Quantifying the Economic Impact of the U.S. Seafood Import Monitoring Program (SIMP) on Global Fisheries: A GTAP-HS Disaggregation Approach

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Abstract

This paper documents the data-construction methodology for a highly disaggregated GTAP-HS computable general equilibrium database in which the standard fishery sector is decomposed into 121 HS6-level commodities — 38 aquaculture raw products, 38 wild-capture raw products, 41 processed seafood items, and 4 ancillary categories (laver, other seaweed, fishmeal, and a residual agri-fishery class). Building on the species-definition and trade-disaggregation framework presented in earlier work, the paper concentrates on a component that prior studies treated only summarily: the value-based disaggregation of domestic production. We introduce the VDMK (Value of Domestic purchases at Market prices) procedure, which fixes each region's farmed total to the observed FAO country-level aquaculture value and distributes the remaining capture envelope across species using FAO production quantities and a capture-to-aquaculture price coefficient derived from national statistics. The contribution is a transparent, reproducible pipeline that preserves the GTAP control totals while delivering species-level resolution suitable for commodity-specific policy simulation.

Keywords: GTAP-HS, fishery disaggregation, computable general equilibrium, aquaculture, capture fisheries, domestic production database

1 Background and Motivation

1.1 The Seafood Import Monitoring Program (SIMP)

The motivation for this database is a class of trade measures that are inherently commodity-specific. The U.S. Seafood Import Monitoring Program (SIMP) is the leading example. Established to combat illegal, unreported, and unregulated (IUU) fishing and seafood fraud, SIMP requires catch documentation and chain-of-custody traceability data at the point of import for a set of priority species. As of the current rule, coverage extends to thirteen priority species groups encompassing roughly 1,100 individual species — including shrimp, tunas, Atlantic and Pacific cod, swordfish, blue and king crab, abalone, sea cucumber, groupers, snappers, mahi-mahi, and sharks.

SIMP operates not as a tariff but as an administrative and documentary import restriction. Importers must report harvest and landing information and maintain a traceable chain of custody from the point of harvest to entry into U.S. commerce. Compliance imposes real costs: industry surveys report that customs-broker data-entry time rose roughly ninefold after SIMP introduction, and the per-entry administrative burden has been estimated in the tens of dollars. A parallel measure, the full implementation of the Marine Mammal Protection Act (MMPA) import provisions, adds a further non-tariff barrier by prohibiting imports from fisheries that fail to meet U.S. marine-mammal bycatch standards. Crucially, the regulatory burden of these measures *varies by species*: it depends on supply-chain complexity, the documentation already required under other schemes (e.g., the CCAMLR Catch Documentation Scheme for toothfish), and whether a product is raw or processed.

1.2 Why GTAP-HS, and why species disaggregation

Quantifying the economic effects of such measures requires a general-equilibrium framework, because import restrictions on seafood propagate through trade reallocation, processing linkages, and income effects that partial-equilibrium tools cannot capture. The GTAP model is the natural choice. However, the standard GTAP database represents the entire fishery sector as a single aggregated commodity, which makes it impossible to distinguish the markedly different supply chains, price levels, and policy exposures of, for example, farmed abalone and wild-caught Alaska pollock.

This is precisely where a single aggregated sector fails. SIMP's burden falls unevenly across species and across production stages: covered species (shrimp, tuna, cod) face documentary costs that non-covered species do not; raw and processed forms of the same species face different requirements; and farmed and wild output of the same species follow distinct supply chains. A model that treats all fish as one good cannot represent any of this. The GTAP-HS disaggregation framework resolves the limitation by decomposing the aggregated fishery sector into HS6-level sub-commodities while preserving the full general-equilibrium linkages of the GTAP model. Species-level resolution is therefore *necessary*, not merely desirable: without it, a commodity-specific measure like SIMP cannot be calibrated or simulated at all.

1.3 Scope and contribution of this paper

An earlier contribution by the author (Lim, 2024) set out a framework for disaggregating the fishery sector into species- and production-method-specific commodities and demonstrated the trade-side disaggregation using the TASTE program. That work, however, described the domestic-production side only in outline: it noted that domestic fishery absorption was "refined into fishery products using FAO statistics," without specifying how the value split between aquaculture and capture output was constructed, how species without aquaculture were priced, or how the procedure preserved the database control totals.

