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National Report on Strengthening Sustainable Aquatic Food Value Chains for Enhanced Food Security and Nutrition in Thailand

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Thailand

Bay of Bengal Programme Inter-Governmental Organisation

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Chennai 600 018, Tamil Nadu, INDIA

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Report Preparation

Dr. P. Krishnan, *Director, BOBP-IGO, Chennai*
Mr. Rajdeep Mukherjee, *Policy Analyst, BOBP-IGO, Chennai*
Dr Ahana Lakshmi, Senior Consultant, BOBP-IGO, Chennai

Background Research

Dr. T. Velumani, Project Scientist, *BOBP-IGO, Chennai*
Dr. K. Nirmala, Consultant, *BOBP-IGO, Chennai*
Dr. Anisha Shafni John, Research Associate, *BOBP-IGO, Chennai*
Ms Afifat Khanam Ritika, BIMReN Fellow, *BOBP-IGO, Chennai*
Ms Bhoomika Kosambi, Intern, *BOBP-IGO, Chennai*
Mr Nihal Kumar, Intern, *BOBP-IGO, Chennai*

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National Report on Strengthening Sustainable Aquatic Food Value Chains for Enhanced Food Security and Nutrition in Thailand

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1. Introduction and Context

1.1. Overview of the country's demographic and economic profile (fisheries)

The Kingdom of Thailand is bordered by the Lao PDR in the north, Lao PDR and Cambodia in the east, Gulf of Thailand and Malaysia in the south, and Andaman Sea and Myanmar in the west. The maritime area is adjacent to the Andaman Sea on the west coast and the Gulf of Thailand on the east coast[1]. Thailand has a coastline of 3,219 km and an Exclusive Economic Zone (EEZ) of approximately 305,772 km². The country also has important inland waters, namely 25 river basins with 254 sub-basins, and the two principal river systems are the Chao Phraya River and the Mekong River[2]. Thailand's marine fishing areas comprise approximately 304,000 km² in the Gulf of Thailand and 116,280 km² in the Andaman Sea, with a total coastline of 2,815 km across 23 coastal provinces, highlighting the country's extensive marine resource base[9].

Per Globefish 2020[3], the GDP per capita was USD 7200 and the average GDP growth was 1.9%. GDP from fisheries was 0.72% and the agricultural GDP from fisheries was 8.96%. The fish available was 29.5 kg/capita. The population in 2023 was 71,702,435, and is listed in the Upper-middle income (UMC) as per World Bank[4].

1.2. Key nutrition challenges (e.g., undernutrition, micronutrient deficiencies, and overweight/obesity).

Thailand faces a "double burden" of malnutrition, characterized by the coexistence of persistent undernutrition and rapidly increasing rates of overweight and obesity, alongside prevalent micronutrient deficiencies. The main challenge has shifted from undernutrition to tackling diet-related non-communicable diseases (NCDs)[5]. In 2021, 5.2% of the population showed prevalence of undernourishment, a decline from 5.6 percent in 2020. In comparison, the world average is 10.78 percent, based on data from 167 countries[6].

1.3. Summary of the importance of aquatic foods in national diets and livelihoods

Aquatic foods are of profound importance to Thailand, serving as a cornerstone of the national diet, a critical source of employment, and a significant contributor to the national economy. They are deeply ingrained in Thai culture and provide vital nutritional and economic benefits. Freshwater aquaculture is mainly for domestic consumption. Small-scale freshwater aquaculture is still very crucial in providing the rural poor with high quality protein food for home consumption. Brackish water aquaculture usually produces high-value products for export[7]. The consumption of fish was 36.45 kg/capita in 2023 as per DoF Thailand sources[8].

2. Country Snapshot

Table 2.1: Country Snapshot Table

Indicator	Year	Value	Source
Population	2025	71.6 million	Worldometer
GDP per capita	2024	USD 7,942	Worldometer
Fisheries production – Capture (ton)	2024	15,42,787	9
Fisheries production – Marine Capture Fisheries (ton)	2024	14,34,918	9
Fisheries production – Inland Capture Fisheries (ton)	2024	1,07,869	9
Fisheries production – Coastal Culture (ton)	2024	5,30,274	9
Fisheries production – Culture (ton)	2024	9,98,648	9
Fisheries production – Freshwater Culture (ton)	2024	4,86,374	9
Freshwater vs. Marine **Capture vs. Culture Share**	2024 2024	25% Inland / 75% Marine 61% Capture / 39% Culture	DoF, Thailand DoF, Thailand
Top Capture Species	2024	Squid, blue swimming crab and Mackerel (by value)	DoF, Thailand
Top Aquaculture Species	2024	White leg shrimp, Nile tilapia, Giant freshwater prawn (by value)	DoF, Thailand
Employment in Fisheries	2022	~600,000 people	DOF Thailand
Export Value	2024	USD 7.08 billion[10]	FAO Globefish

Indicator	Year	Value	Source
Import Value	2024	USD 4.0 billion	FAO Globefish
Per-capita Fish Consumption	2024	34.76 kg/year	FAO Globefish
Animal Protein from Fish	2021	~30%	FAO
Estimated Fish Loss & Waste	2022	10-20%	World Bank / FAO Estimates
Women's Participation (Post-harvest)	2022	~60%	Sector Reports
Key Compliance Measures	Ongoing	HACCP, GMP, Anti-IUU Operations	Govt. Reports
Major Environmental Risks	Ongoing	Overfishing, Coastal Habitat Loss, Aquaculture Effluent	National Reports

3. Aquatic Food Production and Utilization

3.1. Trends in capture fisheries (inland and marine) and aquaculture

Capture fisheries are one of the most important sources of revenue in the economy of Thailand. Marine capture fisheries is categorized into commercial and artisanal based on the size of fishing vessels and location of fishing ground. Commercial fisheries refer to the use of fishing vessels of more than 10 GT and engine of more than 280 hp that operate in offshore areas. The catch is used for domestic consumption and as a raw material for processing and export. On the other hand, artisanal fisheries refer to the use of fishing vessels less than 10 GT or without vessels at all with fishing activities in coastal areas. The catch is generally for household consumption and income through local sales. For inland capture fisheries, fishing activities are carried out in inland waters of the country, including rivers, canals, streams, irrigation, swamps, ponds, lakes, and public water sources that are naturally and man-made. In 2024, Thailand's fisheries production structure comprised 56.5% marine capture, 4.2% inland capture, 20.9% coastal aquaculture, and 18.4% freshwater aquaculture, indicating continued dominance of marine capture alongside a substantial aquaculture contribution[9].

