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The Oceans and Fisheries Partnership (USAID Oceans)
**Technical Guidance on the Design and
Implementation of Electronic Catch
Documentation and Traceability (eCDT) Systems
in Southeast Asia**



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Cover Photo: USAID Oceans technology partner tests the functionality of upgraded transponders aboard a small-scale fishing vessel in General Santos City, Philippines. Credit: USAID Oceans/L Bader

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ACRONYMS AND ABBREVIATIONS

ACDS	ASEAN Catch Documentation Scheme
AMS	ASEAN Member States
AP2HI	Indonesian Pole & Line and Handline Fisheries Association
ASEAN	Association of Southeast Asian Nations
ATH	Alliance of Tuna Handliners
BAC	BFAR Administrative Circular
BFAR	Bureau of Fisheries and Aquatic Resources
CC	Catch Certificate
CD	Catch Declaration
CDT	Catch Documentation and Traceability
COLD	Catch Origin Landing Declaration
CTE	Critical Tracking Event
CTI-CFF	Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security
DFISH	Directorate of Fisheries, Vietnam
DILG	Department of Interior and Local Government
DOF	Department of Fisheries
eACDS	Electronic ASEAN Catch Documentation Scheme
EAFM	Ecosystem Approach to Fisheries Management
EC	European Commission
eCDT	Electronic Catch Documentation and Traceability
eCDTS	Electronic Catch Documentation and Traceability System (Philippines)
EEZ	Exclusive Economic Zones
EU	European Union
FAME	Futuristic Aviation and Maritime Enterprise
FAO	Food and Agriculture Organization of the United Nations
FLUX	Fisheries Language for Universal Exchange
FMA	Fisheries Management Area
GAD	Gender and Development
GDST	Global Dialogue on Seafood Traceability
GT	Gross Tons
IDS	Innovative Digital Solutions
ILO	International Labor Organization
IMO	International Maritime Organization
IUU	Illegal, Unreported and Unregulated
KDE	Key Data Element
LKIM	Fisheries Development Authority of Malaysia
LOV	Landing of Vessel
MCPD	Marine Catch Purchasing Document
MD	Movement Documentation
MDPI	Masyarakat Dan Perikanan Indonesia
MMAF	Ministry of Marine Affairs and Fisheries
MSU Naawan Foundation	Mindanao State University Naawan Foundation for Science and Technology Development, Inc.
NFC	Near-field Communication

NGO	Non-Government Organization
NOAA	U.S. National Oceanic and Atmospheric Administration
RAFM	Rapid Appraisal of Fisheries Management
RCED	Royal Customs and Excise Department
RDMA	Regional Development Mission for Asia
RFMO	Regional Fisheries Management Organization
RPOA	Regional Plan of Action
SALT	Seafood Alliance for Legality and Traceability
SEA Alliance	Seafood Ethics Action Alliance
SeaBOS	Seafood Business for Ocean Stewardship
SEAFDEC	Southeast Asian Fisheries Development Center
SFFAI	SOCKSARGEN Federation of Fishing and Allied Industries, Inc.
SIMP	Seafood Import Monitoring Program
SSCI	Sustainable Supply Chain Initiative
STELINA	Sistem Telusur dan Logistik Ikan Nasional (Indonesia)
TWG	Technical Working Group
UN	United Nations
USAID	United States Agency for International Development
USAID Oceans	Oceans and Fisheries Partnership
VCA	Value Chain Analysis
VMM	Vessel Monitoring Measures
VMS	Vessel Monitoring System

ASEAN MEMBER STATE FISHERIES AGENCIES

Brunei	Department of Fisheries
Cambodia	Fisheries Administration
Indonesia	Ministry of Marine Affairs and Fisheries (MMAF)
Lao PDR	Department of Livestock and Fisheries
Malaysia	Department of Fisheries
Myanmar	Department of Fisheries
Philippines	Bureau of Fisheries and Aquatic Resources (BFAR)
Singapore	Fisheries Division of the Singapore Food Agency
Thailand	Department of Fisheries
Vietnam	Directorate of Fisheries (DFISH)

TERMS AND DEFINITIONS

Southeast Asia is a geographically large and culturally and socio-politically diverse region, with many distinct languages, dialects, and written languages. It is therefore very important to clarify a specific set of definitions for the most important terms that are associated with fisheries catch documentation and traceability. The following definitions are based off of accepted international definitions provided by relevant organizations (e.g., the Association of Southeast Asian Nations/ASEAN, Southeast Asian Fisheries Development Center/SEAFDEC, United Nations Food and Agriculture Organization/UN FAO) and supporting technical publications (e.g., USAID Oceans and Fisheries Partnership/USAID Oceans and Future of Fish reports). All terms and definitions presented below were reviewed, revised, and confirmed by relevant representatives from ASEAN Member States (AMS) during the development of this document (2018-2019). It should be noted that these terms and definitions vary by country. For more information on distinction by country, see Annex I.

Key Term	Definition
Artisanal Fisheries	Traditional fisheries involving fishing households (as opposed to commercial companies), using a relatively small amount of capital and energy, relatively small fishing vessels (if any), and making short fishing trips, close to shore, and mainly for local consumption. In practice, the definition varies between countries. Artisanal fisheries can be subsistence or commercial fisheries, providing for local consumption or export. They are sometimes referred to as small-scale fisheries. ¹
Bill of Lading	A legal document issued by a carrier to a shipper that details the type, quantity, and destination of the goods being carried. A Bill of Lading also serves as a shipment receipt when the carrier delivers the goods at a predetermined destination. This document must accompany the shipped products, no matter the form of transportation, and must be signed by an authorized representative from the carrier, shipper, and receiver. ²
Catch Certificate (CC)	A document that is uniquely issued to a specific catch being unloaded from a fishing vessel. Although it varies by country, the catch certificate is often provided to the first buyer or processor taking ownership or possession of the associated catch, or to the fishing vessel owner/company making the catch. A duplicate certificate is often required by and provided to a government agency or other designated party (e.g., a Regional Fisheries Management Organization) for the purpose of validating the origin and harvest process associated with the specific catch. Both catch certificates and trade certificates are linked sequentially via their document numbers, ensuring a hard traceability link between transactions along the supply chain. Whereas small-scale fishers will likely only be required to submit a single aggregated or simplified catch certificate, commercial fishing operations may be required to submit multiple catch certificates, depending on the relevant regulations.
Catch Declaration (CD)	Tabulated form submitted by the Master of Fishing Vessel or their authorized representative, specifying information related to catch and landing data.

¹ FAO, 2019a

² Investopedia, August 2019

Key Term	Definition
Chain of Custody	The complete path of a product from its harvest to its final destination. USAID Oceans defines the chain of custody as the period from catch of a seafood product to its import in the destination country or point of final sale.
Certify	To declare in writing that relevant forms or documents are true.
Certificate of Origin	A document prepared and completed by the exporter or the manufacturer that may be subject to official certification by an authorized third party.
Competent Authority	Any person or organization that has been legally delegated or invested the authority, capacity, or power to perform a designated function.
Conservation and Management Measures	Means or procedures to conserve and manage one or more species of living marine resources that are adopted and in force in accordance with relevant rules of international and/or national law.
Consignment	Products which are either sent simultaneously from one exporter to one consignee or covered by a single transport document during shipment from exporter to consignee.
Consumer	The individual who ultimately purchases and consumes a seafood product. The consumer marks the end of the seafood supply chain. Typically, the consumer purchases the seafood product from a retailer or restaurant, although some buy direct from producers. Purchase decisions may differ between men and women based on their perceptions and knowledge of quality, cost, origin, and traceability of the seafood product.
Critical Tracking Events (CTE)	A point in the supply chain where a seafood product is moved between actors, premises, or is transformed. These CTEs often correspond with points at which data capture is necessary to maintain traceability. Common CTEs within the wild-caught seafood supply chain include: production (i.e., the at-sea harvest event); landing (i.e., arrival at port or transshipment vessel); transportation (i.e., an exchange of goods; includes both shipping and receiving); transformation (i.e., the creation or manipulation of the seafood product(s), both inputs and outputs; includes processing, aggregation, and packaging); depletion (i.e., exit of seafood product from the supply chain; includes sale to and consumption by the end consumer, as well as disposal).
Distributor	A person or business that sells seafood products to retailers, restaurants, or consumers. Most distributors buy seafood products from processors or wholesalers, though some distributors buy direct from producers or at auction.
Electronic Catch Documentation and Traceability (eCDT)	The collection, documentation, sharing, and analysis of verifiable ecological, economic, and social data related to captured wild fisheries (catch) as they move through the supply chain, such that they are “traceable” throughout all points in the supply chain—from point-of-catch through to export. Effective eCDT systems must be used by all actors in the supply chain, including fishers, buyers, processors, transporters, exporters, and national government agencies. Most eCDT systems involve the deployment and use of both electronic wireless communications hardware and software (digital applications for both handheld devices and desktop computers).

Key Term	Definition
Exportation	Any movement of fish and fishery products harvested from one AMS to another AMS or non-AMS.
Exporter	A person or business shipping seafood out of the country in which it was caught, landed, and/or processed. Typically, the export will be to a wholesaler that receives the product in a different country.
Fish/Fishery Products	Any marine fish and fishery product, (except those listed in Annex I) of the SEAFDEC ASEAN Catch Documentation Scheme Provisions.
Fishing Master	A person controlling, directing, or determining all fishing operations and activities of a fishing vessel.
Fishing Vessel	Any vessel used or intended for the purpose of commercial exploitation of fishery resources, including those for support, processing, transshipment, and carrier vessels equipped for the transportation of fishery products (except container vessels). The vessel may also perform basic/initial seafood processing tasks and/or segregate or aggregate various products.
High Seas	All parts of the sea as defined in Article 86 of the UN Convention on the Law of the Sea .
Human Welfare	The health, safety, and well-being of a person, group, or organization, with due consideration to differences in gender needs and associated factors. Human welfare is one determinant of human prosperity, happiness, and quality of life; a driver in achieving sustainable development goals; and is influenced by surrounding economic, social, political, and environmental factors.
Importation	The introduction of fish and fishery products into any AMS, including those for transshipment purposes at ports/landing sites in its territory.
Importer	A person or business that brings seafood in from another country for the purpose of resale, usually to a distributor, retailer, or wholesaler.
Illegal, unreported, and unregulated (IUU) fishing	The ASEAN Guidelines defines the following five (5) major forms of IUU fishing activities occurring in the Southeast Asian region: <ol style="list-style-type: none"> 1. Illegal fishing activities within a country; 2. Unauthorized transshipment and landing of fish/catch across borders; 3. Poaching in the Exclusive Economic Zones (EEZs) of other countries; 4. Illegal fishing and trading practices of live reef food fish, reef-based ornamental and endangered aquatic species; and 5. IUU fishing in the high seas and Regional Fisheries Management Organization (RFMO) areas.
Integration	The linking of data obtained from the different nodes of the value chain.
Interoperability	The ability of different information technology systems and software programs to communicate seamlessly for the purpose of exchanging and using data. True

Key Term	Definition
	interoperability requires both semantic (a common meaning) and syntactic (a common format) communications between/among systems and programs used.
Key Data Element (KDE)	Critical data that are required to successfully “trace” a seafood product and/or its ingredients through all relevant CTEs within the supply chain. KDEs usually focus on information relating to the <i>who, what, when, where,</i> and <i>links</i> of a seafood product as it moves through different CTEs.
Landing	An event where a wild-caught seafood product is off-loaded from the fishing vessel that captured the product at sea. Landing events typically occur at a port; however, landing can also happen if the seafood product is subsequently transferred to another vessel.
Logbooks; Logsheets	Tabulated forms used to collect a variety of information (i.e., gear type, gear capacity, number of fishing operations, catch amount by species or group, and/or fishing grounds) that should be documented by the Master of Fishing Boat or authorized persons/or representatives.
Processing Vessel	A large ocean vessel with extensive on-board facilities for processing and freezing captured seafood. Such vessels may significantly shorten the supply chain by catching, grading, processing, packing, and/or freezing seafood products in retail-ready packaging ready to be landed and distributed at port.
Processor	A person or business that receives seafood in bulk from a fishing vessel, factory-fishing ship, or at auction, and then cleans and transforms the fish into a new form of product. Processors may pack and ship the transformed product to a distributor.
Producer	An actor who conducts fishing operations to capture and land seafood. A fisher is an example of a producer.
Production	The event where the wild capture of the seafood product occurs (i.e., at-sea harvest).
Re-exportation	Any movement out of any AMS of fish and fishery products which had been previously imported into that AMS.
Fisheries Management Organization	A sub-regional, regional, or a similar organization with competence, as recognized under international law, to establish conservation and management measures for living marine resources placed under its responsibility by virtue of the convention or agreement by which it was established.
Representatives	A person authorized by a vessel owner/captain/Fishing Master to certify the authenticity of data and information.
Retail	The process of selling seafood products in supermarkets, shops, or through other informal means, such as street-based food vendors or market stalls.
Retailer	A person or business that sells seafood products to consumers, as opposed to another business or wholesaler. Retailers receive products from a distributor or supplier.

Key Term	Definition
Seafood Import Monitoring Program (SIMP)	A risk-based traceability program requiring the U.S. importer to provide and report key data—from the point of harvest to the point of entry into U.S. commerce—on thirteen imported fish and fish products identified as vulnerable to illegal, unreported, and unregulated fishing and/or seafood fraud. Additional information available at www.iuufishing.noaa.gov .
Shipping	An event where a traceable seafood product is dispatched from one defined location to another defined location. A shipping CTE is typically followed by a receiving CTE. Shipping often occurs by road, ship, rail, and/or air transport and is usually supported by formal shipping documents such as product invoice, packing list, Bill of Landing, certificate of origin, and/or cargo manifest.
Simplified Catch Document	A type of catch declaration or logbook/logsheets applicable for small fishing vessels to be filled by the skipper and submitted to authorities upon landing.
Skipper	The Master/Captain of Vessel, especially of a small fishing vessel
Small Fishing Vessels	Small fishing vessels are commonly defined as those that: <ol style="list-style-type: none"> 1. Have an overall length of less than 12 meters without towed gear; 2. have an overall length of less than 8 meters with towed gear; 3. do not have a superstructure; or 4. are less than 20 gross tons (GT) in weight.
Supplier	A person or business that buys seafood products from a wholesaler or producer with the intent of re-selling these products to restaurants or retailers that serve consumers. Suppliers also include the buyers, brokers, traders, or middle actors that sell seafood products to the processor.
Supply Chain	The system of people, businesses, operations, information, and resources involved in the production, processing, brokering, and distribution of seafood products from producer (wild capture) to consumer. Seafood products may be transformed multiple times along the supply chain as the product changes hands from one actor within the supply chain to another.
Traceability	The ability to track information about the origin and journey of seafood products as they pass through a supply chain. This ability includes both: (a) tracking the forward movement of a seafood product through specified stage(s) of the extended supply chain; and (b) tracing the backward history, application, or location of the product at specified point(s) within the supply chain. Traceability results in the ability of actors within the seafood supply chain to access any or all information relating to a seafood product throughout its entire production cycle by means of recorded information uniquely identifiable to the specified product. Traceability is often supported through the measurement of multiple, specified KDEs across relevant CTEs, and requires that supply chain actors have: <ol style="list-style-type: none"> (a) systems to capture, manage and share data; (b) mechanisms for physically linking products and data (such as tags or barcodes); (c) internal processes for tracking products and information about products as they undergo transformation, aggregation, disaggregation, and packaging within a facility;

Key Term	Definition
	<p>(d) supply chain visibility; and</p> <p>(e) the ability to verify that data are accurate and remain intact from origin to consumer.</p>
Traceability Data	Any information regarding the origin, attributes, history, or current location of a seafood product subject to a traceability scheme. Traceability data includes KDEs.
Trade Certificate	A unique document that is issued for a specific seafood product each time that it is acquired within the supply chain, particularly for export, import, or re-export. Trade documents can be issued many times as a seafood product moves through the supply chain. Catch certificates and trade certificates (paper or electronic) are linked sequentially via their document numbers, ensuring a solid traceability link between transactions along the supply chain.
Transformation	An event where any change is made to a traceable seafood product that alters the characteristics and/or identity of the product. Transformation involves the manipulation, processing, aggregation, disaggregation, and/or packaging of a seafood product. Common transformation events include: (a) primary processing of a seafood product from the original form when it was captured into an altered form; (b) secondary processing of a seafood product into a value-added product; and (c) packaging (e.g., canning, wrapping) or re-packaging (e.g., grouping, splitting, mixing) of seafood products. Transformation events usually occur within the physical structure of a specified company within the seafood supply chain.
Transportation	An event where a traceable seafood product moves from one point in the supply chain to another. The transportation event typically involves a transportation company that moves a seafood product from a company that is shipping the product (the sender) to a different company where the product is to be delivered (the receiver). However, a transportation event can also occur between two separate locations within a single company. Transportation of seafood products often occurs by road, ship, rail and/or air between companies. Separation or aggregation of lots may occur during transportation.
Transporter	A person or business responsible for moving seafood from one point in the supply chain to another. Transporters are often a third party between two points/actors in the supply chain that specialize in the cold transport of seafood and other products. While transporters do not transform the seafood products that they transport, they may provide cold storage services for the shipper (outgoing) and/or receiver (incoming) trading points within the supply chain that they are transporting products between. Transporters physically handle trade products (often in packages, cases or pallets), maintain sanitary conditions and temperature control, and provide accountability information (e.g., temperature, distance, and time of transport) that are important for maintaining traceability within the seafood supply chain. Refrigerated vessels involved in transshipment, individuals, and small-scale transporters are included in this category.
Transshipment	The unloading and transfer of some or all seafood products from one vessel to another while at-sea or at port. Typically, transshipment is from a fishing vessel to a refrigerated carrier vessel (also known as a reefer) but can also involve movement of fish between fishing vessels. Transshipment is a CTE.

Key Term	Definition
Validate	To officially prove that certified, relevant CDT documents are true.
Verification	The process of establishing the accuracy or validity of data and information during its catch flow movement.
Verify	To check that relevant CDT documents are accurate.
Wholesaler	A person or business that purchases seafood for the purpose of resale to another business within the supply chain. Wholesalers often receive seafood products from a single distributor in order to ship them to multiple retailers or restaurants. Such wholesale operations are sometimes referred to as “foodservice distributors.”

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USAID Oceans Technical Working Group meeting in Jakarta om July 2015. Credit: USAID Oceans/IJ Pedrajas



USAID Oceans Technical Working Group meeting in Manila in July 2019. Credit: USAID Oceans/IJ Pedrajas

EXECUTIVE SUMMARY

This technical guidance document is a practical guide for developing and implementing electronic catch documentation and traceability (eCDT) systems, principally for marine capture fisheries, that can be aligned to the different capacities, circumstances, and needs of ASEAN member states (AMS). Supported by the Oceans and Fisheries Partnership (USAID Oceans), this guidance aims to facilitate the AMS' transition from paper-based catch documentation schemes to transparent and financially sustainable eCDT systems. This guidance is meant to complement the existing ASEAN Catch Documentation Scheme available for use by AMS governments, their national fisheries departments, and their respective private sector stakeholders. This is a living document, allowing for updates, revisions, and new applications overtime. This guidance is intended for AMS governments, their national fisheries departments, and the respective members of the private sector.

The document consists of three functional chapters—an introduction, technical guidance on eCDT design and implementation, and national experiences with eCDT systems. Chapter 1 (Introduction) details the purpose and objectives of the document as well as an overview of the development process. It covers fundamental principles for implementing eCDT systems; describes the foundational context of eCDT, including the [“FAO Voluntary Guidelines for Catch Documentation Schemes,”](#) the SEAFDEC-developed [“Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020,”](#) and the [ASEAN Catch Documentation Scheme](#).

Chapter 2 (Technical Guidance for eCDT Design and Implementation) describes the process of designing and implementing an eCDT system. This chapter discusses eCDT system and data capture integration and outlines overarching technical conditions. The second chapter details the process for moving paper-based systems to an integrated, electronic system through three major steps: 1) a CDT gap analysis, 2) eCDT system design, and 3) eCDT system implementation. Four eCDT system development models are described, including the minimum suggested performance measures.

Chapter 3 (National Experiences on Designing and Implementing eCDT Systems) presents information from experiences with eCDT system design and implementation in the ASEAN region. This chapter shares USAID Oceans' lessons learned from implementing eCDT systems in the programs two “learning sites”—Bitung, Indonesia, and General Santos City, the Philippines—between 2015 and 2019 as well as in the project's “expansion sites,” with a specific focus on Vietnam's Binh Dinh Province. Finally, the chapter takes a regional perspective and describes the electronic ASEAN Catch Documentation Scheme (eACDS) design and implementation structure and process and implementing eACDS in the AMS.

Details about AMS's fisheries-related definitions/terminologies, AMS fisheries management regulations, regional policies relating to existing CDT, and participants at the various workshops held in the region to develop this technical guidance document are available as Annexes.

I. INTRODUCTION

Electronic catch documentation and traceability (eCDT) systems are a relatively new concept for fisheries managers and seafood companies, both in Southeast Asia and globally. As of 2018, most Association of Southeast Asian Nations (ASEAN) member states (AMS) remained fully or largely reliant on the use of paper-based catch documentation, particularly at the point-of-catch and at landing. Across the AMS, it also varies widely which parties are responsible for collecting CDT data, verifying CDT data, and which data are to be collected at each stage of the supply chain. These details and differences are explored fully in Section 1.1.2.

In an effort to build AMS awareness and capacity relating to using eCDT systems, Southeast Asian Fisheries Development Center (SAEFDEC) and the USAID Oceans and Fisheries Partnership (USAID Oceans) have created this document to provide clear and easily understandable guidance on how AMS (or others) can develop and implement eCDT systems to meet their own fisheries traceability and sustainability needs. This document is designed to support each AMS' initiatives to establish comprehensive and robust fisheries traceability and is intended to provide practical technical guidance to AMS on the eCDT development and implementation process, principally for marine capture fisheries, as well as the different eCDT technologies and methods that have been tested and are available (at the time of writing). Each AMS can customize the design and implementation of their eCDT system based on the process provided in this technical guidance. The guidance is inclusive of multiple traceability solutions, including the eACDS and other eCDT software and hardware technologies. After following the technical guidance outlined in this document, AMS should be in a position to develop a national eCDT system that uses technologies that are broad enough to be dynamic and flexible through time, allow for multiple types and scales of commercial fishery supply chains (from small-scale to large commercial fishing operations), and acknowledge the broad range of regional disparity across ASEAN in terms of national fisheries management capacity and private sector engagement.

This document provides information on additional considerations that should be made when developing traceability systems to ensure a holistic approach that acknowledges environmental, economic, and human aspects of the seafood supply chain. These include human welfare issues related to illegal, unreported, and unregulated (IUU) fishing, particularly human trafficking, labor abuse, working conditions, and gender inequalities. Although paper and electronic catch documentation and traceability (CDT) systems are currently challenged by human welfare-related data gaps due to the complexity of capturing qualitative information, there are some stand-alone initiatives in tracking human welfare activities in the seafood supply chain that can be leveraged—calling for collaboration among developers and users to create eCDT systems that improve human wellbeing, ecological wellbeing, and resource sustainability.

THIS DOCUMENT IS:

- Guidance on how to develop and implement an eCDT system, particularly for marine capture fisheries
- Suggestions for considerations related to environmental, economic, and human aspects of the seafood supply chain
- Guidance to meet national and international seafood regulations and requirements
- A living document

THIS DOCUMENT IS NOT:

Specific, in-depth information on the technical approach and specifications to design, test, and implement an eCDT system.

The technical guidance outlined in this document should also assist AMS to more readily meet national and international seafood regulations and requirements, respond to the increasing demand from importing countries to provide traceable catch documentation, as well as meet AMS obligations as signatories to the United Nations Food and Agriculture Organization (FAO) “Voluntary Guidelines for Catch Documentation Schemes.”

