Automating Marine Fisheries Catch Documentation Schemes: the eACDS

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Market-driven measures, enforced to control the trading of fish and fishery products, specifically, the EC Regulation 1005/2008, have impacted not only the countries that send their products to the EU but also some countries that do not directly export their fish to the EU but need catch certifications. For the conservation and management of tunas, the respective member countries of the Regional Fisheries Management Organizations (RFMOs) adopt the Catch Documentation Schemes of the RFMOs. Based on such market-driven measures, relevant ASEAN Member States (AMSs) that trade their fish and fishery products are also bound to implement the measures. The AMSs recognize that measures are necessary to improve the traceability system of capture fisheries and combat IUU fishing in the region. Catch documentation scheme is one of the management tools that could enhance and strengthen the management of the region's fisheries as well as support intra-regional and international trade of fish and fishery products beyond trading either with the EU or under the framework of the RFMO areas. Based on the abovementioned circumstances, issues pertaining to the EC Regulation 1005/2008 and traceability of capture fisheries had been immensely discussed by the AMSs in various fora, where support was expressed on the need to improve and develop the traceability for capture fisheries to ensure the sustainability of fisheries for food security as well as to prevent the entry of IUU fish and fishery products into the supply chain in the Southeast Asian region. Accordingly, the development of a common ASEAN Catch Documentation Scheme that takes into consideration the format, standards and information requirements of the importing countries but simplified to enhance its applicability by the small-scale fisheries in the region, was endorsed.

The Southeast Asian region is a major producer of fish and fishery products, accounting for a quarter of the global fish production. Of the world's top 20 marine capture fisheries producers, six are from the region, namely: Indonesia, Viet Nam, Philippines, Thailand, Malaysia, and Myanmar. Indonesia ranked second of the world's highest marine capture fisheries producers with production of 6.50 million metric tons (MT) in 2015 an increase of about 41% over the last decade. The FAO Fisheries Global Information System (Figis, 2017) showed that the total production of Indonesia from marine capture fisheries in 2015 (including mollusks and crustaceans) reached 6.49 million MT, followed by Viet Nam at 3.48 million MT, Philippines at 2.06 million MT, Thailand at 1.91 million MT, Malaysia at 1.54 million MT, and Myanmar at 1.14 million MT. It is worth noting that production from marine capture fisheries of Viet Nam increased by 54% over the last decade.

The global demand for the region's fish and fishery products is rising, as more countries are dependent on fish supply from the region. Australia sources nearly half of its fish demand from the Southeast Asian region, and studies have shown that Australia's domestic fish requirement would reach 776,000 MT by 2020, of which 610,000 MT would be imported. Japan, which is Southeast Asia's major trading partners has been the leading importer of seafood in the world. In 2011, Japan's seafood import reached 2.69 million MT amounting to 1.45 trillion Yen. Japan imports shrimps primarily from Viet Nam, Indonesia, and Thailand. Indonesia is also one of the country's major sources of tuna, third to Taiwan and Korea. This growth was driven by the increased demand from Europe and the United States. Viet Nam's seafood is also in demand as exports grew from US$ 5.0 billion in 2010 to US$ 6.2 billion in 2012. The United States is fast rising as a major importer of seafood from Viet Nam. It is the primary importer of tuna and the second largest importer of shrimps from Viet Nam. Thailand and Vietnam are two of the world's major exporters of fish and fishery products.

Development of the ASEAN Catch Documentation Scheme

The ASEAN Catch Documentation Scheme (ACDS) concept was developed in close collaboration with the SEAFDEC Technical Departments, experts and fisheries policy makers from the SEAFDEC Member Countries. Expert group meetings and regional technical consultations were convened by SEAFDEC to draft the ACDS (Siriraksophon *et al.*, 2016), which was later discussed at the Stakeholder Consultations in March 2016 where views were compiled for the development of an appropriate system of ACDS, both in electronic format and manual system to address the requirements of the SEAFDEC Member Countries. In addition, SEAFDEC need to be assured that the ACDS would be applicable and beneficial to relevant stakeholders, *e.g.* operators of fishing vessels, suppliers, seafood processors for export, and traders.