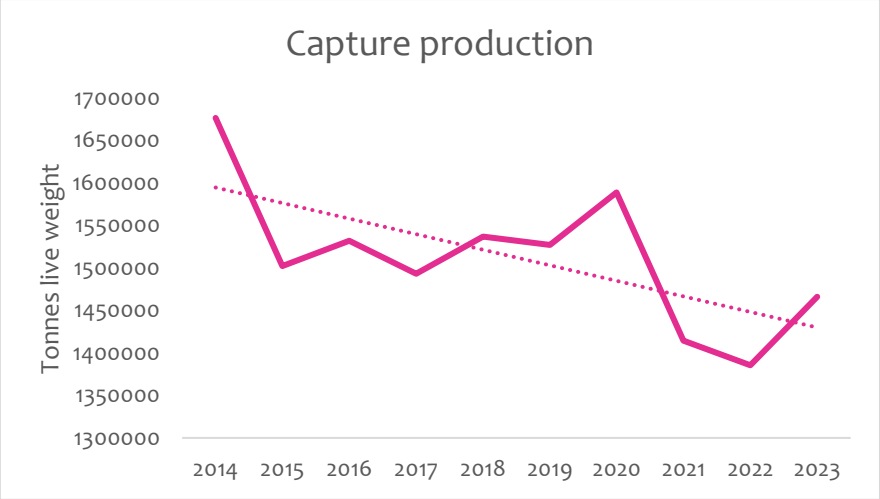


Figure 3.1: Trends in capture fisheries[11]

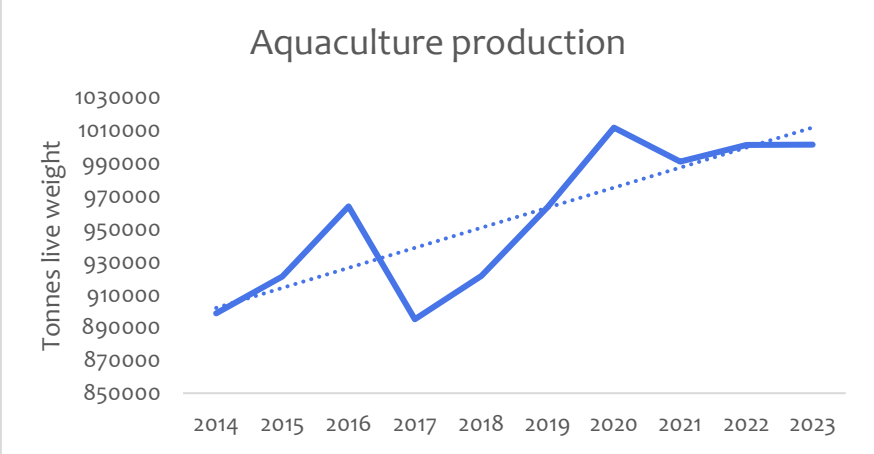


Figure 3.2: Trends in culture fisheries

3.2. Main species and product forms

In Thailand, the marine capture species with the highest catch is trash fish because trash fish are often caught in large quantities as bycatch in various fishing operations, and are commonly used as raw materials in fishmeal production. For inland capture fisheries, barb species had the highest catch quantity, and Marine shrimp in the case of aquaculture. The top ten species by volume are given in the table below.

Table 3.1: Top ten species by volume in 2023[12]

	Marine capture fisheries	***Inland capture fisheries***	***Aquaculture***
1	Trash fish	Barb	Marine shrimp
2	Anchovy	Nile tilapia	Nile tilapia
3	Demersal fish	Siamese mud carp	Giant prawn
4	Sardine	Striped snakehead fish	Seabass
5	Squid	Walking catfish	Catfish
6	Mackerel	Pangasius	Cockle

	Marine capture fisheries	***Inland capture fisheries***	***Aquaculture***
7	Round scads	Seven-line barb	Mud crab
8	Pelagic fish	Climbing perch	Barb
9	Indian mackerel	Naked catfish	Snakeskin gourami
10	Blue swimming crab	Giant freshwater prawn	Oyster

Ref: Fisheries Country Profile: Thailand 2025

The charts below depict the top ten species by volume as per data from FishStatJ.

