Regional Training on Traceability and Effective Management Tools for Fish and Fishery Products in Southeast Asia on 1–3 October 2024, Bangkok, Thailand

Farid Maruf
Seafood Supply Chain Technology, Fisheries Traceability, Private Sector Engagement Specialist

Sustainable Fish Asia Technical Support (SuFiA TS)

USAID
FROM THE AMERICAN PEOPLE

Agenda

E-CDT Implementation (Lesson learn and status)

1. SuFiA TS – Intro
2. E-CDT 101
3. Indonesia (e-logbook and STELINA)
4. Philippines (BFAR and FAME Systems)
5. Vietnam (GTO Software)

Latest Development in E-CDT (ER, EM and AI)

6. SuFiA TS study in AI and Cloud in Fisheries Management

Innovative solutions

7. Cawil.AI
8. Teem.Fish (EM and AI for SSF)
9. Integrated Monitoring (EM)
10. GoMicro

Q&A

---------- Coffee Break ----------

Partnership to innovate and scale of Seafood Traceability

11. Interoperability (GDST)
12. First Movers (Engagement strategy)

ACTIVITY INFORMATION

Program Name:	Sustainable Fish Asia Technical Support (SuFiA TS) Activity
Activity Start and End Dates:	November 24, 2021 to November 23, 2025
Name of Prime Implementing Partner:	Tetra Tech ARD
Agreement Number:	GSA OASIS Contract GS00Q14OADU138 (Pool 1) Task Order No. 72048622N00001
Names of Subcontractors:	The Stimson Center
Major Counterpart Organizations	ASEAN Secretariat Food Agriculture and Forestry Division (ASEC FAFD), the Regional Secretariat of the Coral Triangle Initiative on Climate Change, Fisheries and Food Security (CTI-CFF), the Secretariat of the Regional Plan of Action to Promote Responsible Fishing Practices including Combating IUU Fishing (RPOA-IUU), the Southeast Asia Fish for Justice (SEAFish) Network, Coral Triangle Center (CTC), Coral Reef Alliance (CORAL), Southeast Asian Fisheries Development Center (SEAFDEC).
Geographic Coverage (cities and or countries)	Southeast Asia and the Pacific: Brunei Darussalam; Cambodia; Indonesia; Laos; Malaysia; Myanmar; Papua New Guinea; the Philippines; Singapore; the Solomon Islands; Thailand; Timor Leste; and Vietnam.

OVERVIEW

Indo-Pacific region

- global epicenter of marine biological diversity
- home to the most productive fisheries on the planet

Threats or issues facing the region's marine ecosystems

- pollution
- uncontrolled coastal development
- climate change
- illegal, unreported, and unregulated (IUU) fishing

Distant water fishing fleets of foreign state actors contribute to unsustainable IUU fishing, threatening regional economic, food, and maritime security.

GOALS

Through Sustainable Fish Asia Technical Support (SuFiA TS), USAID works to promote sustainable fisheries and conserve marine biodiversity in the Indo-Pacific by:

- Improving regional sustainable fisheries policies, standards, and regulatory frameworks;
- Promoting fair labor and sustainable fishing practices; and,
- Enhancing the capacity of regional institutions and non-governmental organizations in multi-stakeholder collaboration, communications and outreach.

STRATEGIC APPROACHES

Strategic Approach One (SA1):
Adoption and implementation of regional sustainable fisheries policies, standards, and regulatory frameworks.

Strategic Approach Two (SA2):
Increase in the adoption of fair labor and sustainable fishing practices by fishery businesses in the region.

Strategic Approach Three (SA3):
Effective and efficient project coordination, administrative and technical support, and outreach and communications delivered.

Strategic Approach Four (SA4): Improved social inclusion within regional fisheries management, including small-scale fishers, women, and youth empowerment. *(Cross-cutting theme)*

Strategic Approach Five (SA5): Regional institutions and countries empowered to safeguard their fishery resources from foreign malign influences. *(Cross-cutting theme)*

Activities

Strategic Approach One (SA1):

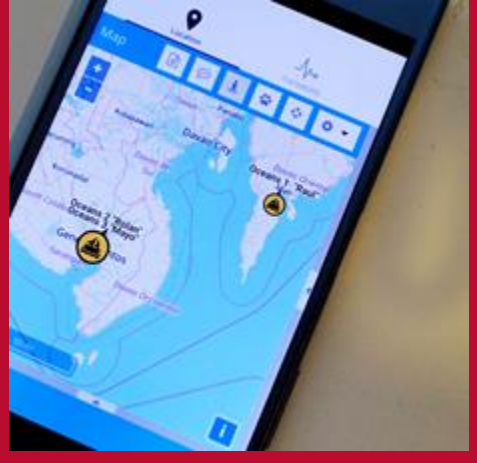
Adoption and implementation of regional sustainable fisheries policies, standards, and regulatory frameworks.

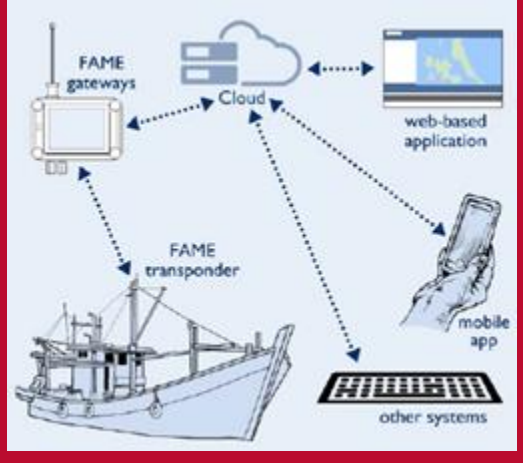
- Support the establishment of Regional Data Sharing Mechanism/ Platform
- Conduct online focus group workshops on the availability and application of e-CDT (ASEAN, RPOA-IUU, CTI-CFF)
- Develop policy recommendations on the use of cloud-based computing in fisheries in the Indo-Pacific region

USAID
FROM THE AMERICAN PEOPLE

Electronic Catch Documentation and Traceability (E-CDT)

101





YOU CAN'T MANAGE WHAT YOU DON'T KNOW/SEE

- Electronic Catch Documentation and Traceability (E-CDT) allows a product to be traced back through all stages of its production, processing and distribution in the complete supply chain
  - inform and strengthen fisheries management
  - verify the legality of harvest and
  - counter labor abuse
- Successful E-CDT implementation required strong support from government, supply chain actors and private sectors

Event-Based Framework

A Single Definition for Traceability

Event-based traceability breaks down complex supply chains into a series of events – like harvesting, shipping, or receiving – that are common to all commodities. The practice of recording data at each of those events as a product moves through its supply chain is known as event-based traceability.

Critical Tracking Event (CTEs) are events in a supply chain where data capture is necessary to maintain traceability; these are usually critical points of transfer or transformation. The entity that performs each event is the entity responsible for capturing the data associated with the event.

Key Data Elements (KDEs) are the data elements that must be captured at each CTE to successfully trace a product and/or its ingredients through the supply chain.

A shared approach to traceability practices reduces repetitive data collection, improves data reliability, and makes traceability more affordable and accessible to all stakeholders.

Source: The Global Dialogue on Seafood Traceability

CRITICAL TRACKING EVENTS (CTEs)

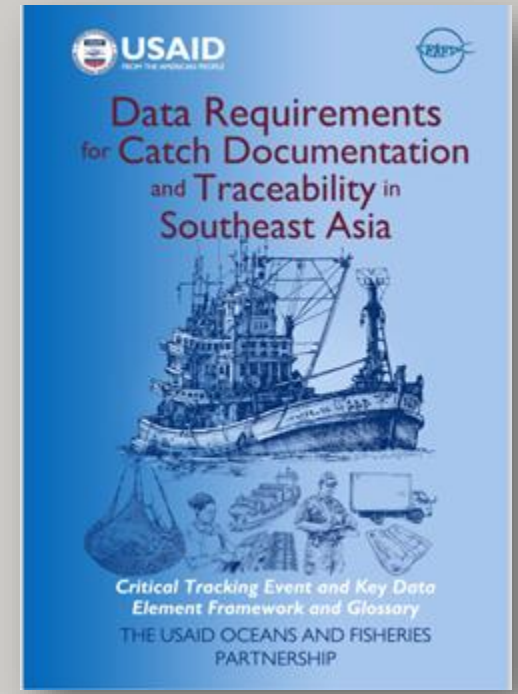
- Points in time where data should be captured (whether internal or external)
- An event notes that “something” has happened to a product

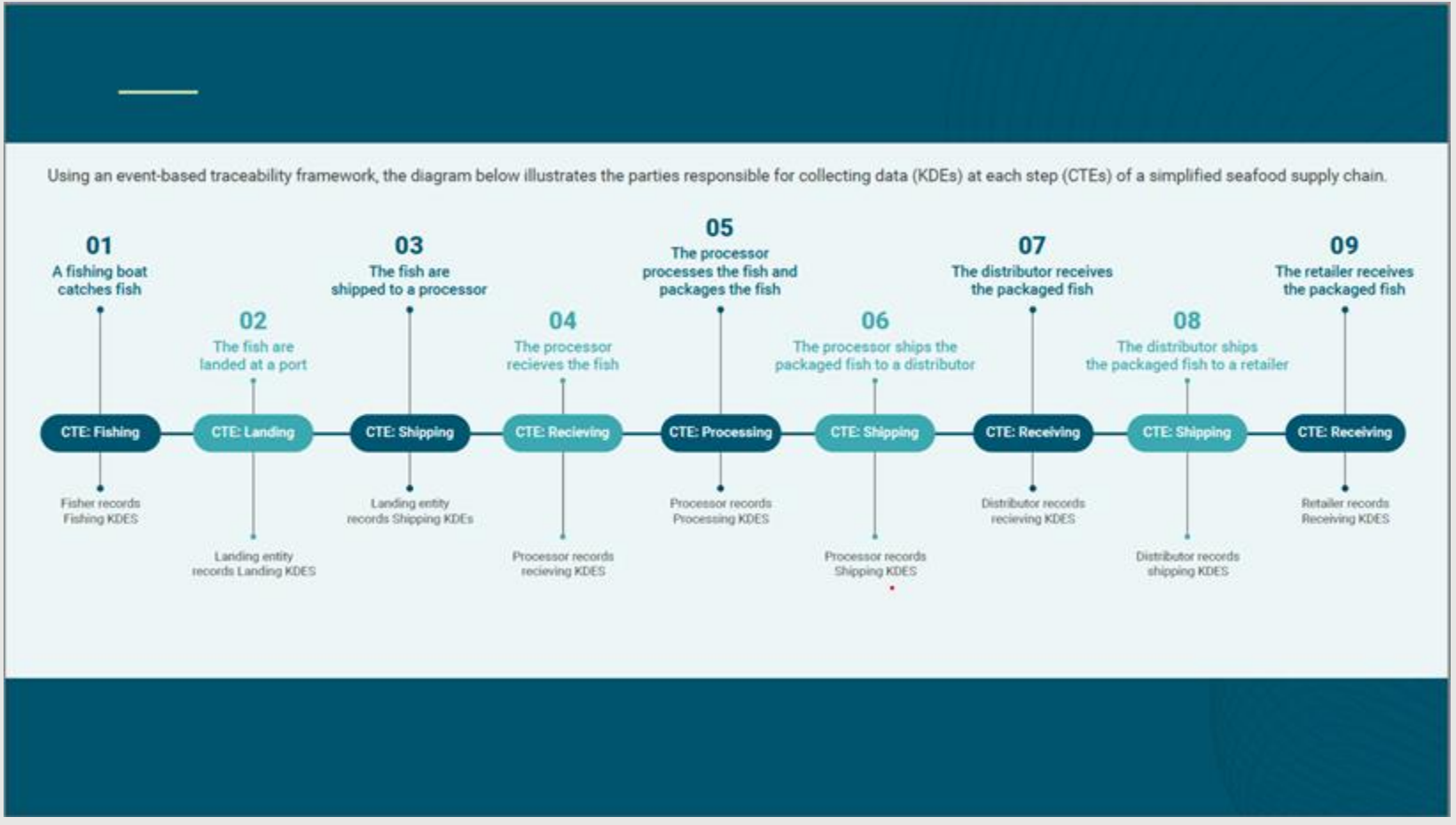
Photo credit: poleandlinecaught.com

Key Data Elements

Key Data Elements (KDEs) are critical aspects or characteristics of the product that associated with particular CTEs.

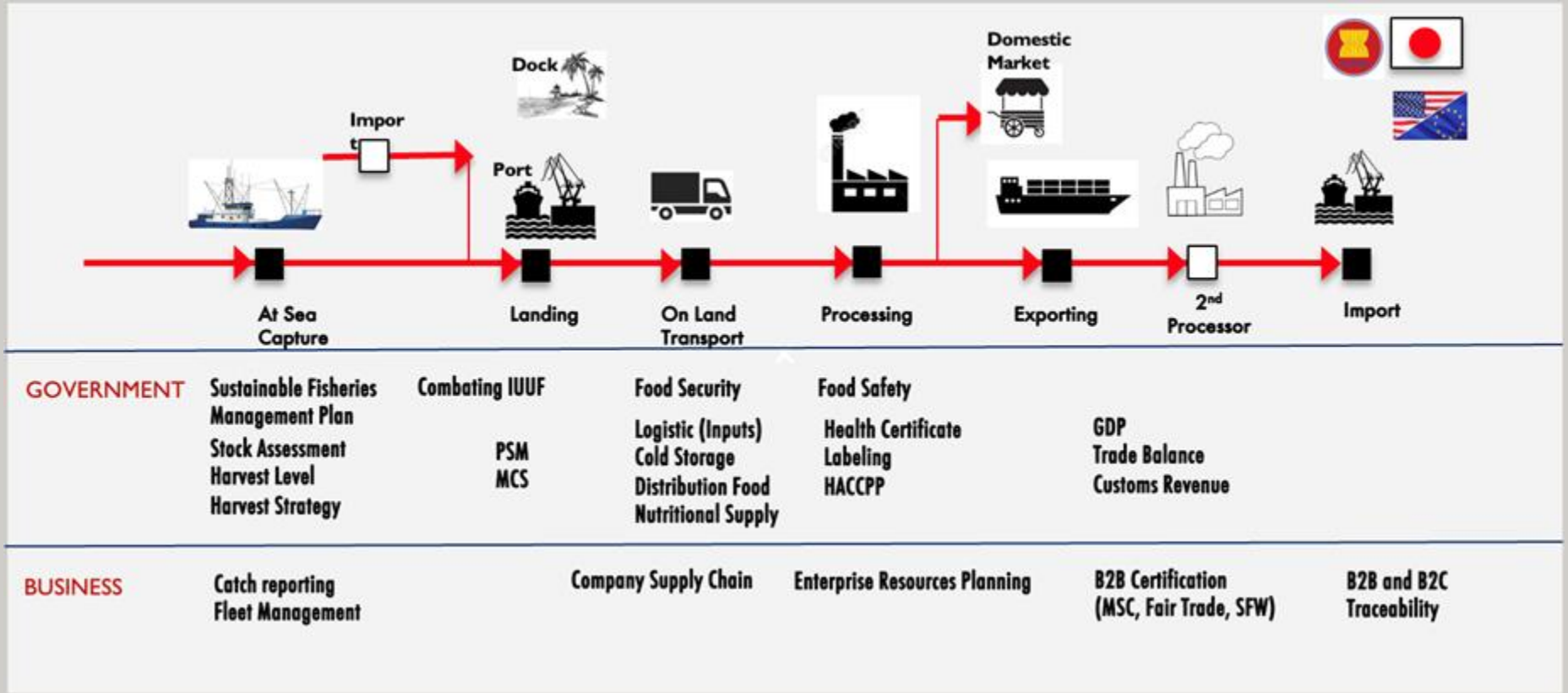
Because KDEs are linked to CTEs, they are often used to support the tracking of products through the supply chain.