The ACDS is meant to: provide a unified framework that will enhance the traceability of fish and fishery products for effective marine fisheries management in the AMSs; enhance the credibility of fish and fishery products for intra-regional and international trade; and prevent entry of fish and fishery products from IUU fishing activities into the supply chain of AMSs. In addition, the ACDS could also enhance the cooperation among the AMSs for the advancement of the ASEAN Economic Community (AEC).

Voluntary for all AMSs, the ACDS applies to trade of marine fish and fishery products, processed or not. In this connection, a catch certificate and details of transshipment shall accompany all catches, either transshipped, landed, exported, imported, or re-exported, under the jurisdiction of the AMSs, and there is no waiver for this requirement. The ACDS would also cover catches from small fishing vessels that contribute to trade among the AMSs, where a simplified catch document would be applied accordingly for such cases.

To support better understanding to SEAFDEC Member Countries on the usage and effectiveness of the ACDS on fisheries management through the enhancing of traceability system for marine capture fisheries, the Infographics of the ACDS Guide was published (SEAFDEC, 2017; SEAFDEC, 2018 (2nd ed.)). The ACDS Guide consists of 5 groups with 17 scenarios of catch and trade flows into and/or among the AMSs, namely: (1) Fish from Flag State Vessel Operating within the EEZ; (2) Fish from Flag State Vessel Operating outside the EEZ and/or Neighboring AMS; (3) Transshipment at Sea within the EEZ; (4) Fish from Flag State Vessel Operating in the High Seas and/or RFMO's Area of Competent; and (5) Imported Fish across the Border by Land Transportation.

Furthermore, at the Forty-ninth Meeting of the SEAFDEC Council in April 2016, it was suggested that an electronic system of the ACDS (eACDS) should also be developed by SEAFDEC not only for the commercial fisheries but also to support the small-scale fishers. The eACDS should also be harmonized with other existing catch documentation schemes to ensure that this would support the requirements of various trade regulations, *e.g.* EC Regulation 1005/2008, US Presidential Task Force including the two new US Seafood Traceability Programs. Thus, trading of fish and fishery products from the Southeast Asia would be enhanced. The SEAFDEC Council also endorsed Brunei Darussalam as a pilot site to test the eACDS.

Electronic System of the ASEAN Catch Documentation Scheme

In the development of the eACDS, SEAFDEC reviewed the existing similar Catch Certification Systems adopted by some AMSs, such as the Ministry of Marine Affairs and Fisheries (MMAF) of Indonesia and Department of Fisheries of Thailand that operate the system to accommodate the requirements by importers from the EU. SEAFDEC also learned the Catch Documentation for toothfish (*Dissostichus* spp.) under the Area of Competent of the Commission on the Conservation of Antarctic Marine Living Resources (CCAMLR), entered into force in 2015. Additionally, the lessons learned from the Swedish Agency for Marine and Water Management (SwAM)