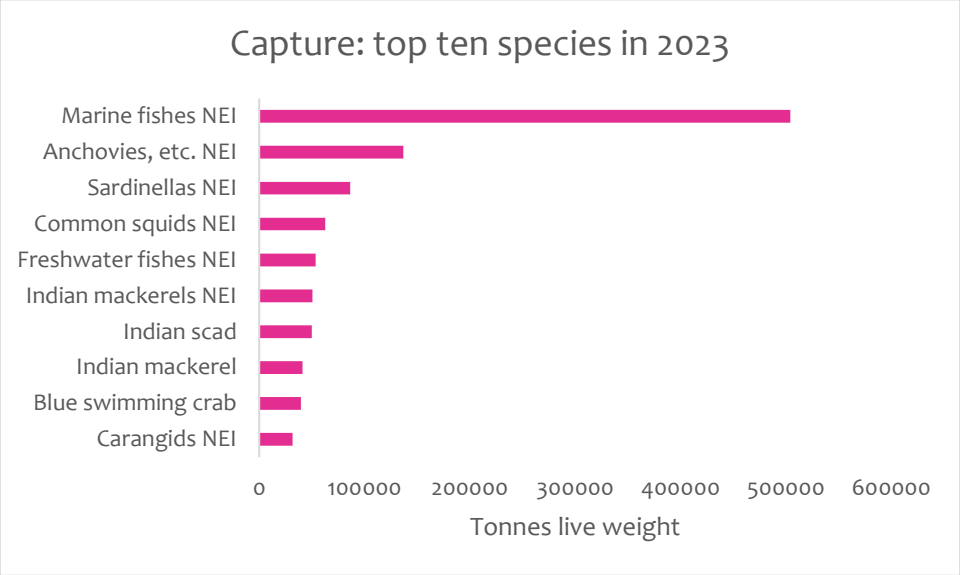


Figure 3.3: Top ten species in capture in 2023
Data from FishStatJ

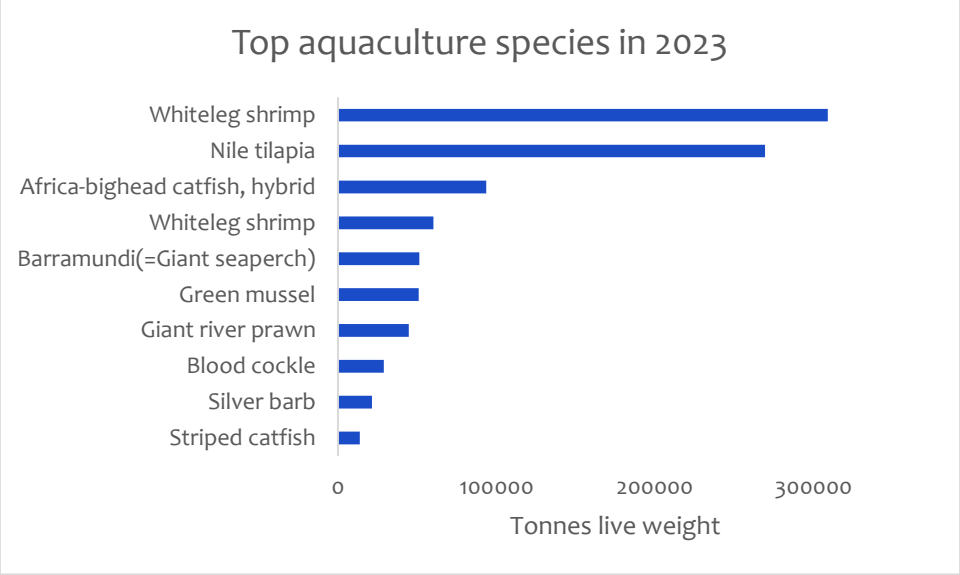


Figure 3.4: Top ten species in aquaculture in 2023
Data from FishStatJ

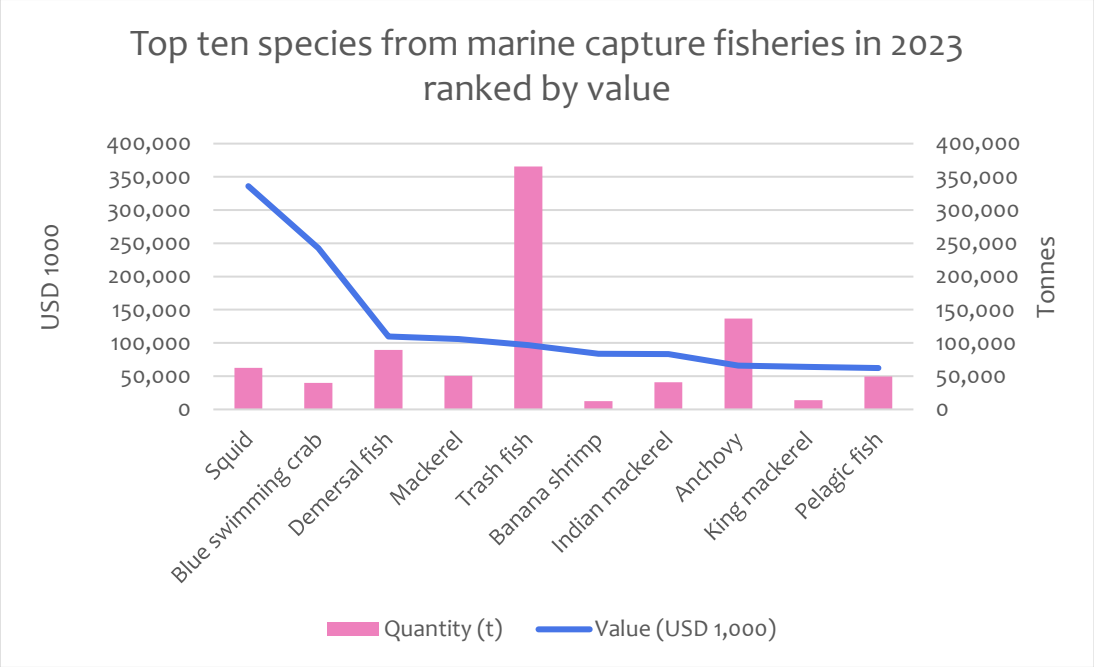


Figure 3.5: Top ten species from marine capture fisheries in 2023 ranked by value
Data source: DoF Thailand, 2024[13]

3.3. Major production zones and seasonal characteristics

The major fishing areas are: Gulf of Thailand, Andaman Sea and Indian Ocean. The Gulf of Thailand is a semi-enclosed sea in the waters of the South China Sea with an area of approximately 304,000 km^2 with rich fishery resources being influenced by four main rivers, namely Chao Phraya, Mae Klong, Tha Chin, and Bang Pakong. Mainly used by small-scale and commercial fisheries. The Andaman Sea is located in the southeast of the Bay of Bengal with an area of approximately 116,280 km^2 as a deep-sea environment with a variety of marine life and coral reef ecosystems. Thailand is a member of IOTC and has legal right for fishing and transshipment of tuna and tuna-like species in the competence area, as well as the Southern Indian Ocean Fisheries Agreement (SIOFA) for deep-sea fishing in the Southern of Indian ocean area.

3.4. Processing, preservation and domestic consumption practices

Fish is the primary source of animal protein for most of Thailand's population, particularly in the coastal and near-coastal provinces. In Thailand, fish processing involves a mix of traditional methods for domestic consumption and industrial-scale operations (freezing, canning) primarily for export. Fish is a primary source of animal protein in the Thai diet, consumed both fresh and in various processed forms[14]. A diversified marine processing sector comprising approved primary processors, packing houses, cold storages, carrier vessels, and fishing ports/piers, reflecting Thailand's strong industrial processing capacity supporting both domestic and export markets[9].

Table 3.2: Number of Marine Fisheries Factory by Type of Plant, 2024[9]

Type	Units	%	Volume (tons)	%	Value (M THB)	%
Cold Storage	209	17.12	9,97,721	32.69	90,989	57.76
Canned Seafood	47	3.85	9,82,235	32.19	54,094	34.34
Fish Meal	55	4.50	9,15,361	30.00	7,793	4.95
Fish Sauce	37	3.03	98,639	3.23	1,688	1.07
Salted Fish	456	37.35	36,388	1.19	1,484	0.94
Dried Squid	129	10.57	6,451	0.21	726	0.46
Dried Shrimp	81	6.63	2,897	0.09	301	0.19
Fish/Shrimp Crackers	81	6.63	5,423	0.18	220	0.14
Meatballs and fish cakes	26	2.13	3,516	0.12	144	0.09
Grilled/Smaoked Fish	22	1.80	715	0.02	28	0.02
Budu Sauce	21	1.72	1,386	0.05	24	0.02
Steamed / Baked Fish	15	1.23	535	0.02	22	0.01
Dried Shellfish	42	3.44	428	0.01	9	0.01
Total	1221	100.00	30,51,695	100.00	1,57,522	100.00

4. Trade and Market Dynamics

4.1. Overview of fish exports (species, value, markets)

Exports: Thailand is a global seafood export leader, with USD 7.08 billion (2024). Its strength lies in advanced processing and value-addition. Fish and fishery products most exported are canned/processed tuna, shrimp, processed seafood, and canned cat and dog food.

- Processed Products: Canned tuna (a world leader), frozen shrimp, breaded and ready-to-eat products.
- Shrimp: A cornerstone of exports, both frozen and value-added.
- Major Markets**:** United States, Japan, China, and the European Union. (Source: UN Comtrade, 2023; FAO Globefish, 2024)

  Source: Thailand's fishery exports valued at USD7.08B in 2024 highest in 10 years https://thailand.prd.go.th/en/content/category/detail/id/2078/iid/361991 last accessed 14 Jan. 26

4.2. Key import flows and their drivers

Imports: Thailand's USD 4.0 billion (2024) are primarily driven by the needs of its processing industry as Raw Material for Processing: Significant imports of tuna and other fish to supply canneries and processing plants and as Feed Ingredients for its massive aquaculture sector. Thailand also imports fish and fishery products from other countries to meet the demand for domestic consumption.

