Regional Guidelines on Traceability System for Aquaculture Products in the Asean Region

Post-Harvest Technology Department
Agri-Food and Veterinary Authority of Singapore

Marine Fisheries Research Department
SouthEast Asian Fisheries Development Center

REGIONAL GUIDELINES ON TRACEABILITY SYSTEM FOR AQUACULTURE PRODUCTS IN THE ASEAN REGION

Japanese Trust Fund V:
Traceability System For Aquaculture Products
In The ASEAN Region

Organised by : Marine Fisheries Research Department (MFRD)
Programmes
Southeast Asian Fisheries Development Center
(SEAFDEC)

In collaboration with: The Government of Japan

SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER

The Southeast Asian Fisheries Development Center (SEAFDEC) is a technical organization devoted to the accelerated development of fisheries in the region. The member countries of SEAFDEC are Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. SEAFDEC has four departments, namely, the Marine Fisheries Research Department (MFRD) Programmes in Singapore, the Training Department (TD) in Thailand, the Aquaculture Department (AQD) in Philippines and the Marine Fishery Resources Development and Management Development (MFRDMD) in Malaysia.

Southeast Asian Fisheries Development Center
Marine Fisheries Research Department Programmes
2 Perahu Road
Singapore 718915

ISBN 978-981-11-2613-0

REGIONAL GUIDELINES ON TRACEABILITY SYSTEM FOR AQUACULTURE PRODUCTS IN THE ASEAN REGION

Content

I. Background

The Codex Alimentarius Commission (2004) defines traceability or product tracing as "The ability to follow the movement of a food through specified stage(s) of production, processing and distribution". In an increasingly complex food system, traceability has become the major tool to deal with issues/problems associated with food safety and quality assurance, thus allowing business to prevent risk and gain consumer trust.

The strengthened ties between countries across the globe encourage and facilitate bilateral trade. It is not uncommon for food to travel thousands of miles to reach a market. In trade, records of traceability are used as proof of compliance to food safety, bio-security and regulatory requirements; these records also ensure quality and other contractual requirements are fulfilled. Thus it is imperative that traceability of food products be strengthened to support food safety worldwide. In the situation such as a food recall, robust traceability systems allow efficient tracing of affected products throughout the supply chain.

ASEAN exports a significant volume of aquaculture fish and fish products annually to regional and global markets. As traceability becomes a trade requirement for eligibility to export aquaculture products to the major markets, such as Japan, European Union (EU) and United States of America (USA), establishing reliable traceability system is crucial for the sustainable development of aquaculture industry in ASEAN. To tap into the demand for aquaculture fish these markets, several large scale aquaculture companies in ASEAN are able to comply with the stringent export requirements. Governments and organizations around the world have also been developing different systems on seafood traceability e.g. TraceFish (EU), TraceShrimp (Thailand). Some countries in the ASEAN region which are major seafood exporters, such as Thailand (shrimps) and Viet Nam (catfish), have begun implementing of traceability systems for their aquaculture products.

Beside stringent regulatory requirement, the greatest pressure for businesses to implement traceability system for aquaculture products has been coming from the general public. A new generation of educated consumers with higher level of awareness drives a growing market demand for food safety, security and sustainability for aquaculture products. Consumers are getting more and more cautious over what they eat – whether the food comes from a safe and sustainable source, and whether production, transportation, and storage conditions can ensure food safety and quality.

In view of these developments, the Southeast Asian Fisheries Development Center (SEAFDEC), under its Marine Fisheries Research Department (MFRD) Programmes, has initiated and implemented a project on traceability for aquaculture products in the ASEAN region. The project is in line with the ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 which has been endorsed at the ASEAN-SEAFDEC Conference 2011 and with the SEAFDEC Program Thrust II: Enhancing Capacity & Competitiveness to Facilitate International and Intra-regional Trade. The goal of the project is to enhance the competitiveness of the ASEAN's aquaculture products through the implementation of traceability system in the aquaculture production and supply chain.

The expected outcomes of the project are envisaged to be the establishment/promotion of traceability programmes for aquaculture products in the ASEAN member countries and enhanced capability and knowledge on the development and implementation of traceability systems for aquaculture products in the member countries. A major deliverable of the project is this Regional Guidelines on Traceability System for Aquaculture Products in the ASEAN region which has been developed in consultation with the ASEAN-SEAFDEC Member Countries.

II. Scope

Traceability is a component of a food safety management system. Traceability in the aquaculture supply chain aims to ensure the safety and quality of aquatic organisms and, to verify that they are farmed in compliance with national or international management requirements or to meet national security and public safety objectives. In order to facilitate trade with specific countries such as the United States of America (USA), the European Union (EU), as well as Japan, traceability has also become a vital tool and requirement for necessary market penetration.

Traceability implementation can be mandatory or voluntary depending on the governmental or private sector initiatives or obligations. Nonetheless, whether or not it is a regulatory requirement, traceability is now a common feature in international trade of fish and fish products.

Most of the ASEAN member countries stipulate the pre-requisites of traceability application in their aquaculture industry. National standards, circular, laws and regulations for traceability are among national programmes stipulated by most of the ASEAN member countries. According to the FAO Expert Panel Review 5.2 on "Servicing the aquaculture sector: role of state and private sectors", to encourage traceability application/ implementation, government could provide training and promote capability building on traceability requirements and system. Other roles of government include provision of infrastructure facilities and financial incentives to enhance implementation of traceability system to improve safety and productivity.

Government can also involve by regulating the aquaculture industry on areas such as farming, by promoting or imposing the adoption of best practices e.g. Good Aquaculture Practice (GAP). For manufacturing of aquaculture products, food safety requirement, such as, Hazard Analysis Critical Control Point (HACCP) is commonly required. Relevant documents, namely, Movement Document (MD) used in the aquaculture supply chain for traceability management can be regulated.