This technical guidance document does not provide specific, in-depth information on the technology and specifications for an eCDT system. That information is provided in other documents such as the [“Southeast Asian Development Center, ASEAN Catch Documentation Scheme for Marine Capture Fisheries”](#) and the USAID Oceans’ [“Fisheries Catch Documentation and Traceability in Southeast Asia: Technical Concept and Specifications.”](#)

1.1 Purpose, Goal, and Objectives

Purpose

The purpose of this technical guidance is to help facilitate AMS' transition from paper-based catch documentation schemes to transparent and financially sustainable eCDT system. This guidance is not meant to replace the eACDS, but to enhance and complement it by supporting establishment and implementation of eCDT systems. This document is intended for AMS governments, their national fisheries departments, and the respective members of the private sector.

Goal

The goal of this technical guidance is to provide a practical guide to developing and implementing eCDT systems that can be aligned to the different capacities, circumstances, and needs of AMS and support regional harmonization.

Objectives

The objectives of this document are to:

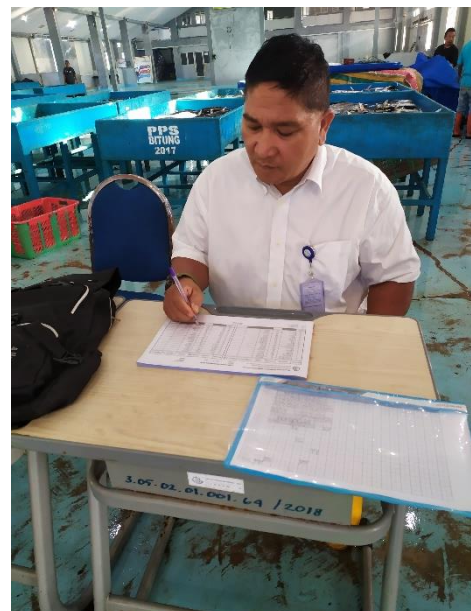
- provide general principles needed to establish and implement an eCDT system that combats IUU fishing and conserves marine biodiversity, including a set of minimum requirements and standards;
- outline a process for designing and implementing an eCDT system; and
- provide guidance on developing national roadmaps to support eCDT system adoption and implementation by ASEAN member countries.

This document has been designed to be used by AMS, alongside the ACDS, to guide customized design and implementation of national eCDT systems.

1.2 Electronic Catch Documentation Systems

Since the early 2000s, a switch from paper-based to electronic fisheries data collection and documentation systems has been underway, including those used for CDT. Paper documentation of seafood in supply chains, as exists in most countries around the world, has proven insufficient to meet the requirements of traceability robust enough to eliminate illegal catch and mislabeling. This movement has been seen at regional, national, and local levels. An example of this can be seen in the ACDS, a paper-based CDT scheme which began its development in 2010 under SEAFDEC as part of a regional initiative between SEAFDEC and AMS to improve traceability of marine capture fisheries, prevent fish and fishery products from IUU fishing from entering the supply chain, and enhance intra-regional and international trade.³ In 2017, the eACDS was developed—an electronic platform to operationalize the ACDS. While the ACDS is based on a paper-based CDT scheme, ASEAN recognizes the role of digital technology in modern fisheries management and encourages the appropriate use of eCDT systems.

Some countries may prefer to implement the existing eACDS either prior to or in lieu of developing their own national eCDT



*In some countries, paper logbooks are still used to capture catch data at the point of landing.
Credit: USAID Oceans/L Bader*

³ Southeast Asian Development Center, 2017.

system. Other countries may prefer to begin with designing and building their own national eCDT system that reflects country-specific conditions and policies. In either case, available eCDT technologies (hardware and software) that are designed for use within specific parts of the fishery supply chain (e.g., point-of-catch; processing center) may be suitable and useful to apply and adapt or customize within existing national and regional fishery traceability systems. If no eCDT system currently exists in a country, it may be useful to adopt and test an existing eCDT system that will allow for integration across the entire value chain (e.g., eACDS). In other cases, a country may already have an existing national eCDT system to capture data from actors operating across the fishery supply chain (e.g., Indonesia, the Philippines, Thailand), and may simply want to build on the existing system and strengthen data integration and interoperability across the value chain.

1.2.1 The Electronic ASEAN Catch Documentation Scheme



In 2017, SEAFDEC led the development of an electronic version of the ACDS—the eACDS—to establish a standardized software application for region-wide use to enter and collate relevant information (KDEs) along specific points in the supply chain. In 2018, the eACDS was launched as a web-based platform, accessible through both desktop and laptop computers and handheld/mobile technologies, including smart phones and digital tablets. The eACDS

stores data in a cloud server during initial testing, with data stored directly in the implementing country's private data server and once fully implemented. During 2018-19, SEAFDEC piloted the eACDS in Brunei and assisted other AMS to explore how the eACDS could be implemented in additional pilot sites to advance national eCDT efforts.

Following the guidance outlined under the ACDS, the eACDS supports three main processes:

1. Issuance of a Catch Declaration (CD) - from point-of-catch to landing
2. Issuance of a Movement Document (MD) - from landing to processor or local market
3. Issuance of a Catch Certificate (CC) - from processing to export/import and consumer

The eACDS also generates Processing Statements/Certificates at the processing stage for seafood products intended for re-export. Completion of these processes provide importers with the required information to clear CDs and trace the origin of fish and fish products through the complete supply chain.

Implementation of the eACDS for domestic fisheries involves nine steps, outlined in Section 2.2. KDEs captured by the eACDS ensure and enhance the efficiency of the system and support more effective fisheries management and good governance. KDEs are collected across six categories:

1. Point-of-Catch
2. Buyers/Receivers and Sellers (Broker/Wholesale)
3. Processors
4. Exporters and International Shipping
5. Importers
6. End Consumers

eACDS mobile application interface for catch reporting

The eACDS applications cover all relevant users in the supply chain, across the following steps:

1. Port-out permission and issuing initial CD
2. Catch reporting at point-of-catch
3. Port-in permission, catch verification and issuing CD
4. Fish purchasing at landing
5. Issuing MD to buyers and processors
6. Requesting the CC by processors
7. Issuing the CC by Competent Authority
8. Export
9. Importer, customs, and consumer trace fishery product from a QR-code

1.2.2 Current National eCDT Systems in ASEAN

Several AMS have also begun to develop and implement their own national eCDT systems. In many cases, these systems have brought together historic paper-based systems and newer electronic data collection mechanisms to document processes across various points in the supply chain, with the goal of transitioning more fully to electronic-based documentation over time. Three of the most significant national undertakings from 2017-2019, are eCDT initiatives by the governments of Thailand, the Philippines, and Indonesia. As of 2019, Malaysia, Vietnam, and Myanmar were also exploring the development of national eCDT systems, supported by the eACDS modules. The relatively recent and rapid advancement of CDT and eCDT capabilities across AMS has resulted in a number of -based and electronic CDT protocols that vary widely across the region. Tables 1-4 provide an overview of AMS CDT infrastructures, capabilities, and protocols as of 2019. Table 5 provides an overview of individual country gaps in eCDT implementation as identified by AMS during USAID Oceans-conducted consultations in 2018 and 2019. The information in these tables illustrates that AMS eCDT capabilities and protocols differ widely by country. Most AMS have catch documentation processes in place that use a combination of electronic and paper data collection at various points in supply chain, with almost all employing paper catch documentation from the point-of-catch and landing. Indonesia, the Philippines, Thailand, and Vietnam have the most advanced electronic/digital components within their CDT systems. Indonesia and Thailand are the only AMS to employ an online electronic catch reporting for oversea fishing vessels.

To effectively meet national and international market requirements and support sustainable fisheries management, it is recommended that national eCDT systems be designed around four components.

FOUR COMPONENTS FOR EFFECTIVE ECDT SYSTEMS

1. **eCDT hardware** – includes computers, sensors, data loggers, digitized tagging equipment, and cellular, radio, and satellite communications equipment
2. **eCDT software** – either programmed by software engineers from within the national fishery agencies or via contract with a private company
3. **Analytical services** – includes machine learning and artificial intelligence, typically with data/analytical visualization capabilities via a “dashboard” software application
4. **Fishery monitoring centers** – an “integrator” to display real-time data gathered and transmitted by eCDT hardware and software through relevant analytics to enable real-time fisheries management and decision making; centers are typically housed within secure offices of national fisheries management agencies or at a separate secure location in partnership with relevant law enforcement and/or maritime defense agencies

Table I. CDT data collection methods used by competent authorities in each AMS, across all stages in the fishery supply chain (2019)

Country	Capture (Small-scale)		Capture (Commercial)		Port		Buying		Shipment (land, boat, domestic)		Processing		Shipment (air or ship, export)	
	Paper	Electronic	Paper	Electronic	Paper	Electronic	Paper	Electronic	Paper	Electronic	Paper	Electronic	Paper	Electronic
Brunei Darussalam	✓		✓		✓	✓	✓		✓		✓		✓	
Cambodia	✓		✓		N/A		✓		✓		N/A		✓	
Indonesia	✓	eLicense, eLogbook	✓	eLicense, eLogbook, observer system, vessel licensing	✓	STELINA, ^a Catch Certification System, Fishing Port Central Information System, port clearance	✓	STELINA	✓	STELINA, certificate of origin	✓	STELINA, health certificate system	✓	STELINA, health certification system, catch certification system online, certificate of origin
Lao PDR	N/A													
Malaysia	✓	e-license, Fisher Registration System	✓	e-declaration, e-licensing, vessel monitoring system (VMS), eLogbook	✓	Landing of Vessel (LOV)	✓		✓		✓		✓	✓
Myanmar	✓		✓		✓	✓	✓	✓	✓		✓	✓	✓	

Country	Capture (Small-scale)		Capture (Commercial)		Port		Buying		Shipment (land, boat, domestic)		Processing		Shipment (air or ship, export)	
	Paper	Electronic	Paper	Electronic	Paper	Electronic	Paper	Electronic	Paper	Electronic	Paper	Electronic	Paper	Electronic
Philippines	✓	Radio frequency-based Vessel Monitoring Measure (VMM), radio frequency technology (pilot stage)	✓	BFAR eCDTS ^b , VMS/VMM ^c , fisheries observer program	✓	BFAR eCDTS ^d	✓	BFAR eCDTS	✓	BFAR eCDTS	✓	BFAR eCDTS	✓	✓
Singapore	N/A		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thailand	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vietnam	✓		✓		✓		✓		✓		✓	✓	✓	✓

^a STELINA (Sistem Telusur dan Logistik Ikan Nasional of Indonesia) is Indonesia's national eCDT system that collects data and facilitates traceability in Indonesia's downstream supply chain, from landing to export, including logistics, cold storage, processing, etc.

^b The Philippine Bureau of Fisheries and Aquatic Resources' eCDT systems.

^c VMM was only recently implemented in the Philippines in some areas of the country. It is intended to cover all catcher vessels, but implementation is currently focused on those supplying canneries exporting to the European Union (EU). In 2020, all vessels will be required to comply. There are some areas in the Philippines piloting or establishing paper-based catch documentation (not the entire industry).

^d This CDT status generally applies to the country (government) as a whole. However, in some provinces, some private companies have their own electronic systems that need to be integrated with the government system, which will require coordination public/private sector coordination and regulatory action.

Table 2. Primary parties (person/agency) responsible for CDT data collection in each AMS, across all stages in the fishery supply chain (2019)⁴

Country	Capture (Small-scale)	Capture (Commercial)	Port	Buying	Shipment (land, boat; domestic)	Processing	Shipment (air or ship; export)
Brunei Darussalam	Fishers	Captain/Skipper	Company/Fisheries Department	Buyer/broker	- Shipper (company) - Import/Export Authority (Royal Customs and Excise Department/RCED)	Processor (company)	- Shipper (company) - Import/Export Authority (RCED)
Cambodia	Captain	Captain	N/A	Broker	Shipper (company)	N/A	Shipper and export authority (government)
Indonesia	Captain	Captain	- Company - Port Authority	Buyer/broker (company or agent)	- Shipper (company) - Port Authority	- Processor/private sector (company) - Government	- Shipper - Export authority (government)
Lao PDR	Fishers	None	None	Buyer/broker	Boat owner	Women's group	Fishers
Malaysia	Fishers	Captain	- Company - Port Authority - Fisheries Development Authority of Malaysia (LKIM)	Buyer/broker (company or agent)	Shipper (company)	Processor (company)	- Shipper - Export Authority (Customs)
Myanmar	Fish buyer or Captain	Captain/company	- Company - DOF - One Stop Service - Landing Site	Buyer/broker (company or agent)	- Shipper - Vessel owner or company	Export company or factory	- Shipper - Export Authority (government)
Philippines	Fishers/ Captain	Captain	- BFAR - Philippines Fisheries	Buyer/broker (company or agent)	Shipper (company)	Processor (Company), BFAR	-Shipping Company -shipper/ exporter

⁴ USAID Oceans AMS Consultation Meetings, 2018-2019.

Country	Capture (Small-scale)	Capture (Commercial)	Port	Buying	Shipment (land, boat; domestic)	Processing	Shipment (air or ship; export)
			Development Authority (PFDA) - Fishing Company				
Singapore	Owner/ Licensed Fisher	Master/Owner	- Shipping Agent - Port Authority (government)	Importer/Buyer	Shipper (company)	Processor (company)	- Shipper - Export Authority (government)
Thailand	Owner/ Master	Owner/ Master	-Port owner -Fish market organization	Buyer	Buyer	Processor (company)	Exporter
Vietnam	Captain	Captain	- Company - Fishing Port Authority (government)	Buyer (company or agent)	Shipper (company)	Processor (company)	- Shipper - Export Authority (government)

Table 3. Primary parties (person/agency) responsible for CDT data verification in each AMS, across all stages in the fishery supply chain (2019)

Country	Capture (Small-scale)	Capture (Commercial)	Port	Buying	Shipment (land, boat; domestic)	Processing	Shipment (air or ship; export)
Brunei Darussalam	Small-scale fishers/DOF	DOF/skipper/Captain	DOF/fishing company	DOF/buyer or broker company	DOF/shipping company	DOF/processing company	DOF/shipping company/import-export authority
Cambodia	Fisheries Administration	Fisheries Administration	Not Applicable	Not Applicable	General Department of Custom, Port Authority	Fisheries Administration	General Department of Custom, Port Authority
Indonesia	Oceanic Fishing Port Authority (government)	Oceanic Fishing Port Authority (government)	Oceanic Fishing Port Authority (government)	- Buyer/broker (company) - Fish Quarantine, Quality Control, and Food Security (government)	- Shipper and company - Fish Quarantine, Quality Control, and Food Security (government)	Processor (company)	Shipper and export authority (government)
Lao PDR	None	None	None	N/A	N/A	N/A	N/A
Malaysia	DOF		LKIM		LKIM	DOF	Customs
Myanmar	Fish Buyer or Captain	Captain/ company	- Company - Department of Fisheries (DOF) - One Stop Service - Landing Site	Buyer/broker (company or agent)	- Shipper - Vessel owner or company	Export company or factory	- Shipper - Export Authority (government)
Philippines	Fisher/BFAR	Captain/BFAR	BFAR/PFDA/ fishing company	BFAR/buyer or broker company	Shipping company/ BFAR	Processing company/BFAR	Shipping company/ BFAR/Department of Health
Singapore	Information not available						
Thailand	DOF/Marine Department			N/A			

Country	Capture (Small-scale)	Capture (Commercial)	Port	Buying	Shipment (land, boat; domestic)	Processing	Shipment (air or ship; export)
Vietnam	Directorate of Fisheries (DFISH) and Sub-DFISH	DFISH	Port authorities	Sub-DFISH	DFISH and Sub-DFISH	Sub-DFISH	Customs

Table 4. KDEs collected at each stage across the fishery supply chain by AMS competent authorities for CDT purposes (2019)

Country	Capture (Small-scale)	Capture (Commercial)	Port	Buyer	Shipper (land, boat; domestic)	Processor	Shipper (air or ship; export)
Brunei Darussalam	<ul style="list-style-type: none"> - Fishing License - Catch data and sales records 	<ul style="list-style-type: none"> - Fishing License - Logbook catch data 	<ul style="list-style-type: none"> - Logbook - Catch landed document 	<ul style="list-style-type: none"> - Catch Purchase records 	<ul style="list-style-type: none"> - Company registration certificate - Delivery order 	<ul style="list-style-type: none"> - Company registration certificate - Raw material batch ID - Finished good ID 	<ul style="list-style-type: none"> - Company registration certificate - Certificate of Export - Commercial invoice - Airway Bill or Bill of Lading
Cambodia	<ul style="list-style-type: none"> - Fishing logbook 	<ul style="list-style-type: none"> - Fishing logbook 	N/A	<ul style="list-style-type: none"> - Landing site logbook 	<ul style="list-style-type: none"> - License form 	N/A	<ul style="list-style-type: none"> - Health Certificate
Indonesia	<ul style="list-style-type: none"> - Logbook - Proof of vessel arrival 	<ul style="list-style-type: none"> - Logbook - Captain's certificate 	<ul style="list-style-type: none"> - Catch certificate/document - Domestic health certificate 	<ul style="list-style-type: none"> - Purchase order 	<ul style="list-style-type: none"> - Manifest or delivery order - Domestic certificate of origin 	<ul style="list-style-type: none"> - Raw material, batch ID - Finished good ID - Certificate of Origin 	<ul style="list-style-type: none"> - Certificate of Origin - Packing list - Health certificate - Bill of Lading
Lao PDR	<ul style="list-style-type: none"> - Personal record 	N/A	N/A	N/A	<ul style="list-style-type: none"> - Manifest or delivery order 	<ul style="list-style-type: none"> - Raw material 	<ul style="list-style-type: none"> - Personal record
Malaysia	<ul style="list-style-type: none"> - Sale Bill - Fishers Registration Card 	<ul style="list-style-type: none"> - LOV - Captain's certificate 	<ul style="list-style-type: none"> - Catch certificate/document/LOV 	<ul style="list-style-type: none"> - Purchase order 	<ul style="list-style-type: none"> - Delivery Order 	<ul style="list-style-type: none"> - Logbook - Raw material, batch ID - Finished good ID 	<ul style="list-style-type: none"> - Certificate of Origin - Packing list - Health Certificate - Bill of Lading

Country	Capture (Small-scale)	Capture (Commercial)	Port	Buyer	Shipper (land, boat; domestic)	Processor	Shipper (air or ship; export)
Myanmar	<ul style="list-style-type: none"> - Sale Bill - Catch document 	<ul style="list-style-type: none"> - Fishing license, fishing logbook /catch data 	<ul style="list-style-type: none"> - Landing catch - Catch document 	<ul style="list-style-type: none"> - PMD, Sale bill or voucher, catch document 	<ul style="list-style-type: none"> - Catch and transshipped document 	<ul style="list-style-type: none"> - Product movement document - Processing Statement 	<ul style="list-style-type: none"> - Catch Certificate - Health Certificate - Export Declaration
Philippines	<ul style="list-style-type: none"> - Fish Catch Report 	<ul style="list-style-type: none"> - Logsheet 	<ul style="list-style-type: none"> - Catch Origin Landing Declaration 	<ul style="list-style-type: none"> - Purchase order 	<ul style="list-style-type: none"> - Manifest/ delivery order 	<ul style="list-style-type: none"> - Receiving report - Raw material, batch ID - Finished good ID 	<ul style="list-style-type: none"> - Packing list - Catch and Health Certificate - Bill of Lading/Airway Bill
Singapore	N/A	<ul style="list-style-type: none"> - Logbook - Catch report document 	<ul style="list-style-type: none"> - Catch certificate/ Inward Manifest 	<ul style="list-style-type: none"> - Import Permit/ Purchase order 	<ul style="list-style-type: none"> - Import Permit/ Inward Manifest/ Delivery Order 	<ul style="list-style-type: none"> - Raw material, batch ID - Finished product ID code 	<ul style="list-style-type: none"> - Certificate of Origin - Packing list - Health Certificate - Bill of Lading
Thailand	<ul style="list-style-type: none"> - Vessel Registration - Simplified Logbook for export 	<ul style="list-style-type: none"> - Vessel Registration - Fishing License - Fishing Logbook - PIPO Documents - MCTD - VMS (≥ 30 GT) 	<ul style="list-style-type: none"> - Marine Catch Purchasing Document (MCPD) - Landing Declaration 	<ul style="list-style-type: none"> - MCPD 	<ul style="list-style-type: none"> - MCPD 	<ul style="list-style-type: none"> - MCPD 	<ul style="list-style-type: none"> - MCPD - Catch Certificate - Health Certificate
Vietnam	<ul style="list-style-type: none"> - Fishing report (vessels 6-12m) 	<ul style="list-style-type: none"> - Logbook (vessels >12m) 	<ul style="list-style-type: none"> - Catch document 	<ul style="list-style-type: none"> - Purchase order 	<ul style="list-style-type: none"> - Manifest or delivery order 	<ul style="list-style-type: none"> - Raw material, batch ID - Finished good ID 	<ul style="list-style-type: none"> - Certificate of Origin - Packing list - Health Certificate - Bill of Lading

Table 5. Identified gaps in implementing eCDT in AMS

Country	Identified Gaps
Brunei Darussalam	<ul style="list-style-type: none"> • Large contribution by small-scale fishers to capture fisheries (70%) • Limited human resources and assets for monitoring, control, and surveillance activities • Limited job opportunities for local youth
Cambodia	<ul style="list-style-type: none"> • Limited market access due to inability to keep up with production and market system of neighboring countries • Lack of cross-border collaboration among key players • Lack of cross-border trade regulation and regulation implementation • Few incentives for the private sector to enter into commercial post-harvest facilities • Lack of financial resources • Lack of port-in/port-out system to meet ACDS requirements • Fish frequently sold at sea without transmission of catch records • High number of small-scale fishers
Indonesia	<ul style="list-style-type: none"> • Lack of data integration for downstream and upstream industries into a single national data system • Lack of a designated government unit responsible for monitoring compliance • Lack of accountability in verification and validation processes
Lao PDR	<ul style="list-style-type: none"> • No existing CDT system, with amount of sale at landing sites the only information presently being recorded • Fisheries consist mainly of small, local landing sites along the Mekong River, reservoirs, and lakes (95% small-scale fishing) • Lack of resources, including for building staff capacity
Malaysia	<ul style="list-style-type: none"> • Catch Certificate reporting involves state export to EU countries • Require additional human and financial resources for monitoring, auditing, and verification • Need additional capacity building on CDT for new and existing fisheries agency officers • Lack consolidation and organization of KDEs under one eCDT system (currently collected at multiple points, through different forms, and managed by different agencies with a very limited scope for data sharing) • Limited integration and collaboration across government agencies
Myanmar	<ul style="list-style-type: none"> • Offshore fishery sector comprised predominantly of trawlers • Current CDT system is largely paper based • Low interest in eCDT from policy/decision makers • Lack of technical capacity and financial resources • Limited post-harvest facilities
Philippines	<ul style="list-style-type: none"> • Catch documentation is mainly paper based (based on BFAR Administrative Circular/BAC 251 and Fisheries Administrative Order 238) • Subscription or adherence to several seafood standards dictated by international markets and other international and non-regulatory standards which have their own lists of certification requirements • Compliance with CDT regulations and seafood certification requirements are seen to be labor and resource intensive • Lack of coordination between national and local governments, and limited local government ordinances to support eCDT system • Amongst small-scale fishers, lack of awareness of eCDT and limited capacity to pay for eCDT technology

	<ul style="list-style-type: none"> • Lack of needed skills and human capacity, especially by Local Government Units to support eCDT
Singapore	<ul style="list-style-type: none"> • Limited domestic fishing grounds • Extensive species and sources of seafood imports • No commercial fishing
Thailand	<ul style="list-style-type: none"> • Lack of eCDT implementation for artisanal fisheries, which are currently using manual and paper-based CDT • Raw material and labor shortages
Vietnam	<ul style="list-style-type: none"> • Fishery sector characterized by small-scale fishing (71% small vessels) • Fishers have low awareness of technology and the need for eCDT • CDT system is mainly paper based until the point of processing, with regulatory gaps in document validation • Lack of integration among multiple, disconnected eCDT systems and the national system • Lack of coordination among government agencies and institutions contributing to the existing national fisheries database

SUMMARY OF AMS CDT SYSTEMS

- Seven countries (Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Vietnam) have catch documentation processes in place, with some having a combination of electronic and paper data collection at various points in supply chain. Almost all are still using paper catch documentation, particularly from point of catch and landing.
- All countries require a catch logbook for commercial fishing operations that must be completed by the Captain. For small-scale fishing, most catch reports are filled in by the fishers, except in Cambodia and Vietnam where catch data are recorded by fisheries officers.
- Indonesia, Philippines, Thailand, and Vietnam have the most advanced electronic/digital components within their supply chain catch documentation. Indonesia has an eLogbook system to store all paper logbook data for all its flagged vessels. Thailand has online electronic catch reporting for oversea fishing vessels.
- Indonesia has the highest number of intra-directorate data sources interfacing with one another from different systems, followed by Malaysia. Thailand has most of their existing catch documentation system data captured under a single platform/application. Indonesia employs on-board catch observers in the collection of catch data. Thailand employs on-board catch observers in the collection of catch data only on overseas fishing vessels.
- Malaysia has the highest number of different agencies (across Ministerial jurisdictions) that are involved in the management and data collection of seafood supply chains. Most countries in ASEAN centralize most of the seafood supply chain management responsibilities within a single Ministry or Department.