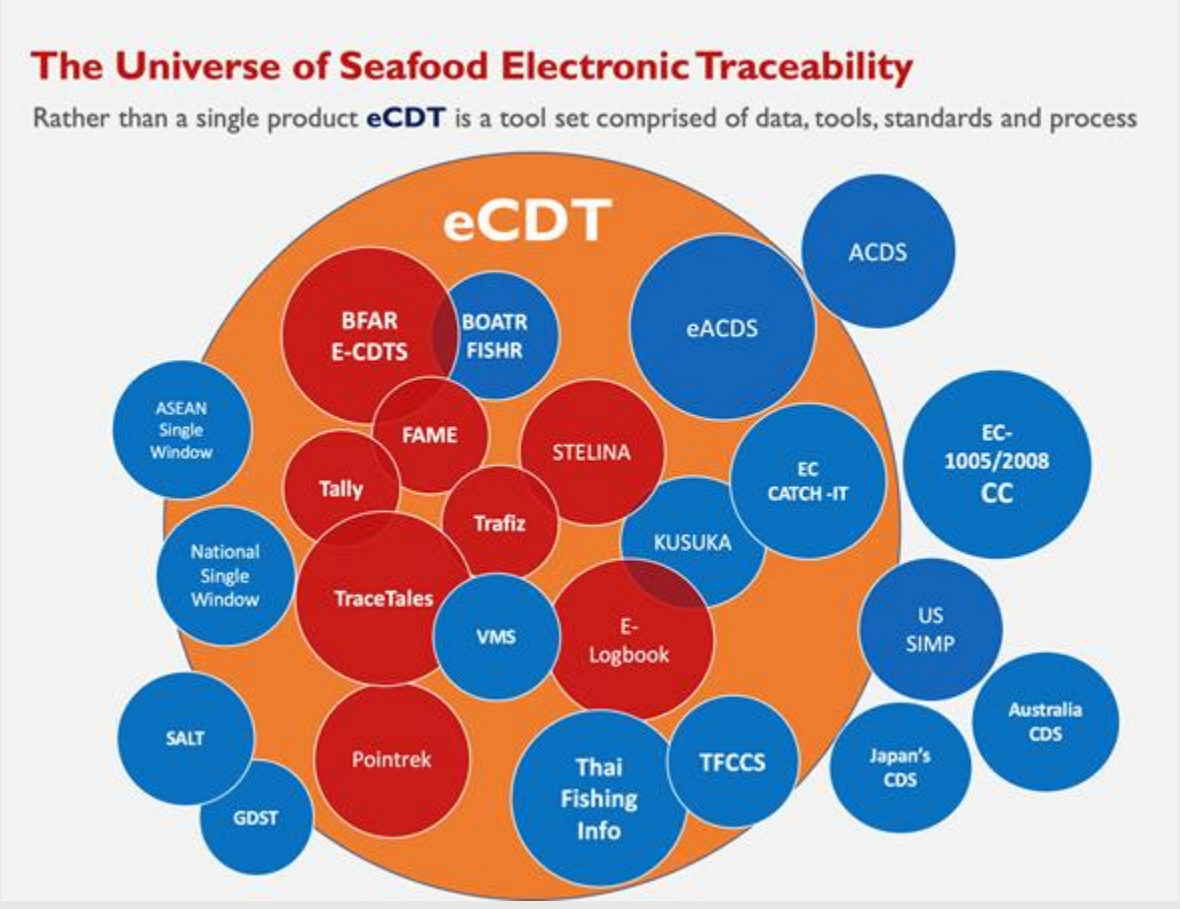


Source: The Global Dialogue on Seafood Traceability

The Role of eCDT to Fisheries Management



Source: Farid Maruf, USAID Oceans Fisheries and Partnerships (Oceans)

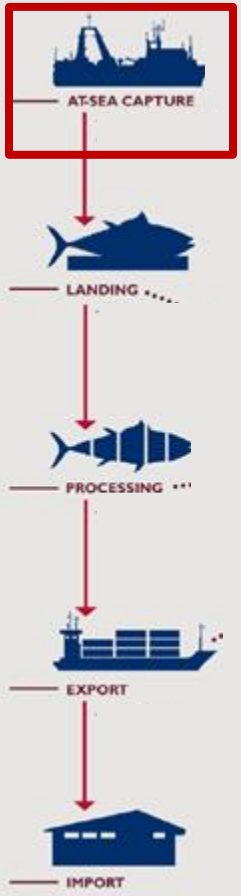


Source: Farid Maruf, USAID Oceans Fisheries and Partnerships (Oceans)

USAID
FROM THE AMERICAN PEOPLE

Indonesia

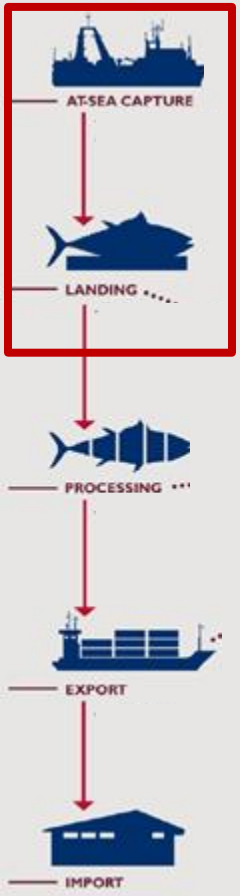
E-CDT TECHNOLOGY



Pointrek/Inmarsat Two-Way Vessel Monitoring System

- Connected via Inmarsat satellite networks
- Fleet management: vessel speed, heading, distance, storage temperature, fuel consumption
- Two-way communication to on shore including text/SMS and email
- Real-time catch reporting and print government Logbook

E-CDT TECHNOLOGY



Pointrek/Inmarsat Two-Way Vessel Monitoring System

- Connected via Inmarsat satellite networks
- Fleet management: vessel speed, heading, distance, storage temperature, fuel consumption
- Two-way communication to on shore including text/SMS and email
- Real-time catch reporting and print government Logbook

E-CDT TECHNOLOGY

TraceTales

Internal traceability for small to medium processors

- TraceTales, developed by USAID Oceans' grantee MDPI, enables processing companies to capture data throughout the processing stage.
- Processors can quickly and easily compile the information required by various national and international traceability requirement
- TraceTales brings paper-based record keeping online for improved business and resource management

Indonesia

MMAF E-Logbook is a upstream and at-sea catch documentation developed by the Ministry of Maritime Affairs and Fisheries (MMAF)

USAID Supports:

- Socializations and trainings
- Early adopter recruitments
- Equipment for early adopters
- Fishery Monitoring Center (FishMon)

Source: DGCF - MMAF

Indonesia

Source: DGCF - MMAF

Indonesia

Source: DGCF - MMAF

Indonesia

Fishing Logbook Data Flow

(Regulation of the Director General of Capture Fisheries 11/PER-DJPT/2018)

Page

After the captain uploads the operational data for fishing. Data is stored in SILOPI and checked for completeness

The logbook verification officer (P3T Functional and Observer) verifies the submitted data

a. **Suitability of fishing areas;**
b. **Suitability of fishing gear and types of fish landed;**
c. **Suitability of catches reported via logbook with landing data;**
d. **Suitability of size of the ship with the number of catches;**
e. **Suitability of base port; and**
f. **Suitability of data efforts.**

P3T:
Capture Fisheries Production Management Officers

Not Comply

1. Clarification;
2. Licensing recommendation;
3. Observer placement recommendation.

Comply

Logbook data analysis on a regular basis as well as other analyzes including productivity figures, open-close seasons, harvest strategy preparation, fishing quota, data reporting to RFMOs, etc.

Source: DGCF - MMAF

Indonesia

- In 2023, there were **12,576** vessels reporting catches using logbook regularly;
- And **10,800 (86%)** of them are using **eLogbook** and 39% of them between 21-30 GT;
- There are 18,826 e-logbook activations.

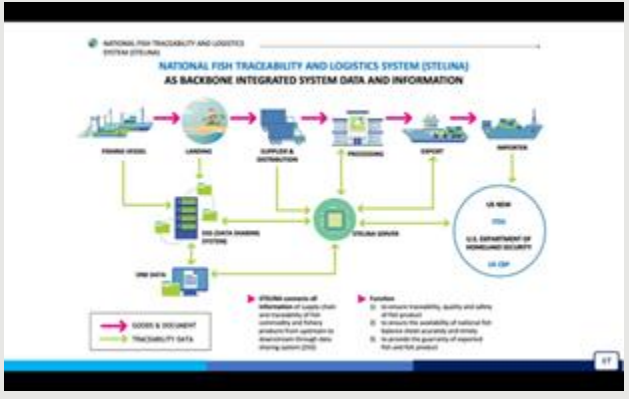
Source: DGCF - MMAF

Indonesia

STELINA is a downstream national fish and fishery product traceability information system that was developed by the Ministry of Maritime Affairs and Fisheries (MMAF)

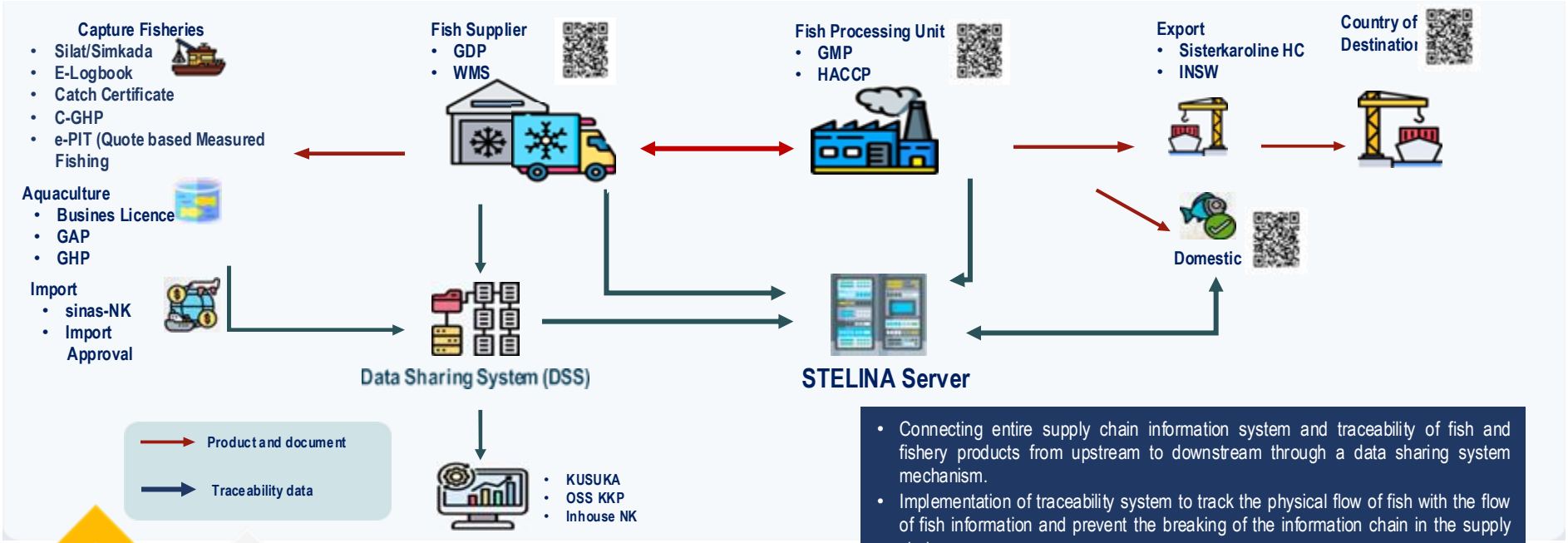
USAID Supports:

- Technical design and expertise
- Socializations and trainings
- Early adopter recruitments
- Equipment for early adopters
- Fishery Monitoring Center (FishMon)