On the other hand, private sector of aquaculture industry should comply with regulatory provisions to support governmental initiatives and programmes and to ensure product traceability. They need to ensure that proper information and records pertaining to the various stakeholders in the aquaculture supply chain provided to the government are accurate documented and maintained throughout the supply chain.

This Regional Guidelines is drafted based on consensus of and in accordance to the collective inputs and efforts from all participating ASEAN-SEAFDEC member countries namely, Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam.

The Regional Guideline consists of a series of introductory review of the importance of traceability in the aquaculture supply chain as well as the fundamental principles behind traceability that link to the adoption of traceability systems in aquaculture supply chain in the context of the ASEAN region. This document also includes a generic supply chain of aquaculture products. It highlights points where traceability information is critical as well as the responsibilities of individual stakeholder to ensure that traceability along the supply chain is not broken.

The generic aquaculture supply chain has been developed from two rounds of consultations with the ASEAN Member Countries. It was subsequently drafted after two Regional On-site Training Workshops held in 2011 and 2013. During the workshops, the participating ASEAN member countries as well as invited traceability experts from the region were consulted and a consensus was reached on development of the generic supply chain of aquaculture products for fish and shrimp.

The critical components or requirements that need to be traced for each specific stakeholder in the generic supply chain were also deliberated upon. These were subsequently translated and incorporated into the Regional Guidelines to serve as a reference guide for ASEAN member countries for implementing traceability system. Member Countries have the prerogative to decide on the nature of the traceability system they would like to implement be it mandatory or voluntary, as well as the degree of regulation of the various stakeholders in the supply chain.

III. Acronyms, Terms and Definitions

Aquaculture

Aquaculture refers to the farming of aquatic organisms such as fish, molluscs, crustaceans, and echinoderms. This involves some forms of intervention in the rearing process to enhance production, such as regular stocking, feeding and protection from predators. Farming also implies individual or corporate ownership of or rights resulting from contractual arrangements to the stock being cultivated primarily for livelihood and business activities. In addition, aquatic organism harvested by an individual or corporation, that has owned them throughout their rearing period as a common property resource, with or without appropriate licenses, are considered as the harvest of fisheries.[1]

Aquaculture Production

Aquaculture production refers to the production (or culture) of aquatic organisms for consumption, for use as raw materials to process other products, or for trade. It also includes the production of aquatic organisms, such as fishes and hatchery output, which are quantified by numbers instead of weight. [2]

Aquaculture Workers

This term broadly refers to individuals employed to handle aquaculture-related work such as repairing ponds, floating fish farms and net cages, as well as feeding of aquatic animal and providing and maintaining water supply. However, it does not include individuals who are employed solely for aquaculture management including planning and accounting.[1]

Chemical Input

Chemical input refers to synthetic substances applied to ponds, coastal fish farms or hatcheries to alter the living environment of aquatic organisms in order to enhance growth of the cultured organisms. The growth enhancement can be achieved through increasing fertility, reducing or eliminating extraneous and unwanted organisms, promoting growth of beneficial organisms or preventing and managing diseases. These chemical input includes application of lime, inorganic fertilizers, pesticides, algicides, fungicides, bactericides and antibiotics, veterinary drugs, etc. [3]

Competent Authority

Officially designated national authority having the competence to enforce relevant national and international food safety regulations or control measures.

Downstream

This refers to looking backwards in the supply chain towards an earlier link. [4]

Feeds

Materials given to cultured aquatic animals for the purpose of nourishing them. Such materials could be wet, dry, live, natural and unprocessed biomass or formulated from a variety of ingredients. [5]

Good Manufacturing Practices (GMP)

Those procedures for a particular manufacturing operation which practitioners of and experts in that operation consider to be the best available using current knowledge. [6]

Hazard Analysis Critical Control Point (HACCP)

HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product. [7]

Internal Traceability

Internal traceability refers to the ability to keep track of what happens to a product, its ingredients and packaging within a company or production facility. [4]

External Traceability

External traceability refers to the ability to keep track of what happens to a product, its ingredients and packaging in the entire or part of a supply chain outside the company or production facility. [4]

International Standard Organisation (ISO)

ISO is the organization responsible for standardization of products quality in general, including standards for food quality.

Middlemen

The middlemen collect and buy aquaculture products from farm or fisherman and sell them to fishery processing plants or retailers at different stages along the supply chain. This system could be of multiple levels where there are some "middlemen" to other "middlemen".

Movement Document (MD)

MD is an obligatory document required by the competent authority for the issuance of health or other certificates (seed MD, fry MD, fish or shrimp MD). It records the details history of the aquatic organisms during cultivation.

Responsible Aquaculture

Responsible aquaculture encompasses (i) the use of appropriate and efficient production technologies and proper transformation processes to value add aquaculture products, and (ii) the application of appropriate commercial practices, including postharvest handling, processing and marketing, to provide consumers with good-quality products. [1]

Traceability

Traceability refers to the ability to follow the movement of a aquaculture product through specified stage(s) of production, processing and distribution (CODEX). It includes the ability to trace the history, application or location of an entity by means of recorded identification. [8]

Trade Unit (TU)

Trade units shall be identified by unique codes. There should be no other trade units that share the same number along the supply chain of the aquaculture products. Trade units can be identified based on information recorded along the supply chain when stakeholders bring in supplies of aquaculture products and trade their immediate products onwards.

