulness (PU), Perceived Ease Of Use (PEOU), Behavioral Intention (BI), Attitude Toward Use (ATU), and Actual Use (AU) influence the intention to adopt traceability practices among small-scale fisheries and aquaculture stakeholders in Bataan?”

Specifically, this study hopes to answer the following questions:

1. What are the existing traceability practices and documentation systems among small-scale fisheries and aquaculture stakeholders in Bataan, particularly in supporting transparency, market access, and compliance with fisheries regulations?
2. How do access to communication resources, technical information, and institutional or extension support influence stakeholders’ perceived usefulness (PU) and perceived ease of use (PEOU) of the traceability systems, attitude toward use (ATU), actual use (AU) and how these Technology Acceptance Model (TAM) constructs influence their behavioral intention to adopt (BI) traceability practices?
3. What policy and program interventions can be recommended to strengthen traceability systems adoption through improved information access, extension support, capacity building, and institutional mechanisms among small-scale fisheries and aquaculture stakeholders in Bataan?

Objectives of the Study

This study aims to examine the communication dynamics and adoption of traceability systems among small-scale fisheries and aquaculture stakeholders in Orani and Balanga, Bataan. Specifically, this study hopes to:

1. Examine the existing traceability practices and documentation systems among small-scale fisheries and aquaculture stakeholders in Orani and Balanga, Bataan, and analyze how these function as communication and information systems in supporting transparency, market access, and compliance with fisheries regulations.
2. Analyze stakeholders' perceptions of traceability systems in terms of the Technology Acceptance Model (TAM), particularly perceived usefulness (PU), perceived ease of use (PEOU), attitude toward use (ATU) and actual use (AU) determine how these perceptions are shaped by access to communication resources, technical information, and institutional or extension support, and how they influence behavioral intention to adopt traceability practices ; and
3. To develop policy and program recommendations to strengthen traceability adoption in small-scale fisheries and aquaculture in Bataan, focused on improving communication strategies, extension support systems, capacity-building interventions, and institutional mechanisms that enhance information access and facilitate sustainable adoption of traceability practices.

Significance of the Study

This research is significant because it provides empirical evidence on existing fisheries traceability practices and stakeholders' acceptance of traceability systems among small-scale fisheries and aquaculture stakeholders in Bataan. By examining current documentation practices, access to information and institutional support, and the Technology Acceptance Model (TAM) constructs of Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Use (ATU), Actual Use (AU) and Behavioral Intention to Adopt (BI), the study seeks to provide a better understanding of the factors associated with the adoption of fisheries traceability systems.

In addition, this study may help identify stakeholders' information, technical knowledge, training, and support needs related to fisheries traceability. Understanding these needs may contribute to the development of more appropriate approaches for improving stakeholders' understanding and acceptance of traceability practices. The findings of this study may also provide insights into how traceability practices can support better documentation, product transparency, regulatory compliance, and access to market opportunities.

For fisheries agencies, local government units, extension providers, and other institutions involved in fisheries and aquaculture development, the findings may provide evidence for designing more responsive fisheries programs, extension services,

information campaigns, and capacity building activities. It can guide the development of appropriate information materials training programs, technical assistance, and stakeholder engagement activities related to fisheries traceability.

The study also hopes to contribute localized quantitative evidence on the application of the Technology Acceptance Model (TAM) to fisheries traceability systems among small-scale fisheries and aquaculture stakeholders. By examining perceived usefulness (PU), perceived ease of use (PEOU), Attitude Toward Use (ATU), Behavioral intention (BI), and Actual Use (AU) in the context of small-scale fisheries and aquaculture stakeholders in Bataan, the study may demonstrate the applicability of TAM to understanding technology acceptance in a fisheries traceability context. It may serve as a reference for future studies examining technology acceptance, traceability practices, and related factors in other fisheries and aquaculture communities.

Finally, this study may contribute to addressing existing knowledge gaps on traceability adoption among small-scale fisheries and aquaculture in the Philippines. The findings may provide a basis for evidence-informed communication strategies, capacity-building initiatives, and policy and program interventions aimed at strengthening traceability implementation and fisheries governance. Moreover, the study may contribute to efforts to support the sustainable adoption of fisheries traceability systems among small-scale fisheries and aquaculture stakeholders in Bataan.

Scope and Limitations of the Study

The study is geographically limited to respondents from the Province of Bataan specifically, Orani and Balanga City. The results may not be directly generalized to all fisheries and aquaculture communities in the Philippines due to differences in socio-economics conditions, fisheries practices, institutional support and technology readiness. The findings are intended primarily to describe and explore the conditions and perceptions of the selected respondents within the study area.

The study is also limited to respondents' self-reported practices, perceptions, and behavioral intentions at the time of data collection. It does not measure actual long-term adoption behavior or establish causal relationships among the variables. While relationships among communication resources, technical information, institutional or extension support, perceived usefulness, perceived ease of use, attitude toward use, behavioral intention, and actual use may be explored, these relationships should not be interpreted as evidence of causality.

Furthermore, the study does not evaluate the technical performance, system architecture, cost-effectiveness, or operational implementation of any specific fisheries traceability technology. Other factors that may affect traceability adoption, such as economic incentives, market conditions, organizational readiness, policy enforcement, cultural influences, and broader digital infrastructure, are beyond the primary scope of the study.

Chapter II

REVIEW OF RELATED LITERATURE

Traceability Systems in the Philippines

Small-scale fishers rely on traditional fishing methods typically characterized by modest capital investment, low energy consumption, small vessels, and short nearshore trips primarily serving local consumption (FAO, 2022). In 2022, 2.30 million registered fisherfolk pursued fishery-related livelihoods nationwide. Capture fishing was the predominant source of income, accounting for 50.96% of livelihoods, followed by aquaculture 11.2%, fish vending 6.83%, and fish processing at 1.96%, with the remaining 29% distributed among other sector activities. Overall, 70% of registered fisherfolk were male and 30% were female. Gender distribution varied significantly across sectors where men comprised the majority in capture fishing and aquaculture, whereas women dominated gleaning, fishing processing, and vending (Phil. Fisheries Profile, 2022).

The primary legal basis for the digital traceability systems is Executive Order No. 127 (1999), which established the Council for Extension, Research and Development in Agriculture and Fisheries. In addition, the Fisheries Order No. 127 series of 2020, Voluntary Guidelines on the Establishment of a municipal catch documentation and traceability system for LGUs to manage fisheries resources. After the threat of the *2014*

EU trade ban for the Philippines' lack of efforts in implementing mitigation measures towards illegal, unregulated, and unreported (IUU) fishing (France-Presse, 2014), action has started.

Several electronic traceability systems have been developed and tested in the Philippines through the USAID Oceans Project. Among these innovations is an RFID-based electronic catch documentation and vessel monitoring system featuring web and mobile applications for real-time data monitoring. Developed for Southeast Asian capture fisheries, the technology was pilot-tested by tuna fishers across General Santos City, the Bicol Region, and Occidental Mindoro (USAID, 2020).

Moreover, Doddema et al. (2020) demonstrated that examining how traceability practices are executed and interconnected makes it possible to understand why these social practices are accepted, modified, or rejected. In practice, operational hurdles like the recurring absences of government officials delay permit processing and shipments, forcing changes in record-keeping habits (Doddema et al., 2020). As a result, implementing traceability management programs remains particularly challenging for nearshore actors (Bush et al., 2017).

In 2014, the Bureau of Fisheries and Aquatic Resources (BFAR) enacted Administrative Circular No. 251, establishing official rules and regulations for a comprehensive fish traceability system. This policy established a framework for a national traceability system encompassing both wild-caught marine species and farmed

aquaculture products, aiming to track seafood supply chains from origin to market (BFAR, 2014).

Implemented under the Sustainable Fisheries Management Plan in partnership with USAID, the BFAR has developed the Electronic Catch Documentation and Traceability System (eCDTS) that serves as a primary digital mechanism to deter, prevent, and eliminate illegal, unreported, and unregulated (IUU) fishing across fisheries supply chain (USAID, 2019).

Responsibility for Philippine coastal and fisheries management is shared across local and national authorities. Municipalities and cities govern local waters, whereas national agencies oversee commercial fisheries, aquaculture, and specific coastal zones. This division of functions makes strong coordination between LGUs, BFAR, and environmental agencies essential for effective documentation and regulatory enforcement (USAID, 2019).

Fish and fisheries product traceability in the Philippines remains predominantly manual and paper-based, particularly at local and regional levels. Essential documentation such as fish catch reports (FCRs) and logsheets is still largely hand-filled and submitted in hard-copy format. Digital technologies such as the Electronic Catch Documentation and Traceability Systems (eCDTS) can track seafood seamlessly across supply chains to improve market compliance, significantly boosting transparency and compliance with international trade standards (BFAR, 2023).