1.3 Fundamental Principles for eCDT Systems

The following principles provide the foundation for a functioning eCDT system based upon the FAO “Voluntary Guidelines for Catch Documentation Schemes,” the SEAFDEC-developed “Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020,” and ASEAN Catch Documentation Scheme, and guidance from the Oceans and Fisheries Partnership’s Technical Working Group (TWG). AMS are undertaking initiatives on eCDT to address their own domestic needs for traceability and fisheries sustainability based on their laws and policies. All principles used in the design and implementation of an eCDT system should conform with national laws, policies, and regulations.

1.3.1 FAO Voluntary Guidelines for Catch Documentation Schemes

The UN Fisheries Resolution on Sustainable Fisheries (2013) expresses concerns over the continued threat to marine habitats and ecosystems resulting from IUU fishing. The Resolution acknowledges the negative impact that these activities have on food security and state economies, particularly in low- and middle-income countries, and calls upon FAO to provide further guidance on catch documentation schemes.

In 2017, FAO developed “Voluntary Guidelines for Catch Documentation Schemes.” The document provides guidance for catch documentation schemes for wild capture fish caught for commercial purposes in marine or inland areas, whether processed or not.

The guidelines are based on the basic principles that catch documentation schemes should:

- conform with relevant international law;
- avoid unnecessary barriers to trade;
- recognize equivalence;
- be risk-based;
- be reliable, simple, clear, and transparent; and
- be electronic, if possible.

Based on these principles, the guidelines state that an eCDT system should:

- serve as the mechanism of issuance and validation of catch certificates by the competent authority, and function as the repository of catch certificate and supply chain data to allow information verification;
- ensure that accurate and verifiable information is available along the supply chain through cooperation of states involved in it;
- be based on agreed international standards and formats for information exchange and data management, ensuring that its components are interoperable;
- be flexible, user-friendly, and designed to easily accommodate uploading scanned documents, printing documents, cancelling documents, and conducting data queries;
- ensure data is secure by requiring logins and passwords or other appropriate means;
- define roles and responsibilities for data input and validation, and specify which parts, functions, and levels of the system individual users or user groups may access;
- facilitate documentation flow;
- be flexible in regard to information requirements; and
- assure support for states with limited resources to develop and implement secure electronic systems.

1.3.2 SEAFDEC Guidance

Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020

In 2011, SEAFDEC developed the “[Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020](#),” providing the following guidance related to fisheries management and optimal use of fish and fish products:

AMS should...

“...strengthen regional and national policy and legislation to implement measures and activities to combat IUU fishing, including the development and implementation of national plans of action to combat IUU fishing, and promote the awareness and understanding of international and regional instruments and agreements” and...

“...develop traceability systems, with mechanisms as needed to certify or validate the information, for the whole supply chain, and establish regulations and enforcement schemes in line with international standards. [They should] align Member Countries’ inspection systems and incorporate strengthened port inspections in the process as means to improve inspection systems.”

ASEAN Catch Documentation Scheme

In 2015, the “[ASEAN Guidelines for Preventing the Entry of Fish and Fish Products from IUU Fishing Activities into the Supply Chain](#)” also presented guidance on managing fishing activities within AMS, which encourages countries to monitor all fishing vessels by keeping records and compliance with national laws and regulations and to implement, where appropriate, a VMS.⁵

In 2017, AMS member states agreed to formally adopt a regional catch documentation scheme that provides a common format, set of standards, information requirements, and simplistic design to enhance applicability with small-scale fisheries across the region. Accordingly, the “ASEAN Catch Documentation Scheme” was developed through a series of regional consultations and endorsed at the 25th ASEAN Sectoral Working Group on Fisheries in May 2017 in Singapore as well as by the Senior Officials Meeting of ASEAN Ministers on Agriculture and Forestry.⁶ ACDS provides guidelines to support three primary objectives:

1. Provide a unified framework that will enhance traceability of fish and fishery products for effective marine fisheries management in AMS
2. Enhance the credibility of fishery products for intra-regional and international trade
3. Prevent entry of fish and fishery products from IUU fishing activities into AMS fishery supply chains

ACDS was designed to be used as a fisheries management tool to strengthen seafood trade with intra-regional and international markets. To do this, ACDS recommends that AMS commit to CDT where any seafood product can be traced backward through the full supply chain—from point-of-sale (consumers) to the point-of-catch. Being able to trace seafood products through every point of the supply chain allows consumers, importing countries, and regulators to verify that the seafood product was caught, processed, and shipped legally, ethically, and sustainably, thereby promoting the long-term sustainability of ASEAN fisheries and reducing IUU fishing. As such, AMS that endorse ACDS and commit to implementing a CDT system support ASEAN’s compliance with the regional *Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain*,” slotted for AMS adoption by 2020.

In April 2016, the SEAFDEC Council specified that the ACDS should not create an unnecessary burden, cost or lengthy process for supply chain actors. Thus, with support from the governments of Japan and Sweden, SEAFDEC collaborated with the Thailand Fish Marketing Organization to design the eACDS. In 2017, a web-based application and mobile application were developed to supplement the paper-based system.

1.3.3 Guidance from the Oceans and Fisheries Partnership Technical Working Group

During the 3rd *Regional USAID Oceans Technical Working Group Planning Workshop* in July 2018, TWG members discussed and recommended several principles for an eCDT systems. They agreed that an eCDT system should, at a minimum:

⁵ Southeast Asian Fisheries Development Center, 2015.

⁶ SEAFDEC, 2019.

- increase competitiveness of fishery products in national, regional and international markets and facilitate intra-regional trading;
- strengthen national and regional cooperation to combat IUU fishing;
- ensure that common and interoperable eCDT systems are in place;
- serve as a tool for increasing transparency in fisheries governance, human welfare, gender equity and working conditions;
- serve as a tool for increasing economic benefits to all actors in the fisheries supply chain;
- allow countries to meet/comply with different country market/import requirements;
- enhance verification of documents among countries and establish communication and networks among countries;
- link data collected from eCDT systems to fisheries information systems to support fisheries management, biodiversity conservation, and regional data sharing.

I.4 Relevant Importing Policies and Regulations

The United States (US)

On December 8, 2016, the U.S. National Oceanic and Atmospheric Administration’s (NOAA) National Marine Fisheries Service finalized the Seafood Import Monitoring Program or SIMP (81 FR 88975), establishing the first phase of traceability requirements for seafood imports into the United States, to be implemented beginning on January 1, 2018. The SIMP establishes, for imports of certain seafood products, reporting and recordkeeping requirements for the importer in order to prevent IUU-caught and/or misrepresented seafood from entering U.S. commerce. The regulations require that certain at-risk species vulnerable to IUU fishing and seafood fraud and imported into US markets, be traced from the point of entry into U.S. commerce back to the point of harvest or production to verify that the seafood was lawfully harvested or produced.

On September 20, 2016, the U.S. Government finalized the rule titled, “Trade Monitoring Procedures for Fishery Products; International Trade in Seafood; Permit Requirements for Importers and Exporters.” The rule sets forth regulations to revise procedures and requirements for filing import, export, and re-export documentation for designated fishery products. NOAA National Marine Fisheries Service sets forth regulations to integrate the collection of trade documentation within the government-wide International Trade Data System and requires electronic information collection through the automated portal maintained by Customs and Border Protection.

The European Union (Eu)

The EU’s regulation to prevent, deter, and eliminate IUU fishing entered into force on January 1, 2010 (European Council Regulation/EC 1005/2008).⁷ This regulation established a community system to combat IUU fishing and to permit importation to only legally caught fish. The regulation:

- requires that all imports of marine fishery products are accompanied by a catch certificate validated by the vessel’s “flag State;”
- enables seafood imports to be banned from “non-cooperating” countries and IUU fishing vessels; and
- includes provisions on punishments for those involved in the fishing of, or the trade in, IUU fishery products.

Catch certification is an essential part of the EU Regulation, intended to help facilitate legal trade and prevent unfair competition from IUU products in the EU market. It provides data on all points in the fishery product supply chain that will help to improve product traceability (from catch to importation, including processing and transport) and the effectiveness of controls used to support compliance with conservation measures.

⁷ Council of the EU, 2008.

“CATCH” is an electronic system that aims to digitalize the currently paper-based EU catch certification scheme as laid down by the EC Regulation No 1005/2008. The objective behind CATCH is to develop a web-based application to support the management (issuance, control, and verification) of official documents and to automate the related procedures as laid down in EC Regulation No 1005/2008 and its annexes.

Japan

As of late 2019, the Japanese Fisheries Agency and the parliament were exploring a unilateral catch documentation scheme. This scheme would be based on the FAO's “Voluntary Guidelines on Catch Documentation Schemes” and on the EU model in terms of the involvement of the government. An electronic system is strongly being considered and would initially target species (not all species would be included at once) selected based on a risk-based approach.

1.5 Industry-led Initiatives on Traceability

There are several global initiatives on seafood traceability. A brief description of some of these initiatives is presented below.

[Global Dialogue on Seafood Traceability \(GDST\)](#). GDST is an international, business-to-business platform established to advance a unified framework for interoperable seafood traceability practices. It brings together a broad spectrum of seafood industry stakeholders from across different parts of the supply chain, as well as relevant civil society experts from diverse regions. GDST established a standard for interoperable seafood traceability. These guidelines have been developed in consultation with over 60 global seafood industry companies and over 100 advisory group members of technology service providers, non-governmental organizations (NGOs), government, academe, certification and standards bodies. At the time of writing, public launch of the standard is planned for March 2020.

[Seafood Business for Ocean Stewardship \(SeaBOS\)](#). SeaBOS an initiative resulting from a series of keystone dialogues between scientists and 10 of the largest seafood companies that collectively produce, process, and trade the highest volumes of marine resources globally. SeaBOS companies' ambition is to lead a global transformation towards sustainable seafood production and a healthy ocean committing to:

- improve transparency and traceability;
- engage in concerted efforts to reduce IUU fishing and ensure that IUU products and endangered species are not present in our supply chains;
- engage in science-based efforts to improve fisheries and aquaculture management and productivity through collaboration with industry, regulators, and civil society; and
- engage in concerted efforts to eliminate any form of modern slavery, including forced, bonded, and child labor in supply chains.

[Sustainable Supply Chain Initiative \(SSCI\)](#). Formed by The Consumer Goods Forum, SSCI is a robust program which benchmarks and recognizes sustainability standards, streamlining benchmarking processes across the Forum. The Initiative provides buyers and suppliers with clear guidance on which third-party auditing and certification schemes cover key sustainability requirements and apply relevant governance and verification practices.

[The Global Tuna Alliance](#). In June 2017, 66 companies, including retailers and other tuna supply chain businesses, signed the “Tuna 2020 Traceability Declaration” with the aim of stopping illegal tuna getting to market and promoting improvements in environmental sustainability and human rights in tuna fisheries. The declaration was convened by the World Economic Forum and supported by six national governments and 21 civil society organizations. The [Tuna 2020 Traceability Declaration](#) is based on four commitments:

1. Tuna Traceability Commitment
2. Commitment to a Socially Responsible of the Tuna Supply Chain
3. Commitment to Environmentally Responsible Tuna Sources
4. Government Partnership

SALT. The Seafood Alliance for Legality and Traceability (SALT) is a global alliance for knowledge exchange and action to promote legal and sustainable fisheries through improved transparency in seafood supply chains. SALT brings together the seafood industry, governments, and nongovernmental organizations (NGOs) to accelerate learning and support collaboration on innovative solutions for legal and sustainable seafood, with a particular focus on traceability.

Seafood Ethics Action Alliance. The Seafood Ethics Action Alliance (SEA Alliance) has been established by the seafood industry to provide a platform for collective engagement, sharing information on emerging issues, agreeing on best practice solutions, and providing a forum for collective pre-competitive action where it is not better fulfilled by an existing organisation. Engagement takes into consideration the PAS 1550:2017 Code of Practice on Exercising due diligence in establishing the legal origin of seafood products and marine ingredients, and the British Retail Consortium IUU Advisory Note (2015), together with meaningful implementation of International Labor Organization (ILO) Regulation 188 and other appropriate instruments.^{8,9,10}

1.6 Technical Guidance Background and Development Process

1.6.1 Conceptual Development (2016-2018)

In 2014, the United States Government tasked USAID to address the challenges related to IUU fishing in Southeast Asia. Subsequently, in 2015 USAID launched the USAID Oceans project, to be implemented through a partnership between USAID's Regional Development Mission for Asia (RDMA), SEAFDEC, and the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF) from 2015-2020. USAID Oceans worked to strengthen regional cooperation for combatting IUU fishing, enhancing fisheries management, and support marine biodiversity conservation. A critical component of the partnership was to develop and test eCDT technologies for application by interested AMS. To support eCDT adoption, the regional partnership was to provide clear and simple guidance on how to develop and implement eCDT systems.^{11,12}

Following the development and testing (2016-2018) of eCDT technologies within fishery supply chains operating at the program's designated learning sites, USAID Oceans and SEAFDEC considered the most appropriate and useful process to provide regional technical guidance on developing national-level testing and implementation of eCDT technologies. In collaboration with government representatives from AMS fisheries agencies, in July 2018, the USAID Oceans TWG decided that, rather than creating a new set of regional guidelines for testing and implementing eCDT systems that might possibly overlap or conflict with the existing ACDS Guidelines, USAID Oceans and SEAFDEC would generate clear and easy-to-use regional technical guidance on how to test and implement eCDT systems. At a minimum, the guidance must provide:

1. a set of general principles in establishing national eCDT systems across ASEAN;
2. a set minimum requirements and standards for development of national eCDT systems across ASEAN; and
3. summary profiles and guidance on the eCDT technologies currently available, and how such technologies could be customized to meet the disparate needs and capacities of AMS.

⁸ The PAS 1550:2017 Code of Practice provides guidance and recommendations on exercising due diligence in establishing the legal origin of seafood products and marine ingredients. It incorporates labor issues and considers illegal treatment of crew on fishing vessels to be linked with illegal fishing. One of the aims of this PAS is to help enable decent working conditions to be provided not only on board vessels but at all factories, work stations, and during all activities throughout supply chains. (Seafish, 2020)

⁹ The British Retail Consortium advisory note offers expert advice on risk assessment and risk mitigation, and encourages action to prevent IUU fishery products entering UK supply chains. (BRC & EJC, 2015)

¹⁰ Convention 188 establishes minimum standards that protect fishers in all aspects of their work. (ILO, 2007)

¹¹ USAID Oceans, 2017b.

¹² USAID Oceans, 2017c.

In addition, the technical guidance should:

- serve as a repository of the various eCDT technologies that have been successfully tested and implemented across ASEAN as of 2020;
- be adaptable to and provide eCDT examples applicable to other regions across the globe;
- provide clear evidence of how ASEAN is committed to combatting IUU fishing, promoting sustainable fisheries, and demonstrating coordinated and integrated efforts, led by SEAFDEC; and
- illustrate ASEAN's commitment to addressing human welfare concerns within fishery supply chains.

1.6.2 Drafting and Finalization

During 2018 and 2019, AMS met with USAID Oceans and SEAFDEC to discuss and contribute to the creation of the draft set of technical guidelines. Following initial discussions at *USAID Oceans' 3rd Annual Technical Working Group Meeting*, national-level workshops were held in 2019 in Thailand (May); Vietnam, the Philippines, and Indonesia (July); and Cambodia, Laos, and Myanmar (January 2020) (see list of participants in Annex IV). At these workshops, participants reviewed, discussed, and contributed content to each section of this document and discussed national-level activity plans or “roadmaps” to test and implement eCDT technologies from 2020 to 2025.

Throughout the drafting process, AMS representatives worked with the program to create technical guidance that is ultimately:

- dynamic, flexible, and able to evolve over time as individual countries increase their capacity to implement eCDT technologies of differing levels of complexity, cost, and technological requirements;
- customizable at national, provincial, and local levels, to provide guidance that can be tailored to the needs of any AMS; and
- broad (general/non-specific) enough to be applicable across a wide range of regional capacities.

A revised draft of this document was subsequently distributed to the AMS fisheries agencies for their review and comment in October 2019. AMS feedback received by mid-November was incorporated into an updated document that was reviewed and discussed for finalization by AMS during a regional meeting co-convened by USAID Oceans and SEAFDEC in Bangkok, Thailand, on December 2-4, 2019. This regional meeting was attended by USAID Oceans TWG members and eCDT technical experts from across AMS. Subsequently, in early 2020 a finalized version of this technical guidance was prepared and released to AMS during the *52nd Meeting of the SEAFDEC Council*. (See Table 6 for the development timeline). Interested AMS are invited to implement and adapt the technical guidance presented in this document as they proceed with their design and implementation of national and/or site-based eCDT systems

Table 6. Regional CDT Guidance Development Process

Date	Activity	Details/Output
Jul 2018	3 rd Regional TWG workshop	Participants requested the development of a regional CDT guidance
Jan – May 2019	Document development	1 st draft of of Regional CDT Guidance
Feb 5, 2019	Coordination meeting with SEAFDEC	Agenda: Development of regional eCDT guidance
Apr 3, 2019	Coordination meeting with SEAFDEC	Agenda: Conduct of a workshop on the Regional eCDT guidance
May – Oct 2019	Country workshops to review the draft document	<ul style="list-style-type: none"> • Bangkok, Thailand (May 14-16) • CTI Countries, Dili, Timor Leste (June 8) • Manila, Philippines (July 4) • Jakarta, Indonesia (July 15) • Nha Trang, Vietnam (July 26) • Phnom Phen, Cambodia (October 11)
Jul 1, 2019	Coordination meeting with SEAFDEC	Agenda: Regional eCDT Guidance & regional workshop
Oct 2019	Revision of 1 st draft	2 nd draft of Regional CDT Guidance
Oct – Nov 2019	Review of 2 nd Draft by TWG	Received inputs from Malaysia, Philippines, Thailand
Dec 2-4, 2019	Regional eCDT Guidance Workshop	Finalization of Regional CDT Guidance
Jan – Feb 2020	Review of 3 rd Draft	USAID review of finalized guidance document
Feb 2020	Final Document	USAID-approved guidance document released
Early 2020	SEAFDEC Council Meeting	USAID-approved guidance document shared with AMS at SEAFDEC Council



USAID Oceans eCDT Regional Guidance Worksho, Bangkok, December 2019 Credit: USAID Oceans/L Bader

2. TECHNICAL GUIDANCE FOR ECDT DESIGN AND IMPLEMENTATION

2.1 eCDT System and Data Capture Integration

Current catch documentation schemes, usually paper-based, have been shown to not be entirely effective and do not have the capacity to trace all products along the complex supply chains of international, regional, and trans-boundary seafood trade back to the harvest event (Figure 1). This is due, in large part, to the inability of existing catch documentation schemes and document flows to effectively connect with the complexities of international seafood supply chains. In addition, current schemes are challenged by exemptions for specific operations (such as artisanal and small-scale fisheries) and specific seafood product derivatives. In some cases, domestic landings are exempt from catch documentation, traceability, or certification, further weakening systems and diminishing their scope to cover non-IUU related management functions.

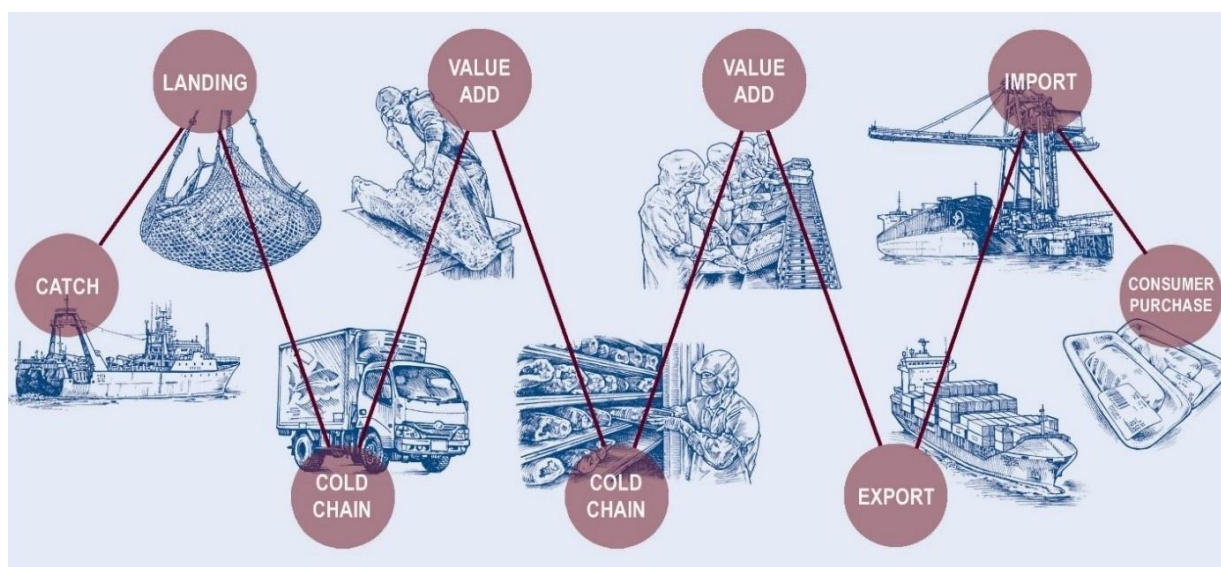


Figure 1. Seafood product movement and data flow

The shift towards a fully compliant eCDT system requires supply-chain wide transformation that leverages the strengths of current systems and migrates KDEs from CTEs into an efficient, secure, and transparent data management platform. A robust eCDT system should use data-logging devices (i.e., a mobile data collection device), remote sensing technology, satellite communications equipment (i.e., VMS), and factory control and automation systems (i.e., bar coding, radio-frequency identification tags, and telemetry gathered at Hazard Analysis Critical Control Points). In Figure 1, each circle notes a point in the chain where product is handled, modified, or transferred and thus technology is required to electronically document the event and pass along that data.

Transparent and financially sustainable eCDT systems can help ensure that a nation's fisheries resources are legally caught and properly labeled, and when integrated with existing fisheries information systems can support the collection and analysis of products' ecological and economic data throughout the seafood supply chain so that they are traceable from their point-of-catch to import and end-retail. CDT remains one of the most valuable and comprehensive methods for collecting fisheries statistics at a reasonable cost, particularly valuable for stock assessment and marine spatial planning efforts. An integrated eCDT system can also provide an important opportunity to support other national and regional priorities, including effective national fisheries monitoring, control, and surveillance.

The data provided along the supply chain by eCDT systems can be used by importing countries to trace verifiable information regarding seafood products “from bait-to-plate,” and detect and deter IUU products.¹³ Such eCDT systems are typically a combination of hardware and software installed and used onboard fishing vessels and on land, at port, in processing facilities, and within transportation systems. By using an eCDT system, relevant information about a seafood product can be documented digitally and transmitted in real time to online data exchange services via satellite, cellular, or radio frequency information communication technologies. When combined with strong port-state control measures to prevent the importation and sale of undocumented fish, the data generated through eCDT systems can significantly limit the entry of IUU fish into the fishery supply chain, thereby reducing revenues to illegal operators while strengthening market access for producers who are operating legally and “traceably.”