Upstream

This refers to forward direction in distribution along the supply chain which would eventually reach the final consumer.[4]

[1] *Adapted in parts from: [Regional Guidelines for Responsible Fisheries in Southeast Asia: Responsible Aquaculture. Southeast Asian Fisheries Development Center, 1999, Page 5]*

[2] *Adapted in parts from: [Regional Guidelines for Responsible Fisheries in Southeast Asia Responsible Aquaculture. Southeast Asian Fisheries Development Center, 1999, Page 6]*

[3] *Adapted in parts from: [Regional Guidelines for Responsible Fisheries in Southeast Asia Responsible Aquaculture. Southeast Asian Fisheries Development Center, 1999, Page 8]*

[4] *[Traceability of Finfish Products- Specification on the Information to be Recorded in Farmed Finfish Distribution Chains. ISO 12877:2011, Switzerland: International Standards, 2013, Page 1]*

[5] *Adapted in parts from: [Petersen, Arni, and David Green. Seafood Traceability: A Practical Guide for the U.S. Industry. North Carolina: National Fisheries Institute, Inc and North Carolina Sea Grant, n.d., Page 11]*

[6] *Adapted in parts from: [FAO, Implementation of the International Plan of Action to Deter, Prevent and Eliminate Illgegal, Unreported and Unregulated Fishing, International Plan of Action- IUU, 2002, http://www.fao.org/docrep/005/y3536e/y3536e00.htm#Contents]*

[7] *[U.S. Food and Drug Administration, Hazard Analysis & Critical Control Points (HACCP), 07/05/2013, http://www.fda.gov/food/guidanceregulation/haccp/default.htm]*

[8] *[Traceability of Finfish Products- Specification on the Information to be Recorded in Farmed Finfish Distribution Chains. ISO 12877:2011, Switzerland: International Standard, 2013, Page 1].*

IV. Traceability Principles

Traceability is characteristically recognised by the requirement of all stakeholders along an aquaculture supply chain to be able to trace "one step before" and "one step after" each individual stage of aquaculture chain. In general, traceability is the ability to provide linkage of vital information across each stakeholder to ensure that the aquaculture product is able to be traced effectively. Internal traceability involves sharing and linking of traceable data, such as information of ingredients or raw materials, at various stages of the supply chain of aquaculture products within a company. On the other hand, external traceability involves the sharing and linking of traceable data throughout the supply chain of aquaculture products, whereby the data traced is typically be transferred to the next stakeholder of the supply chain.

All traceable Trade Units (TU) throughout the aquaculture product supply chain would be uniquely identified by each stakeholder, this is known as *Unique identification*. TUs that move from one chain to another are commonly identified based on their batch or lot numbers. These batch or lot numbers should be verifiable whenever necessary.

Data recording and record maintenance are crucial to ensure transparency of information and to allow the tracking of movement of aquaculture products along the supply chain. All stakeholders involved in the value chain of aquaculture product are required to establish and maintain a robust record keeping system to ensure efficient tracking of data and information. These stakeholders, namely, hatcheries, feed millers, chemical suppliers, farmers, processors, distributors, middlemen, exporters and retailers need to ensure that the sufficient data or records are kept such that the previous sources and immediate recipients of aquaculture products could be identified.

V. Advantages of Traceability Implementation

By implementing traceability system which includes keeping proper records throughout the supply chain of aquaculture products, transparency of product information are guaranteed for all stakeholders. This allows greater sense of security to consumers who are at the receiving end of the supply chain. Reliable information and comprehensive documentation also allow timely information sharing with as well as prompt and effective intervention by relevant competent authorities should problems arise.

In times of massive aquaculture product recalls, traceability system implemented allows timely identification of batch affected or stakeholder involved along the supply chain. The traceability enables prompt verification of records. Through effective identification of root cause of food incidents, the impact can be minimised.

Implementation of traceability system in aquaculture industry enables efficient inventory management as well as improvement of product quality. Unique identification of aquaculture products accelerates logistic arrangements, improves storage requirements and facilitates communication/information sharing. A robust traceability system is effective for business to save cost and for quality assurance.

Traceability is now a trade requirement imposed by the United State of America, European Union and Japan for granting eligibility to export aquaculture products to these markets. Thus implementing traceability system in aquaculture industry could further strengthen the international trade of aquaculture products.

VI. Types of Traceability Systems

Traceability systems could be paper-or computer-based or a mixture of both.

Paper-based Traceability system

Paper-based traceability system has traditionally been practised by stakeholders along the supply chains of aquaculture products. This system is suitable and feasible for companies of smaller scale due to its low operational cost and ease of maintenance. Moreover as these companies deal on with limited products, such system is sufficient for their product tracing. However, paper-based traceability system requires more storage space for the archived documents and is inefficient (especially during product recalls). Manual retrieval of information through massive piles of stored and archived documents is time consuming, labour intensive and tedious.

In the context of ASEAN, aquaculture industries in most of the Member States adopt and practise paper-based traceability system. For example, Movement Document (MD) is commonly employed by ASEAN Member States. In Thailand, the Fry Movement Document (FMD) and MD, consist of critical details which the stakeholders need to record and maintain. Such information will then be shared with the next stakeholder in the supply chain.

The information found in the FMD is as follows:

- Reference number (province, day, month, year, farm code)
- Name of Hatchery/ Hatchery Owner
- ID card no./ Registration no./ Name
- Type of aquatic species
- Pond number and size
- Fry volume (tonnes and pieces/kg)
- Size of harvest
- Indication of whether the farm is certified Code of Conduct Standards (COC) or Good Aquaculture Practices (GAP)

For the FMD tracing from buyer to farmer, the information includes the following:

- ID card no./ Registration no./ Name
- Farmer's address
- Quantity of purchase
- Date of purchase

Usually, FMD will be followed by MD. A typical MD includes the following:

- FMD no.
- Production volume
- Farmers involved

Electronic and Computerised Traceability system

Bar-coding system

The bar coding system is the more common form of electronic traceability system applied along the supply chain of aquaculture products. The bar coding system normally is coupled with computerised systems. This form of traceability system is swift and efficient as information can be easily recorded in and retrieved from computerised database. This system is fast in information retrieval, a characteristic much needed for product recall. In addition, this system does not require much storage space, unlike the case of a paper-based traceability system.