Given the unequal access to appropriate technologies and internet connectivity, alongside regulatory misalignments, promoting traceability systems for sustainable fisheries through inclusive development communication is essential to driving the growth of the blue economy in the Philippines.

Drivers and Barriers for the Adoption of the Traceability Systems

Research has demonstrated that mobile-based technology plays a critical role in enhancing the marketing of fishery products by establishing direct links between fishermen and end markets (Fujita et al., 2018). Furthermore, mobile technology supports various auxiliary functions for those engaged in the fishing industry, including digital record-keeping, literacy promotion, and activity monitoring (Hassan et al., 2011).

A recent study identified safety, product origin, market compliance, consumer protection, quality assurance, and seafood fraud mitigation as the primary drivers for adopting a traceability system. Understanding these motivators enables the food industry to better evaluate its capacity to implement such systems (Macusi et al., 2024). Recognizing these drivers allows businesses to assess their readiness for adoption. However, adoption is frequently hindered by high costs, lack of government support, insufficient infrastructure, weak regulations, and inadequate technology practices.

A WWF report highlighted the extensive data-sharing required for seafood supply chain transparency makes manual, paper-based tracking ineffective. Although digital traceability technology is already available, implementation requires active collaboration between industry leaders and government stakeholders. These stakeholders must adapt traceability systems for small-scale fisheries and aquafarming, creating mechanisms that discourage poor practices and promote regulatory compliance (WWF, 2020).

Combating illegal, unreported, and unregulated (IUU) fishing through reliable catch documentation is a fundamental objective of traceability systems. Despite its importance, several studies reveal critical adoption barriers. Infrastructure gaps at landing sites, scarce fuel support, and financial constraints frequently impede implementation (Balasubramaniam et al. 2015). Additionally, limited technical understanding alongside lack of awareness regarding digital traceability systems hinder adoption.

Widespread overfishing and human rights abuses on fishing vessels have prompted consumers and seafood companies to demand greeted product origin transparency. In response, major industry actors formed the Global Tuna Alliance in 2017 to block illegally caught tuna from commercial markets while advancing environmental sustainability and human rights standards in tuna fisheries. Reflecting this broader trend, vessel operators of all sizes are implementing systems to log and transmit catch data across the value chain (Mongabay News.2019).

Traceability schemes seek to enhance supply chain transparency across global value chains by introducing new reporting requirements for fishers and traders (Bush, et al. 2017). In examining how these systems are adopted, a social practice perspective diverges from traditional behavioral models by focusing on collective practices rather than individual attitudes or environmental constraints. Social practice framework activities like catching, landing, and trading fish represent goal-directed, routine interactions integrated with technology. Understanding how these practices operate and interlock with other activities reveals how, where, and why targeted interventions are accepted, rejected, or adapted (Schatzki, 2002; Shove, et al., 2012; Spaargaren, et al., 2016)

The steep decline of fish stocks in the Philippine Exclusive Economic Zone (EEZ), particularly within municipal waters, severely affects small-scale fishers. This decline stems not only from overfishing but also from destructive environmental impacts of unsustainable industrial operations. To secure sufficient tuna catches, fishers are driven into offshore waters, exposing them to greater operational hazards. The resulting surge in fuel, time, and operational costs diminishes profit margins, directly contributing to elevated poverty incidence among artisanal fishing households (Muallil, et al., 2014).

This perspective overlooks at least three crucial social factors. First, conventional models frequently assume the presence of perfect information, expecting fishers to calculate the future costs and benefits of alternative effort choices with absolute

certainty. Empirical evidence from developing fisheries shows that fishers operate with bounded rationality based on limited observations amidst ecological and economic uncertainty (Allen and McGlade, 1987). Second, socio-cultural norms significantly shape fishing decisions and must be integrated into analyses (Pollnac et al., 2001; Salas and Gaertner, 2004; Salayo et al., 2008; Fulton et al., 2011). Third, fishers possess adaptive capacity, frequently modifying their behavior in unexpected ways when facing new policies or environmental shifts. Relying exclusively on economic drivers while ignoring these human factors risks counterproductive policy outcomes (Schlüter et al., 2012).

Catch Documentation and Traceability Scheme

To strengthen fisheries supply chain traceability across Southeast Asia, the Southeast Asian Fisheries Development Center (SEAFDEC) developed the electronic ASEAN Catch Documentation Scheme (eACDS) an application that integrates supply chain data from catch to consumer through web and mobile platforms (Saraphaivanich et al., 2022). Transitioning to an electronic catch documentation scheme offers significant advantages over paper-based tracking, including faster data processing, real time notifications, and enhanced analytical capabilities for supply chain actors to detect patterns and evaluate systemic risks.

Standardizing data formats is essential for establishing end-to-end traceability and unlocking the value of reliable data flows. By enabling system interoperability, standardized data improves fisheries management through catch documentation

scheme (CDS), fosters equity for small-scale operations, and mitigates technical trade barriers. Additionally, it optimizes communication across supply chain actors, allowing firms to pull precise data throughout the value chain without friction (GDST, 2024).

Smartphone-based monitoring systems offer real-time data collection or can store data locally until network connectivity is established. Given the widespread ownership of smartphones among fishers, these systems provide a cost-effective solution that functions reliably in offline and remote environments (Mancion, 2020).

Within the Philippine context, empirical research applying the Technology Acceptance Model (TAM) to fisheries related technologies remains limited, though it is steadily expanding. Traceability adoption in municipal fisheries is critical for ensuring food safety and complying with stringent international market requirements, such as European Union (EU regulations). Applying TAM reveals that while adoption is propelled by perceived benefits like enhanced catch value and expanded market access, it remains constrained by underlying technical and socioeconomic barriers (Macusi et al., 2024).

Similarly, a preprint study in the Davao Gulf utilized binary logistic regression to examine the determinants of tuna traceability adoption among small scale fishers. Key variables include fishing trip duration, vessel capacity, and peer-to-peer communication emerged as significant predictors of adoption. The study highlights that strong social

capital and community level information sharing are key drivers for implementing traceability systems (Santos et. al., 2023).

A gap between conservation design knowledge and practical implementation experience accounts for the limited literature from developing countries. Most conservation planning research stops short of evaluating the operational transition from design to action (Gjertsen, 2005). Addressing these disconnects requires tailoring conservation policies to the unique social, economic, and political realities of developing contexts, particularly with inshore marine waters(Cinner and Aswani, 2007)

Adaptation and adaptive capacity are generally regarded as desirable attributes within disaster management and social resilience frameworks. However, short-term, these behavioral shifts risk sequential stock depletion and can escalate resources degradation on a regional scale through expanded illegal, unreported, and unregulated (IUU) fishing (Cinner et al., 2011).

Theoretical Framework

This study is anchored on the Technology Acceptance Model (TAM) by Davis (1989), which explains technology acceptance primarily through the following constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), Behavioral Intention to Use, Attitude Toward Use (ATU) and Actual Use (AU). The Technology Acceptance Model (TAM) was utilized in this study to explain how fishers and

aquaculture stakeholders perceive digital traceability systems in terms of its usefulness and ease of use, and their intention to adopt the technology.

Perceived usefulness refers to the extent to which stakeholders believe that using a traceability system can improve their fisheries or aquaculture activities, while perceived ease of use refers to the extent to which they believe that the system can be used with minimal difficulty or effort.

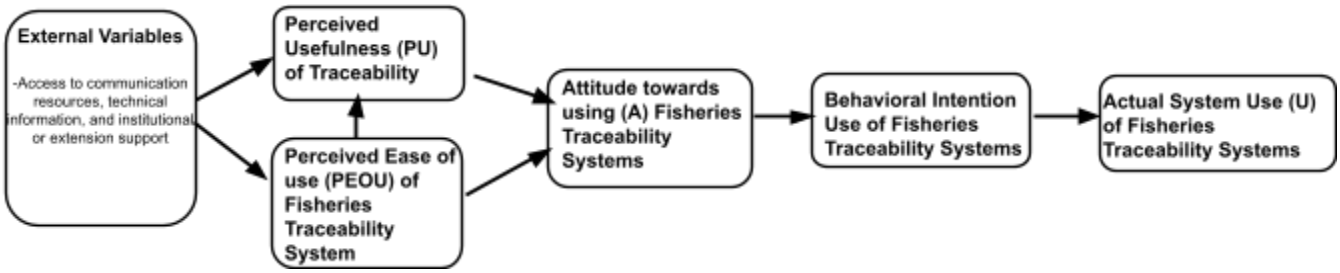
Attitude Toward Use (ATU) represents stakeholders' willingness or intention to use or continue using fisheries traceability systems. Within the TAM framework, favorable perceptions of the usefulness and ease of use of traceability systems contribute to their attitude toward using such systems. A favorable attitude indicates that stakeholders generally view the use of traceability systems as beneficial, appropriate, or useful.

