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# SUMMARY RESULTS AND LESSONS LEARNED FROM TESTING ELECTRONIC CATCH DOCUMENTATION AND TRACEABILITY TECHNOLOGIES IN VIETNAM



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# ACRONYMS

AMS	Automated Manifest System
ASEAN	Association of South East Nations
CDS	Catch Documentation Scheme
DARD	Department of Agriculture and Rural Development
D-Fish	Directorate of Fisheries
eCDT	Electronic catch documentation and traceability
EEZ	Exclusive Economic Zone
GTO	GTO Media Corporation
IUU	Illegal, unreported and unregulated fishing
KDEs	Key Data Elements
MCD	Centre for Marinelife Conservation and Community Development
MARD	Ministry of Agriculture and Rural Development
SEAFDEC	Southeast Asian Fisheries Development Center
Sub-DFISH	Sub-Department of Fisheries
VASEP	Vietnam Association of Seafood Exporters and Producers
VINATUNA	Vietnam Tuna Association
VMS	Vessel Monitoring System
VNPT	Vietnam Posts and Telecommunications Group

# EXECUTIVE SUMMARY

The electronic catch documentation and traceability (eCDT) system is a new concept to fisheries managers and companies, and recently introduced and applied in South East Asia. eCDT is considered as a tool for combating IUU, meeting the market requirements and improving the fisheries management. It is being developed as electronic catch documentation device, and app/software systems to ensure the traceability of the captured products in all stages from fishing, trans-shipment, landing, transportation, processing, preservation and packaging.

Vietnam is considered as learning site in ASEAN region for applying the Electronic catch documentation and traceability (eCDT) technologies with support of USAID Oceans. Given EU warning on IUU fishing and recognizing the importance of market requirements on product quality and origin, Vietnam has step-by-step upgraded its fisheries management institutions in a responsible way. The 2017 Fisheries Law (amended) contains various adjustments to regulations on catch logbook and reporting, and then the Circular No. 21/2018/TT-BNNPTNT dated 15 November 2018 provides clear regulations on the submission of catch logbooks and reports. According to the Technical Guidance on the Design and Implementation of Electronic Catch Documentation and Traceability (eCDT) System in Vietnam 2020 – 2023 (USAID Oceans & MCD, 2020), Vietnam has already established the paper-based catch documentation and traceability. And Vietnam’s model could be switched from paper-based into electronic system (following Model #2 in the regional guideline).

With support from the USAID Oceans, MCD has implemented a project on “Applying catch documentation and traceability technologies in Binh Dinh Province, Vietnam” in collaboration with D-FISH. The pilot demonstration is conducted (from the point of catch, to the first sale) applicable to tuna supply chain in Binh Dinh, a major tuna fishing center in Vietnam with the total fishing fleet of over 2,100 vessels. The tuna products of Binh Dinh province are exported to USA, EU and other countries, with the total annual value of 30 million USD.

The roadmap of the eCDT pilot in the tuna supply chain in Binh Dinh included five steps: (i) Conduct need-gap analysis for eCDT application, learn about the condition and current status of different actors in the tuna supply chain in Binh Dinh; (ii) Consultations on the eCDT pilot; (iii) Select the technology for the eCDT pilot; (iv) Train on eCDT technology for fishermen and other actors in the chain; and (v) Demonstrate/pilot the eCDT technology in Binh Dinh.

The eCDT pilot model for application of traceability technology was conducted by MCD with support from D-Fish, Binh Dinh provincial Sub-department of Fisheries and a technical solution company – VNPT. The pilot was officially conducted from mid December 2019 to the end of April 2020. The app can be used to request for information about the origin of tuna products, with sufficient information about the products at two key points: the point of catch and the point of first sale. Each tuna fish needs to have a unique traceability code, and the code tag must be kept/ maintained on the tuna tail throughout the voyage to provide traceability information at convenience. The traceability data must be compatible to the national traceability system and comply with prevailing regulations on traceability.

The eCDT pilot in Binh Dinh was implemented in a short time but it provided valuable experience as Vietnam fisheries sector is making attempts together with the private sector and fishermen to remove the EU yellow card and to improve fisheries management towards modernization and integration and addressing IUU fishing. The pilot results of the first fishing trip of 10 vessels indicated that the ability to apply technology by tuna handline vessels in Binh Dinh was initially met and been suitable to the requirements on the point of catch, on the type of tuna, output, location (coordinates), time (date of the catch) of each fish (tuna) and the first buyer.

Tuna data (the point of catch and first buyer) were QR code encrypted, and could be accessed using a web-based system connected to D-Fish following the <https://gstc.tongcucthuysan.gov.vn/xnngts/> and it is linked to D-Fish's vessel monitoring software: <https://gstc.tongcucthuysan.gov.vn/>

There are some lessons learned from the pilot demonstration on recording catch during a fishing trip at sea as follows:

(i) *The technology qualification:*

The eCDT pilot was necessary for fishermen and stakeholders to enhance understanding, skills and improve the sustainable product traceability. The recording/inputting/updating data into the traceability app was simple and easy for fishermen, 70% of captains did it successfully and generated complete data. The traced information was sufficient for all stages, from the point of catch to the landing, and first sale (first buyer). The catch data were verified by the vessel management system (VMS) of D-Fish. The Web-based system and app for each user were managed suitably, yet there should be more time to operate, connect, analyze and manage data (provincial Sub-department of Fisheries, D-Fish, and VNPT).

(ii) *Fishermen's capacity/skills and experience in eCDT application:*

Traceability was new to fishermen, they were not familiar with recording, storing data/files, and they faced difficulties in recording at sea. There is a need to continue providing guidance, monitoring and evaluation via collaboration with Binh Dinh Sub-department of Fisheries and partners. Different captains have different capacity levels, and they have low level of education, therefore more time is needed to instruct them and to let them practice more suitably. Vessels/captains can exchange/share experience together after each fishing trip. Binh Dinh Sub-department of Fisheries will contact the focal points (vessel owners, captains) and promote the evaluation, monitoring and sharing of information about the use of app and how to handle difficult manipulations at sea.

(iii) *Promotion of eCDT application in association with value chain actors:*

Fishermen have not been fully aware of the benefits of the program, there requires more active engagement of other supply chain actors in the pilot phase such as middlemen/purchasing agents, processing and import-export enterprises. These are change makers who could connect with vessel owners and it is expected to apply through value links developed by Mai Tin Company to meet market requirements. This traceability system needs further development to be interconnected with the system/s of food processing facilities and export facilities. To assure and to maintain the catch documentation and traceability, seafood processing and export enterprises could connect the purchasing agents/middlemen (point of first sale) with the fishermen (point of catch).

(iv) *Improving relevant institutions, policies and regulations:*

eCDT application requires national-level legislation, therefore, the Government needs to develop and complete a systematic and synchronous legal basis/framework based on the pilot practices in the provinces of Binh Dinh, Binh Thuan and others, and based on the technical guidelines on the eCDT design and implementation developed within this project conducted by MCD in collaboration with D-Fish. This is suitable to the practical situation, needs and trends in the world and in the region in order to improve the fisheries management in a sustainable and transparent way, and to minimize IUU fishing in Vietnam.

There are some recommendations:

- 1) D-Fish review the eCDT technical guidelines, consider results and lessons learned from eCDT pilot; approve the guidelines and roadmap and organize its implementation; maintain the role of the eCDT focal point for information to keep mobilizing the engagement and cooperation of the private sector and non-governmental organizations e.g. MCD; develop and implement the 2020-2021 plan together with MCD and partners in order to further promote eCDT work; revise legal

- documents/regulations on fishing management; facilitate good conditions for the seafood traceability to meet market requirements.
- 2) It is recommended that DARD/Sub-Department of Fisheries in Binh Dinh and other provinces review the technical guidelines; review and utilize the lessons learned from the eCDT pilot demonstration; make a proposal to DFISH and higher management bodies to have a “legal” eCDT system; expand/replicate the pilot demonstration activities with their fisheries.
  - 3) Associations and enterprises (Vinatuna, VASEP) refer to the lessons learned from the Binh Dinh pilot demonstration and better connect with supply chain actors to ensure smooth traceability of seafood origin. The most challenging stage is the traceability of seafood at the point of catch and landing.
  - 4) Donors (and implementing partners) continue supporting the public-private cooperation to have eCDT systems and to promote sustainable and fair fisheries; pay more attention to the welfare and gender aspects of the chain actors, especially of fishermen.