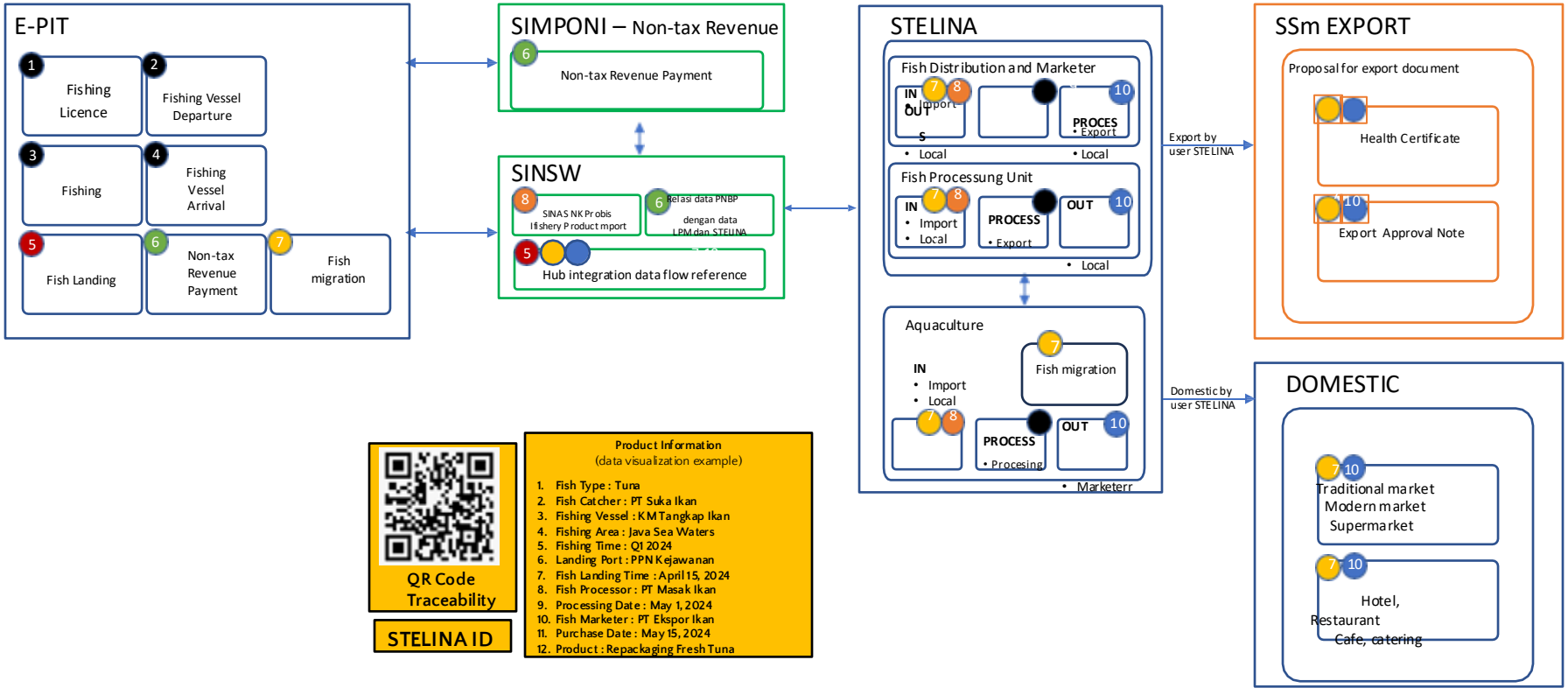
Source: DGPC - MMAF

STELINA INTERCONNECTION



- Connecting entire supply chain information system and traceability of fish and fishery products from upstream to downstream through a data sharing system mechanism.
- Implementation of traceability system to track the physical flow of fish with the flow of fish information and prevent the breaking of the information chain in the supply chain.

STELINA DEVELOPMENT PLAN
LINK & SYSTEM INTERNAL EXTERNAL



TRACETALES AND STELINA INTEGRATION

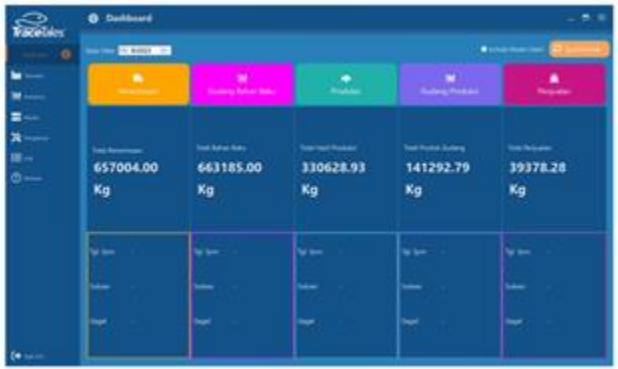
TraceTales Data

STELINA

STELINA INTEGRATION OBJECTIVES:

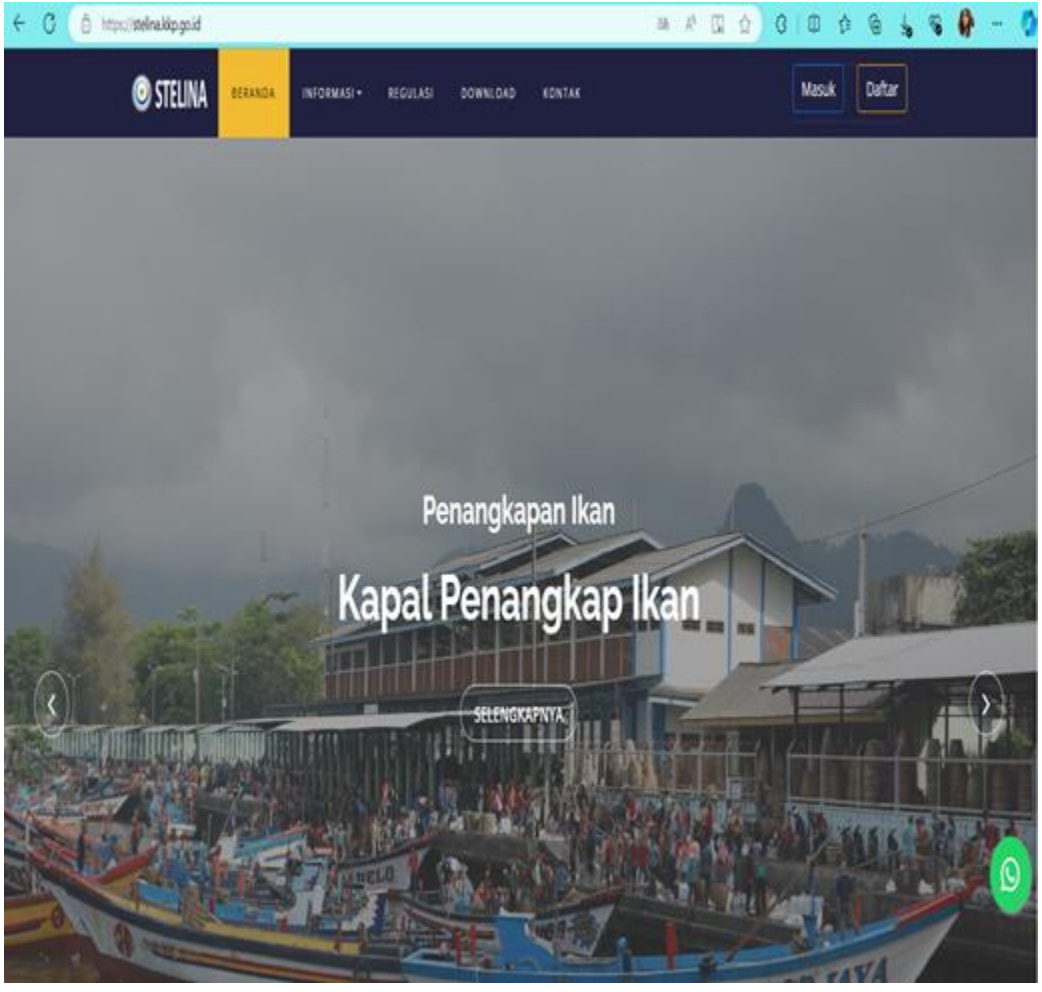
1. Facilitate the development of STELINA API by providing integration modules with existing traceability technologies.
2. Providing alternatives solution for FPU that already use the traceability system so they can use STELINA more easily and quickly
   - No need to entry double
   - Data more reliably and integrated

DATA INTEGRATION - STELINA



CHALLENGE

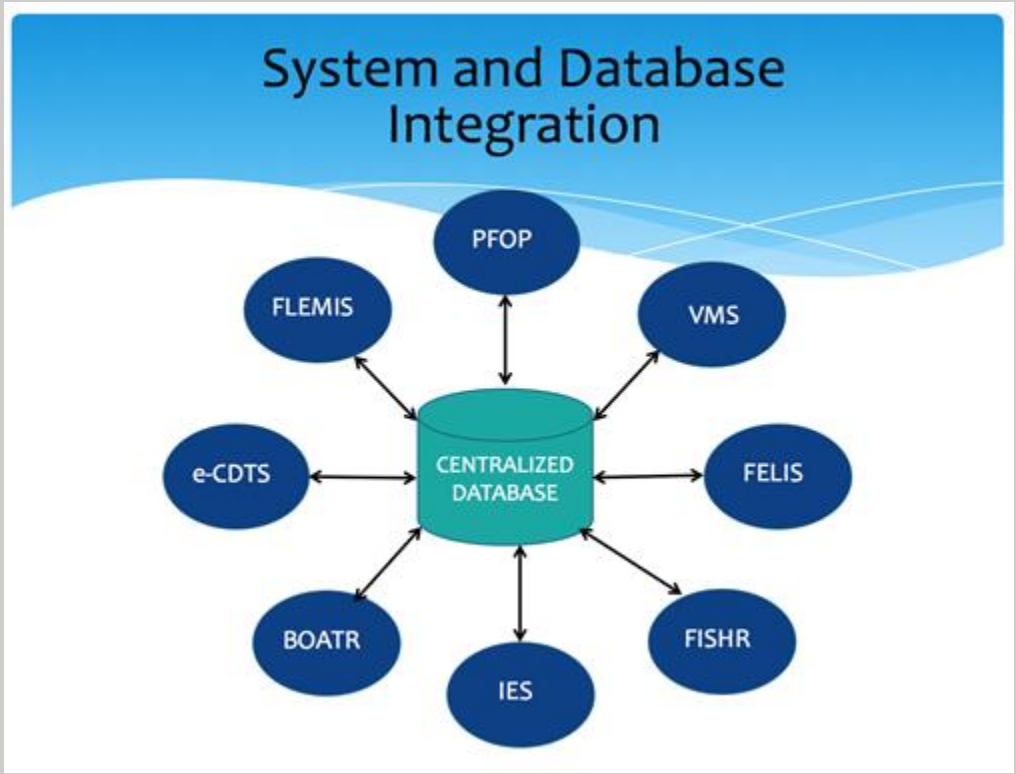
1. STELINA Implementation become mandatory
2. To standardize the KDEs
3. Increase the awareness of all stakeholder in all business scale (micro, small, medium, large)
4. Administrative sanction enforcement
5. Interconection Stelina with multi-party and to make easier
6. Benefit of Stelina
7. Facing Compatibility Test with GDST



Philippines

Philippines

BFAR BAC 251 + E-CDTS



Philippines

Philippines

BFAR eCDT SYSTEM

is an upstream and at-sea catch documentation developed by the BFAR

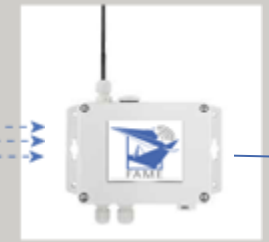
USAID Supports:

- Development support and funding
- Technical design and expertise
- Socialization and training
- Recruited First Mover with SFFAII
- Equipment for early adopters
- Establishment Fishery Monitoring Centers (FishMon), 2 at BFAR offices and 7 at the LGUs

USAID
FROM THE AMERICAN PEOPLE
Futuristic Aviation and Maritime Enterprise, Inc.
Uplifting The Lives Of Fishers Thru Our Maritime Transponders
A presentation during the "Strengthening Partnerships with Seafood Industry Stakeholders to Adopt Fair Labor and Sustainable Fishing Practices" organized by Sustainable Fish Asia Technical Support (SUFIA TS) Activity on September 3-6, 2024

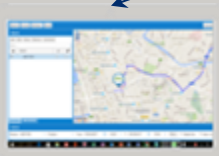
OUR PRACTICAL SOLUTION

- Customizable
- Option for wind power
- Track and monitor in real-time
- Independent messaging

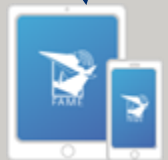


FAME gateways

Cloud

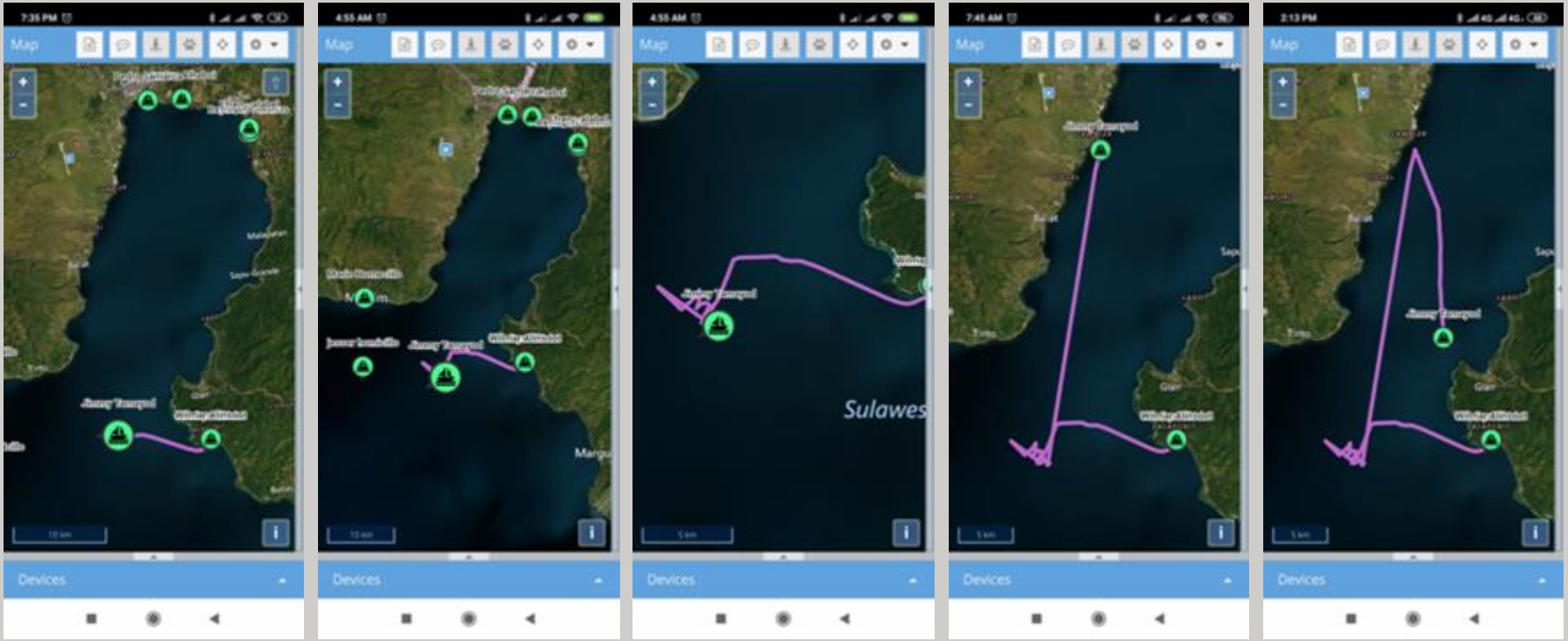


FAME platform



Mobile App

Boat Tracking



1. TAP card.

2. Attach to tuna.

3. Read data.

4. Tap in port.

Actual Fish Catch Traceability

NFC cards with data attached to tuna.