Within the study, these constructs are examined in relation to Behavioral Intention to Adopt (BI) fisheries traceability systems. The framework assumes that stakeholders who perceive traceability systems as useful and relatively easy to use are more likely to express an intention to adopt or continue using traceability practices. Actual Use (AU) represents the stakeholders' observable or reported application of traceability practices and technologies in the fisheries and aquaculture activities.

The study further considers access to communication resources, technical information, and institutional or extension support as external or contextual variables associated with stakeholders' perceptions of traceability systems.

Fig.3.1

Conceptual Framework



Conceptual Framework on the Communication Practices, Technology Acceptance, and Adoption of Fisheries Traceability Systems among Small-Scale Fisheries and Aquaculture Stakeholders in Bataan, Philippines, adopted from Davis (1989) Technology Acceptance Model (TAM).

The study examines variables within a quantitative descriptive-exploratory design. Existing traceability practices and documentation systems provide the descriptive context, particularly in relation to transparency, market access, and regulatory compliance. Communication resources, technical information, and institutional or extension support serve as contextual variables associated with stakeholders' acceptance of traceability systems. Using Davis' Technology Acceptance

Model (TAM), Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are examined in relation to Behavioral Intention to Adopt (BI), Attitude Toward Use (ATU) and Actual Use (AU).

Chapter III

METHODOLOGY

This chapter presents the research design, study area, respondents, data collection procedures, research instruments, and data analysis methods in the study. The methodological approach was structured to systematically assess the traceability practices and adoption of fisheries traceability systems in small-scale fisheries and aquaculture in the selected coastal municipalities of Bataan, Philippines.

The study describes existing traceability practices and stakeholders' perceptions and explores associations among communication resources, technical information, institutional and extension support, perceived usefulness, perceived ease of use, and behavioral intention to adopt fisheries traceability systems using Davis' Technology Acceptance Model (TAM).

Research Design

The study adopts a quantitative descriptive-exploratory research design to examine existing fisheries traceability practices and stakeholders' perceptions and acceptance of fisheries traceability systems among small-scale fisheries and aquaculture stakeholders in the Province of Bataan.

The quantitative approach enables the collection and analysis of numerical data from selected respondents using structured survey questionnaire. The approach also supports the comparison and summarization of responses across different groups of fisheries and aquaculture stakeholders.

The descriptive component focuses on the current traceability practices and documentation systems and the perceived role of traceability in supporting transparency, market access, and compliance with fisheries regulations. It also describes respondents' access to communication resources, technical information, and institutional or extension support relevant to fisheries traceability. It also assessed stakeholders' acceptance of fisheries traceability systems using Technology Acceptance Model (TAM). The primary TAM constructs in the study examines the Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Use (ATU), Behavioral Intention to Adopt (BI), and Actual Use.

Research Instrument and Likert Scale

The study gathered primarily quantitative data using a structured survey questionnaire designed according to the objectives, research questions, and conceptual framework of the study. The data consisted of ordinal responses measured through a five-point Likert scale. The questionnaire includes sections covering respondents' demographic and fisheries-related profiles, existing traceability and documentation practices, communication resources, access to technical information, institutional or

extension support, and the Technology Acceptance Model (TAM) constructs of perceived usefulness, perceived ease of use, and behavioral intention to adopt. The Likert responses were coded numerically as shown in Table 3.1 and summarized using descriptive statistical measures.

For perception-based items, the study used five-point Likert scale to quantify the respondents level of agreement with each statement:

Table 3.1.

Five-point Likert Scale

Scale	Response	Interpretation
5	Strongly Agree	Very High
4	Agree	High
3	Neutral	Moderate
2	Disagree	Low
1	Strongly Disagree	Very Low

The Likert scale enables respondents' perceptions and attitudes toward fisheries traceability to be systematically quantified. The internal consistency of multi-item constructs was assessed using Cronbach's alpha before computing and interpreting composite scores.

The collected quantitative data was analyzed using appropriate descriptive statistics, frequency and percentage will be used to summarize respondents' traceability practices, and categorical responses, while mean and standard deviation will be used to summarize the Likert-scale constructs.

Study Area

The research was conducted in the coastal local government units (LGUs) of Bataan Province, Philippines, specifically Orani and Balanga City. These study sites were purposely selected because of their active involvement in both small-scale capture fisheries and aquaculture, making them appropriate settings for examining the communication dynamics and adoption of fisheries traceability systems. Their diverse fisheries activities and established value chain actors provide an ideal environment for assessing existing traceability practices, and documentation systems, and communication processes among stakeholders.

Respondents

The study included one hundred two (102) respondents from small-scale fisheries and aquaculture in the municipalities of Bataan, specifically, Orani and Balanga City. The respondents included small-scale fishers, aquaculture operators, local traders, processors, fisherfolk organization representatives, and fisheries officers who are directly involved in fisheries and aquaculture activities.

All respondents answered a structured survey questionnaire that assessed existing traceability practices, access to information and support, and perceptions based on the Technology Acceptance Model (TAM), particularly Perceived Usefulness, Perceived Ease of Use, Attitude Toward Use (ATU), Behavioral Intention to Adopt and Actual Use (AU).

Data Collection Procedures

The study examined the existing traceability practices and documentation systems among small-scale fisheries and aquaculture stakeholders in Orani and Balanga City, Bataan. It analyzed how these practices functioned as communication and information systems that supported transparency, market access, and compliance with fisheries regulations. The study used a structured interview questionnaire to assess stakeholders' perceptions based on the Technology Acceptance Model (TAM), specifically Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Use (ATU), Behavioral Intention to Adopt (BI), Actual Use (AU).

Letters of permission and informed consent forms were submitted to the Provincial Agriculture Office (PAO), with coordination conducted through the respective Municipal Agriculture Offices (MAO) prior to the survey interviews. The survey was administered through Google Forms and was designed to take approximately 10 to 15 minutes to complete.

Additionally, an online meeting with the stakeholders was conducted for the guidance and assistance of the fisheries office to circulate the survey questions via group chat and on-site fisheries managers. Respondents answered the survey questionnaire using their mobile phones or devices by accessing the Google Form link shared by the municipal fisheries officers.

Data Analysis

The data collected from the structured survey questionnaire was organized, tabulated, and analyzed using appropriate descriptive and exploratory statistical techniques consistent with the quantitative descriptive-exploratory research design of the study. The analysis focuses on describing existing fisheries traceability practices, measuring stakeholders' perceptions based on the Technology Acceptance Model (TAM), and exploring patterns and associations among the identified study variables. Responses to the five-point Likert-score items were converted into numerical scores. Responses to the five-point Likert-scale items were converted into numerical score in Table 3.1.

A statistician was consulted during the development of the survey questionnaire to ensure that the research instrument was consistent with the quantitative descriptive-exploratory research design of the study and aligned with the objectives of the study. The consultation helped ensure that the questionnaire items were

appropriately structured, measurable, and suitable for statistical analysis. Particular attention was given to the formulation of the Likert-scale items and their alignment with the Technology Acceptance Model (TAM) variables examined in the study: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Behavioral Intention to Use (BI), Attitude Toward Use (ATU), and Actual Use (AU).

Frequency and percentage distributions were used to describe the respondents' demographic and fisheries-related characteristics and categorical responses. They used to determine the distribution of responses to individual traceability practice items. This analysis provides a descriptive profile of existing practices, such as documentation of catch details, invoices and records, product labeling, use of digital tools, and location information.

The mean was used to determine the average score for each survey item and study construct, while the standard deviation was used to determine the variability or consistency of responses around the mean. Mean and standard deviation was applied to the following variables;

- Existing traceability practices and documentation systems;
- Communication resources;
- Access to technical information;
- Institutional or extension support;
- Perceived Usefulness (PU);

- Perceived Ease of Use (PEOU);
- Behavioral Intention to Adopt (BI)
- Attitude Toward Use (ATU);
- Actual Use (AU)

Related questionnaire items were aggregated to generate composite scores representing the major constructs of the study. Composite scores were calculated by obtaining the average score of the items belonging to a particular construct. This method was applied to the TAM constructs and other variables. Cronbach's alpha (α) was used to assess the internal consistency of scales.

Ethical Considerations

Informed consent were obtained from all participants before data collection. Respondents are briefed on the study's objective, voluntary participation, confidentiality of responses, and their right to withdraw at any point. Cultural sensitivity is maintained in engaging fisheries stakeholders.