# PART I. OVERVIEW

## I.1 Vietnam context

Vietnam has a coastline of 3,260km in its territory, with 112 estuaries. The country's Exclusive Economic Zone (EEZ) is over one million square kilometers (km<sup>2</sup>) large. Fisheries has become an important sector in the national economy, and contributed to the country's high GDP growth rate, food security and job creation. The export turnover of fisheries sector in the past three years (2017-2019) reached USD8.5 billion per year on average. There are over eight million people, around ten per cents of the country's population, whose major income is from fisheries. In 2019, total seafood landing was 3.76 million tons, with 108,717 fishing vessels. Capture fisheries has gradually shifted into a mechanized sector targeting at high-value and export products. Offshore fishing has developed in a way that helps improve the catch effectiveness and quality for export purpose, stabilize the inshore fishing, and assure that fishing is linked to the protection and development of ecological resources and environment.

Illegal, unreported, and unregulated (IUU) fishing leads to overharvesting that depletes marine resources. Therefore, in efforts to prevent, minimize, and eliminate IUU fishing, some organizations have applied different technical and commercial measures such as Vessel Monitoring System (VMS) and list of IUU fishing vessels. The electronic catch documentation and traceability (eCDT) technology has been considered an important measure to minimize IUU fishing. Certification of catch origin and traceability of seafood products has received attention not only in Vietnam but globally, and electronic catch documentation and traceability is also a requirement of international markets. The world's major importers of seafood, especially EU, US, Japan, or Korea, all apply strict requirements on quality control and traceability. It is therefore necessary to apply the electronic traceability system in order for Vietnam's seafood products to enter these markets.

On the 23 October 2017, the European Commission (EC) issued a "Yellow card" warning – representing a huge challenge for Vietnam's capture fisheries. However, in a positive way, this is also a leverage for Vietnam's fisheries sector to act more drastically against illegal, unreported and unregulated (IUU) fishing. Given EU warning on IUU fishing and recognizing the importance of market requirements on product quality and origin, Vietnam has step-by-step upgraded its fisheries management institutions in a responsible way. The 2017 Fisheries Law (amended) contains various adjustments to regulations on catch logbook and reporting, and then the Circular No. 21/2018/TT-BNNPTNT dated 15 November 2018 provides clear regulations on the submission of catch logbooks and reports; the announcement of fishing ports designated to certify the origin of captured aquatic products; list of vessels conducting illegal fishing; validation of materials and certification of the catches.

## I.2 USAID Oceans

USAID Ocean and Fisheries Partnership (USAID Oceans) is a program funded by USAID's Regional Development Mission for Asia (RDMA) for the period 2015-2020. The Program works to strengthen regional cooperation to combat illegal, unreported and unregulated fishing, and to promote sustainable fisheries and conserve marine biodiversity in the Asia-Pacific region. The Project for "Applying Catch Documentation and Tracibility Technologies in Binh Dinh" is funded by the USAID Ocean and Fisheries Partnership (USAID Oceans), coordinated and implemented at site by the Center for Marinelifelife Conservation and Community Development (MCD), with support from the Directorate of Fisheries (D-Fish). The Project focuses on the eCDT application and pilot to minimize IUU fishing, and to promote sustainable fishing and aquatic product traceability in Binh Dinh province, Vietnam, contributing to the implementation of relevant national-level policies and regulations developed and executed by D-Fish. The Project's specific objectives and scope are as follows:

- To cooperate with D-Fish and other key stakeholders at national level in developing the national guideline on the electronic catch documentation and traceability (eCDT) technologies applicable to seafood products, in order to support the implementation of the Circular No. 21/2018/TT-BNNPTNT of Ministry of Agriculture and Rural Development dated 15 November 2018 regulating the catch certification in Vietnam and Ecosystem Approach to Fisheries Management (EAFM);
- To conduct provincial consultation and implement the plan to combat IUU fishing via the eCDT application and pilot to promote sustainable fisheries and support the marine conservation in Binh Dinh province; and
- To support the demonstration of pilot application of eCDT technologies in line with Binh Dinh provincial development plan for small-scale fisheries, from the point of catch to the landing (port entry) and first sale, with trainings provided.

### 1.3 Selection of eCDT Pilot Location in Binh Dinh

Located along the South-Central coast of Vietnam, Binh Dinh has a coastline of 134km with three major estuaries being Quay Nhan, De GI, Tam QUANG and two side estuaries being Ha Ra – Phu Thu and An Du. Fisheries plays a crucial role in the local economic development and income generation for fishermen. In Binh Dinh there are currently 6,245 vessels registered for fishing and 45,000 workers in related activities. Binh Dinh province is a major tuna fishing center in Vietnam. The province's tuna fishing fleet consists of over 2,100 vessels, mostly in Hoai Nhon district, of which yellowfin and bigeye tuna handline vessels account for 60%, skipjack tuna purse seine and gillnet vessels account for 34% and 3% respectively. The frequent fishing grounds are offshore, in the central region and the Spratly and Paracel islands. Binh Dinh province is making efforts to complete the installation of tracking devices on vessels of 15 meters in length and above, and to promote the modernized fisheries management and development. The province's tuna output remained pretty stable in the past years, at around 9,000-11,000 tons of bigeye, yellowfin tuna per year, and approximately 45,000 tons of skipjack tuna per year. Tuna export value averages USD30 million per year, mostly to USA, Europe and some other countries. Since the EU's yellow card to Vietnam fisheries in October 2017, Binh Dinh has put forth multiple efforts to address IUU fishing. The province established a representative office and three standing groups at the fishing ports to check and control vessels entering the ports. Weekly, these groups check and control the inshore and offshore fishing, and they have detected and handled 102 violation cases. The province also promotes the installation of Movimar: 566 devices were equipped on fishing vessels (511 on vessels under 24 meters in length and 55 on vessels of 24 meters in length and above). Together with the inspection and monitoring, the province has also issued catch certificates to 10,369 tons of raw seafood, equivalent to 78% of the amount in the same period in 2017 (13,275 tons); and 4,635 tons of processed seafood, equivalent to 80% of the amount in the same period in 2017 (5,800 tons).

With support from the USAID Oceans, the Plan on eCDT pilot demonstration with small-scale tuna fisheries in Binh Dinh was supported by Binh Dinh Department of Agriculture and Rural Development (DARD). MCD, in collaboration with Binh Dinh Sub-department of Fisheries, made a plan on and piloted the electronic traceability (from the point of catch, to the first sale) applicable to tuna supply chain in Binh Dinh.

This report summarizes the process, results and lessons learnt of the pilot demonstration of eCDT in Binh Dinh and contribute to the development and improvement of relevant policies on the system of catch documentation and traceability certificates to minimize IUU fishing in Vietnam within the Project framework.

# PART II. INTRODUCTION

## 2.1 Concept and Approach for eCDT in Vietnam

The electronic catch documentation and traceability (eCDT) system is a new concept to fisheries managers and companies, both in the South East Asia and worldwide. Even recently in 2018, almost all ASEAN members states (AMS) were totally or mostly dependent on paper-based catch documentation, especially at the point of the catch, or when landing. In ASEAN member states, different agencies are in charge of collecting catch documentation and traceability (CDT), data verification and determining on which data to be collected at different stages of the fisheries supply chain. Yet discussions about the catch documentation and traceability (CDT) was first initiated long ago in ASEAN region, in 2010s; at that time the Southeast Asian Fisheries Development Center (SEAFDEC) - a regional fisheries management agency – initiated a topic on improved traceability of marine-captured products. ASEAN countries supported this initiative and in 2015 together developed the ASEAN guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain. Another progress was made in the 2017 ASEAN Meeting in Singapore when Member States adopted an electronic ASEAN Catch Documentation Scheme (eACDS). In the same year 2017, with support from Swedish International Development Cooperation Agency (SIDA), SEAFDEC developed the electronic version of the eADCS for ASEAN countries in order to establish a standardized application used in the whole region to input and reconcile Key Data Elements (KDEs) at specific points in the supply chain.