Actual fish catch documentation

CATCH TO CASH PROJECT

Data From Catch to Cash

53

TUNAS RECORDED

4

17,704

TOTAL NUMBER OF KILOGRAMS

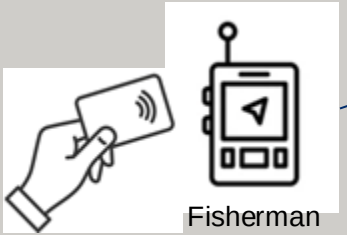
43

FISHERMEN REPORTED THEIR CATCH

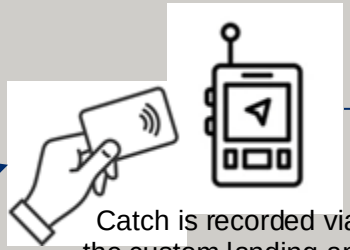
CATCH RECORDED BASED ON MONTH

EXACT LOCATION OF CATCH

FAME's Roadmap

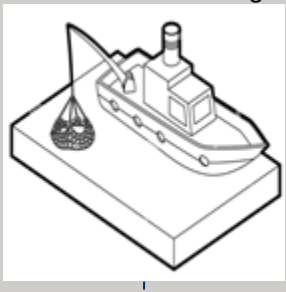


Fisherman
Uses FAME NFC & transponder to record catch



Catch is recorded via the custom landing app

Catch data integrated with processor app



Fisherman Catches Fish

Incentives given to fisherman for the catch data

LGU does electronic catch verification thru the LGU app.

Processor pays FAME with the catch data

For more information, please contact:

Futuristic Aviation and Maritime Enterprises
Plaridel, Bulacan, Philippines 3004

Augosto Martinez
Chief Executive Officer
zes@fame.systems

USAID
FROM THE AMERICAN PEOPLE

USAID
FROM THE AMERICAN PEOPLE

Latest Development in E-CDT (ER, EM and AI)

SuFiA TS study in AI and Cloud in Fisheries Management

Photo: Local government field officer collecting data from a small-scale fisher using an app in Southern Mindanao, Philippines / Farid Hurul / USAID SUFIA TS

APPLYING AI/AA/ML IN PROMOTING FAIR, LEGAL AND SUSTAINABLE REGIONAL FISHERIES MANAGEMENT IN THE INDO-PACIFIC REGION

Regional Review of the Barriers, Opportunities, and Emerging Technology Solutions

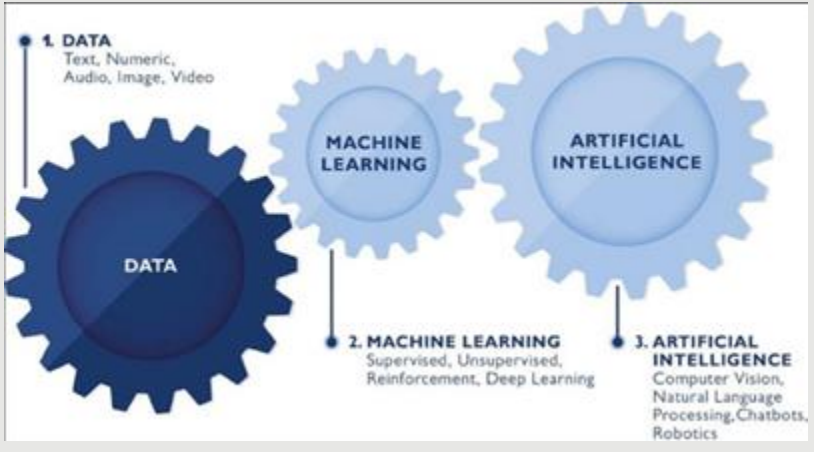
USAID SUSTAINABLE FISH ASIA TECHNICAL SUPPORT ACTIVITY

REGIONAL REVIEW OF THE BARRIERS, OPPORTUNITIES AND EMERGING TECHNOLOGY SOLUTIONS

- Conducted Over 50 Expert Interviews, Reviewed over 90 applications of ML/AI/Advanced Analytics
- Early 2023 to mid 2023, note the study is already outdated as pace of change is going exponential

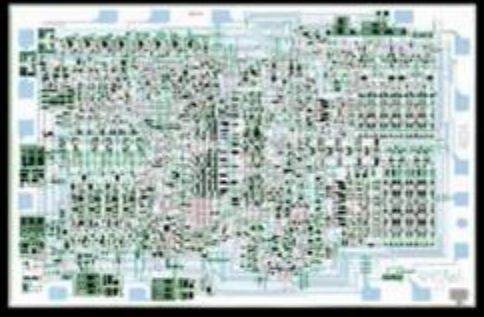
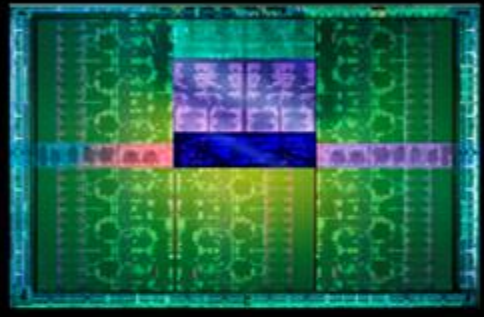
Artificial Intelligence (AI) is a field of computer science that enables machines to mimic human intelligence, allowing them to learn, make decisions, and solve problems.

AI is a critical and rapidly evolving field, driving innovation across multiple sectors in the digital age. We took a look at how it is impacting IUU and Human and Labor Rights in the Indo-Pacific.



Integrated Circuits

abundance 360

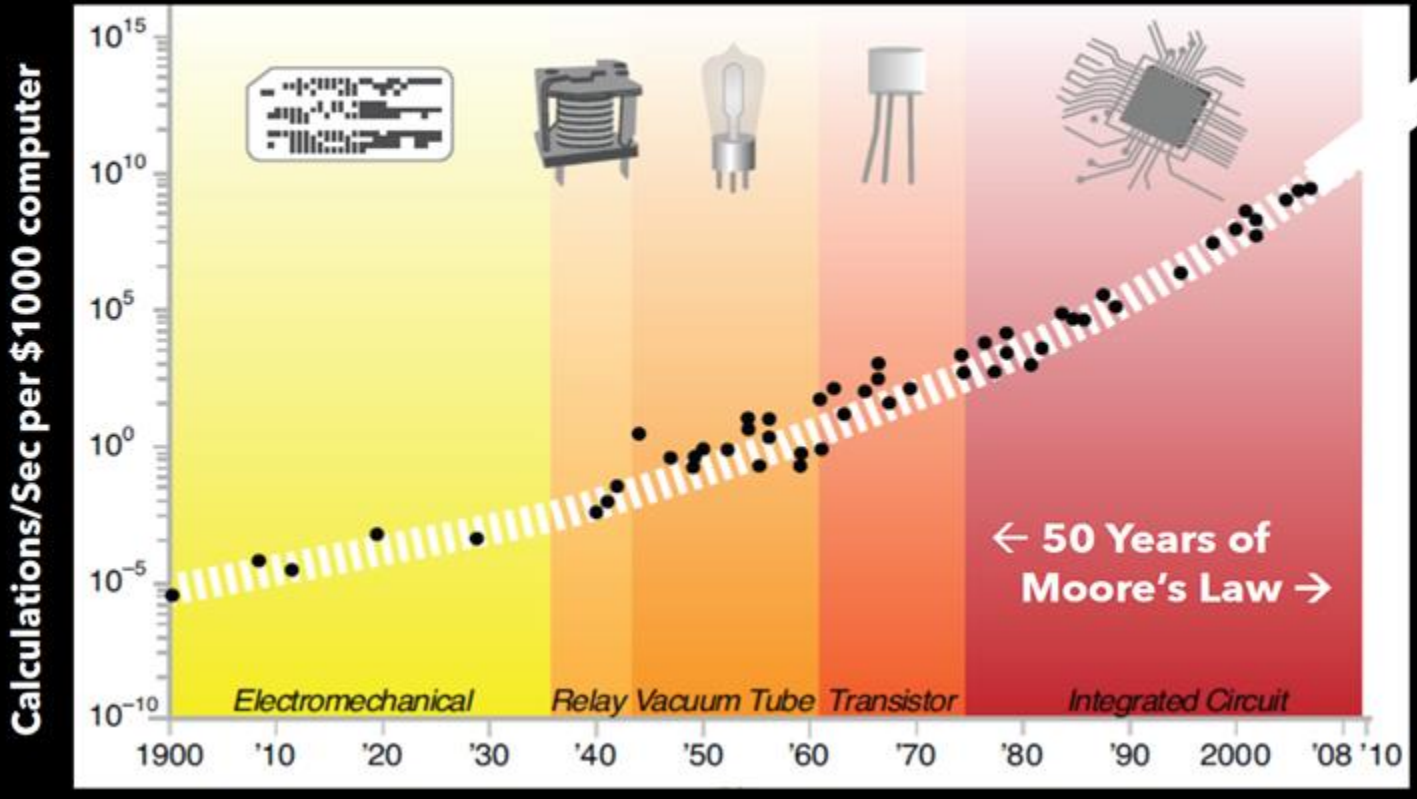
1958: 2 Transistors	1971: Intel 4004	2018: Intel Core i9-8950HK
		
Transistor Count: 2	2,300 Transistors	> 7 Billion Transistors*
Gate Process Length: ½ inch	10,000 Nanometers	14 Nanometers
Speed:	740 KHz (.00074 GHz)	4.80 GHz
Cost of a Transistor:	≈ $1 (1968)	≈ $. 00000024

← 6.5K (faster) & 4.2M (cheaper) →
27+ Billion-fold improvement (47 yrs.)

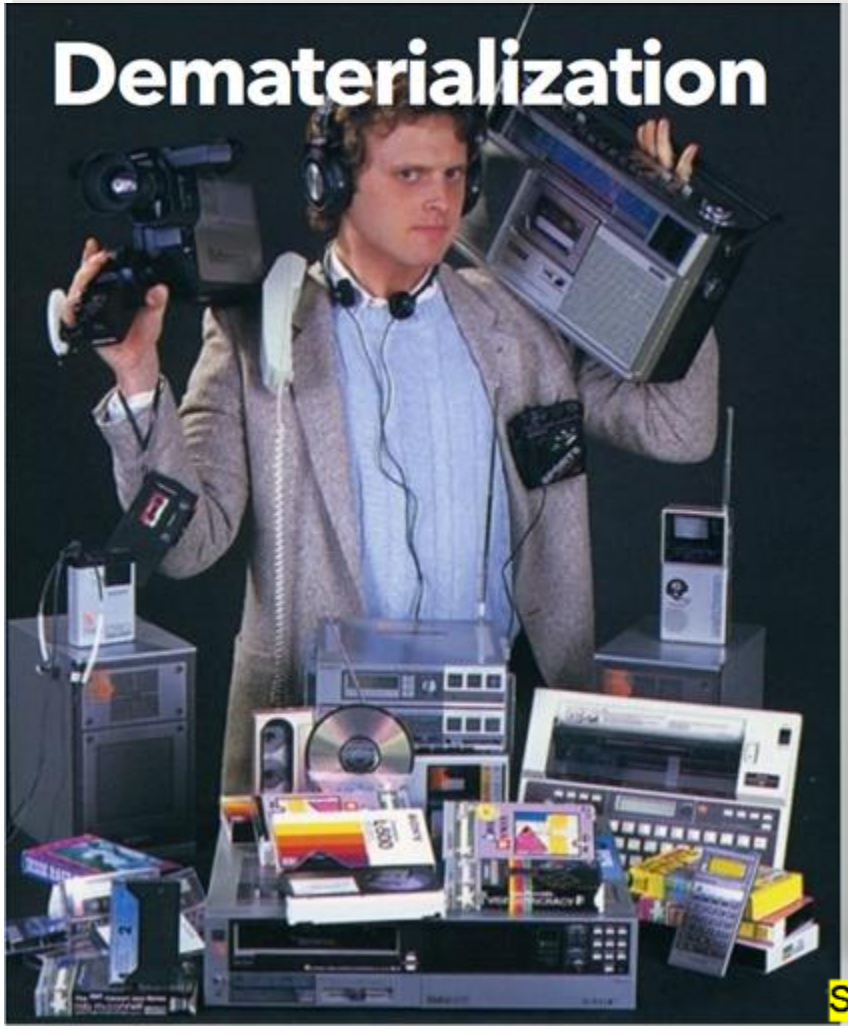
* This is an estimate, as Intel no longer discloses transistor count