This paper closes that gap. Its purpose is methodological rather than empirical — it does not report SIMP simulation results, which are presented elsewhere. Instead it documents, step by step, how a species-level fishery database for GTAP-HS is assembled, with particular emphasis on the value-based domestic-production routine referred to here as VDMK (Value of Domestic purchases at Market prices). The objective throughout is reproducibility: every transformation is traceable to a named source file and a stated rule, and the procedure is designed so that the disaggregated cells sum back exactly to the original GTAP sectoral totals.

2 Disaggregated Sector Structure

The disaggregated database covers ten regions — Korea (KOR), the United States (USA), China (CHN), Japan (JPN), Mexico (MEX), Canada (CAN), Indonesia (IDN), the European Union

(EUR), ASEAN, and the Rest of the World (ROW) — and decomposes the fishery sector into 121 HS6-level commodities. The decomposition follows three organising principles: separation by production method (aquaculture versus capture), separation by processing stage (raw versus processed), and species resolution within each.

The 121 commodities partition into four blocks. The aquaculture raw block (*Fsq*) and the wild-capture raw block (*Fsh*) each contain the same 38 species, so that the same biological commodity is comparable across production methods and across countries. The processed block (*Fod*) contains 41 value-added items capturing global-value-chain complexity. Four ancillary categories — laver (*Crp_ Laver*), other seaweed/crops (*Crp_ Oth*), fishmeal (*Feed*), and a residual agri-fishery class (*Agri*) — complete the structure.

Table 1: Structure of the GTAP-HS fishery disaggregation

Block	No. of sectors	Source aggregate
Aquaculture raw (Fsq)	38	Fsh (DOMSALES)
Wild-capture raw (Fsh)	38	Fsh (DOMSALES)
Processed seafood (Fod)	41	Fod (DOMSALES)
Laver / Other seaweed (Crp)	2	Crp (DOMSALES)
Fishmeal (Feed) / Agri residual	2	Fod (DOMSALES)
Total	121	—

COMMD (disaggregated aggregate anchors) = Fsh, Fod, Crp. The aquaculture and capture blocks share an identical 38-species list so that production-method comparisons are well defined within each country.

3 Data Sources and Concordances

Five primary inputs drive the construction, supplemented by two concordance tables. Table 2 lists each source, its native unit, and the role it plays in the pipeline.

Two design choices in the source layer deserve emphasis. First, FAO reports *value* data for aquaculture but *quantity only* for capture fisheries. Because the GTAP database is value-based, this asymmetry is the central obstacle the VDMK routine must overcome: capture output cannot be valued directly from FAO and requires an external price ratio (Section 5). Second, to smooth annual volatility all FAO magnitudes are computed as three-year means over 2022–2024.

3.1 The ASFIS–FGEM concordance

The principal concordance maps each FAO ASFIS species to a model commodity. It carries four working columns: the ASFIS species name, the model commodity label (*fgem*), and the two destination tags *fsh* (raw-commodity label) and *fod* (processed-commodity label). The *fgem* column collapses the roughly 4,000 ASFIS entries onto the model's ∼40 species groups; *fsh* routes the species into the raw aquaculture/capture blocks, while *fod* routes it into the processed block. A null *fod* entry means the species has no processed counterpart in the model and is therefore excluded from the processed allocation. Table 3 shows representative rows.

Approximately 4,000 ASFIS species are mapped onto ∼40 model commodities. "NEI" = not elsewhere included (FAO residual species categories). A null fod entry (e.g., Common dentex) excludes the species from the processed-block allocation.