USAID Ocean and fisheries Partnership (USAID Oceans) is a program funded by USAID's Regional Development Mission for Asia (RDMA) for the period 2015-2020. The program works to strengthen regional cooperation to combat IUU fishing, and to promote sustainable fisheries and conserve marine biodiversity in the Asia-Pacific region. USAID Oceans operates in cooperation with SEAFDEC and other partners. USAID Oceans program works to support the development and implementation of the electronic catch documentation and traceability (eCDT) to help assure that fisheries resources in the South East Asia are legally caught and properly labeled, and socially and environmentally sustainable. The application of catch documentation (CD) will allow marine products to be further tracked, or “traced” throughout the seafood supply chain (for example from the point of catch to export stage), both only allow legal and safe products to be imported by interested countries, while eCDT technologies provide real-time ecological and economic data of the captured seafood supply chain that enhances the power of fisheries managers and builds capacity in seafood resources management and conservation.

MCD was selected by USAID Oceans to be a private partner in implementing certain activities regarding the eCDT pilot in Binh Dinh, Vietnam. These activities include: i) initiating the multi-stakeholder working group, ii) conducting provincial and national consultations on the eCDT pilot model that are participatory and appropriate to the actual condition and capacity, iii) selecting suitable technology and conducting the pilot at site, iv) documenting lessons learnt and gathering information, and v) developing a technical guideline and a roadmap for the implementation of the guideline on eCDT with reference to the regional guidelines provided by the USAID Oceans, based on the actual eCDT pilot in Binh Dinh, and the literature review of relevant legal policies and documents.

In Vietnam, there are various adjustments to the catch documentation and reporting regulations in the 2017 Fisheries Law (amended). This Law regulates the IUU fishing through catch certification and traceability of exported and imported seafood, requiring fishing vessels of 15 meters in length and above to be equipped with vessel monitoring system (VMS). The Circular No. 21/2018/TT-BNNPTNT (issued by MARD dated 15 November 2018) provides guidance on the submission of catch logbooks and reports, the announcement of 60 fishing ports designated to certify the origin of captured aquatic products; the list of IUU vessels; and guidance on the validation of raw materials. Circular No. 21 is the prevailing legal basis for eCDT in Vietnam. The Circular provides detailed regulations on catch documentation (logbook),

procurement/trans-shipment recording, catch reporting, and certification of the catch. The Circular also states that such data and information could be in either paper-based or electronic form to assure that the data and information are accurate, contributing to the prevention of IUU products into and from Vietnam.

MCD, in consultation with D-FISH, prepared the eCDT technical guideline which includes four parts i.e. 1) Background introduction including principles; 2) eCDT current status in Vietnam; 3) Technical guideline on the eCDT design and implementation in Vietnam, including specific system and step-by-step procedure, with requirements on resources and implementation methods; and 4) Roadmap for the design and implementation of eCDT and national guideline. According to the Technical Guidance on the Design and Implementation of Electronic Catch Documentation and Traceability (eCDT) System in Vietnam 2020 – 2023 (USAID Oceans & MCD, 2020), Vietnam has already established the paper-based catch documentation and traceability. And Vietnam's model could be switched from paper-based into electronic system (following Model #2 in the regional guideline). The guideline on the design and implementation provides four steps given Vietnam context i.e. Step 0 to Step 3. Step 0: Build required capacity to implement other steps in the procedure for eCDT design and development; in this step there would be at least one working group on eCDT. Step 1: Conduct CDT gap analysis to inform the design and development of CDT system. Step 2: Design the system, Vietnam is the case where the paper-based CDT system is available which has not been integrated into the value chain. Step 3: Focus on the implementation of eCDT system. Once the design is completed; such activities as operation, system administration, data collection and validation, monitoring and evaluation shall be structured and initiated.

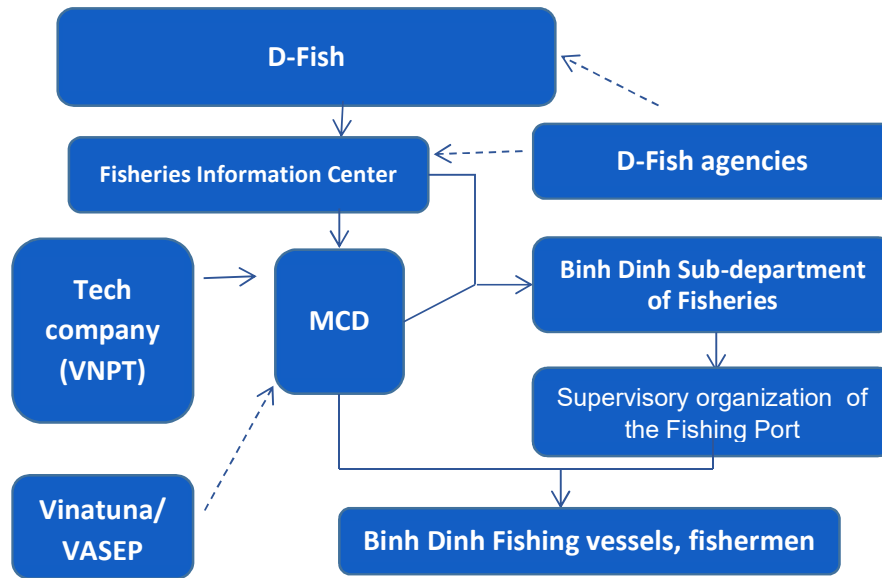
## 2.2 Stakeholder Mapping

Figure 1 shows the relevant stakeholders in the eCDT pilot demonstration in Binh Dinh province. MCD coordinated the implementation of the eCDT pilot plan and was in charge of the Project management. At national level, D-Fish was identified to be the key stakeholder to agree on the policy and to receive implementation result report. D-Fish assigned the Fisheries Information Center to act as the focal point to collaborate with MCD and to coordinate and report directly to D-Fish prior to the organization/implementation of specific tasks. As an agency managing the sector's information system, the Fisheries Information Center is the focal point for management of Vietnam fisheries database (VNFishbase) – the upgraded version of database that allows the nationwide management of information. The Fisheries Information Center manages VMS information system which monitors vessel history data and decentralizes the monitoring authority to provincial Sub-departments of Fisheries using certain criteria.

Other agencies provided inputs for the pilot include the Department of Capture Fisheries, Department of Science & Technology and International Cooperation, Department of Legislation and Inspection, Binh Dinh Sub-Department of Fisheries, VASEP, VINATUNA, and technology companies, independent experts from research institutes and NGOs.

Within the pilot province, the focal point for the pilot implementation was Binh Dinh Sub-Department of Fisheries, as assigned by the provincial Department of Agriculture and Rural Development. The Vietnam Tuna Association (VINATUNA) was a partner providing technical assistance, and VNPT was the technology partner providing instruction on the use of eCDT application (app) with VMS system integrated. In addition, there were representatives from Hoai Nhon district government, processing companies, middlemen and 10 tuna fishing vessels in the supply chain of Mai Tin Company.

In a short period implementing the agreed plan as mentioned above, MCD and the Fisheries Information Center organized consultation events with stakeholders on eCDT pilot in Vietnam. In addition to the launching events organized including: (i) Launching of the multi-lateral working group on 11 December 2019 in Hanoi, and (ii) Technical workshop on eCDT concepts on 19 December 2019 in Hanoi, there were two provincial and national consultation events that provided important inputs for the design of the eCDT pilot.



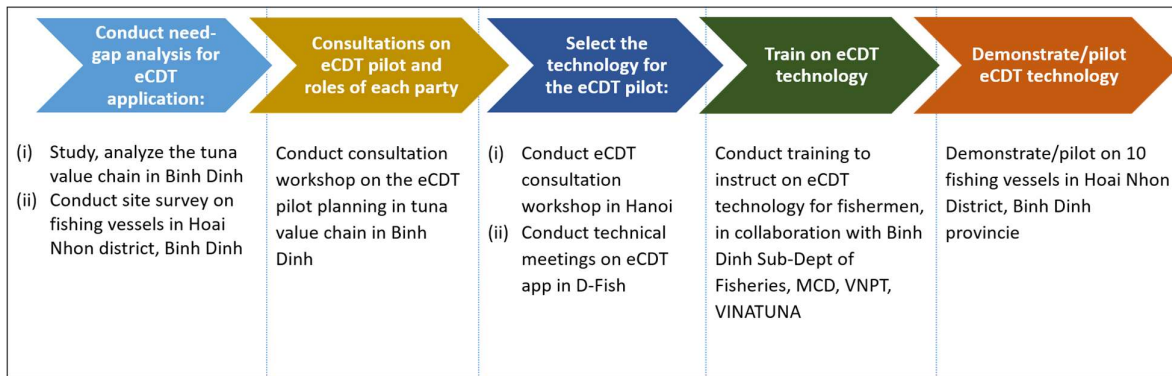
**Figure 1. Relevant fishery stakeholders in the eCDT pilot testing at Binh Dinh, Vietnam**

The provincial consultation in Binh Dinh on 9 January 2020 discussed the current status of fishing vessels, required infrastructure for eCDT and capacity of provincial stakeholders in piloting eCDT. All parties reached an agreement on the 10 tuna handline vessels selected for the pilot. And the roles and tasks of stakeholders engaging in the eCDT pilot were also discussed, including those of the Binh Dinh Sub-Department of Fisheries, tuna processing company in the tuna supply chain and selected vessel owners participating in the pilot.