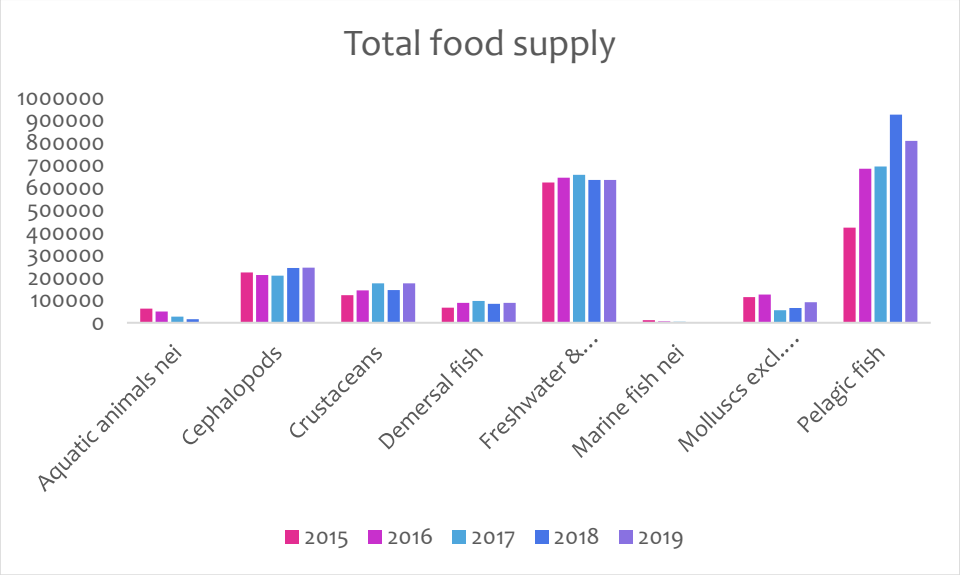
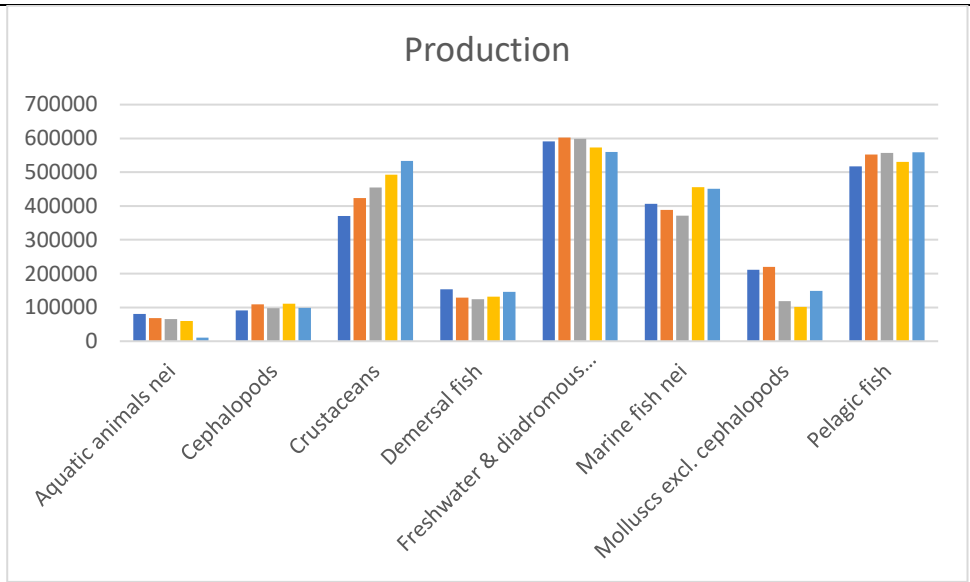


Figure 4.1: Total aquatic food supply 2015-2019



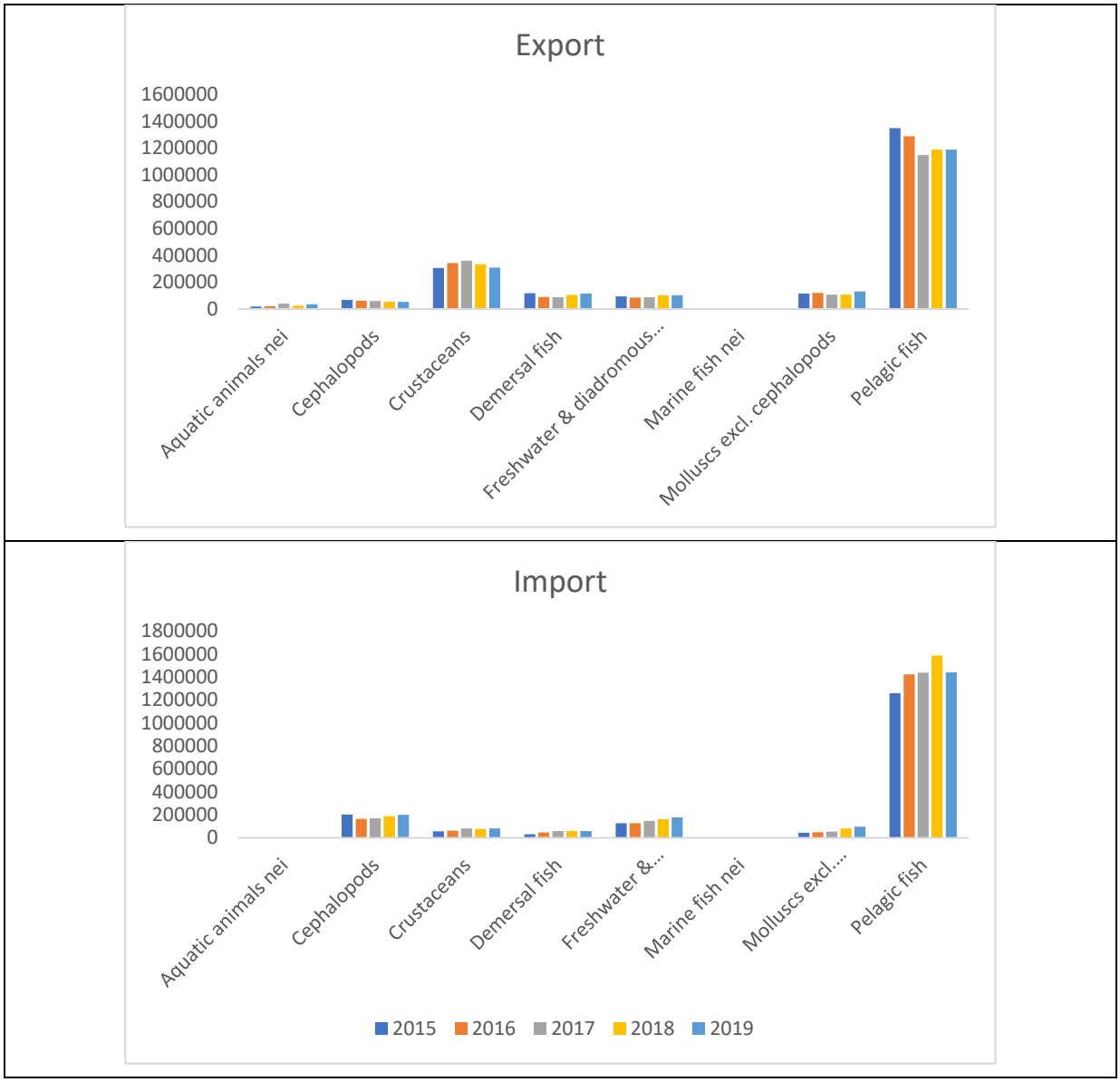


Figure 4.2: Thailand Food Balance, 2015-2019

Table 4.1. Major Export Product from Downstream (2024)[9]

Type	Value (%)	M baht
Canned Tuna	34.25	82,250
Shrimp	18.06	43,325
Canned dog and cat food	11.56	27,751
Prepared/Preserved Seafood	5.33	12,787

Table 4.2. Major Import Product from Upstream (2024)[9]

Type	Value (tons)
Fresh & Frozen Tuna	8,53,228
Fresh & Frozen Fish	6,90,797
Fresh & Frozen Cephalopod	1,41,723

Type	Value (tons)
Fresh & Frozen Fish Meat	1,08,612
Others	3,48,563

4.3. The role of domestic markets in providing affordable fish to households

The domestic market is substantial, with fish being a central part of the cuisine. Wet Markets remain a primary source for fresh fish for a large portion of the population. Supermarkets, hypermarkets, and a vast restaurant sector are major consumers of both fresh and processed seafood.

Of the total fish production, about 78 percent was used for human consumption; the balance of 22 percent was for animal feed. As far as marine catch landings are concerned, about 28 percent was trash fish that was used for non-food and mainly channelled to the fishmeal industry. The balance was for human consumption, of which 20 percent was consumed fresh and the remainder was processed into various product forms of chilled, frozen, canned, steamed or smoked, dried and salted, shrimp paste and fish sauce. For freshwater fish, all was for food fish and 80 percent was consumed fresh[15].

4.4. Barriers and opportunities (tariffs, non-tariff measures, certification, and traceability).

Barriers: Intense scrutiny on labour and ethical standards in the supply chain. Meeting stringent EU IUU regulations and SPS standards in major markets is a continuous challenge.