Slides courtesy of Peter Diamandis, A360 Singularity University

Law of Accelerating Returns



Slides courtesy of Peter Diamandis, A360 Singularity University



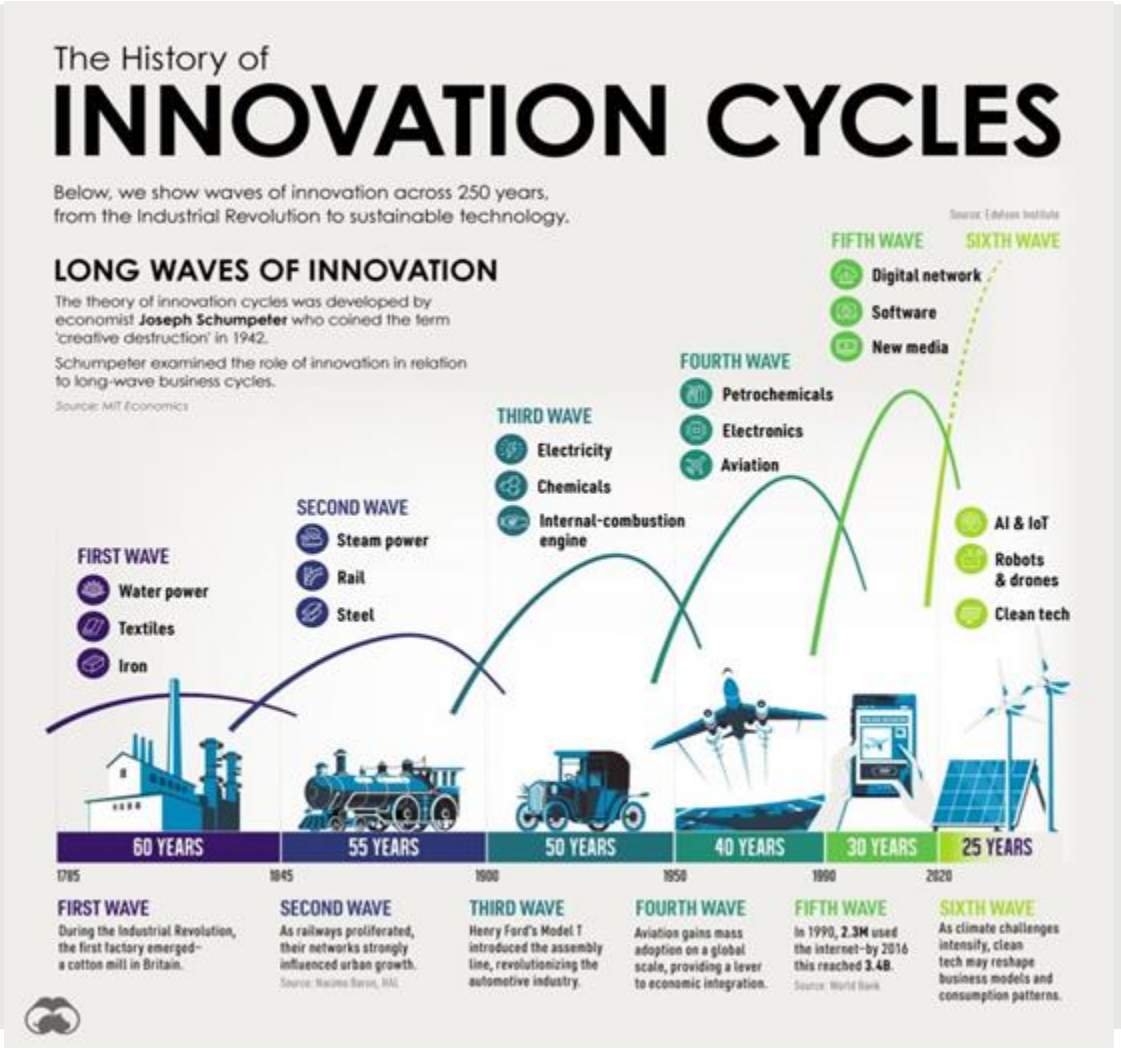
Slides courtesy of Peter Diamandis, A360 Singularity University

INNOVATION CYCLES

The long waves of innovation have implications for fisheries and IUU fishing.

We are now entering the Sixth Wave faster and more disruptive than previous waves.

Source: "APAC artificial intelligence market shows huge growth potential." asmag.com. Accessed May, 23, 2023 https://www.asmag.com/showpost/30393.aspx



Looked at Regional AI Readiness (Index 2022)

Global Rank	Country	Overall score	Government	Technology Sector	Data and Infrastructure
1	USA	85.72	86.21	81.67	89.28
2	Singapore	84.12	89.68	68.50	94.17
17	China	70.84	78.75	59.84	73.91
29	Malaysia	67.37	77.70	50.26	74.16
31	Thailand	64.63	76.77	38.70	78.42
43	Indonesia	60.89	73.85	41.51	67.32
54	Philippines	55.42	65.02	36.33	64.90
55	Viet Nam	53.96	66.77	39.18	55.93
67	Brunei Darussalam	53.96	66.77	39.18	55.93
126	Myanmar	32.45	24.26	25.91	47.17
129	Lao PDR	31.72	29.64	21.46	44.06
132	Cambodia	31.17	27.96	21.14	44.40
137	Timor-Leste	30.86	25.50	21.87	45.23
140	Solomon Islands	30.58	25.03	22.81	43.90
141	Papua New Guinea	30.55	27.19	21.85	42.61

Source: United Nations Industrial Development Organization. Government AI Readiness Index 2022

AI RISKS and CHALLENGES

- Potential misuse by authoritarian regimes
- Biases: deepfakes, biased news and misinformation including unintentional biases due to quality of training data
- Job losses and further marginalization of coastal communities
- Lack of regulatory framework and “alignment of use”

- *De-risking Authoritarian AI. Australian Strategic Policy Institute. Accessed September 2023. https://www.aspi.org.au/report/de-risking-authoritarian-ai*
- *"Security Council Adopts Resolution 2602 (2023) by Vote of 14 in Favour, 1 Against, with Russian Federation Opposing," United Nations, accessed September 2023, https://press.un.org/en/2023/sc15359.doc.htm*
- *"Verify 2023: Navigating AI and Cybersecurity Challenges," Hewlett Foundation, accessed September 2023, https://hewlett.org/verify-2023-navigating-ai-and-cybersecurity-challenges/.*
- *"Following are UN Secretary-General António Guterres' remarks to the Security Council debate on artificial intelligence, in New York today," United Nations, accessed September 2023, https://press.un.org/en/2023/sgsm21880.doc.htm.*
- *https://www.cbsnews.com/news/pope-francis-puffer-jacket-fake-photos-deepfake-power-peril-of-ai/*

BARRIERS TO USE

- Technical constraints: Inaccurate and poorly aggregated data, fragmentation
- Limited expertise and resources: Scarce specialized skills and infrastructure, coupled with prohibitive costs, impede the adoption of AI/ML technologies in fisheries management and labor rights organizations.
- Social and cultural factors: Stakeholder resistance, skepticism, and cultural or linguistic barriers pose obstacles to effective utilization of AI/ML tools in the diverse Indo-Pacific region.
- Practical considerations: Logistical challenges, limited mobile phone usage, lack of coverage at sea, and incompatible operating systems add hurdles to technology adoption in fisheries.
- Regulatory and legal barriers: Unclear frameworks and regulations governing AI/ML applications hinder their implementation in Indo-Pacific fisheries

OPPORTUNITIES

- Massive awareness of opportunities and challenges including risks of AI and ML from fisheries stakeholders

- Improve connectivity at sea and remote area open vast opportunities that otherwise no possible before (Starlink)

EMERGING SOLUTIONS

- Data collection through image recognition:
  - Species Recognition, weight and size estimation
  - Quantity counting and estimation
  - Quality grading
  - Fair labor / force labor prevention (working hours, abuse, safety)
  - E-observer / port inspection (loading and unloading, crew manifest)
  - Postmortem video analysis (by catch, illegal activities)
  - Vessel identification
- Better human interface design - multi language chat bot (text and voice) LLM for knowledge transfer (i.e post harvest, emergency advice)
- Advance analysis from large set of data to do reveal trends, for more effective management plans and improve policy making
- Analyzing satellite imagery and predictive analytics to detect IUU fishing
- Assist MCS in more effective operation (risk based inspection)
- Policy Formulation and Review - Regulatory Impact Analysis (RIA)

Artificial Intelligence - Regulation Impact Analysis

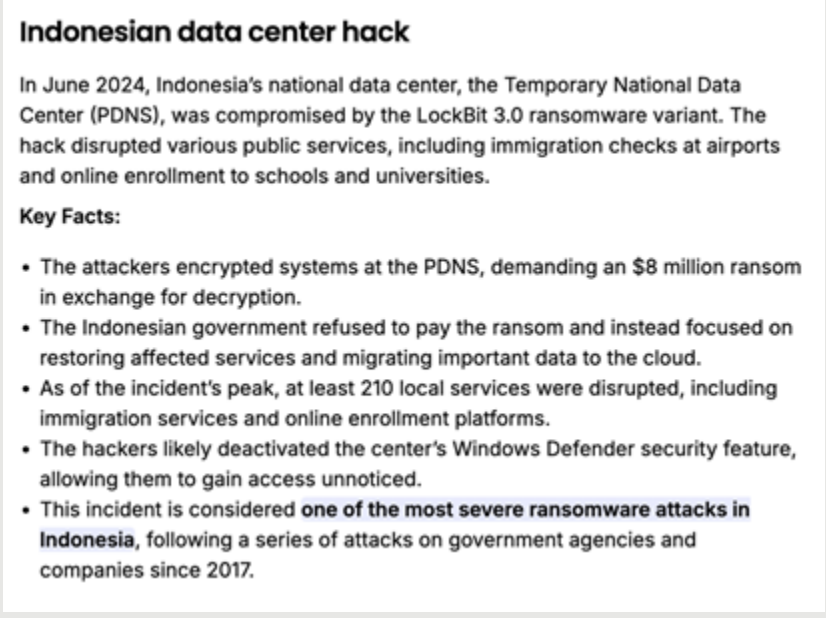
Case Study

In 2021, the European Commission launched an AI-powered tool called "**LEOS**" (Legislation Editing Open Software) to assist with drafting and analyzing legislation, including regulatory impact assessments.

- ✓ The European Commission reports that LEOS has significantly reduced the time needed for initial regulatory drafting and analysis. It has also improved the consistency of regulatory language across different policy areas.
- ✓ However, it's important to note that human experts still play a crucial role. The AI-generated analyses and drafts serve as a starting point, which policy experts then review, refine, and supplement with their own expertise and judgment.
- ✓ The Commission has also emphasized the need for transparency in how AI tools are used in the regulatory process, to maintain public trust and accountability.

Indonesian Ransomware Fiasco

- Indonesian building National Data Center, cloud computing infrastructure that 160 with budget of USD45 millions/year
- On 20 June 2024 it was hacked by LockBit Ransomware group
- Requested USD 8 million
- Held hostage by encrypting 210 government mission critical data, including immigration
- On 2 July LockBit Ransomware group finally provide the encryption key



Indonesian data center hack

In June 2024, Indonesia's national data center, the Temporary National Data Center (PDNS), was compromised by the LockBit 3.0 ransomware variant. The hack disrupted various public services, including immigration checks at airports and online enrollment to schools and universities.

Key Facts:

- The attackers encrypted systems at the PDNS, demanding an $8 million ransom in exchange for decryption.
- The Indonesian government refused to pay the ransom and instead focused on restoring affected services and migrating important data to the cloud.
- As of the incident's peak, at least 210 local services were disrupted, including immigration services and online enrollment platforms.
- The hackers likely deactivated the center's Windows Defender security feature, allowing them to gain access unnoticed.
- This incident is considered **one of the most severe ransomware attacks in Indonesia**, following a series of attacks on government agencies and companies since 2017.

USAID
FROM THE AMERICAN PEOPLE

Innovative Solutions

teem.fish

teem.fish MONITORING

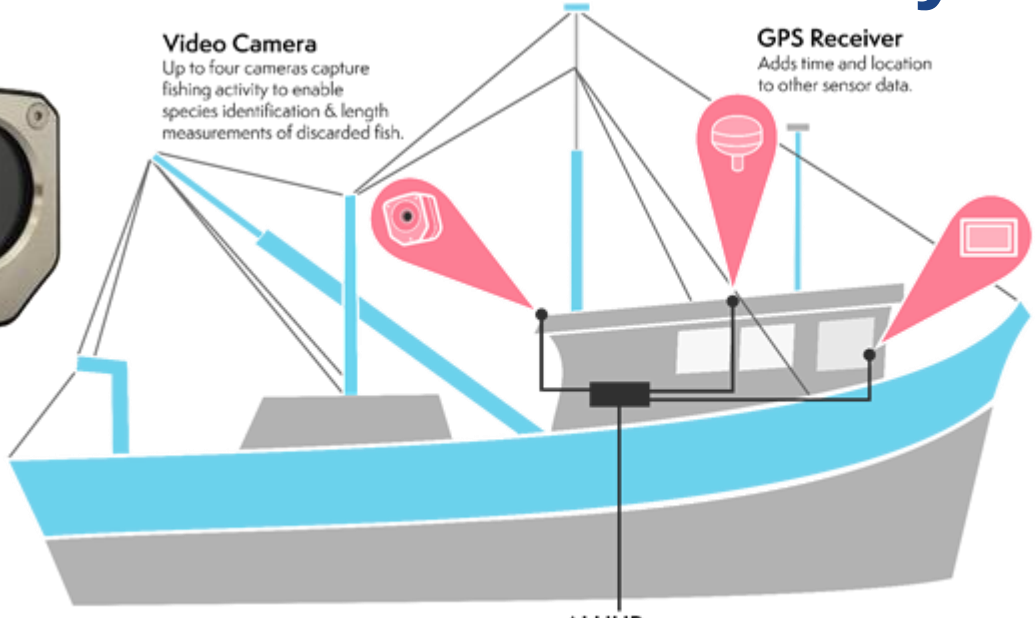
Local focus. Global impact.

Teem Fish

- Canadian based Electronic Monitoring specialists
- Offices in Canada, US, NZ and EU
- World class hardware designed and manufactured specifically for fishing vessels
- Designed to allow the fisher to just fish
- Cloud based software with ability to incorporate AI and ML.
- Drivers of change, working closely with fishing communities to ensure positive outcomes for the whole community.

teem.fish
MONITORING
Local focus. Global impact.

The Teem Fish On Vessel System



Video Camera
Up to four cameras capture fishing activity to enable species identification & length measurements of discarded fish.