Chapter IV

RESULTS AND DISCUSSION

This chapter presents the results of the data analysis and the findings in relation to the three objectives of the study. Specifically, it examines the existing traceability practices and documentation systems among small-scale fisheries and aquaculture stakeholders in Bataan. It also analyzes stakeholders' perceptions of fisheries traceability systems using Technology Acceptance Model (TAM) and the role of communication resources, technical information, and institutional and extension support in influencing adoption. It provides an empirical basis for developing policy and program recommendations.

1. Existing traceability practices and documentation systems among small-scale fisheries and aquaculture stakeholders

This study assessed the key traceability practices including documenting catch details, keeping invoices, and production records, labeling fishery and aquaculture products, and using digital tools like mobile phones for recording and sharing traceability information.

1.1. Item-Level Frequency Distributions

The frequency and percentage distribution of responses for each fisheries traceability item were analyzed using a 5-point Likert scale, ranging 1- Strongly Disagree, to 5- Strongly Agree. The questions: Documenting Catch Details (TP1), Keeping Invoices/Records (TP2), Labelling Products (TP3), Recording Location/Time (TP4) questions are summarized below.

As shown in Table 4.1, 58.8% of respondents strongly agreed that they regularly document catch details (TP1), and 53.9% strongly agreed that they keep invoices/records of catch (TP2) as shown in Table 4.2. An important advantage demonstrates an established record-keeping behavior. This suggests that existing documentation processes can potentially be transitioned into more systematic and digital forms. Results also showed that more than half of respondents already recognize and practice product labeling Product Labeling (TP3), which supports product identification, transparency, accountability, and traceability along the fisheries supply chain (Table 4.3). Results showed that 11.7% disagreed or strongly disagreed suggesting that labeling practices were not consistent among all stakeholders (Table 4.3). The results (Table 4.4) showed that with regards to using digital tools (TP4), more than half (51%) disagreed or strongly disagreed. This suggests that while basic documentation practices are widespread, adoption of digital traceability tools is low. This

suggests that there is a relatively low level of digital adoption, which may limit real-time information exchange, data accessibility, and efficient traceability.

Lastly, for the Record Location/Time(TP5), results showed that respondents strongly agreed that they record the location or time information of catch or production.

The findings reveal a gap between existing traceability and the digitalization of those practices. The results suggested that digital traceability does not necessarily require stakeholders to develop entirely new documentation systems; rather, existing practices can be gradually transferred into digital platforms.

On the other hand, the low use of digital tools may imply that introducing a technology alone may not be sufficient to achieve traceability adoption.

Table 4.1

Frequency and Percentage of Responses – Documenting Catch Details (Item TP1)

Response Category	**n**	**%**
5 – Strongly Agree	60	58.8%
4 – Agree	25	24.5%
3 – Neutral	10	9.8%
2 – Disagree	5	4.9%
1 – Strongly Disagree	2	2.0%
Total	102	100.0%

Table 4.2

Frequency and Percentage – Keeping Invoices/Records (Item TP2)

Response Category	n	%
5 – Strongly Agree	55	53.9%
4 – Agree	30	29.4%
3 – Neutral	10	9.8%
2 – Disagree	5	4.9%
1 – Strongly Disagree	2	2.0%
Total	102	100.0%

Table 4.3

Frequency and Percentage – Labeling Products (Item TP3)

Response Category	n	%
5 – Strongly Agree	40	39.2%
4 – Agree	30	29.4%
3 – Neutral	20	19.6%
2 – Disagree	8	7.8%
1 – Strongly Disagree	4	3.9%
Total	102	100.0%

Table 4.4

Frequency and Percentage – Using Digital Tools (Item TP4)

Response Category	n	%
5 – Strongly Agree	10	9.8%
4 – Agree	20	19.6%
3 – Neutral	20	19.6%
2 – Disagree	30	29.4%
1 – Strongly Disagree	22	21.6%
Total	102	100.0%

Table 4.5

Frequency and Percentage – Recording Location/Time (Item TP5)

Response Category	n	%
5 – Strongly Agree	58	56.9%
4 – Agree	28	27.5%
3 – Neutral	8	7.8%
2 – Disagree	6	5.9%
1 – Strongly Disagree	2	2.0%
Total	102	100.0%

1.2 Conversion of Ordinal Responses to Scores

Likert-scale responses were converted into numerical scores, with Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, and Strongly Disagree = 1.

Table 4.6

Ordinal Responses to Scores

Ordinal Responses	Numerical Score	Interpretation
Strongly Agree (SA)	5	Very High
Agree (A)	4	High
Neutral (N)	3	Moderate
Disagree (D)	2	Low
Strongly Disagree (TD)	1	Very Low

Using the Frequency results the Weighted Scores are obtained for the Traceability Practices Responses using this formula: *Weighted Score= (5 x SA) + (4 x A) + (3 x N) + (2 x D) + (1 x SD).*

Table 4.7

Weighted Scores of Traceability Practices

Item	Weighted Score	Mean Score	Interpretation
TP1 – Document Catch	**442**	**4.33**	Very High
TP2 – Keep Invoices/Records	**437**	**4.28**	Very High
TP3 – Label Products	**400**	**3.92**	High
TP4 – Use Digital Tools	**272**	**2.67**	Moderate
TP5 – Record Location/Time	**440**	**4.31**	Very High

The conversion of ordinal responses into scores enables individual responses to be summarized through frequencies and percentages and multi-item constructs to be described using composite scores, means, and standard deviations.

1.3 Construct-Level Summary

The traceability items were aggregated to form a composite Traceability Practices score. Table 4.8 summarizes the scale statistics: means, standard deviation for each item, and the overall composite mean with reliability.

Table 4.8

Item Means, Standard Deviations, and Scale Reliability (N = 102)

Item	Mean	SD
TP1: Document Catch	4.33	0.97
TP2: Keep Invoices	4.29	0.96
TP3: Label Products	3.92	1.12
TP4: Use Digital Tools	2.67	1.28
TP5: Record Location	4.31	0.98
Composite Scale (Mean)	**3.90**	0.98
Cronbach's α	**0.85**	

All items exhibit acceptable variability and the Cronbach's alpha of 0.85 indicates good internal consistency ($\alpha > 0.70$) for the scale. The item means that four of the five items have high means (>3.9), whereas TP4 (Use of Digital Tools) is considerably lower (Mean = 2.67). This pulls the composite mean down to 3.90 on a 5-point scale. These quantitative results underscore that stakeholders generally view traditional traceability practices as established norms (high means on TP1, TP2, TP5) reflecting positive attitudes toward TAM and these behaviors are consistent with high perceived usefulness.

1.4. Composite Score Distribution

Respondents' composite scores (the average of TP1-TP5) were further categorized into five levels using the original 5-point cutoffs (very high to very low). Table 4.9 shows the frequency and percentage in each category.

Table 4.9

Distribution of Traceability Composite Scores (N = 102)

Composite Category	Mean Range	n	%
Very High	4.21–5.00	8	7.8%
High	3.41–4.20	50	49.0%
Moderate	2.61–3.40	26	25.5%
Low	1.81–2.60	15	14.7%
Very Low	1.00–1.80	3	2.9%
Total	—	102	100.0%

Results showed that roughly half of the stakeholders (49%) fall into the High category, indicating they agree with most traceability practices. Only a small minority (2.9%) are in the Very Low range, meaning almost no one strongly disagrees with all practices (Table 4.9). This distribution affirms that basic traceability behaviors are widely adopted, but the smaller low and moderate groups totalling 40% include digital tools and consistent labeling (Table 4.9). However, the presence of respondents in the low and moderate categories also shows that traceability practices were not yet consistently implemented across all stakeholders.

Table 4.10

Reported Recording Systems Used by Respondents (N = 102)

Reported Recording System	Frequency (n)	Percentage (%)	Interpretation
Manual / Paper-Based	76	74.5%	Predominant recording system
Electronic / Digital	16	15.7%	Limited digital adoption

None / Not Applicable	10	9.8%	No reported recording system
Total	**102**	**100.0%**	

Respondents indicated that documenting catch details using pen and paper is one of the most commonly practiced activities based on Table 4.10, reported recording systems, manual or paper-based reported recording systems at 74.5% or 76. In comparison, only 16 respondents (15.7%) reported using an electronic or digital recording system, while 10 respondents (9.8%) reported no recording system or indicated that the question was not applicable.

In addition, results showed that many (53.9%) respondents practice keeping invoices and production records (Table 4.2) which suggests that respondents maintain transaction and production information that serves as an essential communication tool that supports accountability and transparency.

The data show that keeping invoices and production records obtained a mean of 4.29, interpreted as Very High, with 53.9% of respondents strongly agreeing that they maintain such records. This indicates that record-keeping is already an established practice among many respondents. These records provide documented information on transactions and product movements, creating an information trail that can support verification and accountability across the fisheries value chain. Maintaining invoices and production records may also enable stakeholders to provide documentary evidence for

regulatory and traceability requirements and facilitate information exchange among fishers, traders, processors, and other stakeholders.