Radio Frequency Identification (RFID) System

Radio Frequency Identification (RFID) systems is the emerging technology for electronic traceability system. Unlike bar codes adhered to product packaging that are exposed to the environment, RFID tags are normally embedded within the packaging of the product. The bar code labels on the packaging could be easily damaged causing inaccuracy in data capturing. Moreover, in a pallet full of products, individual scanning of barcode labels is time-consuming. On the other hand, a pallet full of products with embedded RFID tags could be read by an automated reader at one scan. With RFID, product identification is seemingly more efficient and precise. However, a drawback of RFID system is that it is relatively costly and may not be feasible for small-scale companies to adopt.

With growing export demands on efficiency and accuracy, a handful of ASEAN Member States are steadily moving towards the use of electronic and computerised traceability systems. The "TraceShrimp' system, which is used by the Thailand's shrimp aquaculture industry, is an example of such system. This system offers flexibility for tracking and maintenance of electronic record from various stakeholders along the supply chain of aquaculture products. The TraceShrimp system serves as a platform for sharing product information and links individual stakeholders through a secure and automated product tracking system as well as confidential online data exchanges within the Thailand's shrimp industry.

Comparison of Traceability Systems

In general, company size is the key factor that determines the type of traceability systems to be adopted. Some companies may have in place both paper-based and electronic/ computerised traceability systems, while some may only have one system.

Table 1: Comparison of Traceability Systems*

Types of traceability systems	Advantages	Disadvantages
Paper-based	• Based on existing quality assurance/ stock control documentation systems • Inexpensive to implement • Flexible in terms of the processing systems to which it can be applied • Data input is easy and precise	• Manually intensive • Reliant on correct procedural operations • Trace-back of information is time-consuming and difficult • Records cannot be easily reviewed
Electronic traceability system	• Automatic data input • Easy to link additional information, e.g. temperature record • Real-time availability of information • Generation of records and reports is fast and the format can be customised to suit particular situations • Transfer of information to other links in supply chain is simple	• Expensive equipment • Paper-based barcode labels are easily damaged under harsh condition of production • Use of RFID technology is limited, and reading rates are not yet 100%

*Adapted from Petersen, Arni, and David Green. *Seafood Traceability: A Practical Guide for the U.S. Industry*. North Carolina: National Fisheries Institute, Inc and North Carolina Sea Grant, n.d.

VII. Issues and Challenges

The status of traceability system implementation for aquaculture products differs among the participating ASEAN member countries. For countries that already have in place robust traceability system that permits them to export aquaculture products to European Union (EU) or the United States (US), they have established certain degree of legal framework as well as advanced computerised traceability systems to track the aquaculture products from farm to fork. On the other hand, member countries that are in the process of implementing the traceability system have been enhancing their capabilities by building up legal framework for traceability implementation and introducing traceability system to the industries through government support such as regulatory enforcements, education and training. Despite the progress made, to have wider implementation of traceability system for aquaculture products, the industry (especially small scale stakeholders) in ASEAN region are still facing the following issues and challenge:

Lack of resources

In the context of ASEAN, the supply chain of aquaculture products is known as a trade filled with individual small scale stakeholders (i.e. Hatcheries, Feed mill, Farmers, Middlemen, etc.). These stakeholders, under those bigger players, usually face challenges in maintaining their product quality. The lack of resources makes it difficult for them to maintain relevant records of their products.

Due to the small size and limited income of small scale stakeholders, their operations are often tightly run without the presence of spare manpower or funds. Record keeping, a key component of traceability system will result in the need for more operating processes. This inadvertently translates to the need to hire more manpower to fill up this new jobs related to establishing or maintaining the traceability system. Hiring of manpower requires funds which small scale stakeholders lack.

Lack of awareness

Another key factor that challenges the implementation of traceability system for aquaculture products in ASEAN is the lack of knowledge. The key stakeholders in the supply chain of aquaculture products are unaware about the benefits and advantages of having traceability system in their operation. Also some traditional stakeholders are averse to change or reluctant implement traceability system for their operations.

Complexity of supply chain

The supply chain of aquaculture products in ASEAN region is characterised by the presence of numerous small scale aquaculture farms with limited production capacity. This results in the need for central buying stations/collection centres or middlemen to collect and mix aquaculture produce from various small farms. In addition, some stakeholders such as middlemen may be averse to sharing information (e.g. source of their raw materials) as they consider such information as trade secrets.

The presence of diverse stakeholders at each stage of the supply chain including processing and the free trading amongst themselves, results in the mixing of raw materials and end products. The absence of cooperatives to manage these stakeholders accentuates the problem. This forms a complex supply chain framework that makes it more difficult to implement traceability system.

Legal framework

Some ASEAN Member States lack the necessary legal framework for enforcing of traceability in the aquaculture industry. Without the legal framework, various stakeholders lack the motivation and incentive to implement traceability system in their operation. For those who are keen, the lack of technical guidance and assistance hinder the successful implementation of traceability system. In addition, the format of documents to track and record details of aquaculture products has not been established, making it more difficult for the small stakeholder to adopt traceability system.

VIII. Recommendations

Resources

It is well known that adoption of technology is effective in increasing productivity. However, if stakeholders in the aquaculture product supply chain are lack of resources and/ or funding, paper-based traceability systems would suffice. Local competent authorities may encourage paper documentation by providing templates of records in local language for each stage of aquaculture supply chain (i.e. Hatcheries, Feed mill, Farmers, Middlemen, Buying Stations/Collection Centres, Processing Plants and Retailers).