Growth opportunities are there in value-added, convenience seafood products. Expanding sustainable and certified aquaculture (e.g., ASC, BAP) to access premium markets.

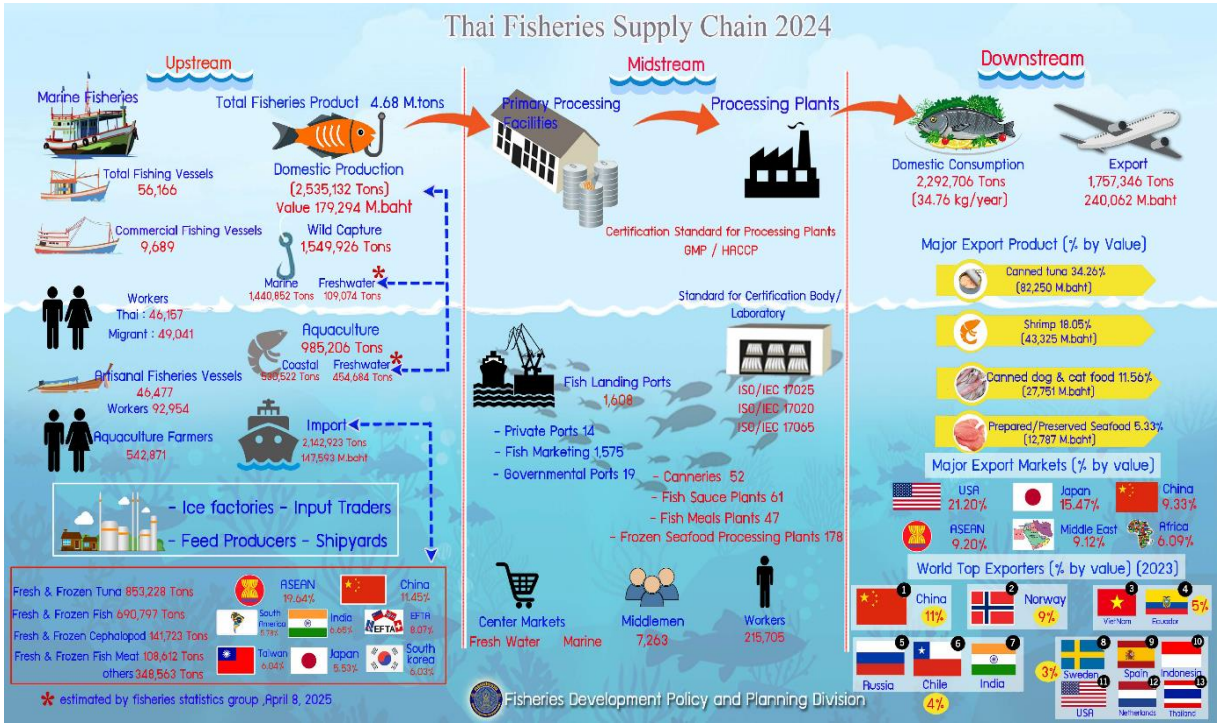


Figure 4.3 :Thailand Fisheries Supply Chain[9]

5. Nutritional Contribution of Fish

5.1. Fish's share in total protein intake

Protein Share: Fish is a major source of animal protein in Thailand, providing approximately 30% of the total. It is a fundamental component of the national diet. (Source: FAO, "The State of World Fisheries and Aquaculture (SOFIA) 2022").

Though Thailand is the largest fish exporting country, supply of food fish to domestic consumers is not jeopardised and the bigger portion of fish production supply the domestic market. In 2000, per capita fish consumption on average was 32.7 kg, far outweighs other animal protein sources. Based on the consumption survey during 1998-2001, per capita fish consumption of people residing in inland provinces was 28.8 kg whereas people in coastal provinces consume 45.21 kg. In terms of quantity, urban consumers consume less fish than consumers in rural areas. Moreover, consumers in different areas/regions have different tastes, preferences and levels of purchasing power, which affect their choices of species and quality of fish they buy[16]. The study observed that despite the fact that per capita income in the northeast is lowest but fish consumption is rather high, suggesting that the Thai people in this region have easy access to freshwater fish, both from natural and cultured sources. Building greater awareness of the nutritional value of fish and promoting the consumption of fish as a regular dietary staple are important steps, the study concluded.

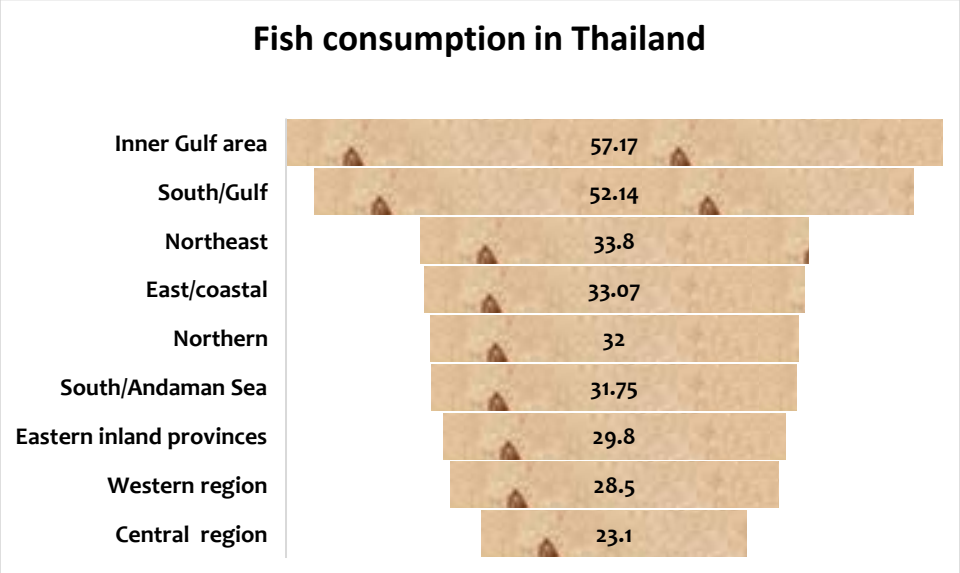


Table 5.1: Fish consumption in Thailand[17]

5.2. Key micronutrients supplied (Ca, Fe, Zn, I, Se, Vitamin A, Vitamin B12, DHA/EPA)

Studies indicate that at the national-level, fishery products supplied between 19% and 35% of the Thai populations recommended dietary protein intake, 4–6% of calcium, 6–11% of iron, and 2–4% of zinc from 1995 to 2015. This research also reported that if Thailand's wild-caught seafood production were to decrease by 13%, as is highly likely, by 2030, the country might face a per capita supply deficit of fish and shellfish to meet healthy and sustainable dietary recommendations (28–30 g/day), let alone the current Thai average intake (32 g/day) [18].

5.3. Role of small fish species consumed whole

Among wild capture production, a study found that the largest supply of protein and zinc came from the “trash fish” group. The Engraulidae, specifically Stolephorus spp., was the largest contributor to the calcium supply. Sardinella spp. from the Clupeidae family contributed most to the total iron yield. For families involved in aquaculture production, the largest supply of protein, calcium, and zinc came from Penaeidae, including *Litopenaeus vannamei, Penaeus monodon*, and *Metapenaeus spp*., while Mytilidae, specifically *Perna viridis*, contributed most to the total iron supply[19].

5.4. Evidence from national nutrition surveys or literature

Evidence from National Surveys: The Thailand Food Consumption Survey regularly documents the high consumption of fish and seafood across all regions, underscoring its role in food security and nutrition.