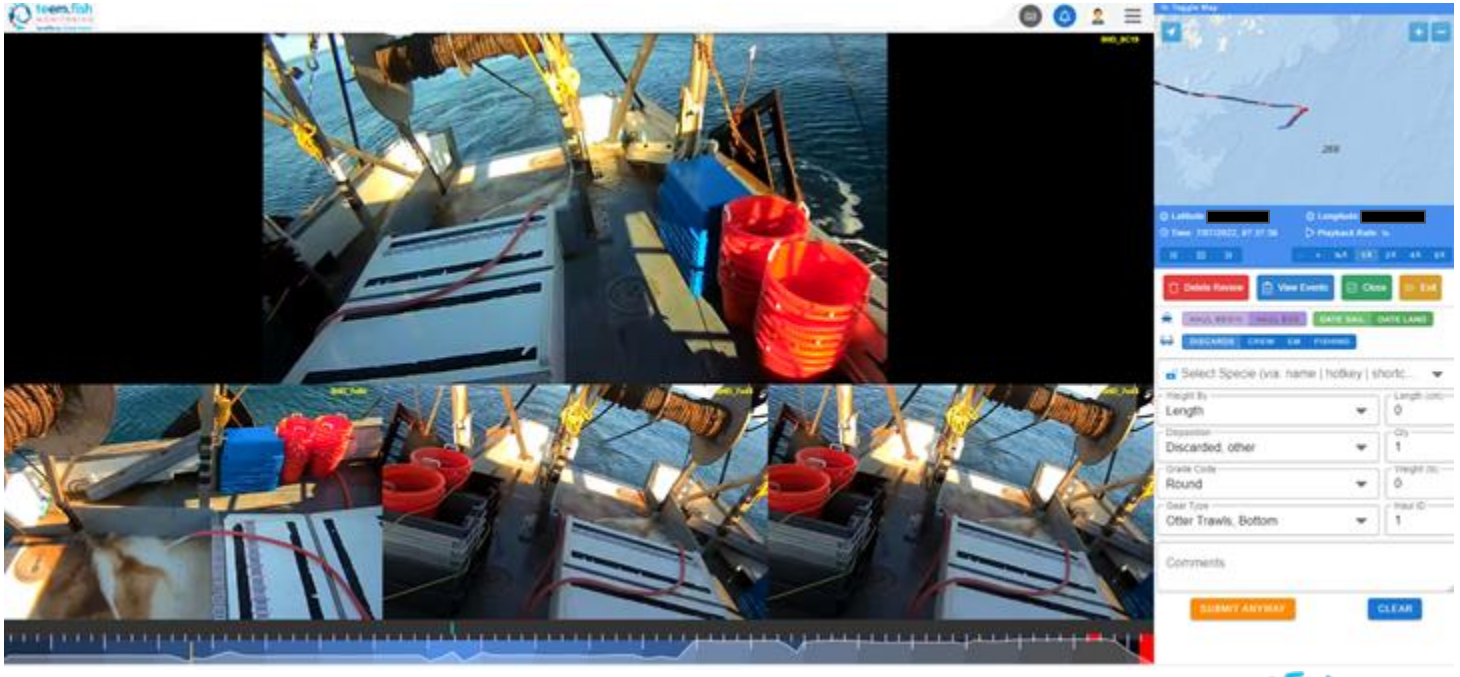
GPS Receiver
Adds time and location to other sensor data.

Tablet or Smartphone
Wheelhouse display allows vessel operator to view system status and see camera feeds.

AI HUB
Central control box with internal & removable storage devices.

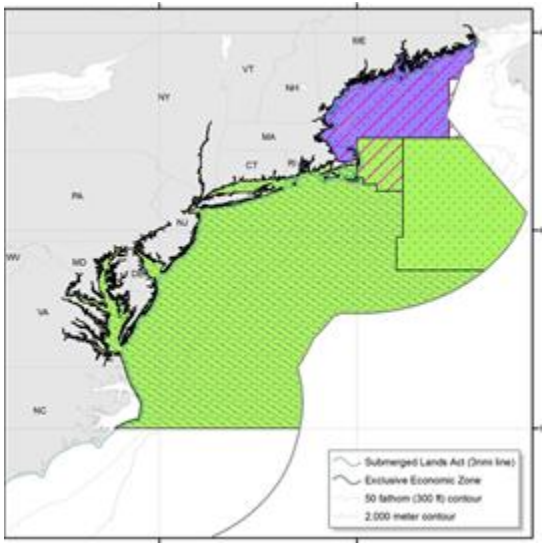
teem.fish
MONITORING
Local focus. Global impact.

Software Solution



teem.fish MONITORING
Local focus. Global impact.

Teem Fish Managed EM Programmes



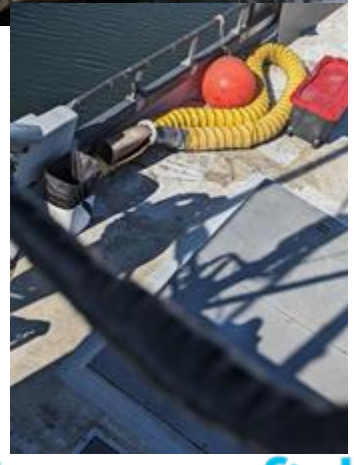
Self Managed EM Programmes

PortablEM

For Flexible EM Solutions

Lessons Learnt

- Being flexible to meet your customer and their communities needs is essential.
- Purpose built cameras with 5+ year lifespan are more cost effective in the long run, saving money on replacements, technicians, shipping and non fishing time
- It is 100% possible for small nations to monitor their own fisheries independently in a cost effective manner
  - There will be bumps in the road and it may not work 100% when first powered on
  - To achieve this both parties need to work together cooperatively for the first period to get the programme operational.
- Tier 2 and 3 Support can be done remotely with no issues with the right software stacks in place.



teem.fish
MONITORING
Local focus. Global impact.

teem.fish
MONITORING
Local focus. Global impact.
THANK YOU

Innovative Solutions

Integrated Monitoring

Integrated Monitoring

TECHNOLOGY INTEGRATION FOR FISHERY-DEPENDENT DATA :

Iain Hayes

© 2023 Integrated Monitoring, Inc. and other contributors. All Rights Reserved.

Integrated Monitoring has an install base of around 600 vessels in over 10 countries with over 1200 under contract --including the entire 300 vessel domestic fishing industry of New Zealand.

Introduction

Integrated Monitoring is a Boston-based maritime technology provider delivering artificial intelligence (AI) enhanced video surveillance solutions to the fisheries and energy sectors. Our services reduce costs and improve the efficiency of compliance with supply-chain, labor, and regulatory reporting obligations.

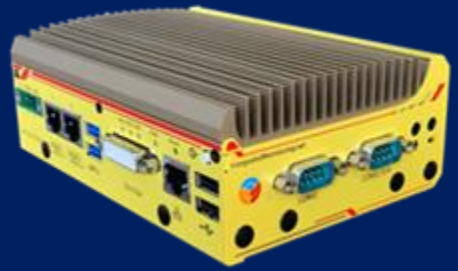
Our management team has experience in delivering large-scale marine projects; including rollouts of several national Vessel Monitoring systems (VMS) and the Long-range Identification & Tracking System (LRIT). Since 2020 we have focused on Wireless Electronic Video Monitoring, with a particular emphasis on the use of machine vision to reduce data transfer, storage and video review costs.

IM holds an extensive series of regulatory approvals – including NOAA USA, New Zealand, Chile, WCPFC (SPC), IOTC (Maldives), and the EU (Denmark). This allows us to meet both operator and regulatory requirements with a single onboard installation.

Controlled, audited access is provided through our market-leading surveillance platform, **Monitor**. Monitor supports automated and semi-automated video review for compliance with seafood sustainability (e.g. MSC), labor monitoring, and regulatory review of video. Data access and retention is based on a flexible security architecture.

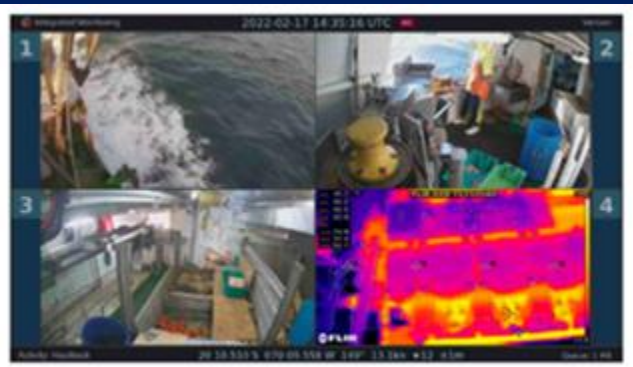
Wireless Remote Electronic Monitoring (REM) Hardware Components

Starlink Satellite Antenna



Yellowfin Secure Server with edgeAI

IM@Sea
Crew WiFi Router



Onboard Waterproof Display

IUU - there are problems with the U's

"The integrity of the fisheries management system really is based on the integrity of the logbooks. So if what the fishers are reporting is not what's happening on the water then that messes with the integrity of the entire fisheries system. "

- Studies have indicated Logbook entries (earlier CDS and electronic CDS / CDT approaches) lack data accuracy and are a significant factor in both unreported and under reporting of catch , ETP interactions and Discards at Sea
- Significant percentages of small scale Fishing operations have inadequate data management to validate sustainable resource management
- Who audits the Logbooks and e-catch reports, and how ?
- Traceability requires timely CTE reporting - REM provides a tool

Wireless REM Technology enables change

“Changes in wireless data network performance, Edge Compute, Cloud hosting and Ai + Machine Learning / Machine Vision can cost effectively improve data management and access fully enabled electronic and digital approaches .“

- Adopting Internet Standards and Data Security standards
- lower costs, higher data and data throughput rates
- 4/5G Wireless is ~ 0.50 USD / Gigabyte
- Satellite High Throughput (HTS) ~ 1-2.00 USD / Gigabyte
- Adopting Edge Compute for Ai and wireless network data ingress optimization and sensor integration (Cameras, IoT Sensors)
- Adopting Cloud Compute is essential to enable Ai and remote management access

What is driving traceability adoption

- Regulated Markets for Seafood and Aquaculture imports

- US Regulations FSMA On 20 January 2026, new rules linked to FSMA Section 204 will come into effect, and the seafood industry – from the top to the bottom of the supply chain – will need to be ready for it, according to trade experts.
- Section 204(d) of the FDA Food Safety Modernization Act (FSMA)

- At the core of this rule is a requirement that persons subject to the rule who manufacture, process, pack, or hold foods on the FTL, maintain records containing **Key Data Elements (KDEs)** associated with specific **Critical Tracking Events (CTEs)**; and provide information to the FDA within 24 hours or within some reasonable time to which the FDA has agreed.

Adopting Standards

- GDST Traceability Standard
- GS1
- GDST / GS1 - In June of 2023, the Standard was updated to GDST 1.2. Version GDST 1.2 transitions from XML to JSON-LD as the supported data format, which is more commonly used in the software development community. This update puts the standard in line with the recent update of the GS1 EPCIS data standard. GS1 is the global, neutral non-profit standards organization which provides the common language at the core of the GDST Standard.
- FAO Species Codes
- FAO HS Harmonized System Nomenclature 2022 Second edition
- ICES International Council for the Exploration of the Sea
- ICES Working Group on Technology Integration for Fishery-Dependent Data (WGTIFD 2022)
- Adopting ISO 22311: 2012 for Enhanced Remote Electronic Monitoring (REM) Systems in Fisheries

Adopting Terminology

- **Fishery-independent data** – refers to information collected independently from commercial or recreational fishing activities, following a specific sampling or statistical experimental design e.g. at-sea surveys.
- **Human-Labelled Data -** Data with labels (annotations) created by humans that can also be used for the purpose of training and/or testing AI models. For the purposes of AI, this refers to observed data and is often treated as the ground truth data.
- **Machine-Labelled Data -** Data with labels (annotations) that has been enriched by AI models and/or algorithm predictions. For example: an image of fish processed by software that automatically adds predicted length and species of those fish.
- **Fully-documented fisheries -** The concept of a fishery with full transparency and documentation of every catch, usually by applying REM and sometimes includes traceability from catch to consumption. It is often used to describe any EM program for marketing purposes

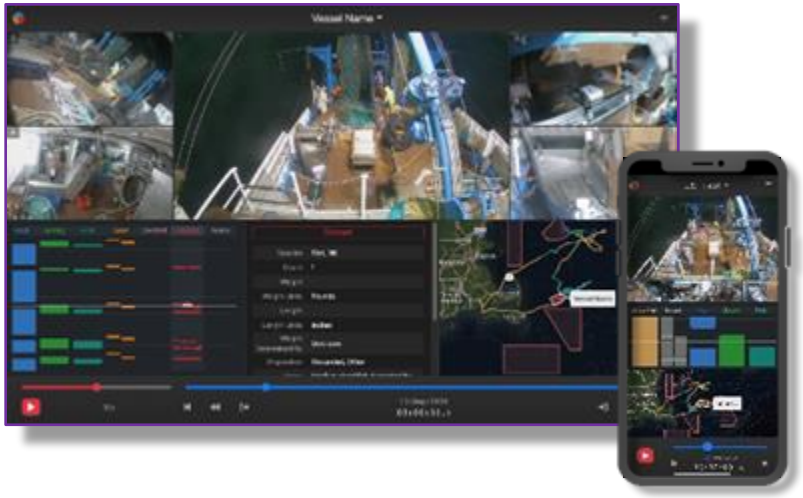
Case Study: New Zealand

- ✓ 300 fishing vessels (8 fisheries)
- ✓ Compliant Solution—Integrated Logbooks, Full Disk Encryption, Secure-by-Design
- ✓ Spark Group Capability
- ✓ Partner for success
- ✓ Wireless Video Transfer/ Cloud Native Video Review
- ✓ Powerful AI Eliminates Gear Sensors
- ✓ Optimised footage Review
- ✓ Simplicity.

Ministry for Primary Industries
Manatū Ahu Matua

Spark Group

Technology Partners



REM and FSMA – A Reality Check

- REM becomes a cost effective tool to annotate and audit e-catch reports and provide a JSON API compliant with the GDST standard
- Edge Ai can automate and augment e-catch reporting
- REM is key in the development of fully documented fisheries
- REM is key the timeliness of reporting of CTEs across the seafood supply chain, Traceability will be required across the entire harvest to processor
- REM SLA’s can provide CTE reports <24 Hrs

USAID
FROM THE AMERICAN PEOPLE

Innovative Solutions

Cawil.AI

CAWIL.ai

TrACE.AI

SEAFOOD TRACEABILITY & SUPPLY CHAIN

We seek to elevate small scale fishing communities via AI applications thru **TrACE.AI** system

TRACE.AI

Food security is a modern need, and yet also a modern problem ...