Several stakeholders may also jointly purchase simple equipment or technology to assist them in data keeping (i.e. Barcode printer and reader). This will help reduce the cost of traceability implementation on individual stakeholder.

Awareness

Most of the small-scale aquaculture stakeholders may be unaware of the potential advantage on implementing traceability. At the same time, they may also be oblivious to the impending risks that they may face in times of a severe food incident. Thus it is imperative that relevant competent authorities to advocate the importance of traceability implementation to ensure safety and security of aquaculture products.

The knowledge and technology transfer can be accomplished through various means such as a series of road shows, stakeholder's forum, training courses or workshops. The approach should strategically cover each province and the message should be to reiterate the fundamentals of traceability and its importance to their business. Information, education campaign through flyers and other forms of reading materials written in local language is also an effective tool.

Complexity of supply chain

Aquaculture farmers should consider liaising with middlemen who are able to maintain records of their distributed products within the supply chain. In doing so, the supply chain becomes less complicated and easier to manage.

Government should consider registering and licensing middlemen. Training and dialogue sessions may be arranged to educate middlemen on proper record keeping and handling of aquaculture products. The importance of keeping track of aquaculture products "a step before" and "a step after" each stakeholder in the supply chain could be reiterated and emphasized.

Legal framework

To overcome this issue, the government may develop a legal framework completed with guidelines and models to aid the adoption of traceability by the various stakeholders. Under this legal framework, each of the stakeholders must be properly registered and licensed in order to partake in the trade within the aquaculture supply chain.

To support the enforcement of the new legal framework, it is important for government to build up its capabilities (e.g. establish a department to be in charge of ensure proper implementation, as well as conducting audits for traceability systems). In addition, it is also important to strengthen the national extension service system to provide sufficient guidance to the stakeholders.

IX. Generic Supply Chain for Aquaculture Products (fish and shrimp) in the ASEAN Region

This generic supply chain of the aquaculture products identifies the various stakeholders involved in the aquaculture production, distribution, trade and retail of aquaculture produce such as fish and shrimps. These are the stakeholders who should generate and hold the information necessary for traceability.

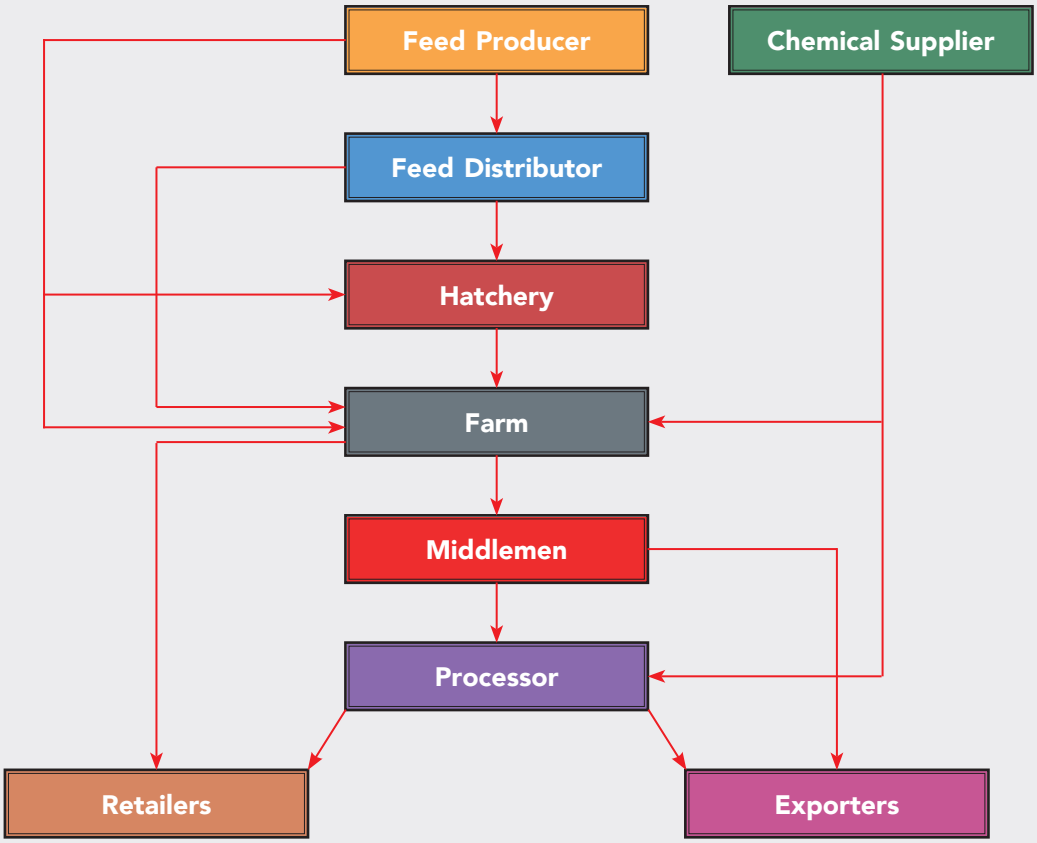

Figure 1: Generic Supply Chain for Aquaculture Products (fish and shrimp) in the ASEAN Region.

X. Regional Guidelines on Traceability System for Aquaculture Products in ASEAN region

Member states within the ASEAN region should establish/promote and maintain records, both individually and regionally through an integrated approach, that are sufficient to identify the immediate previous sources and immediate subsequent recipients of the aquaculture products. The documented information should be archived and kept for at least 2 years.