An electronic data entry system and a culture of information sharing is the foundation of achieving robust eCDT. To achieve this, the following five overarching technical conditions must be met (see more detail in Section 2.2.3).

FIVE TECHNICAL CONDITIONS FOR eCDT SYSTEMS

1. Electronic documentation and verification of catch and landing data.
2. Electronic government import and export certification systems.
3. Product serialization to uniquely identify gross quantities entering or moving through the supply chain.
4. Transactions within the cold chain also must be electronic, not just for business-to-business exchange, but also for traceability.
5. Coordination mechanisms between government agencies, institutions, and the private sector.

It is also recommended that data be captured at multiple points in the value chain, wherever possible, as this provides the best visibility into potential IUU activities (i.e., more catch being exported than was reported caught). Consideration needs to be given in the development of the eCDT system to locations where electronic data access is non-existent or problematic. Full-chain traceability, that is the ability to track KDEs and other information about seafood products as they move between actors throughout a value chain, must be in place to achieve more complete and robust information capture; and timely electronic data capture is required to integrate data across all actors and CTEs across the value chain. To achieve this effectively, national centralized electronic infrastructure and the adoption of a data standardization scheme for seafood supply chain interoperability is a basic requirement. Accordingly, systems must be designed with interoperability in mind (i.e., different IT systems and software applications must be able to communicate, exchange data, and use the information that has been exchanged.)

¹³ USAID Oceans 2017b.

2.2 Process for Moving Paper-Based Systems to an Integrated, Electronic System

To transition data capture efforts from paper-based—or establish data capture where entirely absent—three steps are recommended, shown in Figure 2 and detailed further in this section.

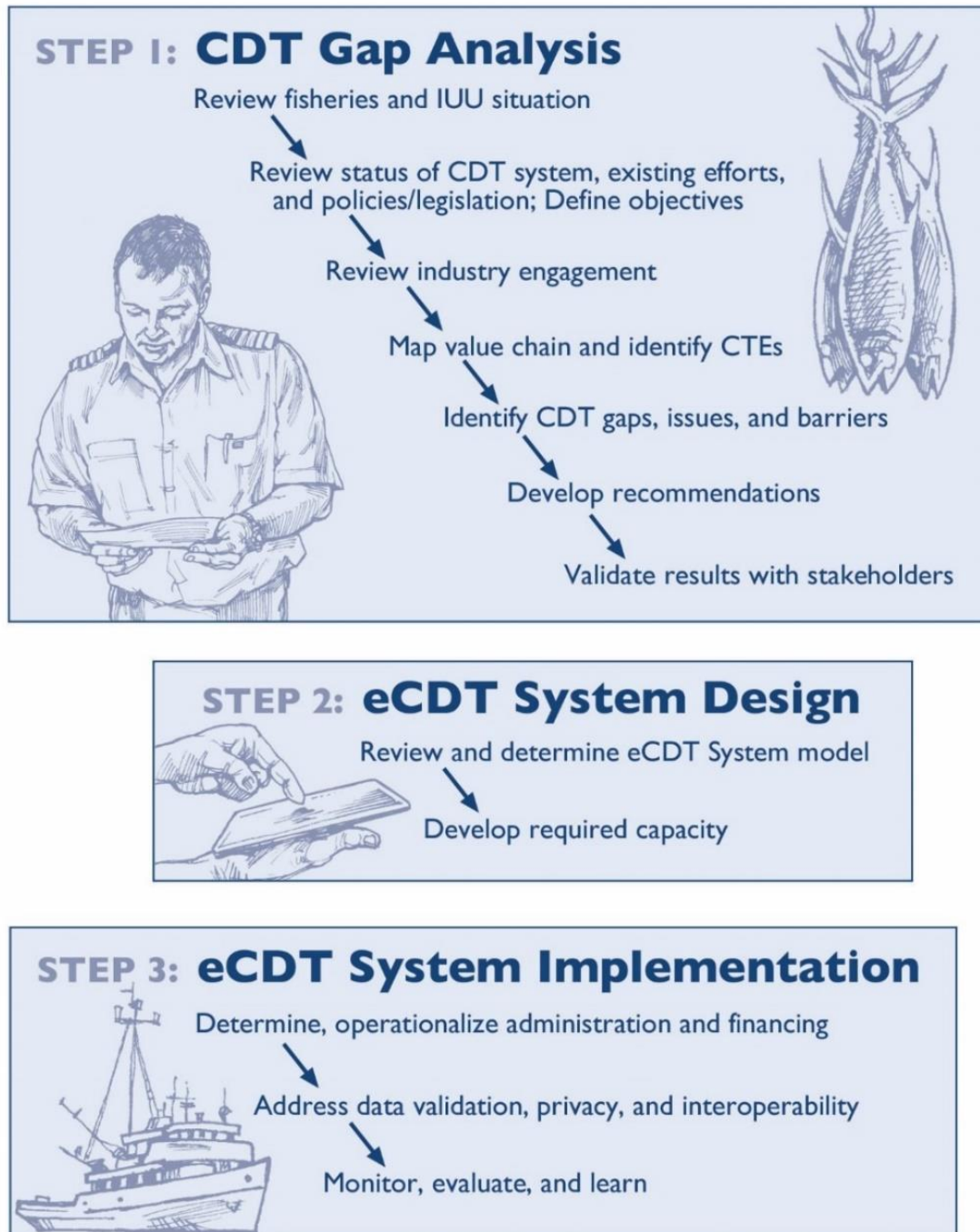


Figure 2. Process for moving to an eCDT system

Step Zero: In some cases, “Step Zero” is suggested to build the necessary capacity required to carry out the other steps in the eCDT design and development process. Step 0 is a “pre-step” that ensures the foundation for designing, testing, and implementing a national eCDT system is well-established. This step is particularly important and useful for nations that are relatively new to fisheries traceability, including national agencies that may not have any existing policies or a relevant agency authority mandate to advance CDT as a tool in combating IUU fishing and promoting sustainability.

1-Gap Analysis. Under **Step One**, a CDT Gap Analysis is conducted to provide inputs to the design and implementation of the CDT system to be developed. A CDT Gap Analysis establishes and assesses the space between the present state (“where we are”) and the target state (“where we want to be,”) and works to bridge this space by identifying what has to be done in order to reach this desired state, and how it should be done. It can also be viewed as a “needs assessment” or a “need analysis” in that challenges and opportunities are presented alongside priorities and timeframes to bridge the gap towards current and ideal eCDT system capabilities. The Gap Analysis provides a framework to review existing information to inform and guide subsequent activities to establish and implement an eCDT system. The Analysis profiles and assesses the country’s fishing industry and market, documents existing CDT protocols and systems, identifies gaps, and ultimately provides recommendations for next steps. The Analysis adopts the Rapid Appraisal of Fisheries Management Systems (RAFMS) framework, which is a typical rapid rural appraisal methodology that, in this case is, applied to assess CDT needs, challenges, and opportunities, and recommendations for eCDT systems that can support and strengthen fisheries management.

2-Design. **Step Two** marks the design phase of the eCDT system. Four scenario models for moving towards an eCDT system can be considered, based on country status:

1. There is no existing CDT system
2. There is an existing paper-based CDT system, but it is not integrated across the value chain
3. There is an existing paper-based and/or eCDT system, but it is not integrated across the value chain
4. There is an existing eCDT system integrated across supply chain but product and human welfare KDEs must be standardized across the value chain

Effective eCDT schemes should be as comprehensive and inclusive as possible in terms of coverage and reach, and may consider technology solutions such as those that enable the timely electronic capture of data associated with integrated trip reporting and trip declarations; data-driven monitoring of fishing harvest activity and fishing effort; quota usage via electronic trip declarations; electronic catch logbook reporting; and receiver and dealer electronic reporting of transshipments or landings. National centralized electronic infrastructure and the adoption of a data standardization scheme for seafood supply chain interoperability is a basic requirement.

3-Implementation. Lastly, **Step Three** focuses on eCDT system implementation. Once design is complete, activities such as system operations and administration, data collection and data verification, and monitoring and evaluation must be structured and initiated.

2.2.1 Step 0: Pre-Step

This step may be taken before launching into system analysis and design to ensure that a strong foundation is present. In this step, the lead agency organizes itself and carries out several preparatory activities. The following steps can be taken to establish necessary organizational structures, dialogues, and resources:

1. Establish an eCDT team in the lead agency to guide the process
2. Engage with other countries, international agencies, and the private sector to strengthen internal eCDT knowledge
3. Assess capacity needs relevant to successful eCDT system planning, design, and implementation and develop initial capacity building strategy
4. Raise awareness and basic capacity of internal and external partners on eCDT through use of new/existing eCDT materials
5. Identify potential partners (from the public and private sectors, non-governmental organizations)
6. Engage with and inform relevant ministries/agencies
7. Make initial courtesy calls and meetings with government, non-government, and private sector to introduce eCDT and the process to be undertaken
8. Convene relevant partners at awareness raising meetings and workshops to discuss the technical aspects and objectives of eCDT implementation (e.g., combatting IUU and enhancing sustainable fisheries management)
9. Identify potential funding sources (e.g., national budget, external donors, public-private sector partnerships)
10. Form a steering committee composed of government, non-governmental, and private sector representatives
11. Develop a draft eCDT system roadmap that includes timeline, budget, and activity lead person in order to establish a clear vision that can guide steps one through three
12. Initial consideration of fish species to be included in the eCDT system

2.2.2 Step 1: CDT Gap Analysis and Foundational Research

2.2.2.1. Review of fisheries and drivers for traceability

The purpose of this step is to establish a baseline for a country's CDT capacity by developing a clear understanding of the country's fishery sector, as well as the drivers for traceability system. Under this step, a desk study is conducted to develop a brief profile of the country's fishing industry, including commercial/industrial fishing and municipal/small-scale operators. The country profile consists of:

- a production sector overview (including catch profiles, ports/landing sites, fishing practices and systems, main resources, management, and an overview of fishing communities);
- post-harvest sector overview (fish utilization, processing, and marketing);
- socioeconomic contributions of the fishery sector (role in national economy, supply and demand, trade, consumption, food security, and employment);
- institutional structure (government agencies, key stakeholders, registration, and licensing);
- summary of key trends and issues;
- summary of key private sector fishery associations and companies (capture fisheries, processing, brokering, marketing, and exporting); and
- an overview of the status of IUU activities in the country, including prevalence and existing measures.

The review should identify relevant drivers for a traceability system relevant to a country including, IUU fishing, fisheries sustainability, food safety and human welfare. The review includes transboundary IUU fishing issues and detail individually the illegal, unreported, and unregulated fishing incidents that occur within the country's territorial waters. In most countries in Southeast Asia, illegal fishing is a greater concern than unreported or unregulated fishing. The purpose of the overview is to better understand the types of IUU fishing occurring in the country and the drivers behind them.

FORMS OF IUU FISHING ACTIVITIES INCLUDE:

1. Illegal fishing activities within a country
2. Unauthorized transshipment and landing of fish/catch across borders
3. Poaching in the EEZs of other countries
4. Illegal fishing and trading practices of live reef food fish, reef-based ornamental and endangered aquatic species
5. IUU fishing in the high seas and RFMO areas

In 2019, USAID Oceans developed “[Assessing Fisheries in a New Era: Extended Guidance for Rapid Appraisals of Fisheries Management Systems](#)” to provide guidance on how fisheries management systems can be appraised through more holistic, modern methodologies.¹⁴ Chapter Two of the guide provides guidance on how to assess the status of an Ecosystem Approach to Fisheries Management (EAFM) program or services in any Fisheries Management Area (FMA). It reviews the original guidance provided in 1996, as well as provides additional guidance, tools, and methodologies that can be used in the RAFMS process.

2.2.2.2. Review CDT objectives, efforts, and policies/legislation

This step is focused on determining a country’s strategic objectives for establishing its eCDT system, current efforts to establish such a system, and existing, supportive policies and regulations (at both the national and local level). Reviewed policies and legislation should include coordination and harmonization mechanisms for eCDT system administration and implementation, which may include policies and legislation on fisheries management; conservation; monitoring, control, and surveillance; enforcement; markets; trade; and food health and safety. Policies and legal statements which describe the country’s strategic eCDT system objectives should be identified, reviewed, and summarized (See Annex II). The purpose of this review is to ensure that the country’s eCDT objectives are clear, specific, and relevant, and that stakeholders know and understand the system’s purpose. The eCDT system should be based on clearly defined objectives, with level of traceability and required functionalities clearly defined, and designed to be user-friendly.

Under this step, researchers should review and document existing government-supported technology platforms that support catch documentation and related data and analytics. The review should include e various technology platforms, both active and in development, housed under different agencies that manage KDEs across CTEs in the seafood supply chain. During this step, all relevant forms and documents used for CDT should be collected to form the basis for the proposed electronic automation and forms of the new system.

KEY QUESTIONS ANSWERED IN CDT REVIEW:

1. What national strategic objectives are related to having a robust eCDT system (e.g., maritime security, food security)?
2. What catch data are currently being documented?
3. What data collection forms are currently being used, if any? Are they paper-based or electronic?
4. How are catch data collected and stored (paper or electronic)?

2.2.2.3. Industry engagement

Under this step, private sector’s engagement in CDT/eCDT initiatives is assessed to identify limited-effort, high-impact partnership opportunities. Engaging with the private sector grounds eCDT efforts within industry realities and supports system adoption, scaling, and long-term sustainability. Engaging buyers, seafood companies, and NGOs early in the design of the eCDT system is essential to motivating suppliers to adopt and scale the eCDT system as well as establishing industry traceability standards and requirements. Guidance on industry engagement is available through the USAID Oceans publication, “[Transformational Fisheries Development: Simplified Steps for Public Sector and Industry Engagement](#).”

During this step, representatives from companies involved in the capture, processing, and export segments of the supply chain are identified and interviewed to assess existing private sector traceability initiatives. Interviews should focus on establishing the companies’ familiarity with CDT/eCDT systems, level of support for an emerging government eCDT system, use of third-party agents, aspects of company labor and welfare, existing government-led CDT partnerships at the national and community level, involvement with associations and organizations, and needs from information and communication technology providers.

¹⁴ USAID Oceans, 2019a.

2.2.2.4. Value chain mapping and CTE identification

Mapping of seafood value chains and their CTEs is a fundamental element of the CDT Gap Analysis process to identify and describe CTEs within the wild-caught seafood supply chain and ultimately ensure that the emerging eCDT system and its required KDEs allow for timely data collection and support data audit requirements. In this step, a Value Chain Analysis (VCA) is undertaken to identify and map organizations, people, activities, information, and resources involved in moving a product through the different phases of production until delivery to final consumers (Figure 3). The VCA is undertaken by individual species or species group.

The VCA approach is mainly a descriptive tool to identify interactions between different chain actors. Typical actors within a wild-caught seafood supply chain include the fishing operation (point-of-catch); catch transhippers (either at sea or once directly off-loaded in port); first receivers (at landing points, carrier vessels, and mini-plants); second receivers (aggregators, pack houses, and suppliers); first and second processors; cold chain facilities; actors involved in seafood storage, supply, and export logistics; seafood buyers (including foreign importers); international customs and trade authorities within a regulated market state jurisdiction; and wholesale and retail distributors. VCAs should be conducted individually for each different fishery sub-sector, such as commercial/industrial fisheries and municipal/small-scale fisheries, or for individual species, such as tuna. The VCA should be undertaken from capture to export as these are the CTEs which are under country jurisdiction.

CTEs are events that are recorded to effectively trace products throughout the supply chain; CTEs serve as critical data points within eCDT systems and play a central role in the design of how and when key data elements are collected within the system.

Common CTEs include:

- Production (i.e., at-sea harvest event)
- Landing (at port or transshipment vessel)
- Transportation (i.e., an exchange of goods)
- Transformation (the creation or manipulation of the seafood product)
- Processing, aggregation, and packaging
- Depletion (exit of seafood product from the supply chain, including sale to and consumption by the end consumer, as well as disposal)

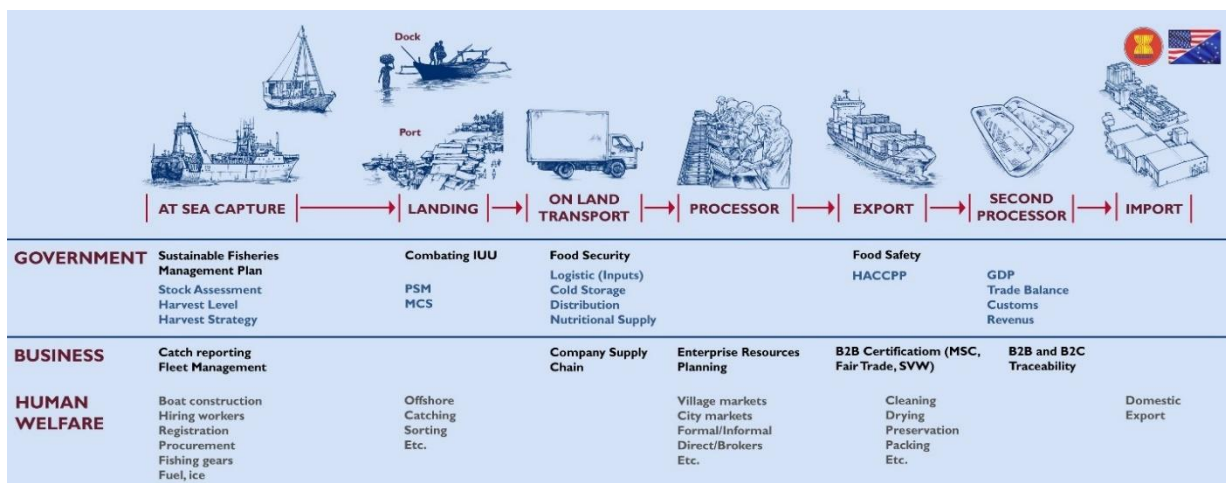


Figure 3. Example of seafood value chain map and uses for eCDT data along the value chain

VALUE CHAIN ANALYSES IDENTIFY:

- Core processes in the value chain
- Actors involved in these processes and their roles and capacities
- Product/service flow, including origins and destinations
- Information and knowledge of actors through value chain
- Types of relationships and linkages throughout the value chain
- Types of (business) services feeding into the chain

2.2.2.5. Identification of human welfare and gender aspects of the supply chain

A Gender Responsive Value Chain Mapping and Analysis should also be conducted to delve further into the gender differentials among the women and men actors in the various fisheries value chain nodes. Through this methodology, gender dynamics and power relations can be analyzed to understand hotspots that could be critical to the efficient application of the eCDT system. More details on this methodology can be found in Chapter Four of USAID Oceans' guide, "[Assessing Fisheries in a New Era: Extended Guidance for Rapid Appraisals of Fisheries Management Systems](#)," which provides guidance on how fisheries management systems can be appraised through more holistic, modern methodologies and how to ensure the human aspects of fisheries are integrated in fisheries management plans and other development strategies. USAID Oceans' "[Gender Research in Fisheries and Aquaculture: A Training Handbook](#)" provides additional information on gender concepts.¹⁵

2.2.2.6. Identification of CDT gaps, barriers, and opportunities

Through the information gathered through the Gap Analysis, gaps, barriers, and opportunities can be identified in the country's current CDT and data capture processes, as well as in fisheries management, human welfare, regulations, infrastructure, and industry preparedness. The Gap Analysis will also help identify technology adoption issues for all actors in the value chain, many of which may directly or indirectly affect the design of the eCDT system. These findings will comprise the most significant insights generated from the Gap Analysis and are critical to understand the country's or sites' various eCDT challenges and opportunities. In this step, these gaps, issues, and barriers are agreed upon and highlighted so that they may be acknowledged and addressed in the eCDT system design process and used as inputs in the fisheries management planning.

Chapter Three of the "[Assessing Fisheries in a New Era: Extended Guidance for Rapid Appraisals of Fisheries Management Systems](#)," guide provides guidance on collecting information to assess CDT needs, challenges, and opportunities to inform the development of eCDT systems that can support and strengthen fisheries management.

2.2.2.7. Development of recommendations

Under this step, recommendations are developed to present a practical roadmap on which aspects of the country's eCDT system-readiness should be prioritized in support of system design and implementation. Recommendations may include potential strategies for system development and implementation, as well as for supportive public-private partnership strategies. The recommendations can be clustered as near-term (zero to six months), short-term (six to twelve months), mid-term (one to two years), and long-term (two to three years), and may be supplemented by additional specific, technical recommendations.

¹⁵ USAID Oceans, 2018.

2.2.2.8. Validation of results with stakeholders

Once all results and research are gathered, a validation workshop is conducted with key stakeholders to solicit responses and reactions to the study results and recommendations. In addition to providing a venue to present the preliminary Gap Analysis report, the workshop should be designed to invite feedback/discussion on the results, document and (as possible) address any issues or concerns raised by the community/stakeholders (e.g., illegal fishing operations, presence of prohibitive gears), and solicit suggestions from participants on possible solutions, recommended actions, and/or new policy directions. Exercises can be held during the workshop to identify positive and negative forces for and against eCDT implementation, as well as to determine the proactive steps that can be taken to influence the uptake and success of the prospective eCDT system.

During or immediately following the validation workshop, a meeting with fisheries agencies should be held to discuss validated results, share policy/actions recommended, and vet private sector partnerships for eCDT system testing and adoption.

2.2.3 Step 2: eCDT System Design

Using the information and relationships established in Step One, eCDT system design may now commence. The shift towards a fully compliant eCDT system requires supply-chain wide transformation that leverages the best of the current system and migrates KDEs from CTEs into an efficient, secure, transparent and integrated data management platform. Moving to a robust and integrated eCDT system requires that the following five overarching technical steps be met.

1. **Electronic documentation and verification of catch and landings data.** Paper documentation of seafood in supply chains has proven insufficient to meet the requirements of traceability robust enough to eliminate illegal catch and mislabeling.
2. **Electronic government import and export certification systems.** The data generated by these systems must allow for tracking products forward in the chain, tracing products back through the chain, and must enable verification of customs status.
3. **Product serialization in order to uniquely identify gross quantities entering or moving through the supply chain.** Serialization can be as basic as country of origin labeling or a serial customs stamp or mark, or as complex as uniquely identifying retail packaging to protect consumer safety or allow consumers to make sustainable food choices.
4. **Electronic transactions within the cold chain,** not just for business-to-business exchange, but also for traceability.
5. **Coordination mechanisms.** If not already existing, a coordination mechanism must be established with and between government agencies, institutions, and levels of government that contribute information to the eCDT system and, just as importantly, with the private sector.

Additional guidance is provided in USAID Oceans' "[Fisheries Catch Documentation and Traceability in Southeast Asia: Technical Concept and Specifications](#)" and "[Technology Solutions for Electronic Catch Documentation and Traceability](#)."¹⁶

2.2.3.1. Design considerations

Scale of the Fishery - Southeast Asian marine capture fisheries are generally characterized as being composed of both large vessels (commercial or industrial fisheries) and small vessels (small-scale fisheries), as well as a wide variety of different fishing gear types. eCDT systems should account for the needs and special requirements of both types of fisheries. In general, these two fisheries have different characteristics in terms of vessel type, equipment type, gear sophistication, ownership, location of fishing operation, processing of catch, disposal of catch, extent of market integration, and data collection. Any eCDT system

¹⁶ USAID Oceans, 2019b.

must recognize these differences and be designed to address the capacity of the owner/operator of the vessel and gear. The systems on-board a small fishing vessel (typically with no remote connectivity) are very different from those deployed by multi-national seafood distributors. For small-scale fishers, literacy, local language, and experience and comfort using mobile devices should also be considered. Additionally, some languages are cumbersome to be typed on mobile devices. Using technology to automate data collection might help with uptake and scaling the system. However, both types of systems are essential within the seafood supply chain.

Private Sector Coordination - Many industry members in the region have developed and use their own paper-based and/or electronic CDT system. These systems should be integrated with the eCDT systems being designed by governments. Data privacy and interoperability need to be discussed and addressed amongst public- and private-sector system users and contributors.