The national-level consultation in Hanoi on 14 January 2020 focused on eCDT technical aspects to meet the requirements of the pilot. The topics for discussion included: i) current status of the execution of IUU and eCDT-related regulations by the Department of Capture Fisheries (to see if the switch from paper-based to electronic system was an urgent priority or not), ii) provincial readiness in applying these regulations (especially when Circular No. 21 regulates that the paper-based catch logbooks are still acceptable and electronic catch documentation is encouraged rather than obligated), and iii) the participation of technology partners and their readiness in providing eCDT solutions. Two potential technology companies offering products and services that most matched eCDT pilot’s requirements in Binh Dinh were VNPT and GTO. Later VNPT became the technology partner in the pilot.

### 2.3 eCDT Pilot Testing Process

The eCDT pilot roadmap was agreed after the workshop on consultation and planning on the eCDT pilot in the value chain in Binh Dinh on 09 January 2020 in Quy Nhon, Binh Dinh (Figure 2). The roadmap of the eCDT pilot in the supply chain in Binh Dinh included five steps: (i) Conduct need-gap analysis for eCDT application, learn about the condition and current status of different actors in the tuna supply chain in Binh Dinh; (ii) Consultations on the eCDT pilot; (iii) Select the technology for the eCDT pilot; (iv) Train on eCDT technology for fishermen and other actors in the chain; and (v) Demonstrate/pilot the eCDT technology in Binh Dinh.



**Figure 2. Roadmap for the eCDT pilot testing in Binh Dinh, Vietnam**

### 2.3.1 Need-gap analysis for eCDT application in Binh Dinh tuna value chain

#### a. Binh Dinh Tuna value chain analysis

According to analysis of the tuna value chain (VCA) in Binh Dinh province conducted by MCD, the flow of products and actors is described of the two tuna species: Yellowfin tuna (*Thunnus obesus*)/Bigeye tuna (*Thunnus albacares*) (Figure 3), and Skipjack tuna (*Katsuwonus pelamis*) (Figure 4).

The VCA findings show that both chains in general involve three major actors including fishermen, middlemen, and processing companies. In Hoai Nhon district, Binh Dinh province, there are more than 1,000 tuna fishing vessels. On average each fishing vessel consists of 6-7 crew members, of which 3-4 crew members are hired laborers. The fishing season for yellowfin, bigeye tuna is from November (lunar calendar) through June. A fishing voyage takes 20 days on average. After deducting all costs, average income of each crew member is around VND6-7 million per month. A crew member chooses the vessel to work for based on social relationships e.g. family members/relatives, friends, or based on “trust” rather than a contract signed.

In general, **fishermen** are fishing oriented, very few are concerned about the fisheries resources and food safety due to the open access situation. They have less power in the negotiation on the prices of products due to limited knowledge and skills on the logbook and traceability of product.

**Middlemen** are local traders who play a key role in the tuna supply chain in Binh Dinh in the context of small-scale fisheries. In the tuna industry, the middlemen mostly act as local purchasing agent for the processing plants at a set price and receive a commission on the buying volume. However, in addition to purchasing, the middlemen also play the role of providing loans and inputs for fishermen, thus they have certain “influence” on purchasing tuna from fishermen. In this context, the middlemen might be one of the key drivers that can influence on changing the practices of fishermen (e.g for e-logbook and traceability systems) and help processing plants develop and operate a better traceability system if incentives are provided (e.g. premium price and a more stable price for traceable products).

**Processing plants** can be seen as one of the most powerful actors in the tuna supply chain. Processing plants are the ones who set the tuna purchase price and volume. However, due to small catches of individual vessels (given the nature of small-scale fisheries), most of the processing plants have to rely on the local middlemen for raw materials. They often establish linkages with the purchasing agents/middlemen through agreements (rather than contracts). Most of the processing plants are concerned about the traceability, market requirements, food quality and food safety certification (including EU, USA, and Japanese markets).

Figure 3. Flow and actors of the yellowfin, bigeye tuna supply chain (MCD, 2020)

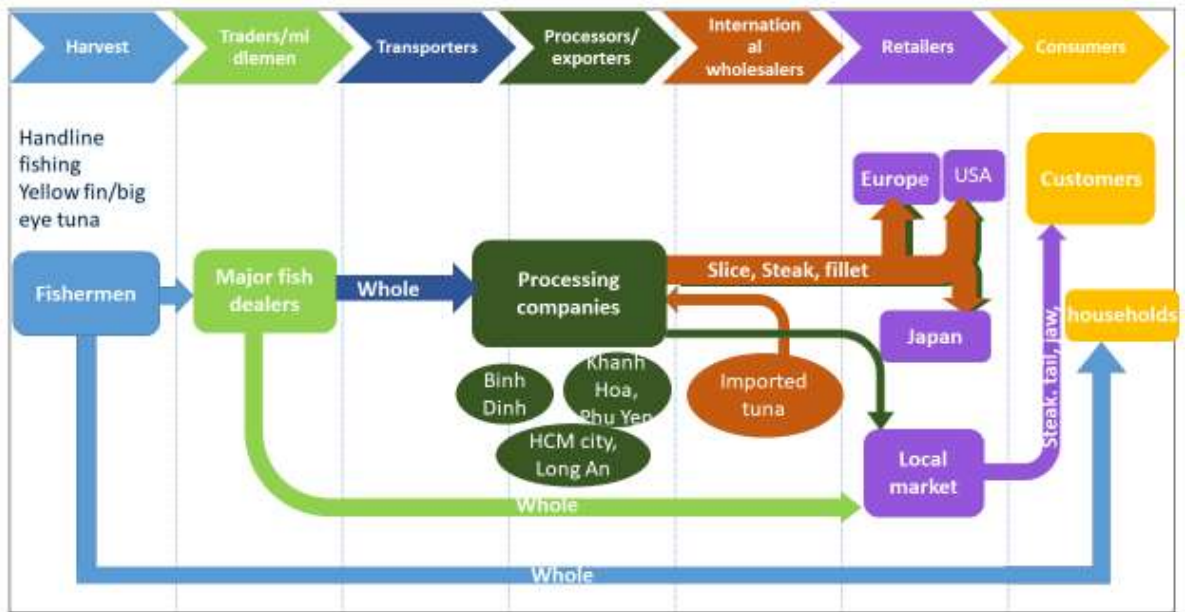
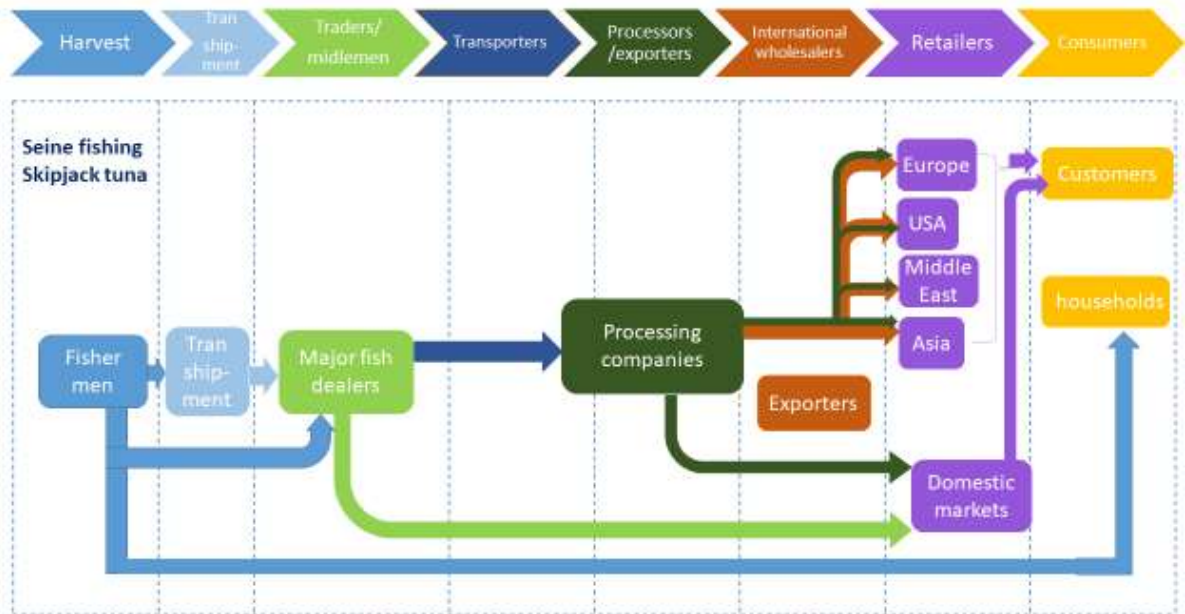