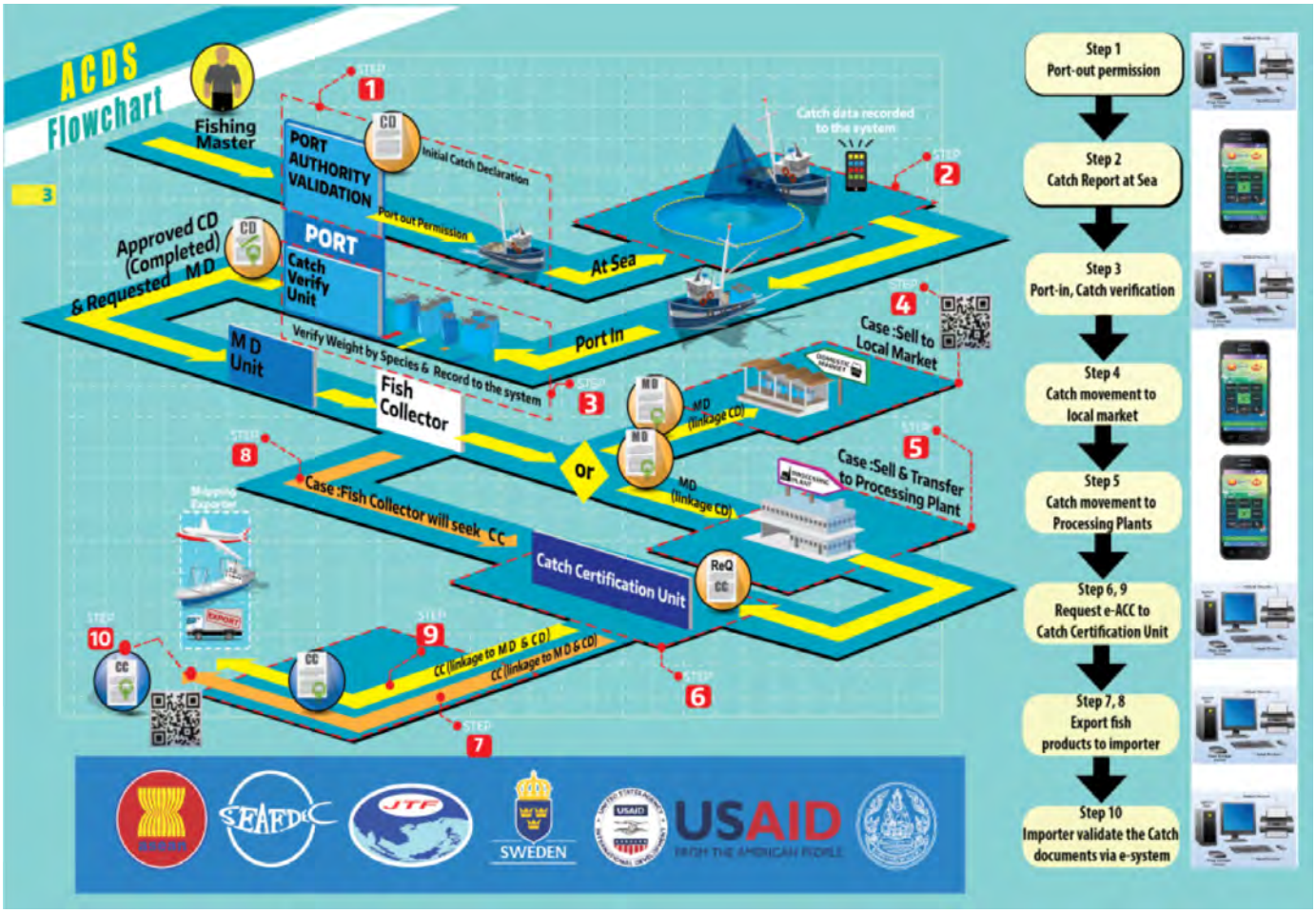

Fig. 1. Flowchart of the implementation of the eACDS at country level

were also referred to particularly on monitoring the fishing vessels activities and catch flow system from sea to landing site, processing producers and/or consumer market. Lastly, SEAFDEC observed the electronic system of the Movement Catch Purchasing Documents (MCPD) developed by the Fish Marketing Organization (FMO) of Thailand, after which SEAFDEC signed an MOU with FMO in November 2016 for the development of the eACDS for the AMSs.

With reference to the definition of Catch Documentation Scheme or CDS which is a "tracking system that monitors the fish from point of catch through to its final destination preventing the entry of IUU fish products into the market," and based on the above lessons learned, the architectural design of the eACDS was therefore finalized as shown in **Fig. 1**. The eACDS consists of three main processes (**Box 1**), namely: (1) Issuance of Catch Declaration (CD); (2) Issuance of Movement Document (MD); and (3) Issuance of Catch Certification (CC). Based on these processes, the importer would be able to make clearance on the CC and trace the origin of fish and fish products along the supply chain. Implementation of the eACDS for domestic fisheries involves 10 steps (**Box 2**) as also shown in **Fig.1**.

Box 1. The processes involved in the eACDS

Issuance of Catch Declaration (CD): This process includes many activities at home port and at seas, such as the port-out control, issuing the initial CD to fishing master, reporting of the estimated catch at point of catch via mobile application, port-in control, verifying the catch weight, and issuing the approved CD to fishing master.
Issuance of Movement Document (MD): This process includes the purchasing activities by key actors such as fish buyers, fish agents, fish processors and all stakeholders concerned in the process. The eACDS system requires that all catch are recorded either at the final local market or at the processing plants while the MD will be generated and verified by the authorized fishery officer at fishing ports and provided to the end process.
Issuance of Catch Certification (CC): This process includes the request for CC from the processors via online application, validation of the traceability of origin of fish in the process from catch to fishery products, issuing of the CC by the Competent Authority (CA) established by the responsible authority on fisheries.