6. Fish Loss and Waste (FLW)

6.1. The main points along the chain where losses occur (landing, transport, processing, retail)

There is no robust, widely accepted, up-to-date national estimate of total fish FLW in Thailand (i.e. combining discard, processing waste, post-harvest spoilage, consumer-level waste). An FAO project on ‘Developing capacity to reduce food loss and waste’ says that in Thailand, MSMEs account for approximately 91 percent of food processing operations and the project was started because of the absence of data on FLW[20].

6.2. Available estimates of quantity and value lost

There are no available estimates of quantity and value lost mainly because primarily because almost all fish caught, including "trash fish" or bycatch, is utilized in some form, often channelled into the substantial fishmeal industry rather than being discarded entirely[21].

6.3. Causes (infrastructure, handling, storage)

Loss of fish after harvest and before reaching the consumer is mainly caused by poor handling of fish ranging from applied knowledge of how to maintain the quality of fish by proper handling to improved market facilities and consumer awareness. The insufficient cold-chain infrastructure for small-scale fisheries as a key contributor to post-harvest losses, particularly at landing and early distribution stages.

6.4. Mitigation practices or innovations

Priority needs to be given to the handling of fish efficient through the entire marketing chain. It is necessary to educate fishers/farmers, processors and consumers about methods of handling aquatic products, including home processing, preparation, quality and the nutritional value of fish[22].

7. Socio-economic and Gender Dimensions

7.1. Employment generated by the sector (fisheries, aquaculture, post-harvest)

The sector is a major employer, supporting approximately 600,000 fishers and fish farmers, with millions more employed in processing, marketing, and export. (Source: Department of Fisheries Thailand, 2022)

7.2. The role of women in processing, trading, and marketing

In fishing communities, the household usually functions as an economic unit where the roles of both men and women are complementary. Fishing is however seen as a male activity despite women playing critical and significant roles in fish production. Women work in direct productive activities including collecting, processing, preparing and marketing of fish and other marine resources. Women are not included as fishers in the formal statistics and a large part of their work is unaccounted in economic valuations[23].

Women's roles in the fisheries value chain include gear maintenance, sorting, processing, gleaning, and marketing. In fisheries in Thailand, women work alongside men, notably in preserving and marketing fish. They also sometimes accompany men fishing[24]. The table below gives some information on the proportion of men and women fish farmers in different activities.

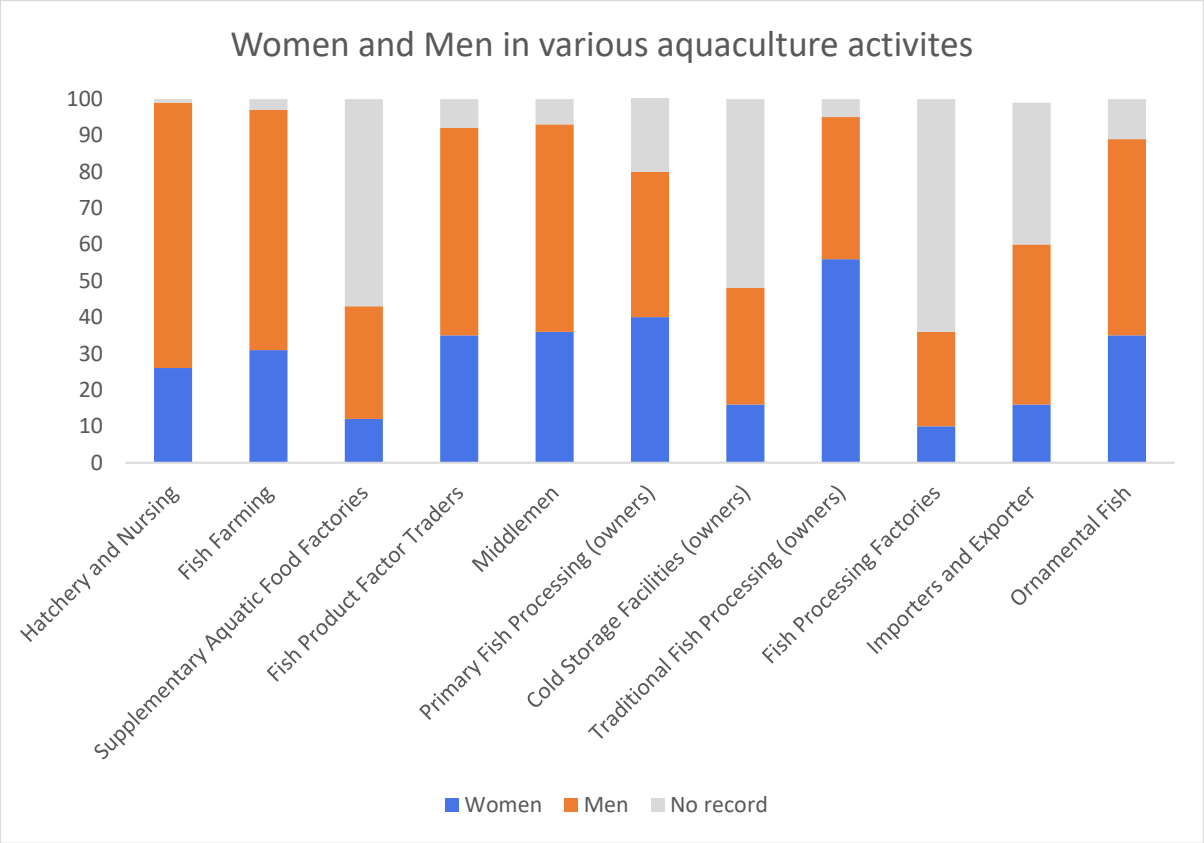


Figure 7.1: Women and Men in aquaculture registered with Department of Fisheries
Source: Visualized based on data in Napaporn Sriputinibondh, 2008

7.3. Constraints faced by small-scale actors (e.g. access to finance, technology)

An important challenge faced by small-scale fishers and farmers is access to finance. fishers need to invest in responsible fishing operations and technologies, reduce overfishing, contribute to fisheries management, and implement climate change adaptation measures. Small-scale fishers often do not have access to financial services to innovate and to make the necessary transition to sustainable fishing operations. Access to financial services will help them to innovate and adopt measures that will provide social, economic and environmental returns, the desired triple bottom line[25]. A policy brief[26] brought out indicated that while 87 percent of small-scale fishers claimed to be able to borrow formally or informally when needed, they often find that the services offered by financial institutions do not meet their needs.

8. Sustainability and Resilience

8.1. Summary of stock status where available (overfishing, recovery, habitat pressures)

Stock Status: Many marine fish stocks in the Gulf of Thailand and the Andaman Sea are fully exploited or overexploited. The government has implemented measures such as fishing vessel licensing schemes, closed seasons, and restocking programs to manage pressure. (Source: FAO, SOFIA 2022; Department of Fisheries)

8.2. Environmental risks (pollution, waste, carbon intensity)

The main environmental risks are overfishing due to historical overcapacity which has led to stock depletion. There is also coastal habitat degradation especially the loss of mangroves due to aquaculture expansion. There are problems due to pollution from shrimp farm effluents in aquaculture. The effluent discharge from industrial factories and declining land availability for aquaculture, both of which pose risks to ecosystem health and long-term production sustainability[9].

8.3. Climate risks and adaptation measures

Climate Risks: Thailand is highly vulnerable to rising sea levels, rising sea temperatures affecting coral reefs, and changes in rainfall patterns that can cause salinity intrusion in aquaculture zones.