Table 2: Primary data inputs and their roles

Source	Native unit	Role in construction
FAO global production quantity	tonnes	Aquaculture and capture volumes by species × country
FAO aquaculture production value	USD 1,000	Observed aquaculture value by species × country (+ fallback world price)
GTAP DOMSALES (CM02)	USD million	Regional control totals for Fsh, Fod, Crp
ISIC industrial output	national currency	Processed-food split (fish processing vs. feed)
KOSIS fishery survey	tonnes; KRW 1,000	Korea aquaculture/capture unit prices for k
ASFIS–FGEM concordance	—	FAO species → model commodity (fgem)
Production–FGEM concordance	—	National species names → model commodity

Table 3: Sample of the ASFIS → fgem → fsh → fod concordance

ASFIS species	fgem	fsh	fod
Rainbow trout	Trout	Trout	Trout
Atlantic bluefin tuna	Tunas	Tunas	Tunas
Common carp	Carp	Carp	Carp
Common octopus	Octopus	Octopus	Octopus
Blue crab	Crab	Crab	Crab
European anchovy	Anchovy	Anchovies	Anchovies
Blue whiting (=Poutassou)	Cods	Cods	Cods
Common dentex	Seabream	Seabream	(none)
Cyprinids NEI	Oth_fsh	Other_fish	Other_fish

4 Trade-Side Disaggregation

The trade side follows the established procedure and is summarised here for completeness. Bilateral trade in the aggregated GTAP fishery and processed-food sectors is split into the 121 HS6 commodities using the TASTE program, which maps HS6 trade flows onto the model commodities and reallocates export and import values accordingly. Processed items are carved out of "other food" (*ofd*), with non-fishery agricultural foods excluded; seaweed is carved out of "crops" (*crp*).

Within each species, the raw-product trade value is allocated between the aquaculture and capture commodities using the *partner country's* aquaculture–capture production ratio, on the assumption that imports embody the exporter's production mix. For instance, since roughly 92% of Korean oyster output is farmed, every destination importing Korean oysters assigns 92% of that value to aquaculture oyster and 8% to capture oyster. Because the same species appears in both blocks for every country, the resulting export and import values remain fully comparable across regions.

5 Value-Based Domestic Production (VDMK)

The domestic-production routine is the methodological core of this paper. Its task is to take each region's domestic fishery absorption from the GTAP database — which, under the GTAP accounting identity, equals domestic fishery output — and split it into species- and production-method-specific cells, while preserving the regional control total exactly. We denote by DOMSALES[r] the domestic-sales control total for region r in the aggregate fishery sector.

5.1 The valuation problem and the value-share principle

A naïve disaggregation would split the domestic total by physical quantity. This badly distorts the result, because aquaculture and capture output have very different unit values and the species mix differs sharply across countries. Korea is the clearest case: its high-value farmed species (abalone, flatfish, eel) are understated when the split is driven by tonnage, since farmed volumes are modest relative to their value. The VDMK routine therefore splits the domestic total by *value*, not quantity.

For each species s and region r, two value magnitudes are formed. The aquaculture value is taken directly from the FAO country-level aquaculture value series — not estimated from a world price — so that each region's farmed total reflects its own production structure. The capture value is then built on the same national price basis:

$$\text{aqua\_val}[s, r] = \text{FAO aquaculture value}[s, r] \quad \text{(observed)} \tag{1}$$

$$\text{cap\_val}[s, r] = \text{cap\_qty}[s, r] \times p_{aq}[s, r] \times k[s] \tag{2}$$

where $p_{aq}[s, r]$ is the region-specific aquaculture unit price implied by the FAO value and quantity (FAO aquaculture value divided by FAO aquaculture quantity for that species and region), and $k[s]$ is the capture-to-aquaculture relative price coefficient (Section 5.3). Valuing capture output at the same country's aquaculture price, adjusted only by k, keeps the two production methods on a consistent price basis within each region.

The allocation then proceeds in two sequential steps rather than as a single simultaneous split. First, the aquaculture cells are set equal to the observed FAO values directly, so that the region's farmed total is fixed to the FAO figure:

$$\text{fsq}[s, r] = \text{aqua\_val}[s, r] \quad \text{(FAO observed, fixed)} \tag{3}$$

Second, the remaining capture envelope — the regional control total net of fixed aquaculture — is distributed across species in proportion to each species' capture value:

$$\text{cap\_resid}[r] = \text{DOMSALES}[r] - \sum_{s} \text{fsq}[s, r] \tag{4}$$

$$\text{fsh}[s, r] = \text{cap\_resid}[r] \times \frac{\text{cap\_val}[s, r]}{\sum_s \text{cap\_val}[s, r]} \tag{5}$$

This sequential design is what fixes the aquaculture total to the FAO value while still preserving the control total: by construction $\sum_s(\text{fsq} + \text{fsh}) = \text{DOMSALES}[r]$ for every region. In the rare case that a region's summed FAO aquaculture value exceeds its fishery control total, the aquaculture cells are scaled down proportionally so that the capture residual does not become negative.