Stakeholder	Regional Guideline
Feed producer Member states should establish and maintain effective record-keeping practices as early as from the fish feed used. Regardless of the source of aquaculture products, be it locally reared in fish farms or imported from foreign sources, feed mill related information should be identifiable upon tracing. The feeds product traded should be identified as the TU.	1) Member states should compile and update all information pertaining to source feed mill, inclusive of name, address, contact number and regulatory certificate of the feed miller. 2) Member states should recommend that feed producers be responsible to maintain record covering relevant feed mill related information on the following: • Manufacturing and expiry dates • List of feed ingredients • Batch and lot number of products • Quantity of supply (Weight) • Feed types and its main composition • Registration certification of processing facility 3) Any other relevant or additional certifications from competent authority or regulatory body should be kept in place as well.

Stakeholder	Regional Guideline
Distributor Member states should adopt an integrated approach to the development, maintenance and updates of record keeping pertaining to the distributions and movement of aquaculture products related activities. Distributors are known to be responsible for the distribution of bulk sales or bulk auction, particularly with feeds involved as the TU from feed miller down the supply chain.	1) Member states should recommend all distributors to keep records of suppliers and buyers through invoices or receipts or equivalent, as well as the information regarding the names of the transporter's immediate previous source and immediate subsequent recipient, origin and destination points, date shipment received and date released, number of packages, description of freight, route of movement and transfer point(s) of shipment. 2) Member states should recommend that apart from the relevant information obtained during the midst of the distribution processes, any incoming source related information such as the following should also be recorded, established and maintained by distributors: • Registration number • Batch number of the source • Registration number of the source • Records of transportation of bulk auction • Movement Document (MD) • Distribution List

Stakeholder	Regional Guideline
Hatchery Member states should recognise the importance of hatcheries, where it involves the receiving of the seeds of aquaculture product and subsequent grow out into fish seedlings or fish fry as a new TU. This could range from a few thousand to several hundred thousand fishes being passed down the supply chain.	1) Member states should recommend that the hatcheries establish and maintain records on the following: • Origins of broodstock or seed • Hatchery registration number/ ID • Invoice number • Batch number • Health certificate from the source country's competent authority where the source hatchery is stationed • Movement Document (MD) • List of Buyers 2) Member states should recommend that the import of aquaculture fry should be from registered suppliers and not from unaccredited or unlicensed suppliers. This would include proper record-keeping by the hatcheries of the suppliers' information for traceability purposes.

Stakeholder	Regional Guideline
Chemical supplier Member states should establish and maintain information and records associated with materials used that are from external sources to the main domain of the supply chain. The identified TU could be the supply of the various chemical substances or supplements at the receiving end, i.e. the different stakeholders such as fish farms and fish processing plants.	1) Member states should establish appropriate mechanisms for monitoring of any drugs and chemicals used in aquaculture, based on the national list of banned drugs and chemicals that are specific to the member countries themselves, as well as the list of authorised drugs and chemicals permitted by each member country. 2) Member states should recommend that all drugs and chemical suppliers execute accurate record keeping for chemical and drug supplies related information. The records should be established and maintained. The information may include the following: • Product origins • Product label • Contact details and information such as name and address of supplier • Certification for authorised supplier by the relevant Competent Authority • Registration number of the authorised supplier by Competent Authority • Registration of the veterinary drug or chemical by the Competent Authority • Certification for veterinary drug or chemical on Good Manufacturing Practices GMP or HACCP certified factory • Invoice and license number of the lot of product • Distribution list

Stakeholder	Regional Guideline
Farm Aquaculture products within the region could be raised from fingerlings or seeds bred at the hatchery or through imports from hatchery for better quality control. Member States should establish legal framework, laws and regulations to ensure farms or hatcheries comply with regional guidelines or global standards in farming activities. Locally reared aquaculture products with commercially acceptable or marketable size are the common TU identified.	1) Member states should ensure the information of grow-out are accurately recorded and maintained by all farmers, and these information includes: • Farm registration number / ID • Origins of seed • Species • Time and date of harvest • Location of harvest • Quantity of harvest • Production lot (size/age/weight) • Destination of harvest • Feeds and feeding records (i.e. source and quantity of feed (kg); relevant details of feed such as date of production of feed and use-by date, feeding regime) • Supplement/Medication records (i.e. antibiotic withdrawal regime) • Relevant quality assurance records (i.e. certification of analysis of feed concerning any addition of any chemical inputs, etc.) 2) Member states should recommend that farmers maintain these necessary records and information with regard to any of the farm activities. The information should be easily retrieved for verification during regular national audit programmes, or other mechanisms under the government regulatory framework. 3) Member states should recommend that aquaculture farmers to have efficient record keeping and traceability by utilising MD. This would facilitate information sharing and traceability beyond the aquaculture farms. All necessary certification arising from laboratory analysis should also be retained and documented properly.

Stakeholder	Regional Guideline
Middlemen Member states should be aware of number of tiers of "middlemen" –within the aquaculture supply chain. Reared aquaculture products with commercially acceptable or marketable size from the fishermen or farms are the common TU identified.	1) Member states should maintain proper record to keep track of all middlemen related information, including the tiers of middlemen. This include the following details, such as: • Middlemen ID • Farm registration number/ID • Dates of purchase for each aquaculture species • Volume of purchase for each aquaculture species • Purchase and distribution information • Movement document 2) Member states are recommended to put in place a mechanism that could track and maintain proper documentation and record of the aquaculture products from various stakeholders during the distribution process as many middlemen could be involved in the distribution activities. Hence MD should be in place. Distribution list should also be maintained. 3) Member states should recommend that stakeholders along the supply chain to deal only with middlemen or distributors of marketable aquaculture products, who are registered by the relevant Competent Authority in order to ensure effective traceability of the aquaculture products.