For marine capture fisheries, the eACDS requires many basic data and information known as "Key Data Elements" (KDEs) to ensure and enhance the efficiency of the system and support more effective fisheries management and good governance. The KDEs (**Box 3**) can be grouped into six (6) categories, namely: 1) Point of Catch; 2) Buyers/Receivers and Sellers (Broker/Wholesale); 3) Processors; 4) Exporters and International Shipping; 5) Importers; and 6) End Consumers.

Web-based Application of the eACDS

With the collaboration of the FMO of Thailand, SEAFDEC developed the eACDS with Web-based and mobile applications to support the users from different sectors throughout the supply chain of fish and fishery products. The

Box 2. Steps in the implementation of the eACDS

Step 1 - Port-out control: Fishing Master should inform the Fishing Port Authority before going out for fishing operation, while the validation of fishing license is one of the key parameters for permitting the fishing master to go to sea. In this process, the Fishing Port Authority will issue the initial CD with password for accessing the mobile application for catch reporting at sea.
Step 2 - Catch reporting at sea: after each fishing operation at sea, fishing master should report their estimated catch via mobile eACDS application using the access accounts and password that appear on the initial CD form.
Step 3 - Port-in control and catch-weight verification: After operation at sea, the vessel moves back to fishing port for Port-in control. In this regard, Fishing Master should report to the Port-in control. The weight of catch on fishing vessels should be verified again by the Fishing Master at port, and the verified catch are recorded on the system. Throughout this process, the Fishing Master will receive the Catch Declaration from the Fishing Port Authority
Step 4 - Catch movement to local market: In case the catches go directly to local market after the purchasing process at landing site, the Movement Document (MD) will be issued by Fishing Port Authority and given to the buyer. At local market, the consumers can trace the origin of fish and other information from the QR-Code attached to the MD.
Step 5 - Catch movement to processing plants: In case the catches are purchased and transferred to processing plants for exportation, buyer should record the MD issued by Fishing Port Authority and give to the final buyer/processor for reference.
Step 6 – Request of CC by Processor: In case the catches are processed for export to international market, the processor should submit the request form via web-based application to the Competent Authority (CA). The request form includes information on exportation of fishery products and use of raw materials as reference to the MD, international logistic information, other health certificate and importer information.
Step 7 – Issuance of CC by the Competent Authority (CA): After CA receives the request from processors as mentioned in the Step 6, CA will validate all information for processing and used of raw materials, and all required documents for exportation. In case of any problems or insufficient information, the CA will send notification to the Processor, but if there is no problem on the submitted documents, the CA will issue the CC to the Processor for exportation.
Step 8 - Catch from port directly exported to international market: In this case, the catch will not pass the processing plants but are directly exported to international market, the exporter or seller should request the CC from the Competent Authority
Step 9 - Export of catch or fishery products to international market: Key actors on this process are the exporter and/or processor or seller, and Steps 7 and 8 are followed.
Step 10 - Importer trace the origin of fish: This is the last step for eACDS, where the importer who works closely with their National Customs, is able to trace the fishery products and origin of fish as raw materials through the QR-Code which is attached to the CC and sent together with the fishery products.

eACDS Web-based Application could be accessed at URL: *http://163.44.197.130/eACDS/*. The eACDS Web-based Application refers to the database which is consists of five (5) modules, namely: (1) list of fish species, (2) list of vessels, (3) list of fishing zones/areas, (4) Manage User, and (5) System Setting as shown in **Fig. 2**. In addition, there are eight (8) main menus for implementation of the eACDS. These are: (1) Dashboard Menu: information center that pools all important information together, such as numbers of port-out and port-in, numbers of catch reported to the system, list of fish species