Human Welfare – Human welfare considerations could be incorporated into the design and implementation of the eCDT system. Technologies developed by the private sector, NGOs, and the development sector for tracking labor conditions, including human trafficking, currently exist. However, most of the technologies are not currently integrated with existing eCDT systems. Linking the systems through an interface to collect relevant information, in particular to deter IUU and related harmful activities, will support good governance of fisheries management areas and human welfare interventions.

Scope of the System – The implementation of an eCDT system can be undertaken at different scales—from a small-scale pilot site to national implementation—depending upon resources available. However, even when implementing a small-scale pilot, it is important to design an eCDT system that can ultimately operate nationwide. Following the pilot, the system can be scaled up in phases, and features can be added to incorporate additional species and CTEs.

Regulation and policies – The eCDT system should be aligned with the country’s fisheries management policies and regulations. If existing fisheries laws and regulations do not currently support an eCDT system, it may be necessary to issue a decree or circular to support the system in the short term while the act or law is amended. (See Annex II for examples of relevant laws/acts.)

2.2.3.2. Models for eCDT system development

Depending upon the current CDT status of the country, there are four possible models for moving towards an eCDT system (Table 7). Each model is designed around four recommended components of an eCDT system (See Section 1.2.2).

Each model is associated with a recommended action to guide eCDT system design. Across all models, system design must address harmonization and coordination within and between government agencies, government levels, private sector actors, and institutions that contribute information to the eCDT system. Once a model has been selected, a validation workshop is conducted with key stakeholders to solicit responses and reactions to the design, development, and implementation of the selected eCDT system development model.

Table 7. eCDT system development models

	Current CDT status	Components	Action
Model 1	No existing CDT system	<ol style="list-style-type: none"> 1. eCDT hardware 2. eCDT software 3. Analytical services 4. Fishery monitoring services 	Move to an eCDT system that is integrated across value chain
Model 2	Paper-based CDT system that is not integrated across the value chain	<ol style="list-style-type: none"> 1. eCDT hardware 2. eCDT software 3. Analytical services 4. Fishery monitoring services 	Move to an integrated eCDT system
Model 3	eCDT system that is not integrated across the value chain	<ol style="list-style-type: none"> 1. eCDT software 2. Analytical services 	Move to an integrated and interoperable eCDT system
Model 4	eCDT system integrated across value chain, but without standardized product and human welfare KDEs	<ol style="list-style-type: none"> 1. Analytical services 	Standardize KDEs across value chain

Model 1: No CDT system → Move to an integrated eCDT system

If no CDT system currently exists in the country, it is recommended to move directly to an eCDT system that is integrated across the value chain. Rather than moving first to a paper-based data capture method, going directly to an electronic system will provide for a more efficient, secure, and transparent data management platform. A number of regional and national integrated CDT systems already exist that can guide a country’s eCDT system development, including the eACDS and existing national CDT initiatives of AMS such as the Philippines Bureau of Fisheries and Aquatic Resources (BFAR) national eCDT system (eCDTS).

Model 2: Existing paper-based CDT system that is not integrated across value chain → Move to an integrated eCDT system

Paper-based CDT systems are already in use in many countries to capture data from various actors in the value chain, and involve fishers (logbooks and captain’s certificates), fisheries officers (catch certificate/document), buyers/brokers (purchase order), processors (raw material label, batch ID), and shippers (manifest or delivery order). Paper-based CDT systems are susceptible to loss of or damage to the paper documents, present storage issues, are difficult to integrate across the value chain. They also have very low implementation of standards for data exchange and have proven insufficient to meet traceability requirements to eliminate illegal catch and mislabeling. The transition from paper-based to electronic data records affects all participants in the supply chain, with each participant having different levels of access to software, hardware, and communications technology.

NOTE ON DATA CONVERSION:

An important consideration when moving from a paper-based system to an electronic system, is data conversion, including allowing ample time for this conversion to take place. Data conversion includes converting data from paper to digital (e.g., typing paper licenses and credential details to a database) or creating a new database (e.g., creating a new registrar database for buyers/brokers). Quite often paper-to-digital conversion is a daunting task as it requires human cyber ability. Synchronization of data is also important. If, for example, boats and vessels data come from different ministries, it is important to ensure that data from all sources is available and up to date. Out-of-date or expired data from could hinder further processing and documentation of an eCDT transaction.

Under this model, the first step is to establish electronic data capture for each actor in the value chain. To do

this, users' needs, capabilities, and limitations must be assessed at each node of the value chain, with appropriate technology solutions identified as needed. Suitable tools may include mobile data collection or computer-based applications. Depending on the technological capabilities of the country, data storage may be cloud-based or in physical servers on premise (national, port, provincial-office based). Once the data-capture system is operational, the next step is to integrate it across the value chain. The data obtained from the different nodes of the value chain should be linked to tie the nodes to each other. Additional guidance on this model is provided in USAID Oceans' "[Fisheries Catch Documentation and Traceability in Southeast Asia: Technical Concept and Specifications](#)."

Model 3: Existing eCDT system, not integrated across value chain → Move to an integrated and interoperable eCDT system

A country may have an eCDT system in place where electronic data capture exists for individual actors in the value chain but is not integrated across the whole value chain. In these cases, it is recommended to transition to an integrated and interoperable eCDT system, where data is exchanged from and throughout the value chain and with other eCDT systems. The data obtained from the different nodes of the value chain should be linked to tie the nodes to each other. This integration will facilitate data movement across the chain, enabling full-chain traceability. It is important when applying this model to establish a strong link between data using a consistent code. In software engineering this is known as "referential integrity." For example, vessel ID should be coded in a consistent manner throughout the system, including consistent using of spaces, dashes, and other characters. This process may need to start with cleaning and converting existing data. Additional guidance on this model is provided in USAID Oceans' "[Fisheries Catch Documentation and Traceability in Southeast Asia: Technical Concept and Specifications](#)."

Model 4: Existing eCDT system is integrated across value chain but not standardized → Standardize KDEs across value chain

In countries that have an existing, integrated eCDT system, it is recommended that KDEs be standardized across the value chain. To do this, CTEs identified during Step One should be revisited to ensure all data is being collected to effectively trace products throughout the supply chain. A robust traceability system must record data at every CTE, and because KDEs are linked to CTEs, they can be used to track products through the supply chain. A set of robust KDEs is required for comprehensive end-to-end traceability that is effective in combatting IUU fishing practices as well as human rights and labor abuses, and at each CTE, must be captured to inform the "who, what, when, where, why, and how" of the seafood product. It is also recommended that the KDEs be standardized with other eCDT systems for interoperability. The standardized KDEs are also important in order to enter the next stage in the information phase: data analytics. Standardized data will enable a country to do data analysis and data mining, as well as use artificial intelligence for machine learning, problem-solving, prediction, and planning.

KDEs TYPICALLY INCLUDE:

- Product's physical location
- Amount or quantity (e.g., the volume and/or weight) of the product
- The movement of the product in or out of a CTE (including the batch or lot number)
- Date/time when the product was received into or shipped out of the CTE

USAID Oceans' guide, "[Data Requirements for Catch Documentation and Traceability in Southeast Asia](#),"¹⁷ details the minimum recommended KDEs, including those recommended under the ACDS, to be captured within each link of the seafood supply chain and provides an overview of those required by predominant import markets and international organizations.

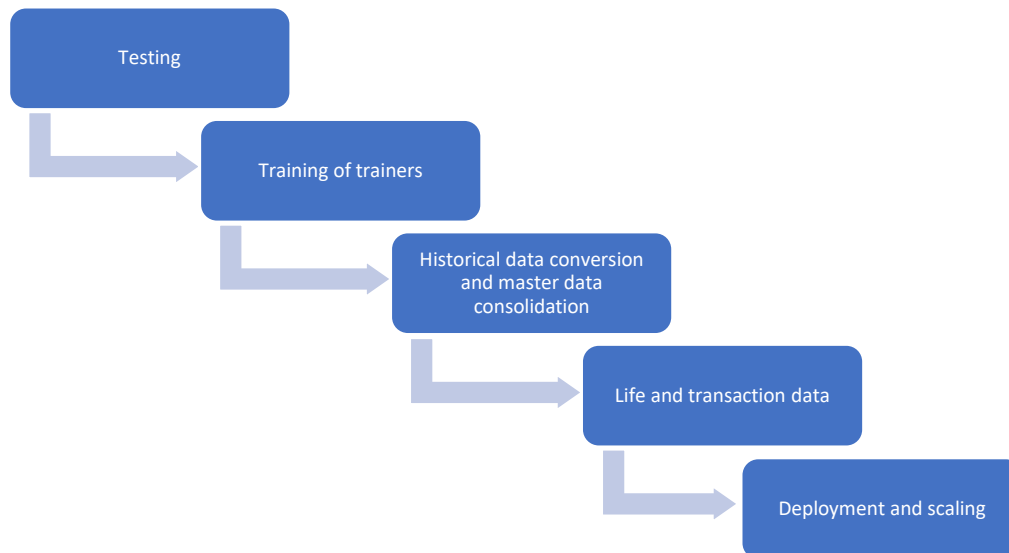
¹⁷ USAID Oceans, 2017a.

2.2.3.3. Capacity development

Building the capacity of stakeholders, including but not limited to government agencies, institutions, and private sector actors, is critical to effective eCDT system implementation. Without a core group of users that are equipped to test and use the system, eCDT operations will not be effective and long-term sustainability will be compromised. While designing and building the eCDT system, it is critical to engage stakeholders in capacity development activities that crosscut the key areas needed for system effectiveness, including traceability, fisheries management, and human welfare. This engagement will ensure that stakeholders are equipped with the necessary skills to implement, use, and contribute to the eCDT system and will support a participatory approach to implementation. A group of trainers should be established to support the capacity development.

2.2.3 Step 3: eCDT System Implementation

Once the eCDT system has been designed, several activities will need to be undertaken to support its implementation, which include establishing an administration system, verifying data, and conducting regular monitoring, evaluation, and learning. eCDT implementation can use the typical “waterfall system” which breaks down project activities into linear sequential phases, where each phase depends on the deliverables of the previous one and corresponds to a specialization of tasks. For example:



2.2.3.1. Administration and financing

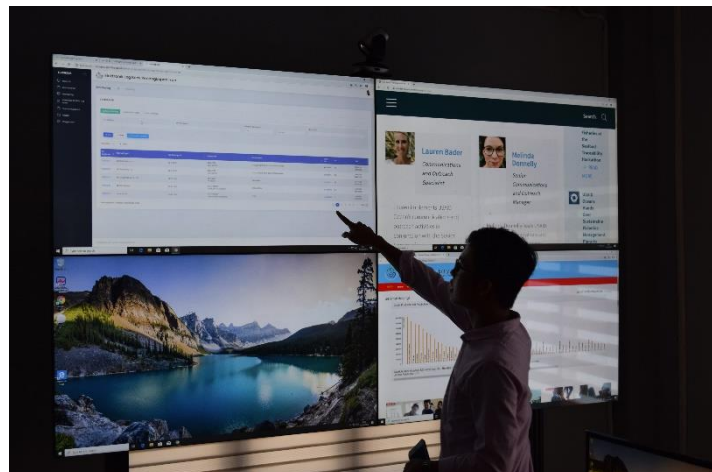
An administrative team, and dedicated office (as possible), should be established to provide fulltime overall administration and coordination for the eCDT system. The administrative team should serve as the national focal point to coordinate, monitor, evaluate, and manage the eCDT system. The office should facilitate data capture and sharing; provide necessary assistance and trouble-shooting to value chain actors; compile and collate supporting information and documents, including a list of competent authorities, official seals, names of authorized signatories and their specimen signatures, and requests for verification; and provide formal progress reports to private sector stakeholders and other government agencies/leadership.

A CDT Fishery Monitoring () Center is a land-based facility usually located in the port or fishery manager offices. It consists of hardware and software to help manage CDT data. The facility should include several large, industrial video displays that can run 24/7 and are controlled by desktop computers and connected with high speed internet. A FishMon Center collects the data from various sources, validates and stores them, and makes the information available for operational and administrative control as well as analysis. FishMon Centers work in tandem with a VMS centers that usually are run by a Monitoring and Surveillance

unit. However, a FishMon Center will add additional capabilities, including managing the process of port-in/port-out vessel activity reporting, at sea catch reporting, and analytics. While the requirements of VMS centers usually only apply to larger commercial fishing vessels, FishMon Centers also collect and monitor data for smaller fishing vessels using online/offline vessel trackers and eLogbooks.

FishMon Centers can also be used to manage administrative activities in processing catch documentation, including landing verification, and the issuance of catch certificate, and transport. Using a geographic information system (GIS), fisheries managers can conduct analysis to develop policies and regulations. FishMon Centers can also incorporate alert systems, whereby individual position reports are compared with database rules. When exceptions to the rules are identified (e.g. vessel entering a prohibited zone), an alert can be sent to an email address or cellular phone at the management authority. However, the positions of fishing vessels can be valuable and sensitive commercial information. Thus, monitoring agencies must make efforts to ensure the physical and operational security of shipboard equipment, communications, and FishMon Centers. Security is essential to ensure that the VMS and CDT information is authentic, of high integrity, and private.

eCDT systems require financial resources to support various operations and facilities. Funding, especially sufficient, timely, and sustained funding, is critical to the sustainability of the eCDT system. In the early stages of implementation, funding may have been obtained from a donor organization or a large development project. This source of funding may or may not continue in the long run. Funds also need to be made available on a timely basis to maintain cash flow for things such as staff salary and activities. The eCDT system must be designed from the start with thoughts and plans for sustainable financing. Too much dependency on external sources could jeopardize sustainability. Several sources of financing may be required and may include direct allocations from government budget, donor grants, and fishing industry levies/cost recovery mechanisms. The choice of which financing mechanism(s) to use in a particular case should be based on analyzing several feasibility factors:



The FishMon Center at the Bitung Fishing Port in Indonesia. Credit: USAID Oceans/L Bader

- Financial (funding needed, revenue generation, revenue flow, year-to-year needs)
- Legal (legal support for financing mechanism, new legislation needed)
- Administrative (level of difficulty to collect and enforce, complication and cost; potential for corruption, staff requirements)
- Social (who will pay, willingness to pay, equity, impacts)
- Political (government support, monitored by external sources)
- Environmental impact

2.2.3.2. Data validation, privacy, and interoperability

Verification procedures should be put in place by the designated administrative team to ensure the eCDT system is compliant at all nodes in the supply chain. Verifications may consist of examining products, verifying declaration data and document authenticity, examining operators' accounts and records, and inspecting means of transport. For verification purposes, competent authorities in importing countries may

seek verification and clarification from exporting countries on the validity and accuracy of the eCDT system documents (or its equivalent) with reference to the identified areas of possible non-compliance.

In addition to the manual verification of data (i.e. visual physical verification), data validation can be performed by cross referencing eCDT data with other databases and systems. For example, fishing grounds can be verified using VMS data; automated data collection by machine (i.e. data logger) can reduce the burden of data validation; and an online/offline eLogbook or electronic reporting application can record global positioning system location onboard fishing vessels during fishing activities. Data also can be validated against business transaction records such as purchase and delivery orders and invoices. Additionally, when designing a CDT system, it's important to maintain data integrity by reducing redundant data entry by allowing certain data (i.e. date of birth, address, gender) to be entered once and easily transferred for use through interconnected nodes of the supply chain.

A robust eCDT system should also include data privacy and security measures to ensure stakeholders' interests are protected. Data privacy and security are important not only to protect against data theft and tampering, but also to ensure data sovereignty in cases where the data center's location is regulated. Data sovereignty means that stored electronic data is subject to the laws of the country in which it is located. International management systems can be used in eCDT system design and development to ensure information is secure. The International Standards Organization's ISO/IEC 27001, for example, is a family of standards that helps organizations keep information assets secure.¹⁸

System interoperability is the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged. It is achieved through a) a shared database, b) file transfer, and c) messaging to transfer of data between applications. System interoperability is crucial to ensure effective eCDT data transfer between different systems and is also required for scalability. Several widely accepted international standards have been established to support effective interoperability and reduce needs to convert or translate fishing industry data. For example, the Fisheries Language for Universal Exchange (FLUX) is a standardized messaging format, developed by the United Nations Economic and Social Council and implemented by the UN Centre for Trade Facilitation and Electronic Business. In addition to the messaging format, FLUX defines the detailed information to carry within the message. Another interoperability standard used in the fisheries industry is Electronic Product Code Information Services, promoted by the Global Food Traceability Center. Although there is no mandatory requirement to use these standards, adopting an international standard will support the system's efficacy and scalability.

2.2.3.3. Monitoring, evaluation, and learning

The eCDT system should be reviewed and updated continuously during the system's testing period and at a minimum every two years and/or when necessary, using a set of established indicators and attributes to consistently measure performance against defined goals. Table 8 presents the minimum suggested set of relevant performance attributes, indicators, and measures that should be established and captured. These can be developed using the three pillars of the EAFM (ecological well-being, human well-being, and good governance) to ensure the system is meeting a diverse and complete set of needs and priorities.

Ecological well-being indicators cover the fisheries value chain's targeted focal species, level of fishing effort, and type of fishing gear/technology. **Human well-being indicators** evaluate income, livelihoods, and human welfare conditions by tracking the value of the catch, employment and occupational structure, labor practices, and compliance with international standards. **Good governance indicators** have three key attributes—law and policy, management, and enforcement and compliance. Sample indicators for law and policy include the local/national enabling policy environment as well as compliance with internationally accepted legal instruments. Management indicators cover degrees of licensing/registration of fishing fleet, level of CDT adoption within the fishing industry, and volume of the traceable catch. Enforcement and

¹⁸ ISO, 2019.

compliance indicators include enforcement coverage, level of stakeholder involvement, defined enforcement procedures, and degree of compliance. It is recommended that these attributes and indicators be evaluated during the CDT Gap Analysis process conducted in Step One in conjunction with the RAFM System.



FAME staff visit small-scale fishers in General Santos to upgrade on-board transponders after testing showed a need for enhanced connectivity and battery life. Credit: USAID Oceans/L Bader

Table 8. Minimum suggested performance measures related to national eCDT system design and implementation¹⁹

Attribute	Indicator	Measure
Ecological well-being		
Focal species	Target catch (species harvested) within the fisheries value chain	Total # and type of fishery species (Aquatic Sciences and Fisheries Information System species code with associated fishery product code) within the fisheries value chain
Extractive effort	# of fishing hours/days per trip; # of trips	Total # of fishing hours/days per trip; number of trips per month/year; multiple choice (gear type) and relative proportions/contributions to total catch
Human well-being		
Income	Value of traceable catch	Total value (in USD)/year of traceable catch being landed (by species/fishery product within the system)
Livelihood	Employment; occupational structure	Total # of full-time and part-time jobs (gender disaggregated) supported throughout the fishery value chain under the CDT system; relative proportion of jobs, by type (multiple choice)
Human welfare and gender equity	Presence and accessibility of accurate, verifiable, and completed records for all laborers associated with the production or transformation of a traceable fisheries product	<p>Checklist (Y/N); If “yes”, (n=5):</p> <ul style="list-style-type: none"> (a) legal name (b) nationality (c) date of birth (d) job/position title (e) legally recognized unique identification number <p>Including fishing crewmembers, processors, and other laborers</p>
	Presence of a fair and secure grievance and reporting process used within the fisheries value chain	<p>Checklist (Y/N); If “yes,” (n=3) of grievance reporting process typology:</p> <ul style="list-style-type: none"> (a) available process for reporting working grievance or concern (b) ability to voice/exercise labor rights (c) access to social protective services <p>Level of comfort/freedom to use the grievance and reporting process without fear of reprisal</p>
	Compliance with international standards of fair labor practices; e.g., ILO 188 (for ratifying countries), UN Global Compact on Labor Principles	Checklist (Y/N); if “yes”, which fair labor standards are being complied with?

¹⁹ USAID Oceans 2019a.

	Degree of workplace grievances or concerns, as reported within the fishery value chain	<p>Checklist (Y/N); If “yes”, total # of reports/year (gender-disaggregated, by complainant; with grievance typology):</p> <ol style="list-style-type: none"> (1) working condition (2) gender-specific workplace violence/coercion (3) physical abuse/violence (non-gender based) (4) sexual harassment (5) safety issue concern(s) (6) gender-specific working/labor condition concern(s) (7) non-gender specific working/labor condition concern(s) <p>Relative proportion/contribution annually of each grievance reported, gender-disaggregated</p>
Good governance		
Law and Policy	Enabling policy environment	<ol style="list-style-type: none"> (1) Total # of policies/regulations promoting or requiring uptake of CDT practices and standards; by scale: national, provincial, local (ordinance) (2) Total # of policies/regulations requiring revision or updating to support uptake of CDT practices and standards; by scale: national, provincial, local (ordinance)
	Compliance with internationally accepted fishery production, handling, and processing standards implemented throughout the fisheries value chain under CDT	<ol style="list-style-type: none"> (1) # and type of traceability standards implemented within the fisheries value chain; (2) #and type of non-traceability standards implemented within the fisheries value chain
Management	Degree of licensing/registration of fishing fleet within the fishery value chain under CDT	Proportion of fishing vessels observed/operating that are legally licensed and registered (International Maritime Organization/IMO #) within the fishery value chain and CDT system
	Level of CDT adoption/uptake within the industry	<p>Total # of fisheries operators participating within the fishery value chain; by species/fishery product within the CDT system; coded by multiple choice:</p> <ol style="list-style-type: none"> (1) fishing vessels/producers (2) processors (3) traders (4) exporters <p>Gender disaggregated, as possible</p>
	Volume of traceable catch (CDT capacity)	Checklist (Y/N); If “yes,” total kg/year of traceable catch being landed; by species/fishery product within the CDT system

	Level of traceability of fishery product throughout the value chain within CDT system	% of all recommended KDEs being reliably and accurately captured along the fishery value chain within the CDT system
	Level/degree of existing data interoperability within the fisheries value chain	Degree of the ability of existing database systems to “talk” with one another, as measured by the total number of “connections” (between two distinct data systems); by species/fishery product within the CDT system
Enforcement and Compliance	Level of known production non-compliance within a fisheries value chain operating under CDT	(1) Total # of suspected illegal fishing vessels identified per year (2) Total # of suspected illegal fishing vessels boarded or inspected per year
	Level of enforcement actions taken within a fisheries value chain operating under CDT	(1) Total # of enforcement actions taken against alleged illegal fishing operations per year; multiple choice: typology of violations/citations (2) Total # of suspected illegal fishing vessels apprehended and/or impounded per year (3) Total # of prosecuted cases made against alleged illegal fishing operations per year; ratio of successful versus unsuccessful convictions; (typology of action/punishment)

3. NATIONAL EXPERIENCES DESIGNING AND IMPLEMENTING eCDT SYSTEMS

3.1 USAID Oceans' Learning Site Experiences

In 2016, USAID Oceans established two program learning sites—in General Santos City, Philippines, and in Bitung, Indonesia. These sites were developed to support the development, implementation, and testing of eCDT systems and serve as a hub for regional knowledge sharing for system replication and expansion. In the learning sites, USAID Oceans and its public and private sector partners followed the approach outlined in Section Two, conducting research, analysis, consultations, and undertaking system design to meet national and site-level needs, priorities, challenges, and opportunities.

While research, design, development, and implementation differed between the two sites—as detailed within this section—USAID Oceans and its partners applied several consistent principles for eCDT system implementation across the two sites. These principles held that an eCDT system should:

- conform with national policies and regulation (e.g., the Philippines' BFAR Administrative Circular/251);
- build on existing catch documentation systems (Fisheries Administrative Order 238); and
- take into consideration the characteristics and needs of small-scale fisheries.

Experiences from the program's learning sites provide insight into the considerations and approaches used by AMS implementing eCDT initiatives.

3.1.1 The Philippines

In 2017, the BFAR launched its first end-to-end digital seafood traceability system, the Philippines' National Electronic Catch Documentation and Traceability System (eCDTS), supported by USAID Oceans. The system was developed by the Government of the Philippines to address IUU fishing through traceability from the point-of-catch to export. The following section provides an overview of the Philippines' current eCDT capabilities and the steps taken to establish its national traceability system.