Stakeholder	Regional Guideline
Processor Member states should establish/ promote and maintain legal framework and regulations for the processors to follow as processing of aquaculture products are performed differently in the ASEANn region, either through processing plants and establishments or direct processing at the fish farms. Processed aquaculture products are the common TU identified.	1) Member states should recommend that processors to adhere to GMP, furthermore, processing plants or establishments should be encouraged or recommended to have HACCP in place. All these standards should be coupled or enhanced with good hygiene practices, International Organisation of Standardisation (ISO) and health certifications, to increase product quality and safety in the mid-stream of the aquaculture product supply chain. 2) Member states should recommend that the processors obtain relevant information and maintain proper records including the following details: • Establishment registration/Approval number • List of suppliers • List of buyers • Batch and production numbers • Relevant labelling and packing records (product description, manufacturing and best before dates) • Destination • Registration numbers of previous stakeholder prior to receiving the product from previous source • Transaction invoices and receipts • All transportation or delivery records 3) Member states should recommend processing plants to establish and maintain internal record keeping for all laboratory results/ quality and safety monitoring records of the necessary raw materials, intermediates, and end products along the processing line(s). Record keeping should include records of batch or container number, date of processing and other critical parameters.

Stakeholder	Regional Guideline
Retailer Retailers should be recognised as the suppliers to the public or consumers, not to other stakeholders upstream of the supply chain. Member states should establish laws and regulations for retailers to follow, particularly in accurate record keeping, since they are likely to break down TU received, package, label or modify the nature of the aquaculture products before marketing the products. The immediate TU could be in the form of processed aquaculture products or packaged aquaculture products with appropriate labelling.	1) Member states should recognise retailers as part of the critical supply chain stakeholders for aquaculture products. Relevant details and information of the retailers should be in place, and this includes license or registration number. 2) Member states should recommend that registered retailers establish and maintain record keeping on their sale transactions, through invoices, delivery or purchase orders or equivalent for traceability purpose. 3) When breaking bulk to retail packaging, member states should recommend that all retailers adopt appropriate labelling of individual retail pack that shows the source of the produce and ensure traceability to source.

Stakeholder	Regional Guideline
Exporter Exporters trade and sell processed or unprocessed aquaculture products as TU to other businesses where they do not alter the nature of the TU. New TU could be created if other stakeholders are at the receiving end where the TU could be broken down, processed and modified. Member states should enforce and ensure accurate documentation and communication of information throughout the production chain given that the exporter is either positioned at the end of the chain or at the beginning of another chain with their TU exported.	1) Member states should maintain proper documentation on the exports of aquaculture products. The relevant information needed from transportation of aquaculture products from middlemen/processors include the following: • batch number • Identification number of vehicles • date of loading • identification (ID) number for the products • source of origin • quantity (kg) • health certificate 2) Member states should take practical measures to help and provide basic infrastructure assistance for the exporters to enable assurance of precise data recording and enhance speed of traceability of origin. Ideally, individual containment should be catered to individual. Should different types of lots be mixed, there should be proper tagging of the particular container holding the products. The tag of the container should include the various identification information of the different lots. 3) Member states should recommend that exporters establish and maintain MD, precise data record keeping on the registration and identification of the product, health certificate, and invoice of the product and accurate product label, for effective information sharing and traceability. 4) The details and information of the importers/ buyers of the aquaculture products should also be properly documented in order to maintain an integrated approach for traceability of products.

XI. References

[1] Petersen, Arni, and David Green. *Seafood Traceability: A Practical Guide for the U.S. Industry.* North Carolina: National Fisheries Institute, Inc and North Carolina Sea Grant, n.d.

[2] *Regional Guidelines for Responsible Fisheries in Southeast Asia.* Southeast Asian Fisheries Development Center, 1999.

[3] *Traceability of Finfish Products- Specification on the Information to be Recorded in Farmed Finfish Distribution Chains.* ISO 12877:2011, Switzerland: International Standards, 2013.

[4] Van, Nguyen Quynh. *Traceability System of Fish Products-Legislation to Implementation in Selected Countries.* National Fisheries Inspection and Veterinary Directorate (NAFIQAVED)- Viet Nam Ministry of Fisheries, 2004.

[5] Washington, Sally, and Lahsen Ababouch. *Private Standards and Certification in Fisheries and Aquaculture-Current Practice and Emerging Issues.* FAO Fisheries and Aquaculture Technical Paper, Rome, Italy: FAO Fisheries and Aquaculture Department, 2011.

[6] U.S. Food and Drug Administration, Hazard Analysis & Critical Control Points (HACCP), http://www.fda.gov/food/guidanceregulation/haccp/default.htm, 2013.

[7] Huss, Hans Henrik. *Assessment and management of seafood safety and quality*. Daya Books, 2007.

[8] *Handbook for Introductionof Food Traceability Systems (Guidelines for Food Traceability)* Food Marketing Research and Information Centre (FMRIC) 2008

[9] *Traceability for Seafood U.S. Implementation Guide*, National Fisheries Institutes in association with GS1, March 2011

[10] Vincent Andre. *Review and Analysis of Current Traceability Practices.* FAO Committee on Fisheries, Sub-Committee on Fish Trade, 2014

[11] *Best Practice Guidelines on Traceability*. FAO Committee on Fisheries, Sub-Committee on Fish Trade, 2014

[12] TraceShrimp, Thailand. http://www.thaitraceshrimp.com/traceshrimpv4/index.jsp#, 2005

[13] *Implementation of the International Plan of Action to Deter, Prevent and Eliminate Illegal, Unreported and Unregulated Fishing*, FAO, International Plan of Action- IUU, http://www.fao.org/docrep/005/y3536e/y3536e00.htm#Contents, 2002

[14] *Servicing the aquaculture sector: role of state and private sectors* (Expert Panel Review 5.2), FAO, Rome and NACA, Bangkok, 2010

[15] Jill E. Hobbs, *Consumer Demand for Traceability*, International Agricultural Trade, Research Consortium, April 2003

[16] BFAR Administrative Circular No. 251, Series of 2014. *Traceability System for Fish and Fishery Products.* Department of Agriculture. Bureau of Fisheries and Aquatic Resources, 2014.