Box 3. Key Data Elements for eACDS				
(1) Point of Catch				
Key Data Element (KDE)	KDEs recommended by WWF	KDEs required for US Imports	KDEs required for EU Imports	KDEs required for eACDS
Scientific Name (species)	X	X	X	X
Common Name (species)		X		X
Local Language Name (species)				X
ASFIS # or 3A-Code (species)		X		X
Estimated Weight (kg)				X
Verified Weight (kg)	X	X	X	X
Location of Catch	X	X		X
Catch Description			X	
Date of Port-out				X
Date and Time of Catch/fishing	X	Date only		Date only
Type of Gear/method used	X	X	X	X
Name of Fisher(s)			X	X
Name of Captain/ fishing master				X
Names and Nationality of Fishing Crew				X
Fishing Company Name		X		X
Fishing Vessel Owner name			X	X
Company Address/contacts		X	X	X
Name of Fishing Vessel	X	X	X	X
Unique Vessel id/ Registration #	X	X	X	X
VMS Unit #			X	X
Vessel Type/ Tonnage (MT)			X	X
Fishing License #	X	X	X	X
Fishing license expiry date				X
Flag State of Vessel	X	X	X	X
Date of port-in/ Landing Port				X
Landing Port name				X
Date, Time, Location of Trans-shipment; Name and Vessel ID of Receiver	X	X		X
IMO/Lloyd's #			X	X
Inmarsat #			X	X
(2) Buyers, Receivers/Suppliers, Sellers (wholesale)				
Key Data Element (KDE)	KDEs recommended by WWF	KDEs required for US Imports	KDEs required for EU Imports	KDEs required for eACDS
Name of Company			X	X
Address of Company				X
Name of Company Owner			X	
Buyer/Receiver/seller registration number/i.d.				X
Description of purchased catch by buyer or receiver	X			X
Verified total weight (kg) of purchased catch	X	X	X	X
(3) Processors				
Key Data Element (KDE)	KDEs recommended by WWF	KDEs required for US Imports	KDEs required for EU Imports	KDEs required for eACDS
On-land Processing Facility:				
Name of Processing Company				X
Address of Processing Company/Plant				X
Registration/License No.		X		X
Batch No.	X	X		X

Box 3. Key Data Elements for eACDS (Cont'd)				
Description of Seafood Processed/ fish products	X	X		X
Fishery Products / HS-Product Code				X
Validation Date (of Processing)				X
Total weight (kg) of Processed Fishery Product	X	X		X
At-sea Processing (Vessel):				
Vessel Name Vessel	X	X		X
License/Regist. #	X			
Catch certificate No.				X
Validation Date (of Processing)				X
Description of Seafood Processed	X	X		X
Total Landed Weight (kg) of Catch				X
Total Weight (kg) of Processed Fishery Product	X	X		X
(4) Exporters and International Shipping/Transport				
Key Data Element (KDE)	KDEs recommended by WWF	KDEs required for US Imports	KDEs required for EU Imports	KDEs required for eACDS
Name and Address of Exporter (Company)		X	X	X
Type of transport (air, sea; carrier type/size)				X
Competent Authority Validation		X	X	X
Certificate of Origin; incl. #				X
Export Declaration Form				X
Bill of Lading				X
Container #				X
Export document #				X
Verified weight (kg)		X	X	X
Gov. catch certificate				X
Gov. health certificate				X
At-sea Export (Vessel):				
Fishing Vessel Name, Registration #		X	X	X
Type and Weight (MT) of Fishing Wessel		X	X	X
Date and Time of Catch		X	X	X
Location of catch		X	X	X
Flag of Home Port		X	X	X
Fishing License #		X	X	X
IMO/Lloyd's #		X	X	X
Inmarsat #		X	X	X
(5) Importers				
Key Data Element (KDE)	KDEs recommended by WWF	KDEs required for US Imports	KDEs required for EU Imports	KDEs required for eACDS
Importer Name (Company)		X	X	X
Address of Importer		X	X	X
Name of Owner or Importing Representative		X	X	X
Import Authority Control/ Validation		X	X	X
Customs Declaration		X	X	X
Gov. catch certificate			X	X
Gov. health certificate		X	X	X
(6) End-consumers				
Key Data Element (KDE)	KDEs recommended by WWF	KDEs required for US Imports	KDEs required for EU Imports	KDEs required for eACDS
List of information and origin of catch via QR Code				X