However, the results should also be considered alongside the respondents' reported recording systems in Table 4.10. The reported respondents using manual or paper-based systems was 76 (74.5%), while only 16 (15.7%) used electronic or digital systems. This result shows that although record-keeping is well established, the information generated remains predominantly managed through conventional methods. Manual records support verification and communication, but their accessibility, retrieval, consolidation, and exchange across different actors is more limited than in integrated digital systems.

Results suggest that the continued reliance on manual documentation also presents important disadvantages. Paper-based records can be difficult to consolidate, retrieve, verify, and share across different actors. They may also be vulnerable to loss, physical damage, incomplete entries, and inconsistencies. As a result, while existing practices provide a useful foundation for traceability, it limits the efficiency and continuity of information exchange across the supply chain. This implies that strengthening traceability requires not only documentation itself but also more standardized and interconnected communication processes.

Table 4.11

Attitude Toward Use (ATU) of Fisheries Traceability Systems (N=102)

Attitude Toward Use (ATU) Indicator	Mean	SD
ATU1. Using a traceability system is a good idea.	3.89	1.06
ATU2. I have a positive attitude toward using a traceability system.	4.14	0.78
ATU3. Using a traceability system is beneficial/useful in my work.	4.06	0.81
Composite Mean	**4.03**	—

The results on the Attitude Toward Use (ATU) show a positive attitude toward the use of fisheries, as reflected by the composite mean 4.03 as high in Table 4.11. Among the indicators, ATU2 “I have a positive attitude toward using a traceability system” obtained the highest mean of 4.14, showing that respondents generally have a positive personal attitude toward using traceability systems. ATU3 “Using a traceability system is beneficial/useful in my work” with a mean of 4.06, suggesting that respondents also perceive the use of traceability systems as beneficial to their work. Lastly, ATU1 “Using a traceability system is a good idea” recorded a mean of 3.89, still high, indicating greater variation of respondents’ views regarding whether adopting a traceability system is good for them.

The advantage of these results is that a favorable attitude provides a supportive behavioral foundation for technology adoption. Stakeholders who view traceability positively may be more receptive to electronic catch records, mobile applications, and

other digital traceability systems. This is consistent with the broader TAM results in the dataset, where Perceived Usefulness (4.11), Perceived Ease of Use (3.96), Attitude Toward Use (4.03), and Behavioral Intention (4.02) were all relatively high.

However, the results also reveal that a positive attitude toward traceability does not necessarily translate into actual digital use. The dataset shows that AU (3.37) is lower than ATU (4.03), and earlier traceability-practice-like paper-based, manual approach showed weak use of digital tools.The use of digital tools for traceability documentation was among the lowest-rated practices.

The importance of ATU results lies in showing that negative attitudes may not be the primary barrier to digital traceability adoption. The results imply that the main challenge is not the absence of traceability practices, but the transition from fragmented and predominantly manual documentation toward more consistent and digitally supported traceability systems. The existing familiarity with record-keeping is an advantage that can support future adoption, while gaps in digital access and capacity remain significant disadvantages.

Table 4.12

Actual Use (AU) of Fisheries Traceability Systems (N=102)

Actual Use Indicator	Mean	SD
AU1. I frequently use the fisheries traceability system.	**3.68**	1.03
AU2. I rely on the fisheries traceability system in my day-to-day activities.	**3.75**	0.89
AU3. I use the fisheries traceability system to track and report my catch.	**3.77**	0.97
Composite Mean	**3.73**	—

The Actual Use (AU) construct obtained a composite mean of 3.73, interpreted as High. Among the three indicators, AU3, “I use the fisheries traceability system to track and report my catch”, which measures the use of fisheries traceability systems for tracking and reporting catch, obtained the highest mean at 3.77. This was followed by AU2, “I rely on the fisheries traceability system in my day-to-day activities”, at 3.75. The AU1, “I frequently use the fisheries traceability system”, measures the frequency of using fisheries traceability systems, recorded the lowest mean at 3.68.

The results indicate that respondents generally report actual engagement with the fisheries traceability systems, particularly for tracking and reporting catch. The relatively higher AU3 result is important because it suggests that traceability is being incorporated into practical information activities rather than being viewed only as a concept or future technology.

The lower mean for AU1 (M=3.68) suggests greater variation among respondents regarding how frequently they use traceability systems. This means that although Actual Use (AU) is generally high, the frequency of use is not equally consistent across all respondents.

An important implication is that High Actual Use should not automatically be interpreted as high digital traceability use. Respondents are actively performing traceability activities while using conventional methods rather than fully digital systems.

Existing Traceability Practices as Communication and Information Systems

The result shows that the four existing traceability practices in the fisheries value chain complement one another and form an integrated communication and information system (Table 4.13).

The results presented in Table 4.13 are important because they demonstrate that the existing traceability practices of respondents are not merely record-keeping activities but also function as communication and information mechanisms within the fisheries value chain. Documenting catch details, maintaining invoices and production records, labeling products, and using documentation tools enable fisheries information to be generated, stored, verified, communicated, and transferred among stakeholders.

The practice of documenting catch details provides the primary source of traceability information by recording information on species, quantity, harvest date, fishing location, and production method. As reflected in the summary table 4.12, this practice generates baseline information that allows stakeholders to verify product origin and demonstrate compliance with fisheries regulations.

Likewise, production records and invoices ensure the continuity of information as products move through the supply chain, reducing information gaps between producers, traders, processors, and regulatory agencies.

Product labeling further extends this communication process by making traceability information visible to buyers and consumers, as a result improving product transparency, consumer confidence, and market competitiveness.

Meanwhile, the use of manual and digital documentation systems facilitates efficient storage, retrieval, and exchange of information, making traceability data more accessible for monitoring, verification, and decision-making.

The importance of these results is evident when respondents reported Very High levels of documenting catch details (4.33), keeping invoices and records (4.29), and recording location or time (4.31), while product labeling was also recorded High (3.92). These results indicate that the fundamental information required for traceability is already being generated by many respondents.

The communication function of these practices depends on information moving between actors throughout the fisheries value chain. Catch information generated by fishers and aquaculture stakeholders can subsequently be used by traders, processors, buyers, fisheries authorities, and other stakeholders. The results further suggest benefits for transparency, market access, and regulatory compliance. Recording catch origin, location, time and transactions can improve the ability to verify where fisheries products originated and how they moved through the supply chain. Product labeling can communicate relevant information to buyers and consumers, while invoices and other records can provide documentary evidence for reporting, inspection, and verification. These functions make traceability relevant not only to individual fishers and aquaculture operators but also broader fisheries governance and supply-chain coordination.

This finding is consistent with FAO (2020; 2022), which highlights the importance of traceability information for food control, verification, transparency, and monitoring throughout the food and fisheries supply chain. Similarly, SEAFDEC electronic ASEAN Catch Documentation Scheme (eACDS) Saraphaivanich et al. (2022) demonstrates how catch documentation can connect information across different stages of the seafood supply chain. The current study supports this principle because respondents already generate several forms of information- catch details, transactions records, labels, and location or time information- that could serve as inputs to a more integrated traceability system.

However, an important contrast came out in terms of digitalizations. Although previous literature demonstrates the potential of electronic and mobile systems to improve fisheries monitoring and traceability, the study found that the use of digital tools was the weakest traceability practice (M=2.67, Moderate). Only 9.8% strongly agreed and 19.6% agreed that they used digital tools, while 51.0% disagreed or strongly disagreed.

In contrast, Mancion (2020) discussed how smartphone-based monitoring systems can support fisheries information collection, including applications designed to operate in remote conditions and accommodate connectivity limitations. The present study does not contradict the technological potential identified in the literature; rather, demonstrated an implementation gap.

Compared with the literature concerning market access and economic benefits, Macusi et al. (2024) identified perceived benefits, including potential improvements in catch value and market opportunities while also identifying technological and socioeconomic constraints to adoption. This is consistent with the current study's High Perceived Usefulness (PU = 4.11), indicating that respondents generally recognize the potential benefits of fisheries traceability.

The implications of these existing traceability practices are particularly relevant to the implementation of the Philippine Fisheries Code (Republic Act No. 8550, as amended by Republic Act No. 10654. The Code promotes responsible fisheries

management, sustainable utilization of aquatic resources, improved fisheries governance, and measures to prevent Illegal, Unreported, and Unregulated (IUU) fishing.