Annex

List of Aquaculture Traceability Competent Authority in ASEAN

Country	Name of Government Agency	Contact Details of Government Agency
Cambodia	Department of Aquaculture Development (DAD), Fishery Administration (FiA) Ministry of Agriculture Forestry and Fisheries (MAFF)	**Address:** # 186, Preah Norodom Blvd, Phnom Penh 12301 Cambodia
	Department of Fisheries Post-harvest Technologies (DFPTQ), Fisheries Administration (FiA), Ministry of Agriculture Forestry and Fisheries (MAFF)	
Indonesia	Directorate General of Aquaculture, Direcorate of Fish Health and Environment, Ministry of Marine Affairs and Fisheries	**Address:** Menara 165 Building, 15th Floor, Jalan TB Simatupang, Kav 1 Cilandak Timur, Jakarta
	Agency for Fish Quarantine and Quality Control, Centre for Quality Management, Ministry of Marine Affairs and Fisheries	**Address:** Kementerian Kelautan dan Perikanan, Jalan Merdeka Timur No 16, Jakarta
Lao PDR	Department of Livestock and Fisheries/Division of Fisheries/ Aquaculture Development Section	**Address:** P.O. Box 6644, Vientiane 01000, Lao PDR

Person-in-charge	Designation	Contact Details of Person-in-charge
Thay Somony (Mr)	Director of DAD, FiA, MAFF	**Tel:** (855) 12 829 971 **Email:** monyangko@gmail.com
Chhoun Chamnan (Dr.)	Director, Department of Fisheries Post-harvest Technologies (DFPTQ) Fisheries Administration (FiA) Ministry of Agriculture, Forestry and Fisheries (MAFF)	**Tel:** (855) 23 224800 **Email:** Chhounchamnan@gmail.com
Dr. Reza Shah Pahlevi	Head of Sub-directorate of Residue Control	**Tel:** 62-81317432328 **Email:** pahlevi.reza.nrmp@gmail.com
Victor Immanuel		**Tel:** 62-21-3860527/ 62-811646567
Mr. Douangtavanh Sysombath	Head of Aquaculture Development Section	**Tel/Fax:** +856-21-217 869 **Email:** d_sysombath@yahoo.com

Country	Name of Government Agency	Contact Details of Government Agency
Malaysia	Fisheries Biosecurity Division, Department of Fisheries Malaysia, Ministry of Agriculture & Agro-Based Industry Malaysia.	**Address:** Fisheries Biosecurity Division, Department of Fisheries Malaysia, Ministry of Agriculture & Agro-Based Industry Malaysia, Putrajaya MALAYSIA
	Food Safety and Quality Division, Ministry of Health Malaysia	**Address:** Food Safety and Quality Division, Ministry of Health Malaysia, Putrajaya MALAYSIA
Myanmar	Ministry of Livestock, Fisheries and Rural Development, Department of Fisheries	**Address:** Office No (36), Nay Pyi Taw, Myanmar.
Philippines	Bureau of Fisheries & Aquatic Resource (BFAR) Fish Health Management and Quality Assurance Section (FHMQAS)	**Address:** 860 Arcadia Bldg., Quezon Avenue, Quezon City, Philippines.
	Fish Inspection Unit (FIU)	**Address:** 860 Arcadia Bldg., Quezon Avenue, Quezon City, Philippines
Singapore	Agri-Food & Veterinary Authority of Singapore	**Address:** JEM Office Tower, 52 Jurong Gateway Road #14-01 Singapore 068550
Thailand	Traceability for Coastal fishery products (shrimp) Department of Fishery, Marine Shrimp Culture Research and Development Institute.	**Address:** Department of Fishery, Central Kaset, Jatujak, Bangkok 10900
Viet Nam	Department of Aquaculture (DoA)	**Address:** No 10 Nguyen Cong Hoan str, Hanoi, Viet Nam

Person-in-charge	Designation	Contact Details of Person-in-charge
Fauzidah Binti Othman (Mdm)	Head of Fish and Public Health Section	**Tel:** +603-8870-4000 **Fax:** +603-8890-3794 **Email:** Fauzidah@dof.gov.my
Noraini binti Dato' Mohd Othman (Mdm)	Senior Director, Food Safety and Quality Division	**Tel:** 03-88833888 **Fax:** 03-88893341 **Email:** noraini_othman@moh.gov.my
Aye Aye Thein (Mrs)	Deputy Director of Department of Fisheries	**Tel:** +95-9-420029947 **Email:** ayeayethein36@gmail.com
Simeona E. Regidor (Ms.)	Chief, FHMQAS	**Tel:** (63)02 448 5432 **Email:** simeona03@yahoo.com
Dennis E. Tiotangco (Mr.)	Head, FIU	**Tel:** (03)02 4116015 **Email:** dtiotangco@yahoo.com
—	—	**Tel:** (65) 6805 2992 **Email:** AVA_Email@ava.gov.sg
During the selection	Director of Marine Shrimp Culture Research and Development Institute	**Tel:** +66 2579 3682 **Email:** thaishrimp@hotmail.com
Mr. Pham Khanh Ly	Deputy Director of Aquaculture Department	**Tel:** + 84 913 043 532 **Email:** phamkhanhly2007@yahoo.com.vn; bangtam291@gmail.com

Notes

Notes

Notes

Notes

Notes