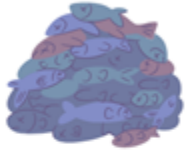
The seafood industry remains a major component of the global food supply chain

Food traceability remains as ambiguous, confusing, and challenging as keeping *sustainability*

CAWIL.ai

TRACE.AI

Threats in the seafood supply chain



70 % is already overfished grounds

Average of US$68.5B in loss due to IUU fishing

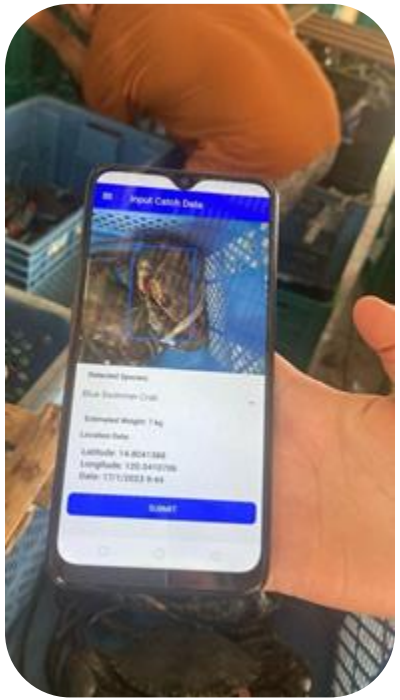
Yet ever-increasing, 50 % of protein diet is demanded from seafood

Traceability technology solutions remain costly for fishermen trapping them between pros and cons

CAWIL.ai

Our Solution

How We Can Help



TRACE.AI

An automated fish catch documentation and traceability platform

Pilot tested the app with WWF Tuna Sustainability Program

Enhancement & Market Validation funded by **DOST-PCIEERD Startup Grant** 2021-2022

AI Species Identification

Copyright © 2023 Cawil Artificial Intelligence.

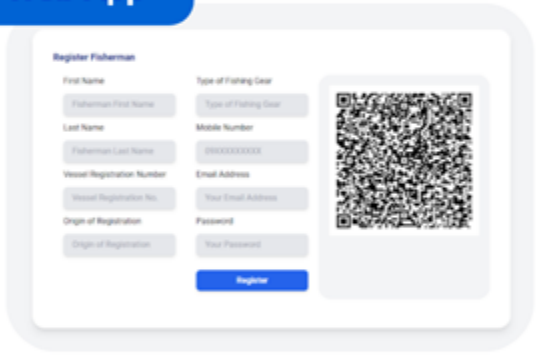
TRACE.AI

DOST

CAWIL.ai

Seafood Catch Automated Data Documentation using an AI-enabled Cross-Platform System

Web App



Web App stores Fisherman Data and generates **QR Code for Fishermen Login**

Mobile App

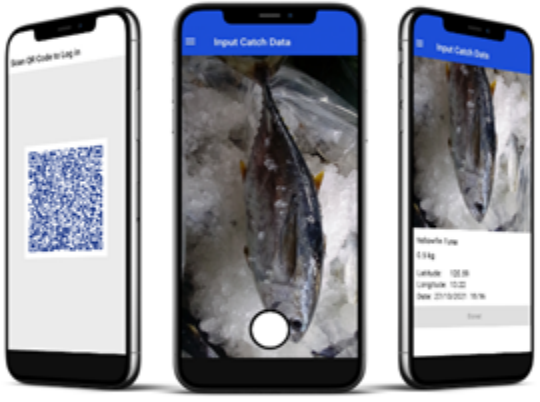
AI Enabled

Steps:

1. Log in
2. Take Photo
3. Upload Catch Image and Info

Automated Data Input:

Species
Location
Estimated Weight
(for single fish image)
Timestamp

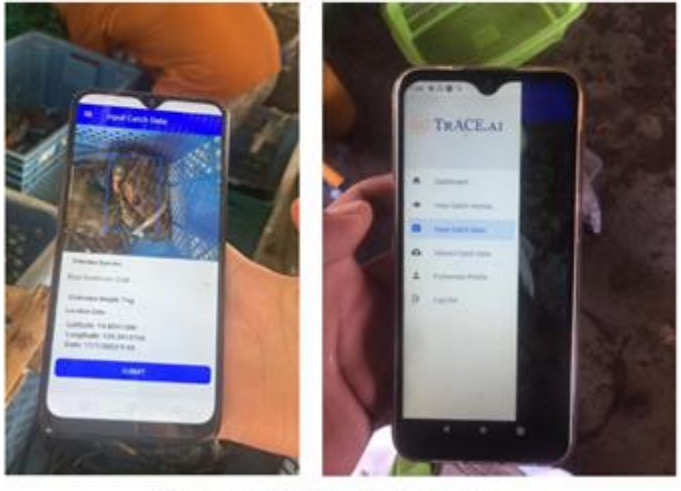


Species Detection (as of May 2023)

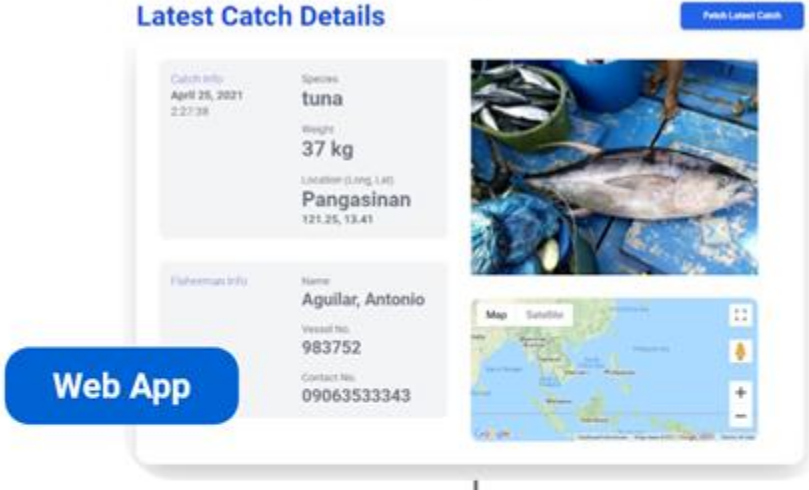
Yellowfin tuna
Blue swimming crab
Skipjack
Grouper

Real-Time Location Monitoring

Stakeholders can view the
catch location and data
via the Web App



Actual Mobile App Usage



Check Points

- Fishermen
- Buying Station Checker
- Buying Station Personnel
- Processor
- Delivery
- Processing Plants
- Off-loading

TRACE.AI

Be a Distributor | Be a Exporter | Book a Meeting

Trace your seafood from catch to plate

Start your journey in helping our fishermen go to market sustainably. Register for free.

Enter your company email here. Sign Up

CAWIL.ai

Outcomes

Data for decision-making

build a data-driven culture for sustainability by harnessing relevant data

Access to hardware and software

for better understanding of data management

Incentivise fishers

for fishers and fisherfolks association through credit scoring

TrACE.AI

Milestones

MOU with Bataan Province

to use TrACE.AI system for their Seafood Traceability

TrACE.AI is currently being

used in 8 coastal municipalities of Bataan

Trained 26 Fisheries Tech

and 420 registered fishermen from Bataan Province & Occ. Mindoro

SAFET
SEAFOOD AND FISHERIES EMERGING TECHNOLOGIES

Technology Provider Listing

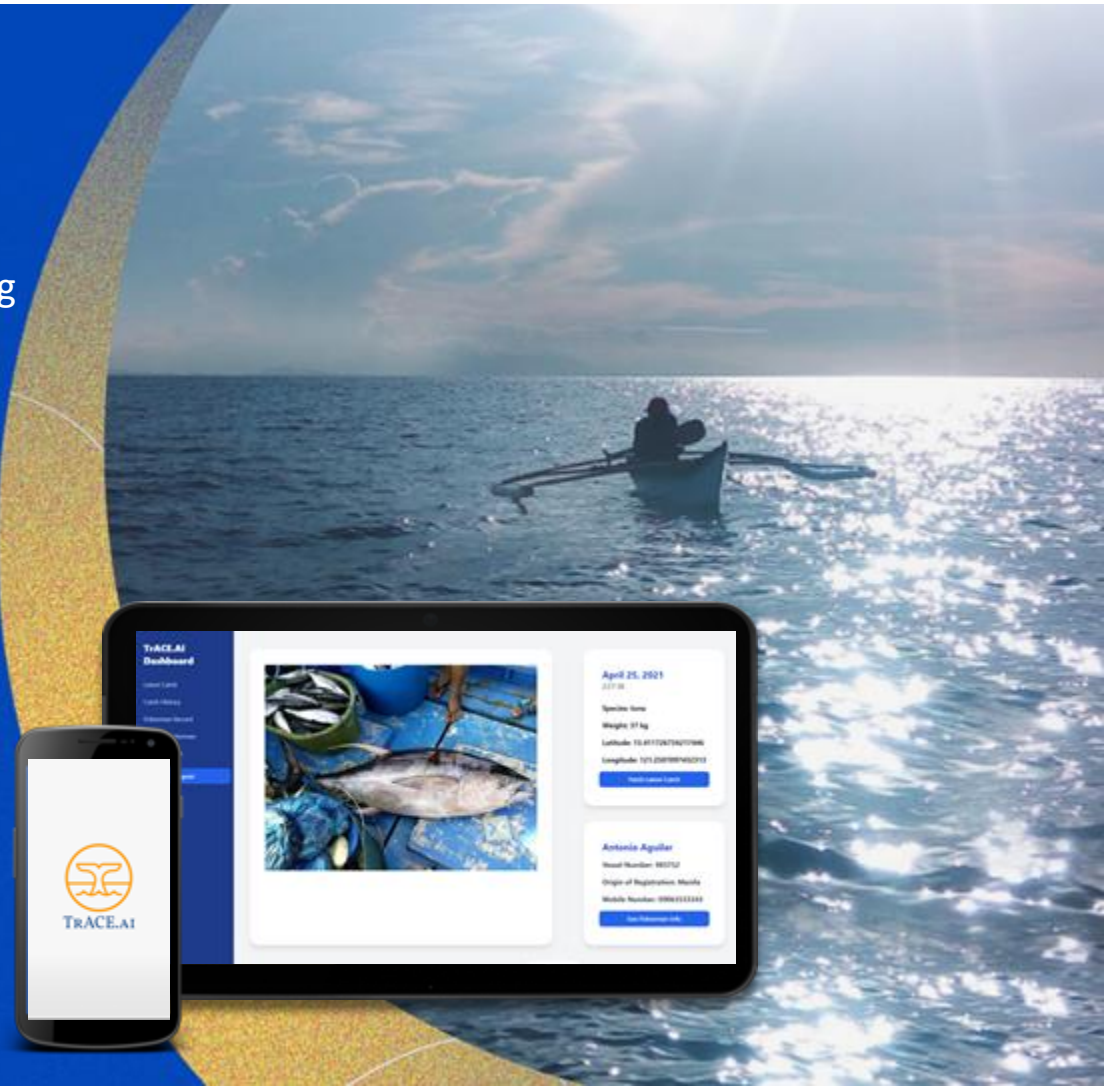
DOST

SAFET

CAWIL.ai

Next Steps

- Pilot the integration to Vessel Monitoring Devices (VMS) for Small Scale Fisheries
- Enhancement of AI capabilities to align with the integration to edge devices
- Establish data centers for training, data management and to normalize digital transformation in the fisheries sector



Digital Directory

https://cawilai.co/

AiCawil AiCawil hi.info@cawilai.co

CAWIL.ai

Innovative Solutions

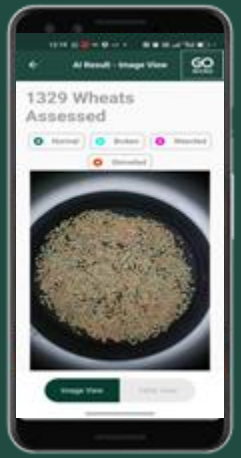
GoMicro

Dr.Sivam Krish

CEO GoMicro Ltd.

AI can assess anything assessed by eye

Grain Quality



Fruits/Veg

Spices

Tea/Coffee

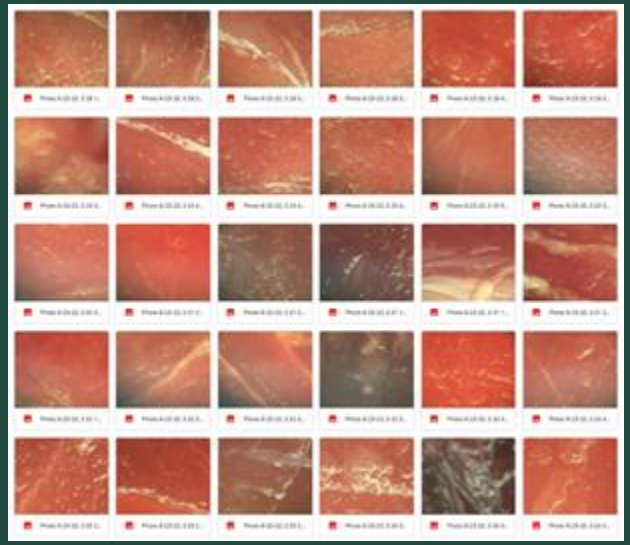
Phones are powerful AI happens in the cloud

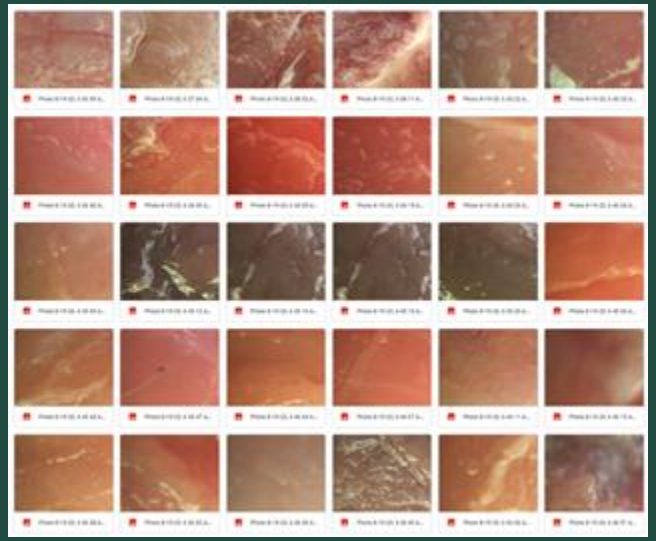
AI can Connect the dots…….