Table 4.13

Existing Traceability Practices as Communication and Information Systems

Existing Traceability Practice	Primary Communication Function	Contribution to Transparency	Contribution to Market Access	Contribution to Regulatory Compliance	Development Communication Perspective
Documenting Catch Details	Generates accurate information on species, harvest date, quantity, and source.	Enables product origin verification and accountability.	Provides credible product information required by buyers.	Supports catch verification and monitoring under fisheries regulations.	Facilitates information generation and knowledge sharing among stakeholders.
Keeping Invoices and Production Records	Documents transactions and product movement throughout the supply chain.	Improves traceability and accountability among fisheries actors.	Demonstrates production history and supply chain integrity.	Provides documentary evidence during inspections and audits.	Strengthens information exchange and institutional coordination.
Product Labeling	Communicates product identity, origin, and production information to buyers and consumers.	Enhances product transparency and consumer confidence.	Increases competitiveness in domestic and export markets.	Supports compliance with food safety and traceability standards.	Promotes effective communication between producers and consumers.
Use of Manual/Digital Documentation Tools	Stores, retrieves, and disseminates traceability information efficiently.	Improves the accuracy and accessibility of information.	Facilitates faster information sharing across the value chain.	Enhances reporting and regulatory documentation requirements.	Supports digital communication, stakeholder participation, and knowledge management.

2. Stakeholders' perceptions on the acceptability and adoption of traceability systems using the Technology Acceptance Model (TAM)

Table 4.14

Composite Mean and Standard Deviation of the Technology Acceptance Model (TAM) Constructs (N = 102)

TAM Construct	No. of Items	Mean	Standard Deviation	Interpretation
Perceived Usefulness (PU)	5	**4.11**	**0.72**	High
Perceived Ease of Use (PEOU)	5	**3.96**	**0.73**	High
Behavioral Intention to Adopt (BI)	3	**4.02**	**0.79**	High
Attitude Toward Use (ATU)	3	**4.03**	**0.88**	High
Actual Use (AU)	3	**3.73**	**0.96**	High

The study also examined the stakeholders' perceptions on the acceptability and adoption of the use of Fisheries Traceability Systems. Table 4.14 presents the composite mean score for the three constructs of the Technology Acceptance Model (TAM). Among the three constructs, Perceived Usefulness (PU) obtained the highest composite mean (M= 4.11, SD= 0.72), which is interpreted as High. This indicates that respondents generally agreed that fisheries traceability systems are beneficial in improving work efficiency, enhancing product quality and safety, supporting compliance with market regulations, and increasing market opportunities.

Behavioral Intention to Adopt (BI) ranked second, with a composite mean of 4.02 (SD= 0.79), also interpreted as High. This result indicates that respondents expressed a strong willingness to adopt, continue using, and recommend fisheries traceability systems. The result shows a favorable intention toward the future implementation of traceability technologies among small-scale fisheries and aquaculture stakeholders.

Meanwhile, Perceived Ease of Use (PEOU) recorded a composite mean of 3.96 (SD= 0.73), likewise interpreted as High. Respondents generally agreed that fisheries traceability systems are understandable, user-friendly, and can be learned without excessive effort. Although this construct obtained the lowest mean among the three TAM dimensions, it still reflects a positive perception regarding the usability of the technology.

The Attitude Toward Use with composite mean of 4.03 further demonstrates generally favorable perceptions towards traceability systems. When considered High composite score for current traceability practices, this indicates that respondents' favorable attitudes are supported by familiarity with the basic processes involved in traceability.

The result for Actual Use (AU) showed a composite mean of 3.73, interpreted as High, indicating that respondents generally engage in fisheries traceability activities. Among the indicators, using the traceability system to "track and report catch" AU3

(M=3.77), “day-to-day activities” AU2 (3.75), while “frequency of system use” AU1 obtained the lowest mean of 3.68 (Table 4.12). Although all indicators were rated High, the results suggest some variation in how consistently respondents use traceability systems.

The results indicate that respondents generally expressed high levels of agreement across TAM constructs, namely perceived usefulness, perceived ease of use, and behavioral intention to adopt. The positive perception of traceability demonstrates stakeholders’ readiness to embrace innovations that enhance transparency, improve record-keeping, facilitate regulatory compliance, and strengthen market competitiveness.

Among the TAM constructs, perceived usefulness received the highest evaluation, indicating that respondents believe traceability systems provide meaningful benefits to fisheries and aquaculture operations. Stakeholders perceive that documenting catch information, maintaining production records, and utilizing traceability technologies can improve product transparency, facilitate compliance with fisheries regulations, increase consumer confidence, and expand opportunities for accessing formal and premium markets.

The results further revealed that respondents also resulted in a high level of perceived ease of use, suggesting that they generally consider traceability practices and technologies to be understandable and manageable. Previous studies have identified

limited digital literacy and insufficient technical support as barriers to adoption. However, the study indicates that stakeholders believe they can learn and implement traceability systems without excessive difficulty, particularly when appropriate guidance and technical assistance are available.

Similarly, respondents demonstrated high behavioral intention to adopt fisheries traceability systems. Their willingness to implement traceability practices reflects positive attitudes toward the potential benefits of improved documentation, digital record-keeping and transparent information management. The strong behavioral intention observed in this study supports the central proposition of TAM that favorable perceptions of usefulness and ease of use contribute to stronger intentions to adopt technological innovations.

Access to Communication Resources

Table 4.15

Summary of Access to Communication Resources

Communication Resource Indicator	Mean	Interpretation
I have access to mobile communication devices for traceability activities.	4.01	High
Internet or network connectivity is available in my area.	3.85	High
I believe traceability systems are necessary for fisheries operations.	4.05	High

Communication tools help me understand traceability requirements.	4.13	High
Composite Mean	**4.01**	**High**

Table 4.15 shows that communication resources play an important enabling role in supporting fisheries traceability activities, as reflected by the composite mean of 4.01, interpreted as High. The results suggest that respondents generally have access to communication resources and recognize their usefulness in understanding and participating in traceability activities.

On the statement “Communication tools help me understand traceability requirements,” the mean score was 4.13, indicating that communication technologies play an important role in enhancing stakeholders’ understanding of traceability systems (Table 4.15). Mobile phones, messaging platforms, online information, and other communication channels can help stakeholders receive instructions, understand documentation requirements, and obtain information related to fisheries regulations and traceability procedures.

On the statement “traceability systems are necessary for fisheries operations“, the mean score was 4.05 suggesting that respondents perceive the importance of traceability systems for their operations. This implies that when information about traceability is effectively communicated, stakeholders can better understand its potential contribution to transparency, product documentation, regulatory compliance, food safety, and market access (Table 4.15).

On the other hand, results showed that the statement “access to mobile communication devices obtained” a mean of 4.01, suggesting that respondents generally possess or can access devices that could support digital traceability activities (Table 4.15). This is significant for the proposed adoption of technology-based traceability because mobile devices can provide a practical interface for recording catch information, receiving instructions, accessing records, and communicating data among fishers, aquaculture operators, traders, processors and fisheries authorities.

Moreover, the statement “internet or network connectivity is available in my area” received the lowest mean score of 3.85 (Table 4.15), indicating that ownership of a mobile device does not necessarily ensure reliable access to an online traceability platform. Weak or inconsistent connectivity could delay data entry, synchronization, verification, and information exchange, particularly for stakeholders operating in fishing grounds or areas with limited network coverage. This implies that a traceability system designed for small-scale fishers and aquaculture sectors should not depend entirely on continuous internet connectivity.

Taken together, the descriptive results suggest that the respondents possess a strong foundation of existing traceability practices and generally favorable perceptions toward traceability systems, but digital tools remain an area requiring attention. The results support the need for interventions that build upon existing documentation, technical information, training, and extension support.

3. Policy and program recommendations to strengthen traceability adoption in small-scale fisheries and aquaculture in Bataan

The third objective of the study sought to recommend a policy and program that would strengthen the adoption of fisheries traceability systems amongst small-scale fisheries in Bataan.

Improved information access should be a central component of traceability programs. Respondents reported High access to communication resources (M=4.01), and that communication tools help them understand traceability requirements with a mean of 4.13. However, internet or network connectivity obtained the lowest communication resource rating at 3.85. This suggests that information strategies should make greater use of communication channels already accessible to stakeholders. Traceability information should be communicated through accessible formats, including mobile communication, community-based information activities, digital platforms, and materials that explain documentation requirements, and the practical benefits of traceability.

Extension support should complement information dissemination by providing continuous assistance during actual implementation. Fisheries extension personnel and relevant institutions can serve as important links between traceability policies, technologies, and their practical applications at the community level. The study's

proposed interventions similarly identify participatory communication, digital extension, regular coaching, and peer-learning activities as mechanisms for strengthening fisheries extension services.