Figure 4. Flow and actors of the skipjack tuna supply chain (MCD, 2020)



**Image 1. Weighing and sale of tuna in Binh Dinh, Vietnam. Photo Credit: MCD.**



Challenges and gaps in the tuna fisheries sector in Binh Dinh are the eCDT requirements: (i) *There is a lack of supply chain management: processing plants or exporting companies depend on the middlemen (to gather raw materials) and they could not develop their own supply chain where they can control the post-harvest quality.* (ii) *There has been no transparency among the actors in the value chain. The tuna quality has not yet been classified nor paid at the highest value. The market access and development, and standards remain limited.* (iii) *The certification of fish origin is not a concern of fishermen but of the processing and import-export companies because these companies need such certificates to ensure the quality of their export products.* (iv) *The awareness and capacity of the small-scale fishers to comply with the requirements on log-book and traceability remain limited.* With such challenges, the study proposed following recommendations to address the gaps of eCDT requirements: (i) *Improve the supply chain management and business model development,* (ii) *Strengthen the capacity and compliance of fishermen and relevant actors regarding the regulations on the logbook/VMS data,* (iii) *Improve the catch documentation scheme (CDS) including e-logbooks and catch certificates that would help efficiently manage the production and traceability,* (iv) *Manage tuna resources sustainably, set up and implement quotas and support the implementation of regulations,* and (v) *Reorganize fishing/production groups so that they become more independent and are empowered to co-manage for sustainable production and application of the traceability and catch the tuna sustainably.*

#### **b. Survey on current condition of tuna fishing vessels, enterprises' needs and technical requirements for the eCDT pilot**

MCD, in collaboration with VNPT experts, conducted a field survey in Binh Dinh province on the 27-28 February 2020. During the trip, the survey team discussed with officials from Binh Dinh provincial Sub-department of Fisheries about some technical features of the eCDT to serve the pilot, and identified 10 vessel owners whose vessels had already been equipped with VNPT's VMS devices to join the eCDT pilot.

After the survey, MCD and Fisheries Information Center collaborated with relevant stakeholders in designing the technology with certain application features.

With the the coordination of Binh Dinh provincial Sub-department of Fisheries and MCD, 10 owners of tuna handline fishing vessels were selected (these vessels had VMS devices installed and they wished to join the tuna supply chain being recently developed by Mai Tin company).



**Image 2. Survey on the vessels selected to join eCDT pilot**



### 2.3.2 Participatory Planning for eCDT Testing in Binh Dinh

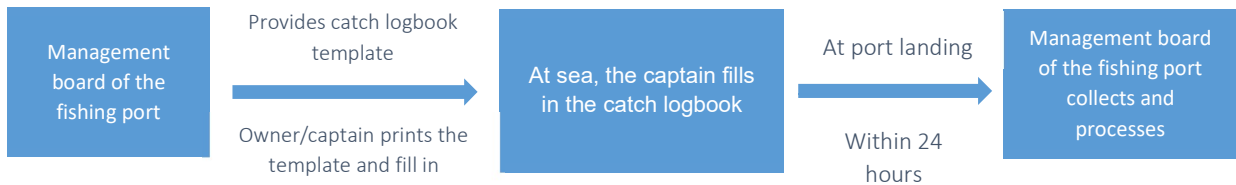
#### a. Selection of eCDT technology to be applied in Binh Dinh

Technical consultation and selection of eCDT technology for the pilot in Binh Dinh:

In order to learn, discuss about eCDT requirements and consult on the selection of eCDT technology for the pilot, MCD collaborated with the Fisheries Information Center (under D-Fish), Binh Dinh provincial Sub-department of Fisheries and technology experts in following process/activities:

The Launching Workshop to plan on eCDT pilot with the tuna value chain in Binh Dinh organized on the 9 January 2020 with 43 central and local participants.

At the workshop, the concept of electronic catch documentation and traceability (eCDT) was presented and discussed. Binh Dinh representatives shared about regulations and procedures for catch logbook and traceability, certification of the catch as per the Circular No. 21/2018/TT-BNNPTNT dated the 15 November 2018, which requires that vessels' catch activities must be logged daily, either by paper-based or electronic method. A captain of any vessel of 12 meters in length and above is responsible for logging the catch activities and submitting the logbook to the management board of the fishing port. The steps in a catch documentation process are as follows:



Electronic catch documentation and traceability (eCDT) technology is a new concept in Vietnam and is being developed with such orientations as: incorporation into vessel monitoring system (VMS) device,

independent electronic catch documentation device, and app/software systems to ensure the traceability of the captured products in all stages from fishing, trans-shipment, landing, transportation, processing, preservation and packaging. Workshop participants discussed and agreed on some outstanding viewpoints of eCDT technologies including:

- Electronic catch documentation and traceability (eCDT) technologies would be a tool that helps strengthen the management of the captured products, increase the transparency in the catch origin, reduce paper-work burden, reduce time and efforts on traceability of the product/seafood raw materials.
- Enhanced technology development in fisheries management is a direction that is on-trend, suitable to the market requirements, and improves the prestige of Vietnam seafood products in domestic and foreign markets.
- The electronic catch documentation and traceability (eCDT) technology needs applying in a unified and synchronous way, and the technology should be simple for fishermen to use.

At the workshop, participants discussed the needs related to eCDT in tuna chain, mostly about following needs:

- Introduction and trainings for fishermen on the practical meaning of the eCDT application in tuna fishing (handline fishing, yellowfin tuna);
- Trainings for fishermen to practice with simple technology and affordable device cost to ensure long-term application;
- Ensuring the traceability of the captured marine products, especially from the offshore point of catch where the signal lost happens frequently to the onshore sale/collection point.

The Workshop on the 14 January 2020 in Hanoi with the participation of representatives from D-Fish, Fisheries Information Center and central agencies, Binh Dinh provincial Sub-department of Fisheries and some provincial/local governments, technology and device supply companies identified iterative and multi-participant trainings as an effective training method for the eCDT pilot. The analysis on the strengths, weaknesses, relevance and readiness of technology companies e.g. GTO, VNPT, Vishipel, Smartlife, Viettel, Mecom, etc for the eCDT pilot in Binh Dinh was an essential base for the selection of technology partner.

The technical meeting with the Fisheries Information Center at D-Fish head quarter on the 11 February 2020 identified concrete technical requirements for the electronic traceability including: assuring the traceability from the point of catch at sea, to the first sale point in land of each tuna fish captured, generating a unique traceability code for each fish. This technology would be piloted on 10 tuna fishing vessels within the linkage chain being developed in Binh Dinh. Potential technology partners were VNPT and GTO.

**Image 3. Launching workshop to plan on eCDT pilot with tuna value chain in Binh Dinh on 9 January 2020**



MCD and the Fisheries Information Center (D-Fish ) worked with technology partners being VNPT and GTO to discuss concrete requirements related to the design of eCDT technologies including “(i) the documentation of the process from the point of catch to the first sale at the port is electronicized; (ii) technical specifications are guaranteed and the technology is as simple as possible for the recorders; (iii) data could be simply transmitted to the land, which is suitable to the available voyage logbook on the vessels, and compatible to the data receiving system of the Binh Dinh provincial Sub-department of Fisheries, and data can easily be found; (iv) devices which can run the application and can synchronize data with the UIC of each tuna captured should be provided.” VNPT was selected as the technology supplier who met eCDT requirements and the system’s criteria in Vietnam and Binh Dinh.