No two human inspectors agree 100% on the quality

Freshness I Grading

How is AI Trained ?





Sri Lanka

National Aquatic Research and Development Agency of Sri Lanka

96%

86%

Skipjack Tuna

Sri Lanka

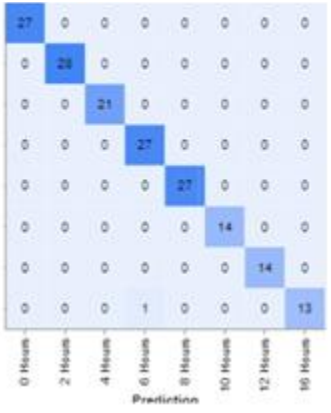
Keels Supermarket Chain

99%

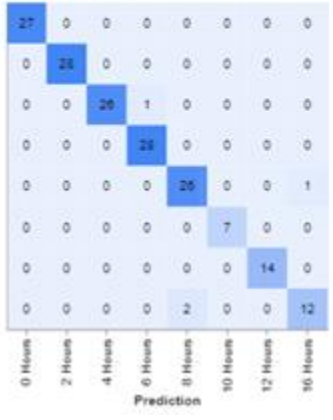
Yellowfin Tuna

India

99%



98%

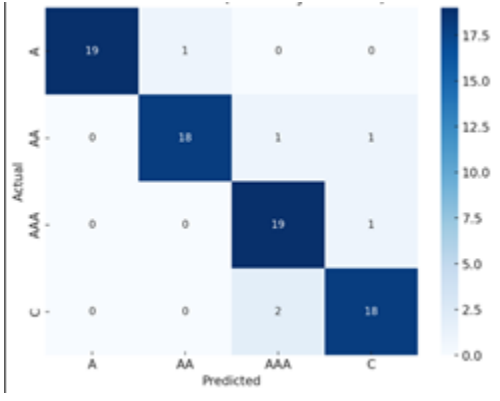


Sear Fish
Spanish Maceral

Indonesia : Ambon

Maritime and Marine Science Center of Excellence, Pattimura University Indonesia

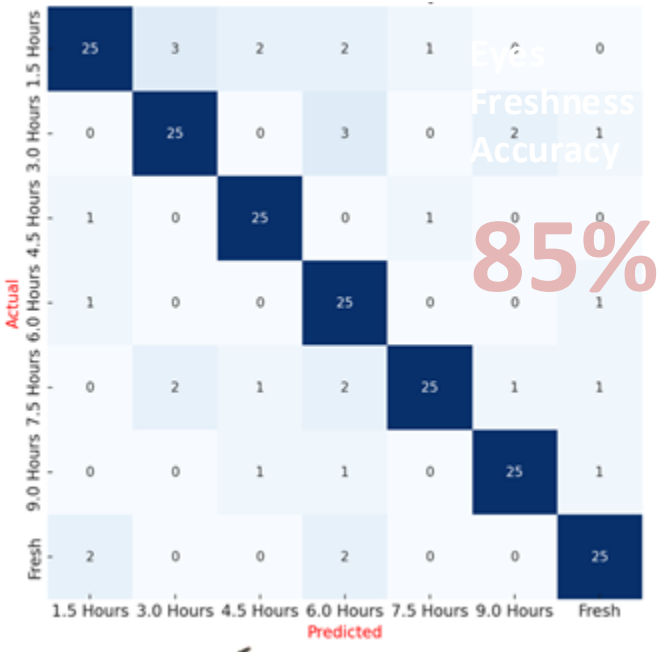
92%



Researcher Prof. Gino Limon

Big Eye Tuna

Indonesia: AP2Hi



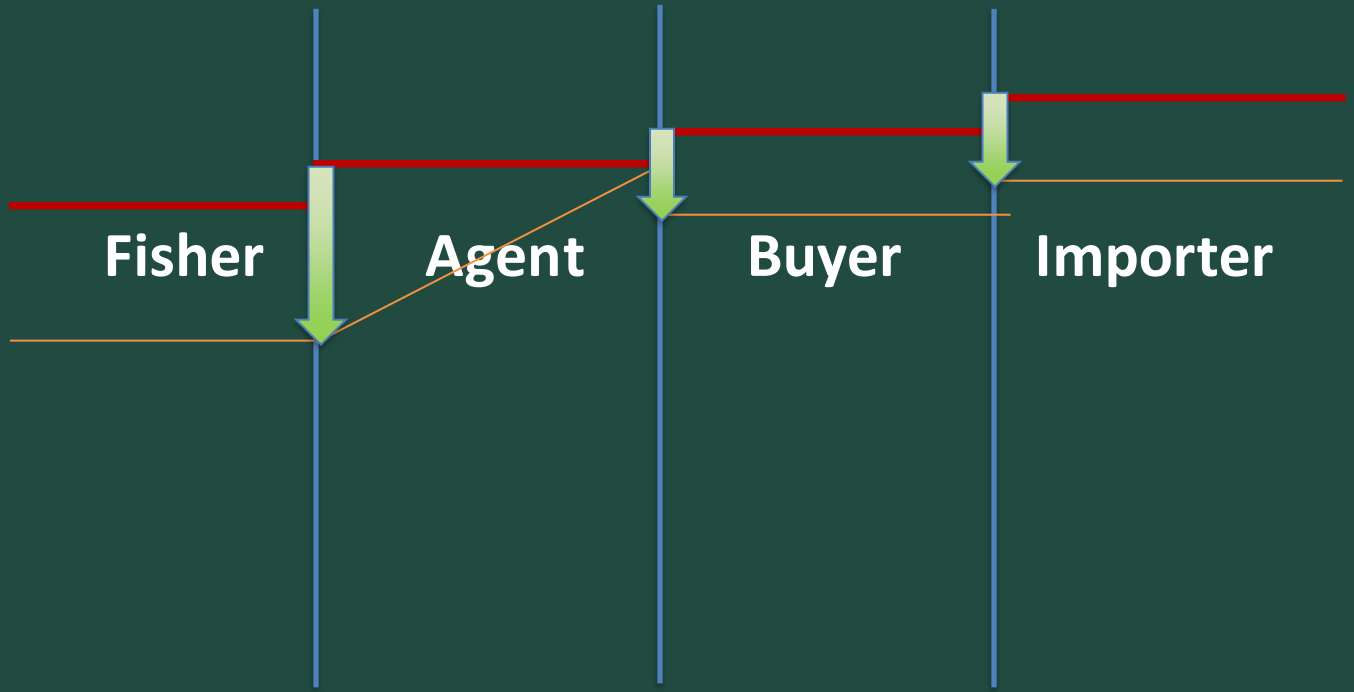
Tongol

How fishers benefit

- Increased Incomes: higher earnings through fair compensation.
- Empowerment: Fishers in remote areas can grade their catch.
- Segregation: Better quality/price market match

Good Fish? | Bad Fish?

Why AI is bad for buyers



AI Assessment will have zero disputes

How buyers benefit

- Improved Product Quality: Better grading enhanced safety and quality.
- Supply Chain Efficiency: Decreased disputes and improved trust between fishers and buyers.
- Reduced Waste: Accurate grading minimizes spoilage and waste.
- Wider Sourcing

How eco-system benefit

- Profitability: Benefits for supply chain actors, including reduced waste and improved profitability.
- Sustainability: Optimizing post-harvest processes and reducing environmental impact.
- Fair pricing and sustainable fisheries can obtain better prices in export markets

Thank You

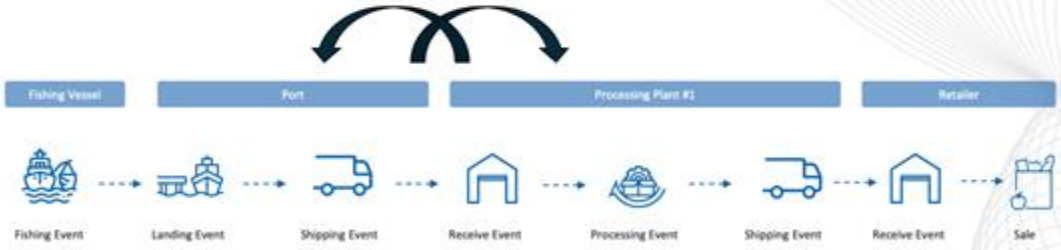
Dr.Sivam Krish
sivam@gomicro.co

USAID
FROM THE AMERICAN PEOPLE

Interoperability

Key challenges

Lack of data is not the problem; the key challenge is how we effectively move data on critical events through the supply chain.



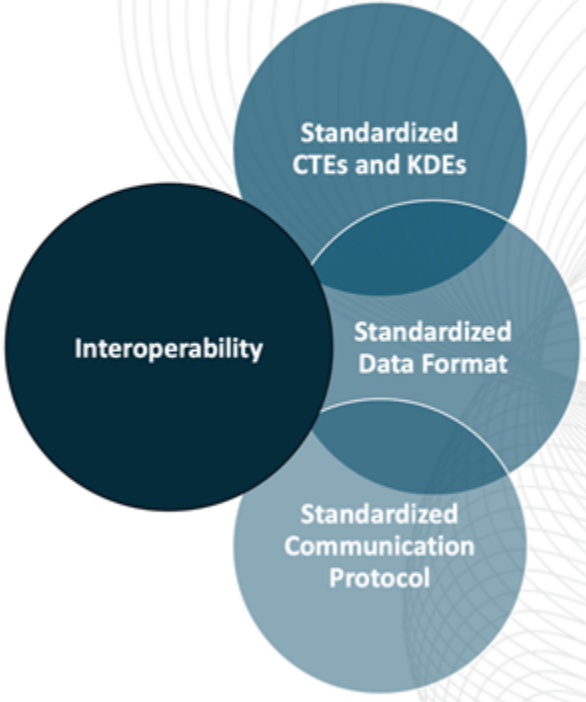
A shared Industry vision on traceability data exchange through cross sector collaboration is key.

Source: The Global Dialogue on Seafood Traceability

Interoperability

With a common approach to data collection, formatting, and exchange, technology solution providers can design systems that interact without the need for customized integration between them.

This allows companies to choose the system that makes business sense for them without worrying whether their choice will be compatible with systems used by suppliers, customers, or governments.



Source: The Global Dialogue on Seafood Traceability

Source: The Global Dialogue on Seafood Traceability

Artificial Intelligence (AI) Emerging Solutions in Fisheries

- Data collection through image recognition:
  - Species recognition, weight and size estimation
  - Quantity counting and estimation
  - Quality grading and freshness
  - Fair labor / force labor prevention (working hours, abuse, safety)
  - E-observer / port inspection (loading and unloading, crew manifest)
  - Postmortem video analysis (by catch, illegal activities, port activities)
  - Vessel identification
  - Analyzing satellite imagery and predictive analytics to detect IUU fishing
- Better human interface design - multi language chat bot (text and voice) LLM for knowledge transfer (i.e post harvest, emergency advice)
- Advance analysis from large set of data to do reveal trends, for more effective management plans and improve policy making
- Assist MCS in more effective operation (risk based inspection)
- Policy Formulation and Review - Regulatory Impact Analysis (RIA)

USAID
FROM THE AMERICAN PEOPLE

How to Effectively engage the **Private Sector** in Implementing E-CDT Systems from Pilot to Scale

Effectively Engage the Private Sector in Implementing E-CDT Systems From Pilot to Scale

Empowering a First Movers Group

First Movers, a community of the willing that consists of representatives from government, private sector, NGOs, and fishery experts who are committed to driving and promoting E-CDT systems

Effectively Engage the Private Sector in Implementing E-CDT Systems From Pilot to Scale

Engage the First Movers early: especially in the ideation and design process

Effectively Engage the Private Sector in Implementing E-CDT Systems From Pilot to Scale

Engage the First Movers early: especially in the ideation and design process

Effectively Engage the Private Sector in Implementing E-CDT Systems From Pilot to Scale

Engage the First Movers early: during the development, prototyping and testing

Effectively Engage the Private Sector in Implementing E-CDT Systems From Pilot to Scale

Engage the First Movers early: during the testing and implementation

Effectively Engage the Private Sector in Implementing E-CDT Systems From Pilot to Scale

Policy Advocacy (review and formulation)

First Movers concertedly conduct policy advocacies to support the scaling of E-CDT system.

- For businesses, the presence of a **consistent** enabling policy is **paramount**.
- Strong and inclusive policy framework provides a stable and predictable environment that supports business operations and fosters growth.

Effectively Engage the Private Sector in Implementing E-CDT Systems From Pilot to Scale

Study and share the **cost and benefit** of implementing system beyond the First Movers

- Create opportunities
- Improve management effectiveness
- Reduce cost of doing business

Effectively Engage the Private Sector in Implementing E-CDT Systems From Pilot to Scale

Study and share the **cost and benefit** of implementing system beyond the First Movers

ROI

1. Fuel and supply savings of approximately 10 percent and 2 percent respectively based on the shorter trips due to better navigation as a result of increased oversight of captains' at-sea operations.
2. Approximate 2 percent increase in catch quality due to coordinated efforts and shorter trips.
3. Labor savings associated with communication and administrative efficiencies of approximately IDR 840,000 (US $60) per month (i.e. radio operator and port-in/landing administrative staff can be reassigned within the company).
4. Increased ease tracking inventories and operational process flow.
5. Reduced risk of tax non-compliance penalties due to quantitative improvements resulting from data that is more accurate, available quickly, and readily transferable via electronic.
6. Improved intelligence and knowledge with regards to business and operations management.
7. Increased compliance with regulatory and market requirements, including SIMP, EU CC, and Marine Stewardship Council (MSC) certification

For more information

Arlene Nietes Satapornvanit
Chief of Party SuFiA TS
arlene.satapornvanit@tetratech.com

Farid Maruf
faridmaruf21@gmail.com

USAID
FROM THE AMERICAN PEOPLE