In recent years, extreme climate events like floods and prolonged dry seasons have been stressing fish farming operations, leading to increased risk for farmers. One of the barriers facing tilapia farmers is that they have limited scientific information about the fish (e.g. common commercial species of choice such as red Tilapia and Nile Tilapia) they grow or the ecosystems they use to grow them. Farmers are not always aware of the best ways to reduce risks from climate variability or to adapt to climate change. Hnece, they need training on this aspect as well as water quality management[27].

8.4. Resilience factors (diversification, community practices, and early warning systems).

Ensuring that aquaculture needs are taken into account by water managers is essential to sustain aquaculture in times of climate stresses.

In the case of fishery declines, four components of resilience were noted including: ability (1) to get work elsewhere; (2) to compete, survive and adapt more effectively; (3) to increase confidence by planning for financial security and learning new skills; and (4) to cope when there is a change. Study results indicated that fishers with more education, those from households that do not depend exclusively on fish for income, younger fishers, those who had been fishing for a shorter time, those with higher levels of individual well-being and basic needs components, and those that would not become a fisherman if they had their lives to live over are more likely to be found in the high resilience group. In addition, fishing communities living in an industrial context (developed urban areas) manifest high levels of competitiveness, survivability and adaptability, which are mainly due to the diverse livelihoods provided in such areas in comparison with non-industrial areas[28].

9. Governance and Policy Framework

9.1. Overview of national fisheries and aquaculture policies

The Royal Ordinance on Fisheries B.E. 2558 (2015) and Amendment B.E. 2560 (2017) systematically regulate fisheries activities in accordance with international standards. Regarding small-scale fisheries, DOF Thailand has enforced the Ministerial Regulation on the Determination of Coastal Sea Zones B.E. 2565 (2022), which originally according to the Fisheries Act B.E. 2558 (2015), defined that coastal sea zones as a distance beyond the coastline of 3 nm, or in some cases, a distance of less than or more than 3 nm but not exceeding 12 nm. Other laws and regulations related to fisheries management, including the Navigation in the Thai Waters Act B.E. 2456 (1913) and the Thai Vessels Act B.E. 2481 (1938) are enforced by the Marine Department; Marine and Coastal Resources Management Promotion Act B.E. 2558 (2015) enforced by the Department of Marine and Coastal Resources; Labor Protection Act B.E. 2541 (1998) enforced by the Department of Labor Protection and Welfare; and laws and orders related to the control of fishing vessels are issued under the authority of the Thai Maritime Enforcement Command Center (Thai-MECC)[29].

Food Safety: Regulated by the Food and Drug Administration (FDA) and the DOF. The country has a robust system of HACCP and GMP requirements for export-oriented processing plants.

9.2. Food safety and quality assurance systems

Thailand's food safety and quality assurance systems are overseen by the Ministry of Public Health and the Ministry of Agriculture and Cooperatives, with key regulations and standards including the Food Act (1979) and the National Bureau of Agricultural Commodity and Food Standards (ACFS). The system includes government supervision from "farm to table," and voluntary schemes like GLOBALGAP, ThaiGAP, and the national Q-GAP are used for different

markets. A significant part of the system involves risk-based supervision, food safety education, and international cooperation.

Thailand has long enforced laws and regulations on food safety. The responsibility for food control is shared between different agencies and ministries under the various laws and regulations[30] such as Ministry of Public Health - Food Act B.E. 2522 (1979) ; Ministry of Agriculture and Cooperatives - Fisheries Act B.E. 2558 (2015), Ministerial Regulation Regarding Importation From and Transit Through the Kingdom of Thailand of Animal Carcasses B.E. 2544 (2001) and Ministry of Commerce: Controlling Importation and Exportation Goods Act. B.E. 2522 (1979).

9.3. Participation in international agreements (e.g., WTO fisheries subsidies, PSMA, CITES)

A list of key instruments to which Thailand is a party is given below:

- Convention on Biological Diversity (CBD)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar)
- United Nations Framework Convention on Climate Change (UNFCCC)
- Kyoto Protocol to the United Nations Framework Convention on Climate Change
- Paris Agreement
- United Nations Convention on the Law of the Sea (UNCLOS)
- United Nations Fish Stocks Agreement (UNFSA)
- Work in Fishing Convention, 2007 N. 188

Thailand has ratified the Port State Measures Agreement.

9.4. Institutional arrangements for managing value chains

The Department of Fisheries (DOF) under the Ministry of Agriculture and Cooperatives is the main organization responsible for management and promoting fishery production, improving the quality of aquaculture, freshwater and marine fishery products in compliance with Thailand and international standards, encouraging research and technological for develop innovation, and strengthening capacity building. Besides, DOF is responsible for the monitoring, control, and surveillance of fishing activities to prevent and eliminate IUU fishing in coordination with the Thai Maritime Enforcement Command Center (Thai-MECC), Marine Department, Royal Thai Navy, Marine Police Division, and Department of Labor.

In addition, the Department of Marine and Coastal Resources (DMCR) under the Ministry of Natural Resources and Environment was established to conserve, recover, and manage marine and coastal resources while promoting awareness of natural resources and

environmental management. The DMCR also develops knowledge that supports marine and coastal resource management in response to changing conditions[31].

10. Key Challenges and Opportunities

10.1. Most pressing constraints (production, markets, nutrition, gender, governance)

1) **Production**
    a. Overexploited or fully exploited stocks in the Gulf of Thailand and Andaman Sea; historical overcapacity.
    b. Environmental pressures: pollution, aquaculture effluents, mangrove loss.
    c. Climate risks (flooding, droughts, salinity intrusion) disrupting aquaculture and increasing farm losses.
    d. Limited access to finance and technology for small-scale fishers and farmers, restricting investment in improved gear, feed, and climate adaptation.
    e. Increasing cost of production alongside depressed aquatic animal prices, which jointly reduce profitability for producers across capture and aquaculture systems.
2) **Markets**
    a. Heavy reliance on imported raw fish for the processing industry; vulnerability to global supply fluctuations.
    b. Stringent international market requirements (EU IUU compliance, SPS standards, labour and ethical standards).
3) **Nutrition**
    a. Despite high fish supply, micronutrient intake remains inadequate
    b. Rising overweight/obesity and NCDs alongside pockets of undernutrition - diet quality challenges.
    c. Potential future deficit in fish supply if wild-caught production declines
    d. Limited consumer awareness on nutrition value and safe handling of fish
4) **Gender**
    a. Women's contributions remain under-recognized and unaccounted, especially in processing, gleaning, trading.
    b. Low visibility in official statistics despite high involvement in post-harvest (≈60%).
    c. Limited access to finance, training, technology, and decision-making for women in fisheries and aquaculture.
5) **Governance**
    a. Fragmented institutional responsibilities across DOF, DMCR, Marine Department, MECC, Navy, etc., complicating coordination.
    b. Enforcement challenges despite modernized fisheries laws (2015 & 2017 ordinances).
    c. Limited data on FLW, small-scale production, and gender-disaggregated labour—weak evidence for policymaking