### 2.3.3 Training Fishers on Using eCDT Technology

#### *a. Training on eCDT and pilot demonstration in Binh Dinh*

The traceability has been implemented by seafood processing and import-export factories, yet in these cases, traceability only starts from the stage of procurement of the catch onshore, and it is very difficult to trace the products from the point of catch due to both objective and subjective reasons i.e. harsh fishing condition, the paper-based fishing logbooks have neither met the data storage safety requirements nor been suitable to the capacity of fishermen, or fishermen are not familiar with the traceability work and they are not aware of the importance of traceability of product origin. Therefore, the introduction of the eCDT pilot and technical trainings on the application of eCDT are necessary for fishermen and relevant stakeholders to improve their understanding, improve practising skills and to improve the sustainable traceability of products.

On the 5-6 March 2020, the Centre for Marinelifelife Conservation and Community Development (MCD) collaborated with Binh Dinh provincial Sub-department of Fisheries in conducting Training and demonstration of electronic traceability technology with tuna supply chain in Hoai Nhon district, Binh Dinh province. There were 20 training participants including: representatives from Binh Dinh provincial Sub-department of Fisheries, staff from Fisheries Station in Hoai Nhon district, Tam Quan Fishing Port; representatives from different associations and organizations i.e. Vietnam Tuna Association (Vinatuna); fishermen, tuna fishing vessel owners; technology supplier selected for the pilot (VNPT) and non-governmental organization (MCD).

**Image 4. Training participants, Hoai Nhon district, Binh Dinh province, 5 March 2020**



**Image 5. Training participants, Hoai Nhon district, Binh Dinh province, 6 March 2020**



MCD introduced the pilot, training plan, and handed over technology devices to serve eCDT pilot prior to fishermen's following fishing trips.

VNPT representative introduced and instructed on technical procedure for the "Catching Doc" app for traceability purpose: "The Captain shall input the weight, type of tuna captured into the mobile phone app, Unit Identification Code (UIC). The catch coordinates (location) and time shall be automatically recorded (captain does not have to input these data). Attach the code tag to the fish tail and take photo using the app. Press the button "Synchronize" so that when the vessel is close to the land, the system will automatically transmit data to the information portal managed by D-Fish. The Captain shall use the satellite phone which is synchronized with the vessel monitoring device to send messages to the onshore system using the structure:

***[tuna name] + [weight] + [UIC code]"***

To assure the monitoring and management of the pilot during fishing trips, Binh Dinh provincial Sub-department of Fisheries was authorized to access to all information and data transmitted to the onshore system by the vessels and they can monitor information using a computer with Catching Doc app installed.

### **2.3.4 Demonstration of the Pilot**

*Demonstration* was a step to practice applying the electronic traceability technology (tuna handline vessels), to review initial results and draw lessons learnt when putting the eCDT app into practical fishing operation, to get comments of fishermen and stakeholders on the use of the app, and to propose recommendations for improvement for the wide replication of eCDT application.

During the preparation for demonstration, the Project cooperated with VNPT, a technology supplier who supported in designing the hardware and software.

**Table 1. Features of vessel management software/app**

No.	FEATURE DESCRIPTION
I.	Android app
1.	Documentation of tuna fishing logbook
2.	Tuna origin documentation and traceability include following information: <ul style="list-style-type: none"> <li>- Location, time of net dropping</li> <li>- Location, time of net retrieving</li> <li>- Image/photo</li> <li>- Tuna type</li> <li>- Weight</li> <li>- QR Code</li> <li>- First buyer</li> </ul>
3.	Synchronization with the monitoring/management center
II.	Website managing the traceability
1.	Management of vessels departing from the port, update
2.	Management of vessel's voyage history from the time of port departure to return
3.	Documentation of catch logbook data
4.	Tracing fish origin using QR code: use mobile phone to scan the QR code, it will be linked/led to the data on the tuna origin data including following information about: <ul style="list-style-type: none"> <li>- Vessel: length, capacity, license</li> <li>- Captain of the trip</li> <li>- Voyage: time of port departure and port return, location</li> <li>- Catch location: time of net dropping, retrieving, location</li> <li>- Fish: image, size, weight</li> <li>- First buyer.</li> </ul>

Description of Catching Doc app:

- The app can be used to request for information about the origin of tuna products, with sufficient information about the products at two key points: the point of catch and the point of first sale.
- Each tuna fish needs to have a unique traceability code, and the code tag must be kept/ maintained on the tuna tail throughout the voyage to provide traceability information at convenience.
- The traceability data must be compatible to the national traceability system and comply with prevailing regulations on traceability. Upon handing over of the traceability data, guidance should be provided for the Binh Dinh provincial Sub-department of Fisheries for their use.

The Permit for administration of the traceability website, which is linked to the vessel monitoring system, is granted to the Binh Dinh provincial Sub-department of Fisheries and the Fisheries Information Center for their access and management of data to serve the completion of technical guidelines and the policy making.

Hardware: Devices/equipment provided to the 10 tuna vessels to serve the demonstration/pilot

- 30 tags (seal) with pre-printed QR Codes
- 10 smart phones with Catching Doc app installed, with sim card installed and 4G package registered.
- Messages via satellite phones synchronized with VNPT's vessel monitoring device (in 1-2 pilot fishing trips)
- One desk-top computer: installed and handed over to Binh Dinh provincial Sub-department of Fisheries to track, monitor the locations of vessels on the vessel monitoring system of D-Fish: <https://gstc.tongcucthuysan.gov.vn/>

Results of the demonstration was that all devices were handed over to fishermen and Binh Dinh provincial Sub-department of Fisheries following standard procedure. Training participants grasped fundamental skills and practiced using the app, accessed to/logged in, inputted information, synchronized information and sent messages to onshore system via satellite phone, received devices and committed to strictly following the procedure when fishing at sea.

**Image 6. The VNPT expert instructs fishers on how to use the eCDT application.**



**Image 7. Fishing captains practice using the eCDT application after being instructed.**



**Image 8. Mr. Nguyen Sanh Ngoc, technology specialist from the Binh Dinh Provincial Sub-Department of Fisheries, introduces and instructs captains and fishers on to proceed with their use of the device and hand-over minutes.**



## PART III: SUMMARY RESULTS AND LESSONS LEARNED

### 3.1 Objectives and Scope

The eCDT pilot model for application of traceability technology was conducted by MCD with support from D-Fish, Binh Dinh provincial Sub-department of Fisheries and a technical solution company - VNPT.

*Objectives:* The model aimed at practicing the electronic catch documentation and traceability of tuna, from the point of catch to the point of landing – first sale (first buyer). All information documented were encrypted and stored in the vessel monitoring system of D-Fish. Through this model, lessons learned and initial pilot results were shared, and recommendations were made to improve the partnership initiatives.

*Scope of the model:* MCD conducted the eCDT pilot model with 10 tuna vessel owners in Hoai Nhon district, Binh Dinh province. Hoai Nhon district, Binh Dinh province is a place with highly concentrated fishing activities, there are around 1,150 offshore fishing vessels with around 6,000 tuna fishermen. The yellowfin and bigeye tuna catch is approximately 10,000 tons a year, generating a value of around VND1,000 billion (Binh Dinh provincial DARD, 2020). These 10 tuna vessel owners were at their initial stage of establishing linkage chain with Mai Tin company. Their vessels are 15-24m in length and had already been installed with vessel monitoring system (VMS) devices of VNPT to facilitate the extract of data from the eCDT data system and VMS system using VNPT and D-Fish’s software.

*Pilot duration:* One fishing voyage of which the port departure and entry dates were between the period of 9 March to 1 April 2020.