5.2 Country aquaculture value and the fallback world price

The primary source for the aquaculture side is the FAO country-level aquaculture value series, which reports farmed output value by species and country. Using these observed values — rather than multiplying farmed volume by a single world price — anchors each region's aquaculture total to its own price structure. The region-specific aquaculture unit price $p_{aq}[s, r]$ follows directly as the ratio of that value to the corresponding FAO quantity, and it is this price that values capture output for the same species and region.

A world aquaculture unit price is retained only as a fallback. It is computed as the global sum of FAO aquaculture value divided by the global sum of FAO aquaculture quantity, converted to a common USD-per-tonne basis. The fallback is used in two situations: when a region records capture or aquaculture volume for a species but no FAO aquaculture value is available for that cell, and when a species is farmed nowhere in the world. For the latter, a quantity-weighted world mean price across all species is substituted. This layered design guarantees that every cell carries a strictly positive price while keeping observed country values in control wherever they exist.

5.3 The capture–aquaculture price coefficient k

The coefficient $k[s]$ addresses the FAO data asymmetry directly. Since FAO provides no capture values, capture output is valued by scaling the aquaculture price by k, defined as the ratio of the capture unit price to the aquaculture unit price for the same species. A value of k below one means farmed product is dearer than wild (typical of finfish); a value above one means wild product commands a premium (typical of shellfish and seaweed, where wild supply is scarce).

National statistics are the natural source for k because, unlike FAO, they report both quantity and value for capture and aquaculture separately. We use the Korean fishery survey (KOSIS, 2025), which reports production quantity (tonnes) and value (KRW 1,000) by species and by fishery type. The survey is organised as a hierarchy: a top level of fishery types (offshore, marine aquaculture, distant-water, inland), a middle level of taxonomic subtotals (finfish, crustaceans, molluscs, seaweed, other aquatic animals), and a leaf level of individual species. Table 4 reproduces a fragment of this structure.

Table 4: Sample of the KOSIS fishery-survey hierarchy (2025, offshore fisheries)

Fishery type	Species (level)	Quantity (t)	Value (KRW mn)
Offshore	· Finfish (subtotal)	738,428	2,742,157
Offshore	·· Flatfishes	15,922	113,015
Offshore	·· Hairtail	44,480	448,292
Offshore	·· Mackerel	202,554	388,344
Offshore	·· Cod	7,890	31,824
Marine aquaculture	·· Abalone	17,895	—

Indentation marks the hierarchy (· subtotal, ·· species). Only leaf-level species rows are used; subtotal and fishery-type rows are dropped by name. Aquaculture is identified with the marine-aquaculture branch; capture is the union of offshore, distant-water, and inland branches. Values converted from KRW 1,000 to KRW million for display.

For each model commodity the species rows are aggregated within the aquaculture branch and within the capture branches, two unit prices are formed, and their ratio is taken:

$$k[s] = \frac{p_{\text{capture}}[s]}{p_{\text{aquaculture}}[s]} \tag{6}$$

Because k is a ratio of two prices expressed in the same units (KRW 1,000 per tonne), it is dimensionless: the national currency and the per-tonne basis cancel. The coefficient can therefore be applied to the region-specific aquaculture price without any currency conversion, and it carries only the relative-price information — how much more or less wild product is worth than farmed product of the same species.

Table 5: Illustrative capture-to-aquaculture price coefficients (KOSIS 2025)

Species (commodity)	Aquaculture price	Capture price	k = cap/aqua
Tunas	60,761	2,747	0.045
Mackerel	20,073	1,905	0.095
Shrimps	19,104	6,504	0.340
Flatfish	14,318	6,341	0.443
Abalone	17,895	18,317	1.024
Oyster	871	979	1.124
Mussels	585	784	1.340
Salmon	2,256	7,070	3.135

Prices in KRW 1,000 per tonne (= KRW per kg). $k < 1$ indicates farmed product is more valuable than wild; $k > 1$ indicates a wild premium. Coefficients shown are for species with both aquaculture and capture output in the Korean data.