10.2. Promising opportunities or best practices that could be scaled up

1) **Production**
    a. Expand sustainable aquaculture, especially freshwater species
    b. Improve post-harvest handling through low-cost technologies
    c. Adopt climate-smart aquaculture practices
    d. Strengthen stock recovery measures to rebuild fish biomass
    e. high-impact national priorities including sustainable fisheries and IUU compliance, climate-resilient aquaculture systems, food safety and traceability, value-added seafood and circular economy, ecosystem restoration, support for small-scale fishers, and digital transformation across the value chain.
2) **Markets**
    a. Strengthen value-added processing (ready-to-eat, convenience seafood) to boost export competitiveness and domestic demand
    b. Leverage Thailand's strong processing industry by increasing sourcing from domestic aquaculture rather than imports
    c. Promote domestic branding for Thai freshwater species to diversify markets beyond export-oriented marine species
3) **Nutrition**
    a. Integrate fish into national nutrition programs, especially for vulnerable groups (children, elderly, rural poor).
    b. Raise public awareness on the nutritional value of fish and safe preparation practices.
    c. Use aquaculture to close future protein gaps, preventing the projected shortfall from wild-catch decline
4) **Gender**
    a. Recognize and formalize women's contributions in statistics and value-chain roles—improving visibility for support programs
    b. Create platforms for women's participation in policy dialogue and value-chain planning
    c. Target women with financial services, training, and digital literacy to support entrepreneurship in processing, trading, and aquaculture
5) **Governance**
    a. Improve cross-agency coordination among DOF, DMCR, MECC, FDA through integrated value-chain management
    b. Expand data systems for FLW, small-scale fisheries, gender-disaggregated roles, and domestic market flows.
    c. Build capacity for climate risk management within fisheries/aquaculture agencies.

11. Priority Policy Recommendations

11.1. Key actionable policy recommendations linking aquatic foods, value chains and Food Security and Nutrition (FSN - six dimensions)

Table 11.1: Key actionable recommendations

S.No.	Dimension	Recommendation	Activities	Rationale
1	**Fish Loss & Waste (FLW)**	1. Establish a national FLW measurement & monitoring programme 2. Upgrade landing sites & cold-chain for small-scale fishers	• Pilot FLW audits, standardize protocols, scale to national monitoring • Insulated landing boxes/ ice machines, community cold rooms at key landing sites	Data not available for fish loss and waste, better infrastructure would enable more fish for consumption than consigned to fish meal plants
2	**Gender Inclusion**	1. Integrate gender into fisheries statistics & planning 2. Women-targeted finance, training & tech adoption	• Disaggregated data collection • Map women's roles in value chains for targeted programmes including digital literacy	Concentration in low-paid roles reduces income and resilience
3	**Compliance & Trade Readiness**	1. Roll out scalable traceability for small actors 2. Strengthen MCS & IUU countermeasures with tech + community reporting	• simple digital registry (QR codes) through producer groups/ cooperatives; subsidize onboarding costs and training • Scale vessel monitoring, port state measures, and community observer schemes	Traceability is required by export markets; small actors struggle to comply Enforcement gaps weaken credibility in global markets.
4	**Environmental Sustainability**	1. Implement stock-recovery & sustainable gear policies 2. Restore & protect coastal	• Enforce seasonal closures, gear restrictions • National mangrove &	Habitat loss (mangrove conversion) undermines nursery functions and resilience

S.No.	Dimension	Recommendation	Activities	Rationale
		habitats (mangroves, seagrass)	seagrass restoration targets	
5	**Nutrition Contribution**	1. Promote small whole fish and affordable nutrient-dense products 2. Nutrition education & behaviour change	• Support SME production of canned/dried small fish, fish powder, and fortified fish products for low-income markets; quality/safety training. • National campaigns (radio, community extension) on fish nutrition, integrate messages into DOF extension services	Small fish consumed whole deliver multiple micronutrients cost-effectively Awareness gaps limit optimal use of fish for nutrition and safe handling
6	**Climate Resilience & Readiness**	1. Integrate aquaculture into water resource planning 2. Financial protection for producers (index insurance & contingency funds)	• Ensure aquaculture needs are considered in basin planning • Develop micro-insurance products for small producers (weather/index-based), emergency contingency funds, and rapid response extension support aftershocks.	Water scarcity and quality affect farm viability and food security Producers lack buffers for climate shocks and market disruptions.

11.2. Recommendations (specific, feasible, and linked to national priorities)

Table 11.2: Recommendations linked with national priorities

S.No.	Dimension	Recommendation	National Priorities
1	**Fish Loss & Waste (FLW)**	1. Establish a national FLW measurement & monitoring programme 2. Upgrade landing sites & cold-chain for small-scale fishers	• Supports DOF's value-chain data needs; links to FAO/World Bank FLW initiatives and national food security monitoring. • Aligns with DOF market infrastructure plans and MSME support programs
2	**Gender Inclusion**	1. Integrate gender into fisheries statistics & planning 2. Women-targeted finance, training & tech adoption	• Supports national gender equity commitments • Aligns with MSME development plans and rural livelihood programs
3	**Compliance & Trade Readiness**	1. Roll out scalable traceability for small actors 2. Strengthen MCS & IUU countermeasures with tech + community reporting	• Builds on HACCP/GMP systems and supports compliance with EU IUU / SPS requirements. • Builds on Royal Ordinance on Fisheries (2015/2017) and ongoing anti-IUU efforts.
4	**Environmental Sustainability**	1. Implement stock-recovery & sustainable gear policies 2. Restore & protect coastal habitats (mangroves, seagrass)	• Links to Fisheries Act (B.E.2558), DOF stock management plans, and international commitments • Aligns with DMCR mandates and national environmental / climate adaptation strategies
5	**Nutrition Contribution**	1. Promote small whole fish and affordable nutrient-dense products 2. Nutrition education & behaviour change	• Ties into food security and nutrition targets and DOF processing/industry plans. • Links MOPH nutrition strategies with DOF outreach programs
6	**Climate Resilience & Readiness**	1. Integrate aquaculture into water resource planning 2. Financial protection for producers (index	• Links to national water resource management and agricultural planning frameworks • Aligns with rural finance initiatives and disaster

S.No.	Dimension	Recommendation	National Priorities
		insurance & contingency funds)	risk management strategies.

12. Provide the traffic-light scoring for the six key dimensions

Table 12.1: Traffic light scoring for the six key dimensions

S.No.	Dimension	Score	Colour	Rationale
1	**Fish Loss & Waste (FLW)**	**2**		FLW data is limited and no national estimates exist; losses occur at handling, landing, and transport; infrastructure deficits remain. But most fish/by-products are utilized and fishmeal industry absorbs "trash fish," reducing outright waste
2	**Gender Inclusion**	**2**		Women's roles remain largely unrecognized in official statistics; high participation (~60% post-harvest) but low visibility, limited access to finance, technology, and leadership positions. Significant inequality persists
3	**Compliance & Trade Readiness**	**4**		Thailand has strong compliance structures (HACCP, GMP, anti-IUU reforms, PSMA accession). Export sector is advanced. Remaining challenges include small-scale traceability, SPS compliance, and ongoing international scrutiny
4	**Environmental Sustainability**	**2**		Marine stocks are fully exploited/overexploited; habitat loss (mangroves), aquaculture pollution, and coastal pressures persist. Some recovery and management measures exist, but environmental risks remain high
5	**Nutrition Contribution**	**4**		Fish is a major protein and micronutrient source; high consumption levels; small fish species contribute essential minerals. Challenges include micronutrient gaps and rising NCDs, but overall contribution to diets is strong
6	**Climate Resilience & Readiness**	**3**		High vulnerability to climate shocks; aquaculture affected by floods, salinity changes, temperature shifts. Some adaptation actions exist (early warning needs, climate-smart training gaps). Moderate but improving

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Bay of Bengal Programme
Inter-Governmental Organisation
91 St. Mary's Road, Chennai - 600 018, India.
Tel: +91 44 42040024
Email: info@bobpigo.org | www.bobpigo.org