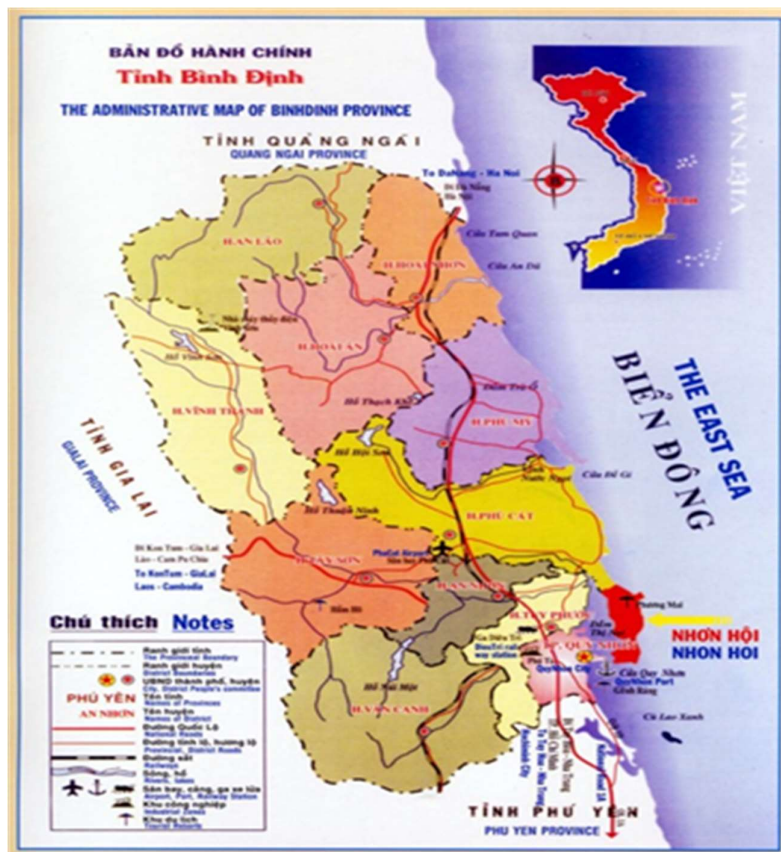


Figure 5. The administrative map of Hoai Nhon district, Binh Dinh province.



*Description of the eCDT pilot:*

Devices were provided to practice documenting and connecting data to the D-Fish's vessel monitoring system; all fishing vessel schedules, catch output and information about each fish were monitored and stored in the computer of the Binh Dinh provincial Sub-department of Fisheries.

MCD handed over the equipment, devices and provided technical instructions for the tuna fishing fleet and officials of Binh Dinh provincial Sub-department of Fisheries. Each fishing vessel was equipped with:

- + 01 smart phone.
- + 30 plastic wires with QR codes (tags).
- + 4G sim card
- + App to input data: the traceability app was installed which provided the vessel number and vessel owner, and was synchronized with the vessel's VMS system.

There are eight steps in the electronic documentation process as prescribed in Figure 6 (below).


Instructions on the use of the management software can be found online:




- Use the D-Fish's vessel monitoring software: <https://gstc.tongcucthuysan.gov.vn/>
- Use traceability software: <https://gstc.tongcucthuysan.gov.vn/xnngts/>
- Use QR Code scan function on mobile phone to check information.





Search for information can be conducted through:



- Traceability software: <https://gstc.tongcucthuysan.gov.vn/xnngts/>
- Use QR Code scan function on mobile phone to check information: enterprises or buyers could request for traceability information about each tuna easily by scanning the QR Code attached to each tuna tail.

**Figure 6. A summary of the steps used by fishing crews at sea in the eCDT pilot testing process with participating tuna handline fishing vessels in Binh Dinh Province, Vietnam.**

Step and Description	Screen Shot of Application Page
Step I: Unlock phone, open the Catching Doc app. Log in using the account granted. Each account was granted to a vessel registration number.	

Step and Description	Screen Shot of Application Page
<p>Step 2: Click the symbol of “Drop net” in the app</p>	
<p>Step 3: Confirm the coordinates and location of the vessel when dropping the net</p>	
<p>Step 4: Click the symbol “Retrieve net” to input tuna data</p>	

Step and Description	Screen Shot of Application Page
<p>Step 5: Attach an UIC tag with a code to the fish tail</p>	
<p>Step 6: Input weight, length of each fish captured, UIC, take photo of each tuna</p>	
<p>Step 7: Click “Synchronize” when the vessel is close to the land, all data and images will be automatically synchronized via the vessel monitoring system device and updated on D-Fish’s information system.</p>	
<p>“Delete” function: to be used in case of wrong input</p>	

Step and Description	Screen Shot of Application Page
<p>Step 8: When landing, input name of the buyer</p>	
<p>Use mobile phone to scan QR code attached to the fish tail, click to see information.</p>	

### 3.2 Key Results from the eCDT Pilot







The pilot results of the first fishing trip of each vessel within the Project indicated that the ability to apply technology by tuna handline vessels in Binh Dinh was initially met and been suitable to the requirements on the point of catch, on the type of tuna, output, location (coordinates), time (date of the catch) of each fish (tuna) and the first buyer.

Tuna data (the point of catch and first buyer) were QR code encrypted, and could be accessed using a web-based system connected to D-Fish as described below. eCDT system could also be incorporated into the vessel monitoring system (VMS).

**Figure 7. Illustrative data (QR codes, digital tuna photo) collected at sea during the eCDT pilot testing onboard participating fishing vessel BD-97738TS in Vietnam waters.**

No.	QR Code	Real Image	Information searched
1			<p><a href="https://gsvc.tongcucthuysan.gov.vn/xnngts/#/">https://gsvc.tongcucthuysan.gov.vn/xnngts/#/</a></p>  <p>72102</p>
2			<p><a href="https://gsvc.tongcucthuysan.gov.vn/xnngts/#/11968">https://gsvc.tongcucthuysan.gov.vn/xnngts/#/11968</a></p>
3			<p><a href="https://gsvc.tongcucthuysan.gov.vn/xnngts/#/37829">https://gsvc.tongcucthuysan.gov.vn/xnngts/#/37829</a></p>

4			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#/66963">https://gstc.tongcucthuysan.gov.vn/xnngts/#/66963</a>
5			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#/39841">https://gstc.tongcucthuysan.gov.vn/xnngts/#/39841</a>
6			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#/34925">https://gstc.tongcucthuysan.gov.vn/xnngts/#/34925</a>

7			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#/71481">https://gstc.tongcucthuysan.gov.vn/xnngts/#/71481</a>
8			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#/86874">https://gstc.tongcucthuysan.gov.vn/xnngts/#/86874</a>
9			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#/96078">https://gstc.tongcucthuysan.gov.vn/xnngts/#/96078</a>

10			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#!/19279">https://gstc.tongcucthuysan.gov.vn/xnngts/#!/19279</a>
11			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#!/43644">https://gstc.tongcucthuysan.gov.vn/xnngts/#!/43644</a>
12			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#!/97859">https://gstc.tongcucthuysan.gov.vn/xnngts/#!/97859</a>



13			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#/95748">https://gstc.tongcucthuysan.gov.vn/xnngts/#/95748</a>
14			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#/92509">https://gstc.tongcucthuysan.gov.vn/xnngts/#/92509</a>
15			<a href="https://gstc.tongcucthuysan.gov.vn/xnngts/#/81631">https://gstc.tongcucthuysan.gov.vn/xnngts/#/81631</a>

**Geoposition data on vessel location and route collected at sea during the eCDT pilot testing onboard participating fishing vessel BD-97738TS in Vietnam waters:**



Out of ten vessels joining the eCDT pilot, six vessels recorded sufficient information about each fish captured and the whole catch, three were not able to record as the captains were not used to electronic documentation/recording at sea, one recorded only once.

**Table 2. Summary of data from eCDT (piloted in Binh Dinh)**

No.	Vessel number	Departure date	Returning date	Catch outputs
1	BD-98551-TS	12/03/2020 09:19:00	01/04/2020 11:39:00	Yellowfin tuna: 770 Kg
2	BD-97738-TS	14/03/2020 10:21:00	01/04/2020 12:14:00	Yellowfin tuna: 560 Kg
3	BD-97524-TS	12/03/2020 05:58:00	31/03/2020 03:36:00	Yellowfin tuna: 285 Kg
4	BD-96776-TS	13/03/2020 08:42:00	01/04/2020 09:08:00	Yellowfin tuna: 45 Kg, the captain recorded only once
5	BD-97399-TS	10/03/2020 16:44:00	31/03/2020 15:08:00	Yellowfin tuna: 499 Kg
6	BD-95433-TS	09/03/2020 01:15:00	01/04/2020 11:39:00	Yellowfin tuna: 296 Kg
7	BD-98338-TS	13/03/2020 10:31:00	01/04/2020 11:39:00	No available information
8	BD-97474-TS	09/03/2020 00:35:00	01/04/2020 11:39:00	Yellowfin tuna: 723 Kg
9	BD-97418-TS	12/03/2020 10:54:00	01/04/2020 11:39:00	No available information
10	BD-96034-TS	15/03/2020 11:28:40	01/04/2020 14:31:15	No available information

### 3.3 Experience and Lessons Learned

There are some lessons learned from the pilot demonstration on recording catch during a fishing trip at sea as follows:

(ii) *The technology qualification:*

The eCDT pilot was necessary for fishermen and stakeholders to enhance understanding, skills and improve the sustainable product traceability. The recording/inputting/updating data into the traceability app was simple and easy for fishermen, 70% of captains did it successfully and generated complete data. The traced information was sufficient for all stages, from the point of catch to the landing, and first sale (first buyer). The catch data were verified by the vessel management system (VMS) of D-Fish. The Web-

based system and app for each user were managed suitably, yet there should be more time to operate, connect, analyze and manage data (provincial Sub-department of Fisheries, D-Fish, and VNPT).