Capacity building is important because favorable acceptance does not necessarily mean that stakeholders are already capable of implementing digital traceability independently. Current record-keeping remains predominantly manual, with 76 respondents reporting manual forms compared with only 16 reporting electronic forms. It is recommended for capacity building activities to emphasize practical competencies such as digital record keeping, mobile devices application, data management, and the correct recording and sharing of traceability information across the value chain.

Institutional mechanisms are necessary to sustain adoption beyond individual training activities. The study's proposed interventions include stronger institutional coordination for data sharing, policy implementation, monitoring and stakeholder collaboration with the coordination among national agencies, LGUs, fisheries agencies, extension personnel, fisherfolk organizations, academic institutions, technology providers among others.

Chapter V

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

This study examined the communication practices and adoption of fisheries traceability systems among small-scale fisheries and aquaculture stakeholders in Orani and Balanga City, Bataan. The study was guided by three major research objectives. First, it examined the existing traceability practices and documentation systems among small-scale fisheries and aquaculture stakeholders, particularly in relation to transparency, market access, and compliance with fisheries regulations. Second, it analyzed stakeholders' perceptions of fisheries traceability systems based on the Technology Acceptance Model TAM), particularly Perceived Usefulness (PU), Perceived Ease ofUse (PEOU), Behavioral Intention to Adopt (BI), Attitude Toward Use (ATU), and Actual Use (AU), in terms of the communication resources, technical information, and institutional extension support, capacity building, and institutional mechanisms for sustainable fisheries traceability adoption. Lastly, the recommended policy and program interventions needed to strengthen traceability adoption.

To summarize, the results demonstrate that small-scale fisheries and aquaculture stakeholders included in the study already engage in several forms of traceability-related documentation, particularly recording catch information, maintaining

records, labeling products, and documenting location or time. However, digital traceability remains less established, as shown by the comparatively low score for the use of digital tools.

The Technology Acceptance Model (TAM) results indicate high levels of Perceived Usefulness, Perceived Ease of Use, Behavioral Intention to Adopt, Attitude Toward Use (ATU), and Actual Use (AU), indicating generally favorable stakeholder acceptance of fisheries traceability systems. At the same time, the difference between high behavioral intention and moderate actual use of digital tools highlights an important implementation gap that may need to be addressed through practical and accessible interventions.

The advantage of these results is that resistance to traceability technology does not appear to be a primary challenge. Respondents generally recognize its usefulness, demonstrate willingness to adopt, and have access to communication resources. The challenge lies in transforming this favorable environment into actual and sustained use. This emphasizes the importance of communication as a bridge between technology acceptance and technology adoption.

The results suggest that strengthening fisheries traceability in the study areas may benefit from building upon stakeholders' existing documentation practices while addressing the weaker areas of digital tool utilization, connectivity, practical understanding, and ease of use. These results provide an empirical basis for developing

policy and program interventions focused on improving information access, practical capacity building, extension support, and appropriate mechanisms for sustainable fisheries traceability adoption.

Conclusion

Based on the results of the study, it has been determined that small-scale fisheries and aquaculture stakeholders in Bataan generally demonstrate established traceability and documentation practices and favorable acceptance of fisheries traceability systems, although important gaps remain in the use of digital technologies.

For the existing traceability practices and documentation systems, the results showed that respondents generally demonstrated established traceability practices. The findings show that small-scale fisheries and aquaculture stakeholders in Bataan already practice several fundamental components of fisheries traceability. These include documenting catch details, maintaining invoices and production records, recording the location and time of catch, and labeling fisheries products. These existing documentation practices are important because they support the generation, preservation, and exchange of information throughout the fisheries value chain. Catch and production records can help establish the origin and movement of fisheries products, thereby improving transparency and accountability. Proper documentation and labeling can also provide buyers, processors, regulators, and other stakeholders with

information needed to verify fisheries products, which can contribute to market access, consumer confidence, and compliance with fisheries and food-safety requirements.

The results also reveal that documentation remains predominantly manual or paper-based, while the use of digital tools is considerably less established. Although stakeholders already perform many of the activities required for traceability, the limited digitization of these practices may restrict the timely retrieval, sharing, consolidation, and verification of information.

From a communication perspective, these practices are also important because documentation serves as a means of recording and transferring information across the fisheries value chain. Catch records, invoices, location data, and labels allow fishers, traders, processors, government institutions, and consumers to communicate and verify information about fisheries products. Therefore, traceability can be viewed not only as a documentation process but also as an information and communication system supporting fisheries governance and decision-making.

Access to communication resources provides an important enabling environment for traceability adoption. Access to mobile communication technologies and other channels can facilitate the recording, exchange, and verification of fisheries information. However, connectivity remains an important consideration. This means that access to devices alone may not guarantee effective digital traceability when stakeholders operate in areas with unstable or limited network access.

The implication is significant for future digital transformation. The advantage is that stakeholders have advanced knowledge and practice the underlying activities required for traceability. Although, the low use of digital tools limit real-time information sharing, data retrieval, integration across the supply chain, and the efficient reporting. It will create difficulties as markets and regulatory systems increasingly require more accessible and verifiable traceability information.

Similarly, access to technical information contributes to stakeholders' understanding of how traceability works, why it is necessary, and how it can be incorporated into their activities. Understandable, and relevant information can strengthen Perceived of Use (PU) by demonstrating the benefits of traceability for transparency, market access, product verification, and regulatory compliance. Technical information and practical guidance can also strengthen Perceived Ease of Use (PEOU) by reducing uncertainty about how traceability technologies and procedures should be used.

The high Perceived Usefulness (PU) score indicates that respondents generally regard fisheries traceability systems as beneficial to their fisheries and aquaculture activities. The high Behavioral Intention to Adopt (BI) suggests a favorable level of willingness toward adopting or continuing to use traceability systems. The implication is that demonstrating clear and locally relevant benefits is an important foundation for encouraging technology acceptance.

The study concludes that fisheries traceability initiatives should build upon stakeholders' existing documentation practices while addressing barriers to digital adoption. Since respondents already demonstrate favorable perceptions and behavioral intentions toward traceability systems, interventions should be focused on translating this acceptance into practical and sustained use.

The results of the study provide a basis for recommending programs to improve connectivity and information access, practical training and capacity building, technical assistance, and strengthened fisheries extension and institutional support. Particular attention should be given to helping stakeholders transition from conventional documentation to simple and digital traceability practices for technology inclusivity.

To further conclude, small-scale fisheries and aquaculture stakeholders in Bataan have a strong foundation for fisheries traceability adoption, demonstrated by established documentation practices, high perceived usefulness and ease of use, favorable behavioral intention, and high access to communication resources. However, the relatively limited use of digital tools represents a key gap between existing traceability practices, technology acceptance, and actual digital utilization.

Thus, strengthening fisheries traceability adoption in Bataan requires not only promoting awareness of its benefits but also creating an enabling environment that makes digital traceability accessible, easy to use, supported by adequate information

and extension services, and compatible with stakeholders existing practices and local conditions. These data provide an empirical basis for developing context-responsive policies and programs aimed at supporting the gradual and sustainable adoption of fisheries traceability systems.

Recommendations

This study provides an initial empirical understanding of fisheries traceability practices and stakeholders' acceptance of traceability systems among small-scale fisheries and aquaculture stakeholders. While respondents demonstrated a high perceived usefulness, perceived ease of use, and behavioral intention to adopt, the actual use of digital tools remained comparatively limited. The study looks at the future research on technology acceptance and actual digital adoption and how it can be sustained. The factors that remained unanswered in the present study includes digital literacy and skills training, affordability and access to devices, organizational and institutional readiness, data governance, interoperability of fisheries information systems, and long-term sustainability of digital traceability systems technologies.

1. Future Research recommendations

It is recommended that future research should further examine which communication resources and channels are most effective in supporting actual traceability adoption among different stakeholder groups. Studies may investigate the

accessibility, frequency of use, reliability, perceived credibility, and usefulness of mobile devices, messaging applications, social media, fisheries extension workers, fisherfolk organizations, government information channels, and other communication resources.

Future studies should also examine whether differences in digital literacy, connectivity, information quality, communication preferences, and access to technical guidance are associated with Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Behavioral Intention (BI), Attitude Toward Use (ATU), and Actual Use (AU). Unlike the present descriptive-exploratory study, future research could employ inferential or longitudinal designs to test these relationships and determine which communication conditions are statistically associated within sustainable adoption of traceability systems.

Future studies should expand the research to other parts of the Philippines to determine similar patterns are observed in different socioeconomic, technological, institutional and academic contexts.

Academic institutions and ICT researchers are encouraged to conduct further research on the design, development, and evaluation of accessible digital fisheries traceability systems suited to small-scale fisheries and aquaculture stakeholders.