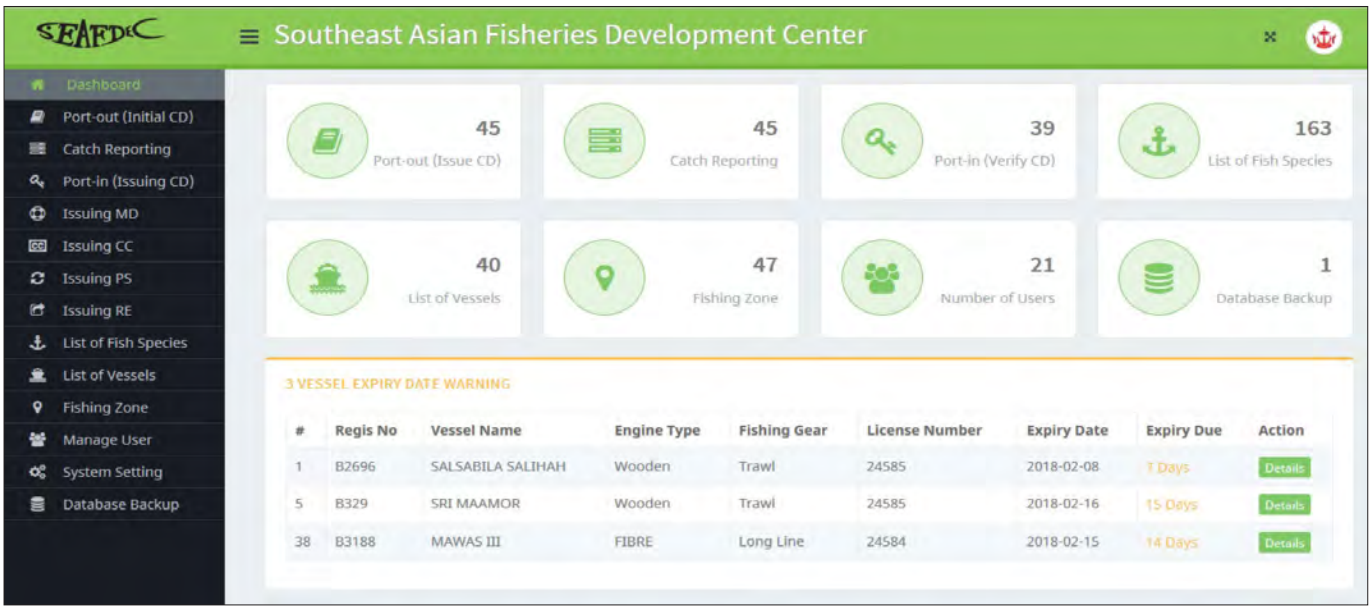

Fig. 2. Web-based Application of the eACDS

in the system, list of vessels, fishing zones, number of users, and database backup; (2) Port-out Menu; (3) Catch Reporting Menu; (4) Port-in Menu; (5) Issue MD Menu; (6) Issue CC Menu; (7) Issue RC Menu); and (8) Issue PS Menu.

Mobile Application of the eACDS

The Mobile Application of the eACDS can be downloaded from Play Store of the Android operating system by opening the Play Store on the mobile devices and type "eACDS" in search textbox and choose eACDS application as shown in **Fig. 3a**; or by opening the browser such as google chrome and then enter *https://play.google.com/store/apps/details?id=org.seafdec.e_acds* (**Fig. 3b**). The eACDS Mobile Application has been developed mainly for relevant users, such as fishing masters, buyers or fisheries agencies, and other concerned stakeholders. In the process of catch reporting onboard fishing vessels or at sea, fishing masters should report their catch by species and weight to the eACDS system via the Mobile Application. In addition, in the process of purchasing/sale of catch at landing sites, the buyers and/or fish agents registered with the Department of Fisheries could also access the Mobile Application. This way, catch data and information could be recorded in all steps of the supply chain for traceability of the fish and fishery products.