(ii) *Fishermen's capacity/skills and experience in eCDT application:*

Traceability was new to fishermen, they were not familiar with recording, storing data/files, and they faced difficulties in recording at sea. There is a need to continue providing guidance, monitoring and evaluation via collaboration with Binh Dinh Sub-department of Fisheries and partners. Different captains have different capacity levels, and they have low level of education, therefore more time is needed to instruct them and to let them practice more suitably. Vessels/captains can exchange/share experience together after each fishing trip. Binh Dinh Sub-department of Fisheries will contact the focal points (vessel owners, captains) and promote the evaluation, monitoring and sharing of information about the use of app and how to handle difficult manipulations at sea.

(v) *Promotion of eCDT application in association with value chain actors:*

Fishermen have not been fully aware of the benefits of the program, there requires more active engagement of other supply chain actors in the pilot phase such as middlemen/purchasing agents, processing and import-export enterprises. These are change makers who could connect with vessel owners and it is expected through value links developed by Mai Tin Company to meet market requirements. This traceability system needs further development to be interconnected with the system/s of food processing facilities and export facilities. To assure and to maintain the catch documentation and traceability, seafood processing and export enterprises could connect the purchasing agents/middlemen (point of first sale) with the fishermen (point of catch).

(vi) *Improving relevant institutions, policies and regulations:*

eCDT application requires national-level legislation, therefore, the Government needs to develop and complete a systematic and synchronous legal basis/framework based on the pilot practices in the provinces of Binh Dinh, Binh Thuan and others, and based on the technical guidelines on the eCDT design and implementation developed within this project conducted by MCD in collaboration with D-Fish. This is suitable to the practical situation, needs and trends in the world and in the region in order to improve the fisheries management in a sustainable and transparent way, and to minimize IUU fishing in Vietnam.

## PART IV: CONCLUSION AND RECOMMENDATIONS

### 4.1 Conclusion

The eCDT pilot in Binh Dinh was implemented in a timely manner, providing valuable experience as Vietnam fisheries sector is making attempts together with the private sector and fishermen to remove the EU yellow card and to improve fisheries management towards modernization and integration and addressing IUU fishing. The eCDT pilot was part of the Cooperation Plan on “piloting technology application to contribute to minimizing illegal, unreported and unregulated fishing, targeting at sustainable fisheries management” supported by the D-Fish as per its Official Letter No. 2435/TCTS TTTS dated 30 October 2019. The Fisheries Information Center and MCD collaborated in organizing consultation sessions at national and provincial level (in Binh Dinh) with the technical and financial support from the USAID Oceans and Fisheries Partnership. The pilot was officially conducted from mid December 2019 to the end of April 2020. The short time period of the pilot demonstration was due to the close-out/end of the USAID Oceans project in May 2020.

Key results from the pilot testing include:

- (a) The strong collaboration mechanism (between NGO and members of the public-private group) was applied by a professional working group;
- (b) The design of the eCDT pilot model went through many consultative rounds at both national and local levels, on different topics including background analysis, understanding of the tuna value chain, local capacity and needs, suitable technology;
- (c) The on-spot instruction on the pilot was given to the vessel owners in a timely manner that matched with their fishing schedules; and
- (d) Most importantly, eCDT technical guideline and the implementation roadmap were adequately submitted to D-Fish.

A key challenge during the pilot was the onset of the COVID-19 pandemic during February 2020 and subsequent National Government’s requirement in March 2020 for social distancing, including in-person event and travel bans. Due to the pandemic, some activities were not implemented during the conclusion of the eCDT pilot testing as originally planned; for example, a final Consultative Workshop on the National Roadmap in support of National eCDT Technical Guidance was to be held, during which participating fishing vessels would have shared their pilot testing experiences with other fishers and stakeholders. In lieu of the in-person workshop, remote consultations were conducted by MCD using online tools.

Key valuable lessons learned out of the eCDT pilot testing by participating fishing vessels were the usefulness of the eCDT technology to allow proactive and flexible adaptation of fishers to comply with fisheries traceability requirements, the relative ease with which fishers could make use of the application and technology, and the benefits associated with linking eCDT data to support essential information needs of the national fisheries sector and province-level fisheries managers.

### 4.2 Recommendations

It is recommended that:

- 1) D-Fish review the eCDT technical guidelines, consider results and lessons learned from eCDT pilot; approve the guidelines and roadmap and organize its implementation; maintain the role of the eCDT focal point for information to keep mobilizing the engagement and cooperation of the private sector and non-governmental organizations e.g. MCD; develop and implement the 2020-2021 plan together with MCD and partners in order to further promote eCDT work; revise legal documents/regulations on fishing management; facilitate good conditions for the seafood traceability to meet market requirements.

- 2) It is recommended that DARD/Sub-Department of Fisheries in Binh Dinh and other provinces review the technical guidelines; review and utilize the lessons learned from the eCDT pilot demonstration; make a proposal to DFISH and higher management bodies to have a “legal” eCDT system; expand/replicate the pilot demonstration activities with their fisheries.
- 3) Associations and enterprises (Vinatuna, VASEP) refer to the lessons learned from the Binh Dinh pilot demonstration and better connect with supply chain actors to ensure smooth traceability of seafood origin. The most challenging stage is the traceability of seafood at the point of catch and landing.
- 4) Donors (and implementing partners) continue supporting the public-private cooperation to have eCDT systems and to promote sustainable and fair fisheries; pay more attention to the welfare and gender aspects of the chain actors, especially of fishermen.

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# APPENDICES

**Table 3. List of fishing vessels engaging in the eCDT testing.**

Name	Vessel Registration No.	Company Address	Phone No.
1. Nguyen Dinh Trung	BD-97474TS	Kim Giao Bac, Hoai Hai, Hoai Nhon	0849615799
2. Nguyen Minh Toan	BD-97418TS	Tam Quan Bac, Hoai Nhon	0845061799
3. Dao Duy Menh	BD-95433TS	Tan Thanh, Tam Quan Bac, Hoai Nhon	0843584799
4. Nguyen Van Quoc	BD-98338TS	Thien Chanh I, Tam Quan Bac, Hoai Nhon	0842382599
5. Nguyen Minh Danh	BD-97399TS	Tam Quan Nam, Hoai Nhon	0847364799
6. Bui Van Xep	BD-97738TS	Thien Chanh, Tam Quan Bac, Hoai Nhon	0847451799
7. Tran Quyen	BD-97524TS	Thien Chanh, Tam Quan Bac, Hoai Nhon	0842360799
8. Le Minh Huan	BD-98551TS	Cua Loi, Tam Quan Nam, Hoai Nhon	0845261599
9. Nguyen Que	BD-96776TS	Thien Chanh I, Tam Quan Bac, Hoai Nhon	0842354799
10. Bui Lot	BD-96034TS	Tam Quan Bac, Hoai Nhon	0845392999

**Table 4. List of partners cooperating in the eCDT testing.**

No.	Agency/organization	Roles
1.	D-Fish	Direction, decision making
2.	The Fisheries Information Center (FICEN)	Focal point to coordinate the eCDT project at the national level
3.	Department of Capture Fisheries	Providing consultation
4.	Department of Science & Technology and International Cooperation	Providing consultation
5.	Department of Legislation and Inspection	Providing consultation
6.	MCD	Implementing, organizing and coordinating the implementation
7.	Binh Dinh provincial Department of Agriculture and Rural Development	Agency making the decision approving the pilot in Binh Dinh
8.	Binh Dinh Sub-department of Fisheries	Implementing partner
9.	VASEP	Technical support partner
10.	Vietnam Tuna Association - VINATUNA	Technical support partner
11.	VNPT	Technology supply partner
12.	Mai Tin Company	Enterprise in the tuna value chain
13.	Management board of the fishing port	Monitoring, managing the fisheries catch
14.	Fishing vessels, fishermen	Implementing the pilot