Overview of the Philippines' eCDTS

With the eCDTS, catch documentation and traceability begins aboard fishing vessels (medium- and large-scale, including vessels with VMS). The fishing vessel operator/captain encodes and uploads a fishing logsheet, which includes the species of the fish, the location of catch, and other KDEs, to a centrally managed BFAR database. (Currently, a paper-based logsheet is used on board and encoded upon landing as an eLogsheet if electronic capabilities, such as VMS, have not yet been established). Once uploaded, the eLogsheet is first validated online by a VMS operator and then by a BFAR Fisheries Officer/Inspector who, equipped with an eCDTS-linked tablet or mobile device, inspects the vessel's catch upon landing to develop an approved Fish Unloading and Monitoring Report. After all documentations/verifications have been done, a Catch Origin Landing Declaration (COLD) will be created/ issued by Fisheries Officer/Inspector. The approved/validated COLD serves as a proof that the fish is legally caught and will be the basis for the issuance of the Catch Certificate (Figure 4).

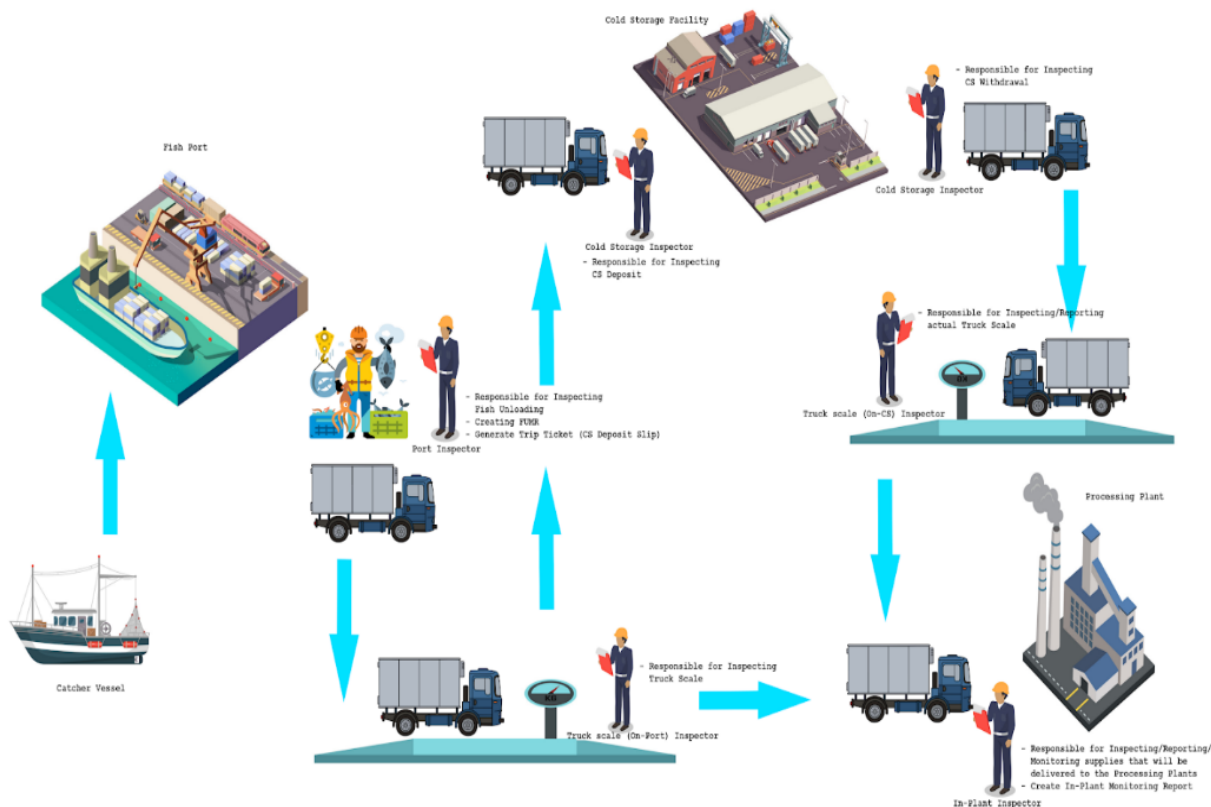


Figure 4. Philippines inspection report flow

Once the COLD has been created/issued to the supplier, the exporter can now apply for a Catch Certificate. The Catch Certificate will be evaluated to check the correctness and consistency with the supporting documents. An “endorser” will finally review the CC and endorse it to the Certifying Officer for approval (Figure 5).

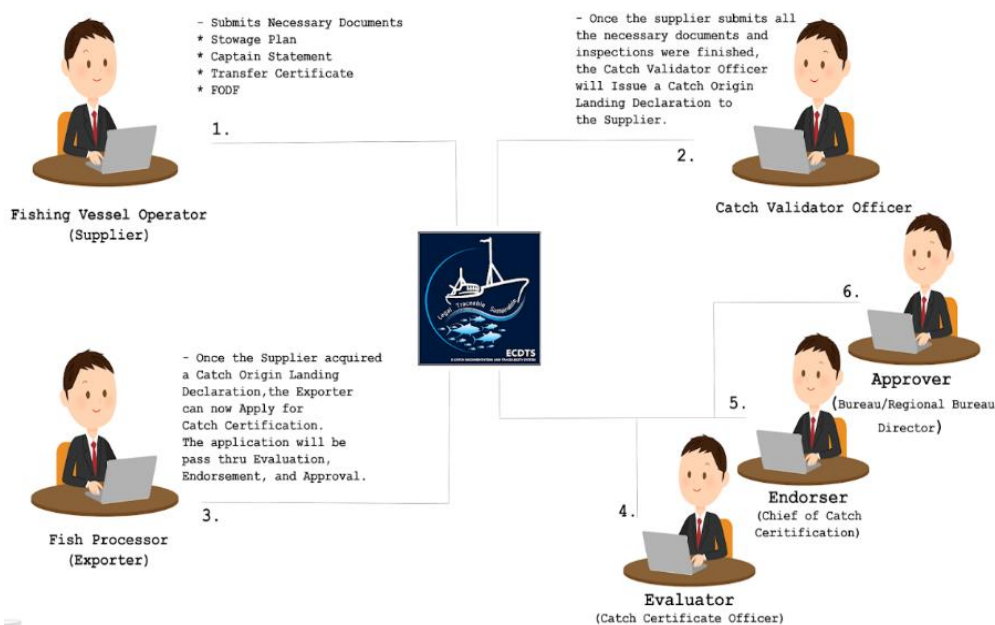


Figure 5. Philippines' online catch certification application and evaluation

Step One: Research and Engagement

In 2016 and 2017, USAID Oceans collaborated with BFAR and local partners to conduct a CDT Gap Analysis, RAFA, [seafood value chain studies](#), and labor and [gender](#) analysis studies to inform the design and development of the eCDTS. The foundational research reinforced that the eCDTS should be designed to build on the Philippines' BFAR Administrative Circular No. 251;²⁰ bridge small, medium-, and large-scale eCDT data capture tools; and integrate existing national databases to improve fisheries management. The design would enable and ensure KDE capture at every stage of the supply chain, enabling traceability data to be entered and stored electronically with more efficient validation processes than previous paper-based recording.

Step Two: System Design and Testing, Private Sector Engagement, and Capacity Development

With foundational research completed, BFAR began its electronic system design phase, supported by USAID Oceans. System design was a two-part process: 1) conceptual design, followed by 2) intensive design and development, including links to existing BFAR fisheries information and database systems such as vessels/boat and fisher registration systems.

Under the initial conceptual design phase, the partners worked together to design an eCDT system that would capture KDEs at each point in the supply chain, enabling traceability and transparency. The eCDTS would enable required paperwork to be generated and approved online for streamlined, efficient operations; would prevent illegally caught fish from entering the market; would reduce profits from IUU fishing; and would encourage stakeholders to participate in a traceable, sustainable marketplace.

To develop the system, after holding a series of consultation and planning meetings, USAID Oceans and BFAR established the eCDTS architecture and determined that the system interface software would be developed internally by BFAR. In June 2017, the planning, requirement analysis, and initial system design of the eCDTS was completed and a series of "Development Camps" was launched from June to August, during which a team of 15 developers worked to create the eCDTS software.

User acceptance workshops with industry members and field testing were conducted, with system modifications and improvements continuously made, as needed. A dedicated learning site eCDTS team, composed of BFAR National TWG members and programmers, relevant BFAR regional personnel, industry partner the SOCKSARGEN Federation of Fishing and Allied Industries, Inc. (SFFAI), and USAID Oceans' staff, was formed as a venue to discuss issues and concerns that may arise during the development and testing and ensure that were properly addressed in a timely manner.

Given the importance of advancing small-scale traceability capabilities and BFAR's priority to do so, USAID Oceans worked to explore small-scale traceability technology solutions, and in 2018 launched a partnership with the Futuristic Aviation and Maritime Enterprise (FAME) to develop and test CDT technology with integrated communications capabilities for small-scale fisheries. FAME is a private, Philippines-based company and the leading provider of small-scale vessel trackers and monitors.²¹ FAME's technology makes use of radio frequency to send and receive information, with data transmitted through gateways and stored in the cloud. FAME's technology enables data to be sent up to 50 km offshore, with the potential to be further extended via mesh technology between transponders. USAID Oceans and BFAR worked with FAME in parallel to the overarching national system design and development, working to first rollout and test the technology, with full system integration to follow.

²⁰ BFAR Administrative Circular No. 251 guides the Philippines' national traceability systems for fish and fishery products.

²¹ Futuristic Aviation and Maritime Enterprises, Inc., 2019.

To support the eCDTS launch, USAID Oceans, BFAR, and SFFAI, worked closely with private sector industry members in 2017 to recruit “First Movers” as initial adopters to pilot the eCDTS technology. SFFAI, a trusted industry organization, strong supporter of eCDT system adoption and a USAID Oceans partner, encouraged its members to become First Movers and worked closely with the 13 recruited First Mover companies throughout the implementation process. First Movers tested the system continuously throughout 2018 and 2019, with paper-based systems running in parallel to the electronic system in the early phases of testing to facilitate a smooth transition for business operations and internal staff. Implementation activities and timeline are detailed in Table 9.



A small-scale fisher in General Santos, and one of USAD Oceans First Mover partners attaches a FAME transponder to his boat. Credit: USAID Oceans/L Bader

Table 9. Key eCDTS design and testing activities in the Philippines

Date/Duration	Activity
August 2016 - February 2017	Consultation and coordination meetings with BFAR CDT Gap Analysis and related studies on fisheries management, value chains, labor, and gender
March 13-16, 2017	CDT Field Study
March 17, 2017	CDT Validation Workshop
March 20-21, 2017	Catch Documentation and Traceability Planning and Design Workshop
April 25-27, 2017	eCDT System Technical Workshop
May 31 - June 2, 2017	Agile Scrum Training for development team ²²
May - July 2017	Series of (4) eCDT Development Camps
July 27-29, 2017	eCDTS development team field trip to General Santos City
August 28 - September 5, 2017	eCDTS dry run and testing
September 6-9, 2017	eCDTS prototype soft launch at 19 th National Tuna Congress
October 2017 - December 2018	eCDTS testing, troubleshooting, and improvement (based on BAC 251)
February 4, 6-8, 2019	First eCDTS user training
February - March 2019	Consultation meetings to revise BAC 251 to address market and user demand
April - May 2019	Modification of eCDTS based on modified BFAF Administrative Circular 251-I
May - July 2019	Modified eCDTS user-acceptance testing
July 3-5, 2019	Modified eCDTS user training
August 2019 to present	Modified eCDTS pilot testing

Step Three: System Implementation and Data Analytics

The FAME platform was fully customized to incorporate USAID Oceans-recommended KDEs to capture required traceability data and ensure it could be seamlessly integrated with the national eCDTS. To test FAME technology, USAID Oceans partnered with the Alliance of Tuna Handliners (ATH) and SFFAIL. Vessel transponders equipped with near-field communication (NFC) card reader/writers were installed in twenty-four First Mover municipal fishing boats and six small-scale commercial fishing vessels. The transponders allow vessels and crew to transmit CDT data at-sea and to communicate more easily with business partners and family members on shore. Additional work is ongoing to integrate the FAME system with the BFAR eCDTS to bring small-scale fishers into the national database. Similarly, to further support small-scale



FAME staff installing transponders equip with NFC readers on small-scale vessels. Credit: USAID Oceans/L Bader

traceability, BFAR and civil society organizations have begun developing and initiating a national consultation process on a municipal CDT system.

As of 2019, BFAR, USAID Oceans, and a network of partners were working to make final system connections to achieve traceability from point-of-catch to export, with planning underway to expand the system beyond General Santos City. The system continues to be closely monitored and modified, as needed, with stakeholders regularly engaged to provide feedback and identify gaps and opportunities for the eCDTS (Table 10).

²² Agile Scrum Development methodology is an approach that enables highly-adaptive software created from the bottom-up.

Table 10. Issues and concerns related to the BFAR eCDTS²³

Issues and Concerns	Remarks
Involvement of other government agencies (such as the Department of the Interior and Local Government/DILG)	DILG involvement is currently being pursued by BFAR via series of national consultations on a municipal catch documentation and traceability system. A joint memorandum between the Department of Agriculture and DILG is envisioned to provide policy on a municipal eCDT.
Addressing human welfare aspects	Has been considered by BFAR; potential for collaboration with local government.
Inventory of existing electronic systems (used by industry or government agencies)	The BFAR eCDTS is the only electronic system used for seafood traceability and linked to other national databases within BFAR. There are ongoing municipal eCDT pilots by NGOs (e.g., World Wide Fund for Nature, RARE), which are planned to link to the BFAR eCDTS.
Need for strong private sector and stakeholder engagement to expedite system development and enable stronger sector buy-in	BFAR, through USAID Oceans, has engaged SFFAI, local stakeholders, and the ATH to facilitate this process.
Issuance of municipal guidance for catch documentation for small-scale fishers	To be pursued by BFAR and local governments under the municipal catch documentation and traceability system.
Need technical support for eCDTS infrastructure, maintenance, network troubleshooting (particularly to resolve areas with weak signal)	FAME engaged to address small-scale digital network coverage limitations; alternative VMMs are also being pursued by BFAR.
Processing eCDTS data	In 2019, USAID Oceans, in partnership with BFAR and Mindanao State University Naawan Foundation for Science and Technology Development, Inc. (MSU Naawan Foundation) initiated a “EAFM Grant” to develop a digital solution to use eCDTS data to improve fisheries management.
Highlight the significance of the eCDTS in addressing IUU	In progress as part of the EAFM Grant.
Country design should be focused on process improvement and acceleration	Measures have been proposed to improve BAC 251.
Collection, analysis, and use of information for more efficient delivery of services	In progress with BFAR and private sector.
Need to reduce at-sea selling and buying activities	Measure on transshipment is being addressed by BFAR and the fishing companies, including an Observer Program.
eCDTS must be supported with policy framework	The BFAR eCDTS was developed following BAC 251.
Availability/allocation of sufficient budget	Budget for eCDTS implementation is included in BFAR annual budget and financial plans, however supplemental funding to support technology and infrastructure requirements are important.

²³ As documented during a *Regional eCDT Guidance Review Workshop* conducted on July 4, 2019, Quezon City, Philippines.

In addition to the implementation of the BFAR eCDT system, USAID Oceans and BFAR worked to use data collected to improve fisheries management practices in the Philippines. The partners collaborated to install FishMon Centers in BFAR Region 12 office General Santos City and at the BFAR Integrated Marine Environment Monitoring System center at the Navotas Fishport Complex in Manila. Furthermore, USAID Oceans issued a grant to MSU Naawan Foundation to develop an Innovative Digital Solution (IDS) dashboard to collect available eCDT data, conduct real-time analysis, and use analytical results to inform local and national fisheries management decision-making in collaboration with BFAR. Associated costs for designing, testing, and implementing the eCDT systems, including data analytics, are shown in Table 11.

Table 11. Philippines eCDT system costs

Phase	Description	Est. Cost
eCDT Design	Government: BFAR	
	Personnel Costs (10 persons x PhP 30,000/person/month x 4 mos)	\$24,000
	Development Camp (full-time development in dedicated location)	\$48,000
	Equipment (laptop, desktop, tablets, etc.)	\$20,000
	Overhead expenses (internet, electricity, etc.)	\$1,200
	Total	\$93,200
	FAME	
	Gateways (PhP 190,000/gateway x 5 gateways)	\$19,000
	Electricity for gateways (PhP 1,000/year)	\$240
	Total (First Year)	\$19,240
eCDT Testing	Government: BFAR	
	Consultation meetings	\$5,000
	Travel (for consultation and testing until user acceptance)	\$40,000
	Total	\$45,000
	Industry Partner and First Movers (cost per company)	
	Personnel cost	\$10,000
	Equipment	\$1,000
	Internet and communication	\$360
	Overhead expenses (electricity etc.)	\$720
	Total	\$12,080
eCDT Implementation	Small-Scale/Municipal Fisheries	
	Transponder (PhP 6,500 x 30 units)	\$3,900
	NFC cards (500 cards) and reader-writer	\$3,500
	Subscription (PhP 900/month/transponder x 24 months)	\$12,960
	Consultation and capacity building	\$6,000
	Gateway installation	\$3,000
	Testing and monitoring, updating, and upgrading	\$7,200
	Total	\$36,560
	National FishMon Center	
	Installation/upgrading	\$2,108
	Equipment	\$52,365
	Total	\$54,743
	Regional FishMon Center	
	Installation/upgrading	\$1,700
	Equipment	\$29,984
Total	\$31,684	
eCDT analytics	Grant to MSU Naawan Foundation	
	Personnel	\$45,496
	Equipment	\$4,613
	Total	\$91,847

Note: \$1 USD= Php50.00

3.1.2 Indonesia

Indonesia is one of the world's largest tuna producers, however, due to rampant IUU fishing, the country has incurred losses as high as US\$3 billion per year.²⁴ In late 2014, the Indonesian government declared its intention to reshape its fishery sector and harness the country's potential as a leading maritime and fishing nation, setting in motion a reform process by developing a set of new regulations to eliminate IUU. To support the government's efforts, USAID Oceans established one of its two program learning sites in Bitung, North Sulawesi, Indonesia, in 2016 and began working to develop and implement a country-specific, financially sustainable eCDT system. The system was piloted within the tuna industry in the fishing port and processing hub of Bitung. The following section provides an overview of the Indonesia's current eCDT capabilities and the steps taken to establish its national traceability system.

Overview of Indonesia's eCDT System

Since the issuance of European Council Regulation 1005/2008, which established guidelines to deter IUU fishing products from entering the EU, Indonesia has established itself as one of few countries to implement a strong catch documentation scheme for products exported to the European market. A number of directorates within the Ministry of Marine Affairs and Fisheries (MMAF) have developed electronic applications and databases that can be used to address IUU practices, seafood fraud, and product safety. Each of these applications, however, operated independently of each other, resulting in redundancies of data collection, storage, and maintenance by different systems and directorates. As of 2019, at least 17 systems/applications were operating, most independently and unintegrated (Table 12).

Table 12. Existing Fisheries Databases used by Indonesia

System/ Database	Description
SILOPI	Logbook database for paper logbook
eLogbook	Electronic Captain fishing logbook
VMS Tracking	Online vessel monitoring system
SIPEPI	Fishing licensing system
PIPP	Port information system
SIMKADA	Administration of fishing licensing system for local managed boats
SLO	Manages fishing vessels meeting administrative requirements and technical feasibility to carry out fishing activities
SPB	Sail permitted system (port out)
LHVPI	System for verification of catch and landing
SHTI Online	Online system for EU market Catch Certificate scheme
CPIB	Broodstock system
CBIB	Good aquaculture practice system
AKUBISA	Aquaculture licensing system
SISTERKAROLINE	Quarantine system
HACCP Online	Hazard analysis and critical control points system
SKP Online	Good Manufacturing Practices and Sanitation Standard Operating Procedures
IPHP Online	Import (raw materials) licensing system

²⁴ Economist, 2014.

Step One: Research and Engagement

Foundational research was conducted to guide the design, development, and implementation of a functioning, robust eCDT system to capture KDEs for each CTE from catch to export market. In 2016, USAID Oceans commissioned a [Value Chain Analysis](#) and a [Key Data Element Gaps Analysis](#) to gather information required for a CDT gap analysis.

USAID Ocean's partner, Marine Change,²⁵ conducted a rapid VCA of the tuna sector in Indonesia, focusing on Bitung. The VCA identified critical actors in the tuna value chain; key end markets and their requirements; CDT requirements of different stakeholders within the local tuna industry; leverage points for CDT and fisheries management data collection; and current catch documentation process flow (Figure 6). The analysis also helped establish the business case for different actors through traceability and differentiation.

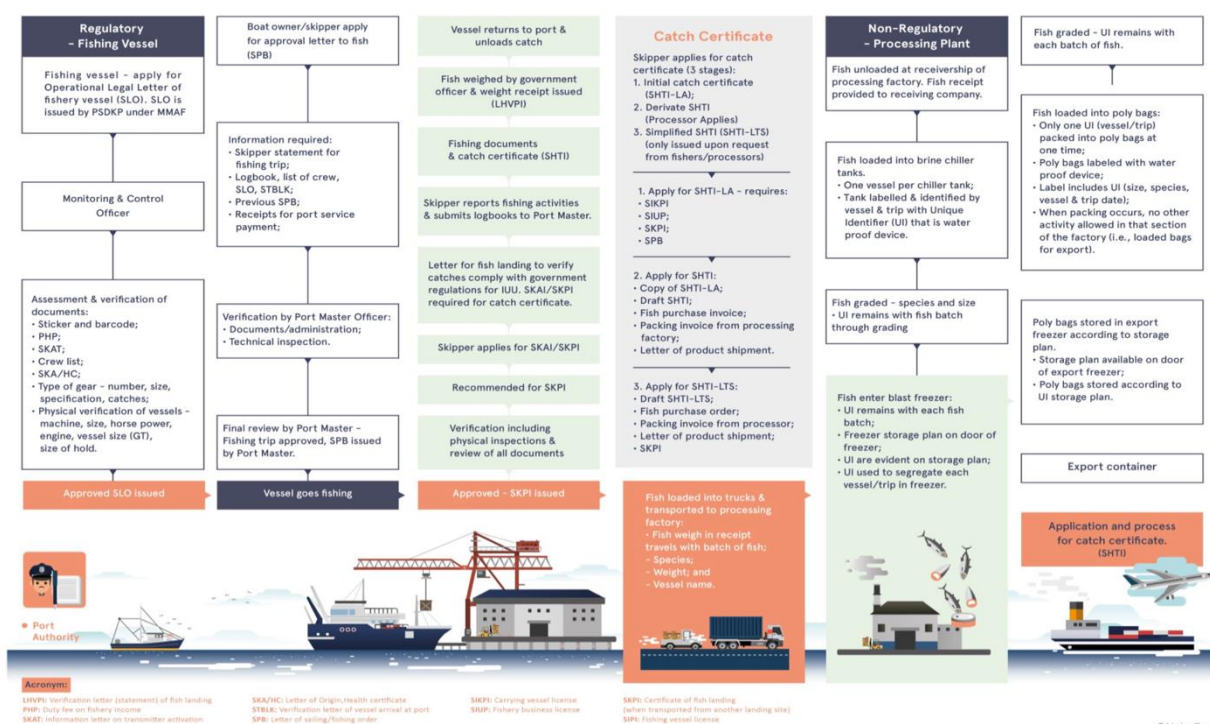


Figure 6. Catch documentation and chain of custody flow (2017)²⁶

The VCA established a clear picture of Bitung's tuna fisheries value chain, including its actors, end markets, and the challenges needed to be addressed through the new eCDT system design. The analysis found that value chain actors were typically only complying with the government's minimum catch documentation requirements, as required by international buyers, which were perceived as extremely cumbersome. These limited efforts on the part of actors significantly undermined the government's ability to gather necessary, accurate data. Additionally, the VCA confirmed the increasing demand and requirements for traceability, particularly from the U.S., EU, and Australia. The analysis mapped barriers and challenges, highlighting key considerations for eCDT system design.