VMS Requirements

To ensure that flag State vessels are fishing within the authorized fishing areas/zones and not to engage in IUU fishing activities, it is strongly suggested that Vessel Monitoring System (VMS) is established at country level. Even though the eACDS is designed not to link directly with the VMS, fisheries inspectors in the field or at landing sites

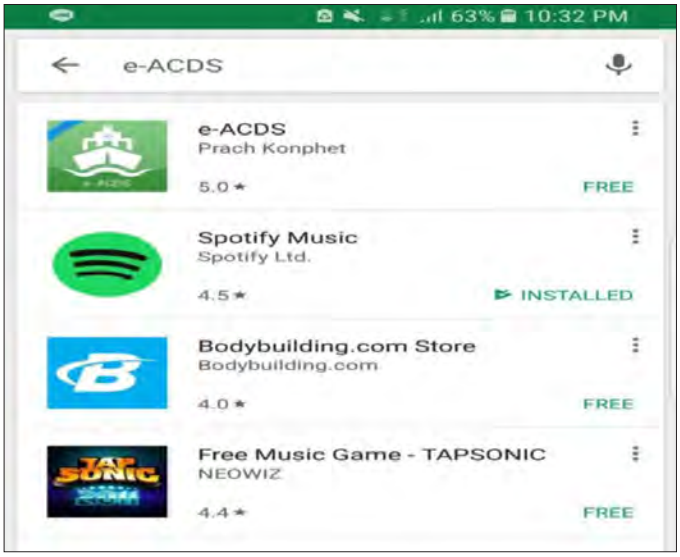

Fig. 3a. eACDS Mobile Application on Play Store

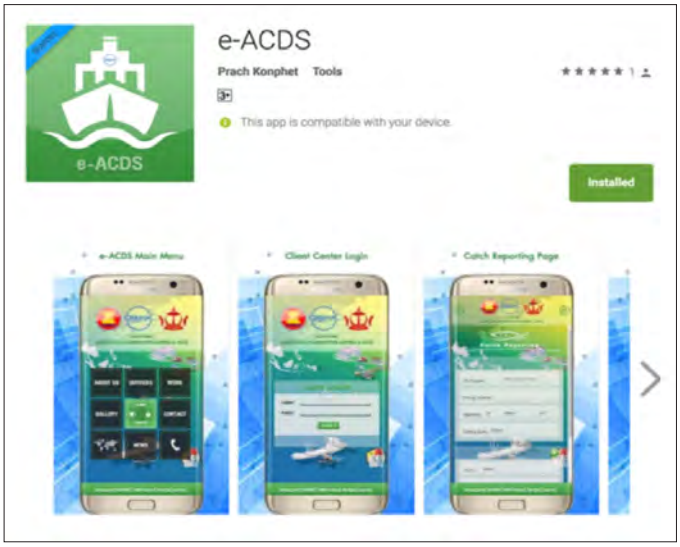

Fig. 3b. eACDS Mobile Application via URL

are able to check and/or monitor the flag State vessels via online devices such (*e.g.* mobile phones, tablets) through the existing VMS. In case a country does not have a VMS in place, validation of the vessel's location could be cross-checked with the Logbooks at the landing sites.

Way Forward

The ACDS is a fisheries management tool for enhancing intra-regional and international trades and is an essential part of the ASEAN Guidelines for Preventing the Entry of Fish and Fishery Products from IUU Fishing Activities into the Supply Chain (Ali *et al*.,2015). As defined in the said Guidelines, the forms of IUU fishing activities occurring in the Southeast Asian region 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. Therefore, exportation and re-exportation of fish and fishery products, processed or not, caught by AMS flagged fishing vessels within their EEZs, that of other AMS and/or the High Seas, should be accompanied by an ACDS.

The first version of eACDS applications was developed for pilot-testing in Brunei Darussalam. Kick-off implementation of the eACDS has been tentatively set from the 1st Quarter of 2018. Nonetheless, the progress on the development of eACDS had been introduced to all SEAFDEC Member Countries during the Twentieth Meeting of the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership in Bangkok, Thailand in November 2017. During such Meeting, SEAFDEC was asked to introduce the system to its Member Countries starting with Viet Nam, Myanmar, Malaysia, Indonesia, and the Philippines. SEAFDEC therefore plans to develop the eACDS for Viet Nam and Myanmar in 2018.

Lastly, considering that the eACDS is designed to meet the requirements of the AMSs and not create unnecessary burden, cost or lengthy process to all supply chain stakeholders, importers and exporters, SEAFDEC will continue to work with its collaborating partners to improve the eACDS. With the eACDS being supported by various electronic formats, the ultimate goal is therefore to ensure that the system is friendly for all stakeholder-users.

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