Researchers should examine the usability, accessibility, technology acceptance, and actual adoption of traceability systems through pilot testing with fisheries and

aquaculture stakeholders. Interdisciplinary collaboration among academic researchers, fisheries experts, social scientists, government institutions, and local communities is encouraged to ensure that technological solutions are technically feasible and responsive to users' actual needs and capabilities.

Communication interventions should translate technical and regulatory information into simple, understandable, and locally relevant messages delivered through appropriate community communication channels, extension activities, demonstrations, and stakeholders dialogues. Collaboration among communication practitioners, fisheries agencies, LGUs, extension workers, academic researchers, and fishing communities also recommended to ensure that traceability initiatives are not only technologically appropriate but also understandable, inclusive, and responsive to stakeholders' information needs.

2. **Expand the scope of research in digital agriculture and fisheries**

Future research should investigate how communication processes influence the adoption of other digital innovations, such as electronic catch documentation, artificial intelligence, and Internet-of-Things (IoT) technologies in fisheries and aquaculture. This would further establish the role of Development Communication in digital transformation and sustainable resources management.

3. **Adopt a communication-centered approach to fisheries traceability implementation**

Since respondents already demonstrated a high overall level of traceability practices, fisheries traceability programs should build upon existing practices rather than introduce entirely new documentation processes. Existing practices such as recording catch details, maintaining invoices and records, product labelling, and recording location or time should be standardized and integrated to digital traceability systems for sustainable adoption.

LGUs and relevant government offices should promote a gradual transition from paper-based or conventional documentation toward digital traceability tools by addressing the limited digital access of stakeholders.

4. **Strengthen Communication Resources and Fisheries Extension Services**

Respondents reported a high level of access to communication resources. The existing communication environment should be utilized to strengthen the dissemination of clear, timely, and understandable traceability information.

Fisheries extension workers should be equipped with communication and facilitation skills to effectively deliver technical information, mentor stakeholders, and support the implementation of digital traceability systems.

5. Address Connectivity as an Enabling Condition

Among the communication-resource indicators, internet connectivity received the lowest rating, highlighting an ongoing need for infrastructure development. Enhancing local digital networks will be critical to supporting the long-term adoption of digital traceability systems.

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ANNEXES

Annex A

Survey Questionnaire

Adoption of Fisheries Traceability Systems

Section A: Respondent Profile

1. Age: __
2. Gender: ☐ Male ☐ Female ☐ Prefer not to say
3. Role in fisheries value chain:

   ☐ Fisher ☐ Aquafarmer ☐ Trader ☐ Processor ☐ Government ☐ other: _____
4. Years of experience in fisheries:

   ☐ <1 ☐ 1-5 ☐ 6-10 ☐ 11-15 ☐ >15
5. Do you currently use any traceability system?

   ☐ Yes ☐ No
6. If No is the answer in #5, why? _____
7. Type of traceability system used:

   ☐ Paper-based ☐ Mobile App ☐ Digital Platform ☐ Other: _____
8. Level of technology familiarity:

   ☐ Low ☐ Moderate ☐ High

Section B: Technology Acceptance Model (TAM)

Please indicate your level of agreement with each statement using the scale below:

1- Strongly Disagree

2- Disagree

3- Neutral

4- Agree

5- Strongly Agree

Perceived Usefulness (PU)

☐ PU1. The fish traceability system improves my work efficiency

☐ PU2. The fish traceability system enhances product quality and safety

☐ PU3. The fish traceability system improves access to better markets

☐ PU4. The fish traceability system helps meet regulatory requirements

☐ PU5. Overall, the fish traceability system is useful in my work

Perceived Ease of Use (PEOU)

☐ PEOU1. The fish traceability system is easy to learn

☐ PEOU2. The fish traceability system is easy to operate

☐ PEOU3. It is easy to become skillful in using the fish traceability system

☐ PEOU4. The fish traceability system is user-friendly

☐ PEOU5. Using the fish traceability system requires little effort

Attitude Toward Use (ATU)

☐ ATU1. Using the fish traceability system is a good idea

☐ ATU2. I have a positive attitude toward using the fish traceability system

☐ ATU3. Using the fish traceability system is beneficial for my work

Behavioral Intention to Use (BI)

☐ BI1. I intend to use the fish traceability system regularly

☐ BI2. I will continue using the fish traceability system in the future

☐ BI3. I will recommend the fish traceability system to others

Actual Use (AU)

☐ AU1. I use the fish traceability system frequently

☐ AU2. I rely on the fish traceability system in my daily operations

☐ AU3. I use the fish traceability system for tracking and reporting activities

Annex B

Coordination Letter to the Provincial Agriculture Office

CAWIL.ai

https://cawilai.co

June 16, 2026

To: **Hon. Jose Enrique S. Garcia III**
Bataan Provincial Governor
Province of Bataan

Thru: **Engr. Johanna R. Dizon**
Provincial Agriculturist

Re: Coordination Letter to conduct a research survey for the *Traceability Adoption in the Philippines for Small-scale Fishers and Aquaculture*

Dear Hon. Garcia,

Greetings! I hope you are safe and healthy. This is **Cherry Murillon**, Founder and Lead Innovator of CAWIL.AI Solutions. We previously collaborated with your fisheries office on our DOST-PCIEERD Project, entitled ***TrACE.AI, which aims to provide traceability access to Consumers and Exporters, powered by Artificial Intelligence,*** for fish and seafood traceability and catch documentation in 2022.

I am writing to request your assistance and permission to coordinate and conduct a survey among the fisherfolk in Bataan Province. My research focuses on '***Tracing the Catch: Communication Processes and Determinants of Traceability Adoption in Philippine Small-Scale Fisheries and Aquaculture.***' The study aims to examine the communication dynamics and the adoption of traceability systems among stakeholders in small-scale fisheries and aquaculture in Bataan.

Here are the key details regarding the survey coordination:

- **Participants:** Approximately 100 fishers and aquafarmers, fisheries staff, enumerators
- **Method of Survey:** The survey will be conducted online via **Google Form** designed to take 10-15 minutes to complete.
- I request your assistance in circulating the link via group chat or email to target offices and respondents.
- Duration of the survey from June 17 to July 3, 2026

I look forward to your positive response.

Respectfully yours,

Cherry Murillon
Founder/Lead Innovator
+63 927 6790679

Annex C

Informed Consent Form

PAHINTULOT SA PAGLAHOK SA PANANALIKSIK (INFORMED CONSENT FORM)

Pahintulot sa Paglahok sa Pag-aaral

Pamagat ng Pag-aaral

"Tracing the Catch: Communication Processes and Determinants of Traceability Adoption in Philippine Small-Scale Fisheries and Aquaculture"

Mahal na Respondente,

Magandang araw!

Inaanyayahan po kayong lumahok sa isang pananaliksik na pinamagatang **"Tracing the Catch: Communication Processes and Determinants of Traceability Adoption in Philippine Small-Scale Fisheries and Aquaculture."** Isinasagawa ang pag-aaral na ito bilang bahagi ng katuparan ng mga kinakailangan para sa graduate degree. Layunin nitong suriin ang kasalukuyang mga **traceability practices** at mga sistema ng dokumentasyon ng mga stakeholder sa maliliit na pangisdaan at aquaculture sa **Orani at Balanga, Bataan**. Nilalayon din nitong maunawaan kung paano nakaaapekto ang **mga mapagkukunan ng komunikasyon, teknikal na impormasyon, suporta ng mga institusyon at extension services**, at ang pananaw ng mga stakeholder sa paggamit at pagtanggap ng **fisheries traceability systems**.

Ang inyong pakikilahok ay nangangailangan lamang ng pagsagot sa isang **survey questionnaire** na inaasahang matatapos sa loob ng humigit-kumulang **10–15 minuto**. Ang mga tanong ay may kaugnayan sa inyong kasalukuyang mga gawain sa traceability, pag-access sa impormasyon at komunikasyon, suportang natatanggap mula sa mga institusyon, at inyong pananaw tungkol sa fisheries traceability systems.

Ang inyong paglahok ay **ganap na boluntaryo**. Maaari kayong tumangging lumahok o umatras sa pag-aaral anumang oras nang walang anumang kaparusahan o negatibong epekto. Wala ring inaasahang malaking panganib sa inyong paglahok. Bagama't maaaring wala kayong direktang matatanggap na benepisyo, ang inyong mga kasagutan ay makatutulong sa pagbuo ng mas epektibong **mga estratehiya sa komunikasyon, extension programs, at mga rekomendasyong pangpatakaran** upang mapabuti ang pagpapatupad ng fisheries traceability at maisulong ang napapanatiling pamamahala ng pangisdaan sa Pilipinas.

Ang lahat ng impormasyong inyong ibibigay ay ituturing na **mahigpit na kumpidensyal**. Hindi ilalathala o ibubunyag ang inyong pangalan o anumang