In addition to this research, the program conducted additional research to update its information base on fish stocks, harvest strategies, and priority fisheries management challenges, as well as [labor](#) and [gender](#) analyses which uncovered priority areas of interest in relation to the human aspects of Bitung's fisheries.

²⁵ Marine Change is an advisory firm based in Indonesia that focuses on investments in the Asian marine sector that advance sustainable and financially rewarding business opportunities.

²⁶ Marine Change, 2017.

Results of all of the research initiatives were reviewed with stakeholders in a [Stakeholder Validation Workshop](#), held in June 2017.

Step Two: System Design & Testing, Private Sector Engagement, and Capacity Development

Following the preliminary research stage, USAID Oceans and its partners engaged in a partnership appraisal and prioritization process in 2017. With strong relationships already formed with supporting government partners, potential private sector partners were identified and assessed according to category: CDT design, technology enabling, and industry. Out of the prioritization process, USAID Oceans formed partnerships with industry First Movers who expressed willingness to test the implemented eCDT technology within their operations. To support implementation, a partnership was also formed with a local non-profit organization, Masyarakat Dan Perikanan Indonesia (MDPI) that had strong existing relationships with the public and private sector and in-depth on-the-ground experience to support technology development and implementation.

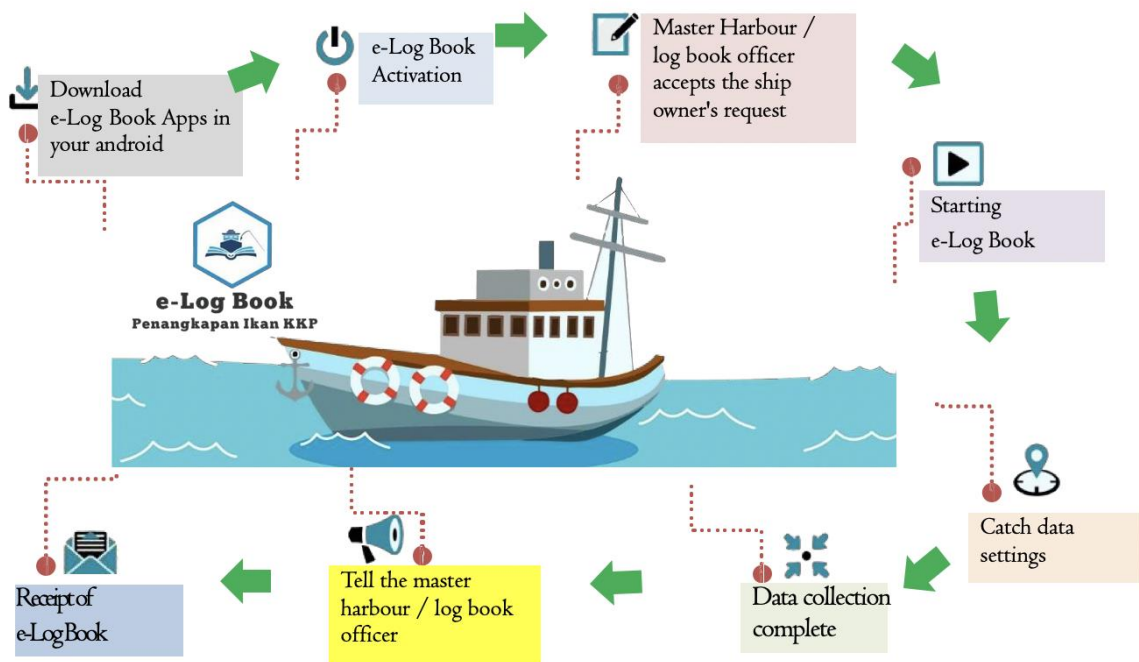
To strengthen its downstream electronic traceability capabilities, in August 2018, MMAF launched STELINA to accommodate and comply with international market requirements, including the United States' SIMP and European Union EU import regulations. STELINA is a downstream, government-hosted traceability system led by the MMAF Director General of Product Competitiveness. In addition to housing traceability data, the system synthesizes data from Indonesia's multiple information systems that currently and disparately host fisheries traceability-related information. STELINA is also designed to allow data exchange between the MMAF system and external private sector systems (e.g., processing companies). For example, when a first buyer enters a fishing license number, STELINA will match and verify the vessel data with the MMAF fishing license system (SIPEPI).

STELINA provides benefits to users across the supply chain. At the point-of-catch, it allows product data (e.g., species type, volume, temperature, location) to be collected. In addition to the data's value toward fulfilling traceability requirements, it is also useful to fishers to manage, track, and plan their catch, and to suppliers to monitor and submit their daily transactions to processors and exporters (per their request or requirement). For processors and suppliers, STELINA provides useful information for inventory monitoring and management, and pinpoints locations of fishing ports, suppliers, and government facilities to support their logistics. The system generates the records needed for export documentation (e.g., Surveyor Export Report or "Laporan Surveyor Ekspor.") MMAF also benefits from STELINA, as it provides information on the availability of marine resources that the nation's food security relies on, aids in combatting IUU practices, and provides valuable data to support the development of effective trade policies to enhance the country's competitiveness in the global fisheries market and improve fisheries management. When fully implemented, STELINA will integrate more than twelve existing fisheries management databases that are currently used by MMAF.

Also in 2018, MMAF launched its eLogbook initiative, making the commitment at the October 2018 *Our Oceans Conference* in Bali, Indonesia, to "implement the electronic fishing logbook to Indonesian fishing vessels...in collaboration with fishing port authorities (central and local governments) and USAID Oceans to improve the quality and quantity of data as a foundation for making strong policy in fisheries management." The eLogbook was intended to improve accuracy and reduce data entry efforts. MMAF undertook application development internally and commissioned a software developer for additional technical support. The eLogbook is used aboard fishing vessels and captures data at the point-of catch that is then fed into STELINA to enable traceability throughout the value chain (Figure 7). The eLogbook is compatible with Android devices, including smartphones and tablets, which are provided to the vessel captains. In 2019, USAID Oceans supported MMAF's eLogbook initiative by procuring and providing 60 tablets for large vessels (>10 GT).



E - Log Book Mechanism



E - Log Book Application (by Android) System

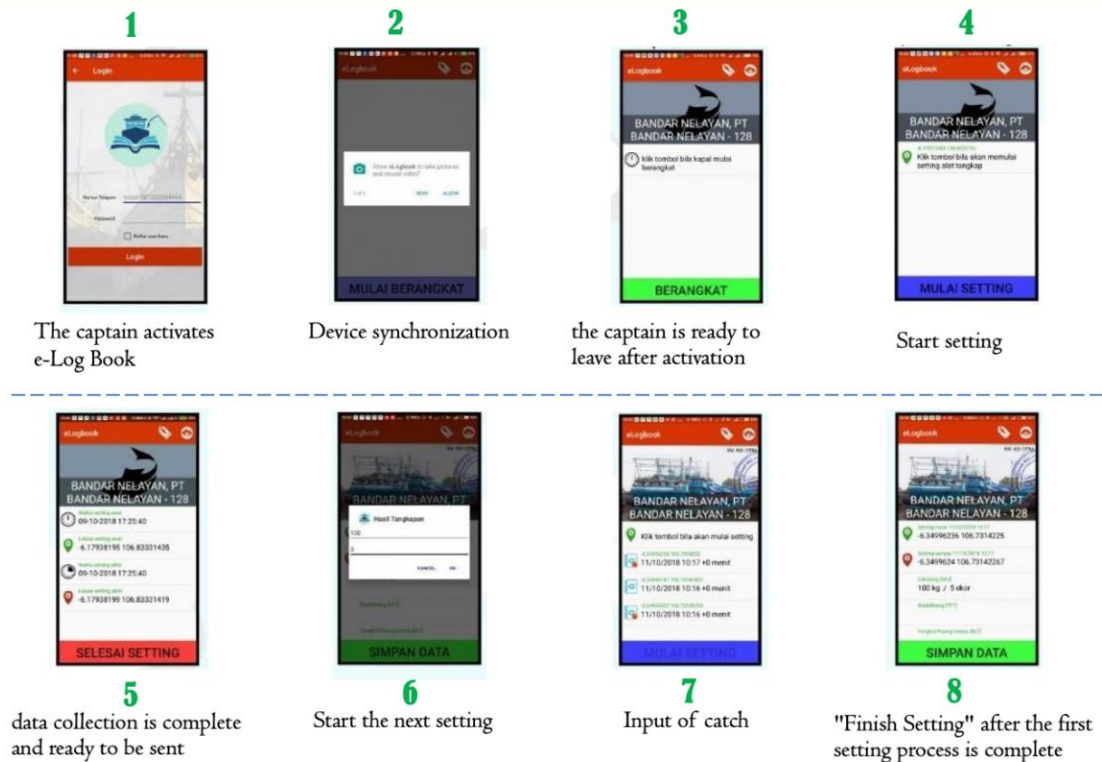


Figure 7. Data flow and interface of MMAF eLogbook (2019)²⁷

²⁷ Indonesia Ministry of Marine Affairs and Fisheries, 2019.

To achieve full connectivity between different traceability tools and technologies to enable data flow through the entire supply chain and across a range of actors towards a full-chain traceability, USAID Oceans also supported the development and testing of private sector based traceability technologies in Indonesia, including Pointrek, a two-way satellite communication and vessel monitoring system for at-sea data capture; Trafiz, a mobile application that can record seafood traceability data at the point of landing; and TraceTales, a fully integrated production, inventory system that function as internal traceability for seafood processors.

Step Three: System Implementation and Data Analysis

In August 2018, MMAF, with the support of USAID Oceans, began piloting STELINA with First Movers to gather feedback from users and address any issues. Following an initial period of use, one of the main challenges identified was the lack of consistent and reliable internet connectivity for data entry and processing, a necessity for the web-based traceability system. For instance, when data was entered by suppliers/buyers at port or in other locations without strong internet signal, data upload was delayed, improperly stored, or unable to be stored. During the pilot, numerous improvements were made based on stakeholder feedback, which included enhancements to system interfaces for easy data entry, and improvements to speed and efficiency of data verification processes through automatic data verification as well as improving synchronization logic. Further testing, including incorporating additional users, was done throughout 2019 to enhance the system's ability to meet user requirements. As of mid-2019, STELINA had been tested with five processors and three suppliers.

The eLogbook system was also implemented in 2018, and by mid-year had already been used about 4,900 vessels. USAID Oceans provided support to increase the system's adoption rate by partnering with the Indonesia Pole & Line and Handline Association (AP2HI) to recruit vessel users and provide them with eLogbook-enabled mobile devices. Each receiving vessel self-funds one additional device for each received, further supporting adoption under a cost-share scheme.

In addition to the implementation of the STELINA and eLogbook technologies, USAID Oceans and MMAF partnered to install FishMon Centers in Bitung and Jakarta to manage the systems' operational aspects and optimize data sharing and analysis.

Pointrek application is a two-way satellite communication and vessel monitoring system that enables fishing fleet owners to efficiently manage their operation. Pointrek was piloted with USAID Oceans' Indonesian-based partners, Nutrindo, Bintang Mandiri Bersaudara, and Sari Usaha Mandiri in 2018. To tailor the system to Indonesia's existing eCDT tools and needs, USAID Oceans worked with the Pointrek development team to enable Pointrek to produce logbook forms. The next step is to develop Pointrek to be able to submit data to MMAF's logbook database so it will have same capability as MMAF eLogbook. Based on the benefits related to managing their fleets, by end 2019 the three companies piloting Pointrek had bought an additional 11 devices for their vessels with plans underway to install more following licensing clearance for additional vessels by MMAF.

The Trafiz application was tested in two supply chains by USAID Oceans—in the tuna supply chain by USAID Oceans' partners Nutrindo and Blue Ocean Grace International and in FMA 715 by MDPI. By the end of October 2018, the application had been used by over 100 fishers and had tracked over 82 gross tons of tuna.

Similar to MSU Naawan Foundation in the Philippines, USAID Oceans issued a grant to MDPI to develop an IDS dashboard to collect available eCDT data, conduct real-time analysis, and use analytical results to inform local and national fisheries management decision-making in collaboration with MMAF. Based on the Indonesian experience, the associated costs for designing, testing, and implementing the eCDT systems, including data analytics, are shown in Table 13.

Table 13. Indonesia eCDT systems costs

Phase	Description	Est. Cost
eCDT Development	Government: MMAF (eLogbook)	
	Software development (estimated 4 months x \$6000)	\$24,000
	Government: STELINA	
	Software development (estimated 5 months x \$6000)	\$30,000
	Small-scale Fisheries: Trafiz	
	Software development and 3 years cloud and infrastructure support	\$65,000
eCDT Testing	Small-scale Fisheries: TraceTales	
	Software development	\$66,000
	Government: MMAF (eLogbook)	
	Workshops/Training - Annual cost per port to conduct 3 trainings/year (including travel, lodging and accommodation)	\$15,000
	Government: STELINA	
	Workshops/Training - Annual cost per port to conduct 3 trainings/year (including travel, lodging and accommodation)	\$15,000
eCDT Implementation	Training with for field validators	\$10,000
	Total	\$25,000
	Government: FishMon Center	
	Bitung Port FishMon Center	\$35,000
	eLogbook/STELINA FishMon Center	\$70,000
	Total	\$105,000
	Private Sector (Pointrek Two-Way VMS)	
	Two-way VMS and first year subscription, installation, and training	\$1,650
	Additional subscription after first year (VMS application)	\$540
	Total	\$2,190
	Private Sector (TraceTales)	
	Hardware	\$20,000
User training (Travel and lodging of trainers and staff)	\$5,500	
Total	\$25,500	
eCDT analytics	IDS Dashboard Grant MDPI	
	Personnel/Labor	\$46,546
	Equipment	n/a
	Training/workshops	\$46,762
Total	\$93,308	

Note: \$1 USD=Rupiah 14,500

3.1.3 Use of eCDT Data for Improving Fisheries Management

USAID Oceans worked with learning site partners in Bitung and General Santos City to develop fisheries management plans that guide safe, legal, and equitable, and sustainable practices. Site-level plans developed with USAID Oceans’ support cover [FMA 716](#), North Sulawesi, Indonesia, and the [Sarangani Bay and Celebes \(Sulawesi\) Seas in FMA 3](#) in Southern Mindanao, Philippines. The program also supported the development of the first [sub-regional EAFM plan for the Sulu-Sulawesi Seascape](#). Implementation of eCDT systems are linked to and supported by the fisheries management plans, especially in the learning sites. While the eCDT systems help curb IUU fishing, these fisheries management plans guide management practices for IUU fishing as well as sustainable harvest, food safety, and other fisheries management goals. As mentioned above, to further support the use of eCDT data for fisheries management, in May 2019, USAID Oceans awarded two EAFM grants—to MDPI to work at the Bitung, Indonesia, learning site, and to MSU Naawan Foundation to work at the General Santos City, Philippines, learning site. The grantees worked to develop IDS to collect available eCDT data, conduct real-time analysis, and use analytical

results to inform local and national fisheries management decision-making in collaboration with MMAF in Indonesia and BFAR in the Philippines. This is an important activity demonstrated that access to real-time, fisheries-related data (made available through the eCDT systems) can enhance fisheries management, thereby promoting conservation and sustainability.

Fisheries managers can use data analysis methodology, tools, and software (e.g., desktop applications using standard and ad-hoc analytic reports, dashboards, and alerts; machine learning; and real time fisheries data analyses) to analyze real-time eCDT data on volume, species distribution, and fishing location, vessel tracking. For example, these managers can use visualizations of spatial distributions of fishing activities and catch per unit effort data within the fishing ground to identify trends in fishing practices and determine species composition of the fisheries/catch. These analyses can improve stock assessment practices to support EAFM. Additionally, if data on gender disaggregation, safety at sea, human security, and labor practices were incorporated into existing eCDT systems, these data could be used to design and implement gender-sensitive and human welfare-focused interventions and policies, such as local government Gender and Development (GAD) Codes.

3.2 Electronic ASEAN Catch Documentation Scheme Implementation in ASEAN Member States

In December 2010, during the 13th Meeting of the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership, members advised the SEAFDEC Secretariat facilitate experience and information sharing among AMS. Experience and information sharing will enhance countries' capacity to deal with market-driven measures, such as import requirements and regulations, that may impact Southeast Asia's fisheries sector, particularly its economic and social aspects. In response, SEAFDEC proposed developing a common regional catch documentation scheme to improve traceability of capture fisheries to meet requirements outlined in EC Regulation 1005/2008 and to reduce impacts from market measures.²⁸

As detailed in Section 1.2.2, AMS expressed their support for improved fishery traceability and sustainability to ensure food security in 2020 onward. Accordingly, SEAFDEC led the development of the ACDS to enhance intra-regional and international trade. The ACDS is part of a regional initiative between SEAFDEC and AMS to improve traceability of marine capture fisheries and prevent fish and fishery products from IUU fishing from entering the supply chain. Between 2014 and 2017, five *Technical Consultation and Expert Meetings* were held to develop the ACDS. In May 2017, the ACDS was endorsed at the *25th Meeting of the ASEAN Sectoral Working Group on Fisheries* in Singapore. That same year, the document was also adopted during the *Senior Officials Meeting of the ASEAN Ministers on Agriculture and Forestry*.

In April 2016, the SEAFDEC Council specified that the ACDS should not create an unnecessary burden, cost, or lengthy process for supply chain actors. Thus, with support from the governments of Japan and Sweden, SEAFDEC collaborated with the Thailand Fish Marketing Organization to design the eACDS. In 2017, a web-based application and mobile application were developed to supplement the electronic system.

eACDS Design and Implementation

eACDS was first piloted in Brunei Darussalam in 2017. Following the successful pilot, the SEAFDEC Program Committee and the SEAFDEC Council requested and began exploring expansion to other AMS, particularly Vietnam, Myanmar, and Malaysia.

The eACDS links information and data in the supply chain from point-of-catch to the consumer's plate. It was developed using CodeIgniter Version 3.0.4,²⁹ which allows for flexibility for modular upgrades as

²⁸ EUR-Lex, 2019.

²⁹ CodeIgniter is an open-source software CodeIgniter is an open-source application development framework for people building web sites using the "PHP" programming language (<https://codeigniter.com/>).

needed. The eACDS consists a web-based application and mobile application that stores six categories of KDEs:

- 1) Point-of-catch
- 2) Buyers/receivers and sellers (Broker/wholesale)
- 3) Processors
- 4) Exporters and international shipping companies
- 5) Importers
- 6) Consumers

The first iteration of eACDS was designed for marine capture fisheries or domestic fisheries. The second iteration focuses on a tractability system for import fishes and transshipment vessels. Collectively, all features of the system cover the full supply chain—from sea to table—and enable consumers, customs staff, and/or importers a to trace the origin of the fish, including the who, how, and when of the catch.

The eACDS generates three certificates for all important phases in the supply chain: 1) Catch Declaration (CD) for fishing masters/operators to ensure that they are not involved in IUU fishing activities; 2) Movement Document (MD) for buyers who are authorized by the government to report the fish purchased and transport it to other destinations, such as processing plants or local markets; and 3) Catch Certification (CC) for processors to be able to export their fish and fishery products.

eACDS Structure and Process

The eACDS consists of two applications—a web-based application and a mobile application—that are used by different stakeholders during various stages of the supply change. To cater to the diverse needs of users, there are nine steps to implementing the eACDS.

NINE STEPS FOR EACDS IMPLEMENTATION

- 1: Port-out permission granted, and initial CD issued to Fishing Master via web-based application
- 2: Catch Reporting at Sea by Fishing Master (offline reporting feature available if fishing vessel does not have communication signal)
- 3: Port-in Permission, including catch weight documentation, species verification, and CD issuance to the Fishing Master, to regulate catch and ensure catch is not from IUU fishing activities
- 4: Catch purchased for local markets and/or for processing; registered buyers report required information to the center/port via mobile application
- 5: Authorized fishery officer issues MD at port so catch can be transferred to local markets or processing plants
- 6: Catch sent to processing plants are processed, and if meant for export, processor requests CC from Competent Authority via web application
- 7: Competent Authority issues CC to processor
- 8: Fish and/or fishery products are exported with CC and QR-code identifying the products' origin and catch information
- 9: Consumers can scan QR code through a mobile application to trace the origin of the fish/fishery products

Promoting and Implementing eACDS in the AMS

Promoting and implementing the eACDS in the AMS was conducted through five main activities:

1. **Introduction.** AMS were introduced to eACDS, and the scheme's structure and function were demonstrated.
2. **Baseline survey and situation analysis.** A baseline survey with relevant authorities on the process of issuing CDs, MDs, and CCs in each country was conducted and analyzed. KDEs were discussed with representative from each country and cooperation for implementing the eACDS was requested.
3. **Prototype development.** The eACDS prototype was developed and modified to the context of each implementing country.
4. **Testing and improving the system.** The eACDS was piloted with relevant users. Problems identified were solved and the system was further tailored to each country context. Relevant authorities, Master Fishers, vessel owners, buyers, and processors were trained on using the application.
5. **IT transfer.** During the testing phase, all data were stored on the SEAFDEC cloud server. When testing was completed, the database was transferred to each country to be maintained.

For additional information on the eACDS visit: <https://www.seafdec-oceanspartnership.org/traceability-tools/eacds/>

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ANNEX I. DISTINCTIONS BETWEEN DEFINITIONS OF KEY TERMS USED BY ASEAN MEMBER STATES³⁰

Country	Small-Scale Fisheries	Commercial Fisheries
Brunei Darussalam	Small-scale/artisanal fisheries: Vessels operating in all zones but concentrating in Zone 1 (0 to 3 nm)	Trawler, purse seiner, or long liner: <60 GT; <350 hp operating in Zone 2; 60.1 to 150 GT; 351 to 600 hp operating in Zone 3; or 151 to 200 GT; 600 to 800 hp operating in Zone 4.
Cambodia	Coastal fisheries: Small-scale fisheries with/without an engine (from 5 to 50 hp) operating in Zone 1	Commercial fisheries: More than 50 hp operating in Zone 2
Indonesia	Small-scale fisheries: fisheries operated by fishers without or with a boat up to 10GT for their livelihood	Commercial fisheries: fisheries operated using vessel size >10GT
Malaysia	Traditional fisheries: Small-scale fisheries using traditional fishing gear (i.e., other trawls and purse seiners) with vessels <40 GT operating in all zones but concentrating in Zone A	Commercial fisheries: Medium and large-scale fisheries using commercial fishing gear such as trawls and purse seines; vessels <40 GT operating in Zone B; vessels from 40 to 70 GRT operating in Zone C; and vessels >70 GT operating in Zone C2
Myanmar	Inshore fisheries/coastal fisheries: Vessels <30 ft or using <12 hp engine and operating in Zone 1; 5 nm from shore (Rakhine coastal); or 10 nm from shore (Ayeyarwaddy and Taninthayi region) ; <25HP engine operating in zone 10 nm from shore	Industrial fisheries: Vessels >30 ft or using >12 hp engines operating in Zone 2 (outer limit of inshore fishing zone to the EEZ); >25HP engine operating in outer area of inshore to end of EEZ
Philippines	Municipal fisheries: Vessels up to 15 km from shore or equidistant between two adjacent municipalities Small-scale fisheries: Vessels <3 GT operating in Zones 1 and 2	Commercial fisheries: Small-scale commercial fisheries with vessels from 3.1 to 20 GT operating in Zone 2; or operating within 10.1 to 15 km in Zone 1 (if authority is granted by the concerned local government unit) Medium-scale commercial fisheries: Vessels from 20.1 to 150 GT operating in Zone 2; or vessels operating within 10.1 to 15 km in Zone 1 (if authority is granted by the concerned local government unit)

³⁰ Funge-Smith, S., Briggs, M. & Miao, W. 2012.

		Large-scale commercial fisheries: Vessels >150 GT operating in Zone 2
Singapore	Small-scale fisheries: Vessels <3 GT operating in Zone I	Small-scale commercial fisheries: Vessels with inboard than engines <50 GT or 380 hp operating in Zone 2
Thailand	Artisanal fisheries: Vessels <5 GT operating in Zone I (includes instances where fishing gear is used without a vessel); fishing operations in coastal seas in which a fishing vessel is used or in which a fishing gear is used without a fishing vessel but in any case does not include commercial fishing	Large-scale/commercial fisheries: Vessels >10 GT operating in Zone 2; fishing operations using a fishing vessel from 10GT or a fishing vessel fitted with an engine or a horsepower as prescribed by the minister
Timor-Leste	Subsistence artisanal fisheries: Commercial small canoes with sails or paddles (exempt from license) operating in Zone A Artisanal fishing vessels: Vessels <10 meters that are self-reliant for <24 hours; motorized artisanal fishing vessels may not have an installed power of >100 CV or 74 kW; operating in Zone A	Semi-industrial fishing vessels: Vessels with overall length of 8 to 20 m; with mechanical means of propulsion; self-reliant for not <72 hours; and power, even when loaded, may not exceed 350 CV or 259 kW of installed power in the case of trawling vessels; operating in Zone C (national) and D (foreign). Semi-industrial fishing vessels usually have means of refrigeration that allow for the conservation of ice and fish onboard Industrial fishing vessels: Vessels with overall length >20 m; mechanical means of propulsion; self-reliant for >15 days; with processing facility and adequate means for the conservation of fish, with separate cold storage and refrigeration compartments; power, even when loaded, may not exceed 1,500 CV or 1,100 kW of installed power in case of trawling vessels
Vietnam	Small-scale fisheries: vessels with no engine or with engine <40 hp. Nearshore fishery: Vessels with an engine capacity of <90 hp that have not registered for operating offshore; Fishing vessels fishing in water <30 m deep from the shore in the Tonkin Gulf water, Eastern and South-Western water, and Gulf of Thailand; or in water <50 m deep from the shore onwards in the central coastal area.	Large-scale fisheries: Vessels with engine >40 hp. Offshore fishery: Fishing in the water bordered by a 30 m deep line from the shore onwards for the Tonkin Gulf water, Eastern and Southwestern water, and Gulf of Thailand and by a 50 m deep line from the shore onwards for the central coast.

ANNEX II. ASEAN MEMBER STATES’ FISHERIES MANAGEMENT REGULATIONS

Country	Existing Fisheries Management Policies and Regulations
Brunei Darussalam	<ul style="list-style-type: none"> • Fisheries Order, 2009 • Brunei Darussalam Fishery Limits, Chapter 130 • Fish Culture Farms Regulations, 2002 • Fish Processing Establishments Regulations, 2002 • Fish Landing Complexes Regulations, 2002 • Fisheries Regulations, 1984 • Subsidiary Legislation, Section 5
Cambodia	<ul style="list-style-type: none"> • Fisheries Law, 2006 • Royal Decree for Community Fishery Establishment • Sub-decree on Community Fishery Management
Indonesia	<ul style="list-style-type: none"> • Director General Capture Fisheries Regulation No. 11/KEP-DJPT/2018 about Standard Operational Procedure Fishing Logbook • National Tuna Management Plan, Ministerial Regulation No 107/2015 • Presidential Decree No.115/2015 concerning Task Force in Combating Illegal Fishing Established FMA 571: Ministerial Regulation Number 75/KEPMEN-KP/2016 • FMA 572: Ministerial Regulation Number 76/KEPMEN-KP/2016 • FMA 573: Ministerial Regulation Number 77/KEPMEN-KP/2016 • FMA 711: Ministerial Regulation Number 78/KEPMEN-KP/2016 • FMA 712: Ministerial Regulation Number 79/KEPMEN-KP/2016 • FMA 713: Ministerial Regulation Number 80/KEPMEN-KP/2016 • FMA 714: Ministerial Regulation Number 81/KEPMEN-KP/2016 • FMA 715: Ministerial Regulation Number 82/KEPMEN-KP/2016 • FMA 716: Ministerial Regulation Number 83/KEPMEN-KP/2016 • FMA 717: Ministerial Regulation Number 84/KEPMEN-KP/2016 • FMA 718: Ministerial Regulation Number 54/KEPMEN-KP/2014 • Law no. 23/2014 on Local Government • Act no. 31/2004 on Fisheries, amended by Act no. 45/2009 • Ministry of Marine Affairs and Fisheries Strategic Plan (2015-2019) • Ministerial Regulation Number 48/PERMEN-KP/2014 on fishing logbook • Law No 45/2009 on Fisheries • Ministerial Regulation Number 30/PERMEN-KP/2012 • Ministerial Regulation Number 26/PERMEN-KP/2013 regarding capture fisheries • Ministerial Regulation Number 42/PERMEN-KP/2015 regarding VMS for vessels 30GT and up • Marine and Fisheries Ministerial Regulation No.12 2012 on EEZ capture fisheries • Conservation and Management Measures RFMO, Resolution IOTC 15/01, 15 • Ministerial Regulation Number 3/PERMEN-KP/2013 regulating Harbor Master activities at fishery ports • Ministerial Regulation Number 1/PERMEN-KP/2013 on Instruments for Monitoring Fishing Vessels and Fish Transporting Vessels • Ministry Regulation No. Per. 13/MEN/2012 regarding catch certification • Law No. 7/2016 <p>Regulation for fishery management plans based on species:</p>

	<ul style="list-style-type: none"> • Blue Swimming Crab: Ministerial Regulation Number 70/KEPMEN-KP/2016 • Flying fish: Ministerial Regulation Number 69/KEPMEN-KP/2016 • Bali Strait Sardine: Ministerial Regulation Number 68/KEPMEN-KP/2016 • Tuna, Neritic Tuna, Skipjack: Ministerial Regulation Number 107/KEPMEN-KP/2015
Lao PDR	<ul style="list-style-type: none"> • Fisheries Law No.03 on 09 July 2009; • Local Fisheries Management Regulations • Regulation of Prohibited Fishing Gears • Law on Livestock and Veterinary (Amended) No. 03 on 25 July 2008; • Decree on Prevention and Control of Animal Diseases No. 228 on 31 May 2012; • Decree on the Management of Animal and Animal Product Movement No. 230 on 04 June 2012; • Ministerial Order on the Inspection and Management of Animal Feed Quality No.0369 on 06 May 2005; • Decision of Minister on Livestock farm Management in the Lao PRD No. 0209 on 06 February 2013 and others related Decision and Instruction.
Malaysia	<ul style="list-style-type: none"> • Fisheries Act 1985 (Act 317) • International Trade in Endangered Species Act 2004 • Dasar Agromakanan Negara 2011-2020 • Pelan Strategik: Jabatan Perikanan Malaysia 2011-2020 • Pelan Strategik Pengurusan Perikanan Tangkapan Malaysia 2015-2020 • Lembaga Kemajuan Ikan Malaysia Act 1971 (Act 49) • Malaysia NPOA IUU, and Management of Fishing Capacity • National EAFM Trainings
Myanmar	<ul style="list-style-type: none"> • Myanmar Marine Fisheries Law, 1990; amended in 1993 • Law amending the law relating to the fishing rights of foreign fishing vessels, 1993 • Aquaculture law • State and Regional freshwater fisheries laws (14) • DOF rules and regulations and license conditions (released regularly) • Aquaculture Law (1989) • State and Regional Freshwater Fisheries Laws (14) (2011-2012)
Philippines	<ul style="list-style-type: none"> • Republic Act 8550: The Philippine Fisheries Code of 1998 • Republic Act 10654: An Act to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, Amending Republic Act 8550 (2015) • Comprehensive National Fisheries Industry Development Plan, 2016-2020 • Republic Act 9147 The Wildlife Conservation and Protection Act of 2001 • Republic Act 8435 Agriculture and Fisheries Modernization Act • Republic Act 7160 Local Government Code (RA 7160) • Republic Act 6734 Autonomous Region of Muslim Mindanao (ARMM) Organic Act (1989) <p>IUU measures & fisheries management interventions:</p> <ul style="list-style-type: none"> • BAC 251: BFAR Administrative Circular on Traceability System for Fish and Fishery Products (2014) • Banning of Destructive Means of Fishing (under RA 8550, 2015) • FAO 238 s. 2012 Rules and regulations governing the implementation of EC regulation No. 1005/2208 on the catch certification scheme • Export Ban on Protected Corals and Other Species (FAO 202 s 2000) • National Tuna Management Plan (2018 - 2022) • National Plan of Action for the Conservation and Management of Sharks (2009) • National Plan of Action to Deter IUU Fishing (2015) • National Tuna Fish Aggregating Device Management Policy (2015) • National Plan on Blue Swimming Crabs

	<ul style="list-style-type: none"> • Establishment of FMAs & Demarcation and topographical map of FMAs (FAO 263, 2019) • Sardine Management Plan/Framework (2019 – 2024), and seasonal fishing closure • Roundscad Management Plan and seasonal fishing closure • Management of Long-Distance Fishing • Intensified law enforcement, fisheries management, and regulatory mandates • Unified and Inter-relational Monitoring Control and Surveillance (FAO 241 s 2012) • Municipal Fisherfolk Registry (FishR) and Boat Registration (BoatR) • Dismantling of Illegal Structures in Bay and Inland Bodies of Water <p>EAFM initiatives:</p> <ul style="list-style-type: none"> • Mainstreaming EAFM in BFAR plans/programs • Electronic EAFM trainings & trainings of trainers; Mainstreaming and localized EAFM training • Institutionalization of FMAs, Reference Points (RPs), Harvest Control Rules (HCRs) • Establishment of FMAs (FAO 263, 2019)
Singapore	<p>National Fisheries Management Legislation:</p> <ul style="list-style-type: none"> • Fisheries Act, 1969 (currently undergoing legislative review) <p>Fisheries Management Programs:</p> <ul style="list-style-type: none"> • Licensing of fishing vessels and fishing gears • Reporting and recording of catch data <p>Measures to combat IUU fishing:</p> <ul style="list-style-type: none"> • Advance notification of vessels entering port • Work with shipping agents to discourage them from representing IUU fishing vessels • Inspection of IUU fishing vessels if they enter port; denial of port services and unloading of IUU vessels • All fishing vessels are installed with transponders monitored by the Maritime Port Authority.
Thailand	<ul style="list-style-type: none"> • Royal Ordinance on Fisheries B.E. 2558 (2015) • Royal Ordinance on Fisheries (No. 2) B.E. 2560 (2017) • The Royal Ordinance on Thai Vessels B.E. 2561 (2018) • Navigation in Thai Waters Act (No. 17) B.E. 2560 (2017) • Wildlife Conservation and Protection Act, B.E. 2535 (1992) • Customs Act B.E. 2560 (2017)
Vietnam	<ul style="list-style-type: none"> • Fisheries Law 2003 • Fisheries Law (Amended), Law No. 18 /2017/QH14 <p>Fisheries Management Initiatives:</p> <ul style="list-style-type: none"> • Certificate of Safety of Fishing Vessels; Certificate of Technical Safety of Fishing Vessels • Certificate and Training Captain, Chief Fishing Vessel Machinery • Inspection and Monitoring (Fisheries Monitoring Center) • Circular No. 21/2018/TT-BNNPTNT, including regulations on the recording, submission of reports, and logbooks of aquatic resources; list of fishing ports confirming the origin of fisheries from exploitation; list of illegal fishing vessels; certification of raw materials; and certification of exploited aquatic resources issued by the Minister of Agriculture and Rural Development³¹ • Circular No. 24/2018/TT-BNNPTNT dated November 15, 2018 regarding the update, exploitation and management of national data on fisheries • Circular No. 28/2011/TT-BNNPTNT dated April 15, 2011, providing the validation of catch certificates and statements for exportation into the European market³² • Co-management, EAFM

³¹ FAO, 2019b.

³² Ibid.

ANNEX III. REGIONAL POLICIES RELATING TO CDT

Declaration/ Document/ Plan/Guideline	Date of Approval/ Adoption/Formulation	Description
United Nations Convention on the Law of the Sea	Resulted from the third United Nations Conference on the Law of the Sea, which took place between 1973 and 1982	International agreement which sets limit on territorial waters and protection of ocean's resources.
ASEAN Catch Documentation Scheme (ACDS) for Marine Capture Fisheries	Adopted by 39th ASEAN Ministers on Agriculture and Forestry Meeting September 28, 2017	A fisheries management tool to improve traceability for marine capture fisheries and enhance intra-regional and international trade of the AMSs.
FAO Voluntary Guidelines for Catch Documentation Schemes (VGCDS)	Officially adopted by the FAO Conference at its Fortieth Session in July 2017	Provides assistance to states, regional fisheries management organizations, regional economic integration organizations and other intergovernmental organizations when developing and implementing new catch documentation schemes or harmonizing or reviewing existing schemes.
Port State Measures Agreement	Approved by the FAO Conference at its 36 th Session (Rome, 18-23 November 2009) under paragraph I of Article XIV of the FAO Constitution, through Resolution No 12/2009 dated November 22, 2009	Aims to prevent, deter, and eliminate IUU fishing by preventing vessels engaged in IUU fishing from using ports and landing their catches.
Global record of fishing vessels, refrigerated transport vessels, and supply vessels	Foundations laid in 2005 when the Rome Declaration on IUU Fishing was adopted by the FAO Ministerial Meeting on Fisheries in Rome	The record is a global initiative that primarily involves State authorities and regional fisheries management organizations in compiling an online comprehensive and updated repository of vessels involved in fishing operations.

<p>Regional Plan of Action (RPOA) to Promote Responsible Fishing Practices including Combating IUU Fishing</p>	<p>Endorsed by ministers responsible for fisheries in Bali, Indonesia, May 2007</p>	<p>Eleven countries endorsed the RPOA (Australia, Brunei Darussalam, Cambodia, Indonesia, Malaysia, Papua New Guinea, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam); four regional fisheries organizations provide technical advice and assistance, (FAO/Asia-Pacific Fishery Commission, SEAFDEC, InfoFish, and Worldfish Center). The RPOA aims to enhance and strengthen the overall level of fisheries management in the region, in order to sustain fisheries resources and the marine environment, also to optimize the benefit of adopting responsible fishing practices. The actions cover conservation of fisheries resources and their environment, managing fishing capacity, and combating IUU fishing in the areas of Sub-Regional Southern and Eastern of South China Sea and Sulu-Sulawesi Seas, Sub-Regional Gulf of Thailand, and Sub-Regional Arafura-Timor Seas.</p>
<p>Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) RPOA</p>	<p>Adopted at CTI Summit in Manado, Indonesia in May 2009</p>	<p>The RPOA is multilateral partnership of six countries (Indonesia, Malaysia, Papua New Guinea, Philippines, the Solomon Islands, and Timor-Leste). The CTI-CFF RPOA is a living and non-legally binding document that aims to conserve and sustainably manage coastal and marine resources within the Coral Triangle region, taking into consideration laws and policies of each country. CTI-CFF RPOA is a 10-year plan organized in a four-level structure, including goals, targets, regional actions, and national actions excerpted from National CTI Plan of Action.</p>
<p>ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain</p>	<p>Endorsed by Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership in 2014, SEAFDEC Council in April 2015, and ASEAN Sectoral Working Group on Fisheries in June 2015</p>	<p>A collaborative effort among AMS and SEAFDEC, these guidelines provide tools for AMS to make sure the fish and fishery products from the region entering the global supply chain do not come from IUU activities. They are meant to enhance the credibility and competitiveness of the Region's fish and Fishery products.</p>
<p>Strategic Plan of Food, Agriculture and Forestry (SP-FAF), 2016-2025</p>	<p>Endorsed by the 37th ASEAN Ministers on Agriculture and Forestry, held on September 10, 2015, in Makati City, Philippines</p>	<p>This document is designed to guide ASEAN towards achieving Millennium Development Goals, the post-2015 Sustainable Development Goals, and related goals of the UN Zero Hunger Challenge.</p>
<p>Strategic Plan of Action for ASEAN Cooperation on Fisheries, 2016-2020</p>	<p>The First Technical Working Meeting on the Development of Strategic Plan of Action for</p>	<p>This document was developed to ensure the deliverables of the vision and SP-FAF (2016-2025) that are relevant to fisheries sub sector within a five-year time frame, covering the period of 2016-2020.</p>

	ASEAN Cooperation on Fisheries (2016-2020), held on November 11-15, 2015, in Tangerang, Indonesia, agreed to elaborate the activities based on the vision and SP-FAF 2016-2025	
European Union Council Regulation no. 1005/2008	Adopted on September 29, 2008 by the Council of the European Union	The regulation aims to establish a community system to prevent, deter and eliminate IUU fishing. It establishes a framework in which access to EU markets for fisheries products is partly conditioned by the extent to which a country, area or region of origin is demonstrably or increasingly free of IUU fishing. The regulation has four main components: port state measures against third-country vessels, a catch documentation scheme, IUU vessel listing, and listing of non-cooperating states.
CATCH IT	Version 1.0 was launched May 7, 2019 by Commissioner Vella at Seafood Expo in Brussels.	EU is in the process modernizing its catch certificate scheme called CATCH IT. CATCH IT aims to digitalize the currently paper-based EU catch certification scheme as laid down by the Regulation (EC) no. 1005/2008. CATCH has been included as part of the revision of the Fisheries Control Regulation (Amendment of Article 12 of the EU IUU Regulation). Until the adoption of the proposal (expected in 2020/2021), this IT system will be used on a voluntary basis by EU member states and their national operators. While being a considerable driver for the reduction of the administrative burden reduction for all actors involved, the use of the system will remain voluntary for third countries even after the adoption of the legal basis. CATCH version 1.0 includes catch certificates, processing statements, importer declarations, and risk-management tools. Other documents as laid down in the EU IUU Regulation (i.e., simplified catch certificate) will be part of future versions/releases of the system developed by the Commission with active involvement of EU Member States.
International Maritime Organization (IMO) Circular Letter No. 1886/Rev.6	August 2016	The IMO scheme was introduced with the aim of enhancing maritime safety and preventing maritime fraud. It assigns a permanent, unique seven-digit number to ships for identification purposes, which remains unchanged even if the ship changes name, ownership, or flag. The scheme became mandatory for cargo and passenger ships over a certain tonnage on January 1, 1996; however, fishing vessels were exempt. In December 2013, the IMO General Assembly removed the exemption, allowing fishing vessels of >100 GT into the scheme on a voluntary basis. In August 2016, through Circular Letter no. 1886/Rev 6, the scheme was further expanded to cover all motorized inboard fishing

		vessels of >100 GT down to a size limit of 12 meters LOA that are authorized to operate outside of waters under national jurisdiction.
European Union Commission Regulation no. 1010/2009	Legislated in 2009	This regulation sets out detailed rules for implementing Council Regulation no. 1005/2008, establishing a European Community system to prevent, deter, and eliminate IUU fishing. These rules cover, in particular, inspections of third-country vessels in member states ports, the catch certification scheme for importation, and exportation of fishery products and sightings.
U.S. Seafood Import Monitoring Program (SIMP)	January 1, 2018	SIMP establishes reporting and recordkeeping requirements for imports of certain seafood products, to combat IUU-caught and/or misrepresented seafood from entering U.S. commerce. SIMP provides additional protections for the U.S. national economy, global food security, and the sustainability of our shared ocean resources. This is a risk-based traceability program requiring the importer of record to provide and report key data from the point of harvest to the point of entry into U.S. commerce on thirteen imported fish and fish products identified as vulnerable to IUU fishing and/or seafood fraud.
RFMO Catch Documentation Scheme		While some RFMOs play an advisory role, many of them have management powers to set catch and fishing effort limits, technical measures, and control obligations.

ANNEX IV. eCDT GUIDANCE DEVELOPMENT WORKSHOPS

Workshops Held to Gather Input to Develop Regional eCDT Guidance Documents

- Regional eCDT Guidance Review Workshop, May 14-16, 2019, Bangkok, Thailand
- Regional eCDT Guidance Review Workshop for Member Countries of the Coral Triangle Initiative for Coral Reefs, Fisheries, and Food Security, June 28, 2019, Dili, Timor-Leste
- Regional eCDT Guidance Review Workshop, July 4, 2019, Quezon City, Philippines
- Regional eCDT Guidance Review Workshop, July 15, 2019, Jakarta, Indonesia
- Regional eCDT Guidance Review Workshop, July 26, 2019, Nha Trang, Vietnam
- Regional Electronic Catch Documentation and Traceability (eCDT) Guidance Workshop, December 2-4, 2019, Bangkok, Thailand

Participating Organizations

- AgrTECH
- Alliance of Tuna Handliners
- Altermyth
- Anova
- Aquaculture
- Binh Dinh Fisheries Joint Stock Company
- Binh Dinh Fishing Association
- BlueTrackers
- Bureau of Fisheries and Aquatic Resources
- Center of Fisheries Infrastructure Management, Khanh Hoa
- Conservation and Environment Protection Authority
- Coral Triangle Initiative on Coral Reefs Fisheries and Food Security (CTI-CFF)
- Defense Security Cooperation Agency
- Department of Agriculture and Rural Affairs, Vietnam
- Department of Fisheries, Sabah
- DJPDSPKP (MMAF) Indonesia
- DJPT (MMAF)
- DKP Sulut, Indonesia
- DKPD Sulut, Indonesia

- Fishing Technology Institute, Vietnam National University (NTU)
- Futuristic Aviation and Maritime Enterprise, Inc., (FAME)
- General Tuna Corporation
- Global Dialogue Seafood Traceability (GDST)
- GTO Company
- Hai Vuong Group (Tuna Processor)
- Hoai Nhon, Binh Dinh Fishing Station
- Hon Ro Fishing Port Authorities
- Immatech/Lyseaco (Fishing Company)
- Indonesia Directorate General of Competitiveness of Marine and Fisheries Products
- Indonesian Pole & Line and Handline Fisheries Association (AP2HI)
- Infrastructure Management, Khanh Hoa
- International Pole and Line Foundation (IPNLE)
- Khanh Hoa University, Vietnam
- KIPM Manado, Indonesia
- Local fishers from USAID Oceans learning sites and expansion sites
- Masyarakat Dan Perikanan Indonesia (MDPI)
- Marinelife Conservation and Community Development (MCD) Vietnam
- MFARMC Camarines Sur
- Mindanao State University Naawan Foundation
- Ministry of Agriculture and Fisheries (MAF)
- Ministry of Fisheries and Marine (MFMR), Solomon Islands
- Ministry of Marine Affairs and Fisheries (MMAF), Indonesia
- National Network on Women in Fisheries (Philippines) (WINFISH)
- National Oceanic and Atmospheric Administration (NOAA)
- Nha Trang University
- Pacific Ocean University
- PSDKP (MMAF) Bitung, Indonesia
- PT. Nutrindo
- PT. SISFO
- Pusdatin (MMAF)
- RARE
- Rell and Renn Fishing Corporation
- Rell and Renn Seafood Sphere Inc.
- RIMF Vungtau

- SOCSKSARGEN Federation of Fishing and Allied Industries, Inc. (SFFAI)
- Southeast Asian Fisheries Development Center (SEAFDEC)
- TBNEF Company
- TFA
- Thailand Department of Fisheries (DOF)
- The Nature Conservancy
- Tin Think Group (Tuna Processor)
- Trinity Roots Co., Ltd.
- Tuna Explorers Inc.
- U.S. Department of the Interior (DOI)
- UI-PDS (MMAF) Indonesia
- United States Agency for International Development (USAID)
- Universidade Nacional Timor Lorosa'e (UNTL)
- University of Khanh Hoa
- UNTL
- USAID Oceans and Fisheries Partnership (USAID Oceans)
- USAID Regional Development Mission for Asia (RDMA)
- USAID Sustainable Ecosystems Advanced (SEA) Project
- Vietnam Directorate of Fisheries (DFISH)
- Vietnam Maritime Communication and Electronics, LLLC.
- Vietnam Posts and Telecommunications Group (VNPT)
- Vietnam Tuna Association (VINATUNA)
- West New Britain Provincial Administration, Provincial Fisheries Div.
- Wildlife Conservation Society
- WIMA
- World Wide Fund for Nature (WWF)
- Zunibal Vietnam Co., Ltd.

Country Representation at eCDT Guidance Workshops

- Cambodia
- Indonesia
- Lao PDR
- Myanmar
- Malaysia
- Papua New Guinea
- Philippines
- Solomon Islands
- Thailand
- Timor-Leste
- United States
- Vietnam