5.4 Treatment of species without an observed price ratio

Not every model commodity yields a national price ratio. The routine distinguishes three cases and treats each transparently:

1. **Both production methods observed.** Species farmed and caught in the national data (15 commodities, e.g. tuna, mackerel, salmon, abalone) receive the empirical k of Section 5.3.

2. **Capture only.** Species caught but not farmed nationally (17 commodities, e.g. pollock, cod, octopus, toothfish) have no aquaculture price to form a ratio. For these k is set to one, so that capture output is valued at the region aquaculture price without further adjustment — a neutral choice when no domestic farmed comparator exists.

3. **Absent from national statistics.** Species not produced in the national data (6 commodities, e.g. cobia, herring, seabream) fall back to a single coefficient. Rather than an arbitrary value, we adopt $k = 0.75$, derived from the FAO SOFIA 2024 world aggregates: the global capture unit price (USD 1,701 per tonne) divided by the global aquaculture unit price (USD 2,261 per tonne) yields 0.752. This anchors the residual coefficient to a documented world benchmark.

5.5 Ancillary blocks: laver, processed food, and feed

Laver split from crops (using Nori data). Korean dried laver (gim) is economically significant but sits inside the aggregated GTAP *crops* sector rather than the fishery sector. The routine therefore splits the domestic *crops* control total into a laver commodity (*Crp_Laver*) and a residual (*Crp_Oth*). The laver share is measured using FAO *Nori* aquaculture value: ASFIS species whose names contain "nori" (dark green nori, Nori NEI, and laver/Nori) are summed to obtain the laver aquaculture value, and the domestic crops total is divided between *Crp_Laver* and *Crp_Oth* in proportion to that value versus the residual. The procedure verifies that the laver value does not exceed the crops control total before applying the split, so the crops total is preserved exactly.

Processed-food split via ISIC industrial output. The domestic *processed-food* control total bundles three economically distinct activities: fish processing, animal-feed manufacturing (which absorbs fishmeal), and a residual of non-fishery processed agriculture. To separate them the routine uses UNIDO/ISIC Rev. 4 industrial-output data at the four-digit activity level. Two activities are isolated — ISIC 1020 (processing and preserving of fish, crustaceans, and molluscs) and ISIC 1080 (manufacture of prepared animal feeds) — and expressed as shares of total food-manufacturing output, defined as the sum of ISIC activities 1010 through 1079 plus 1080. The domestic processed total is then allocated as:

$$\text{fishfood}[r] = \text{DOMSALES\_Fod}[r] \times (\text{ISIC 1020/total food output}) \tag{7}$$

$$\text{feed}[r] = \text{DOMSALES\_Fod}[r] \times (\text{ISIC 1080/total food output}) \tag{8}$$

$$\text{Agri}[r] = \text{DOMSALES\_Fod}[r] - \text{fishfood}[r] - \text{feed}[r] \quad \text{(residual)} \tag{9}$$

The fish-food portion is then distributed across the 41 processed commodities by the same species value shares used on the raw side, while feed enters as a single fishmeal row. For Korea (2022 ISIC), the relevant ratios are illustrative: fish processing (1020) accounts for about 7.2% of food output and prepared feeds (1080) for about 13.5%, as shown in Table 6.

Table 6: ISIC food-manufacturing output and processed-split ratios (Korea, 2022)

ISIC activity	Output (USD mn)	Share of food output
1010 Meat processing	18,836	20.9%
1020 Fish processing	6,438	7.2%
1050 Dairy	6,840	7.6%
1079 Other food n.e.c.	13,390	14.9%
1080 Prepared animal feeds	12,157	13.5%
Total food (1010–1080)	89,925	100%

fishfood ratio = 1020/total ≈ 0.072; feed ratio = 1080/total ≈ 0.135. Only the fish-processing and feed activities are extracted; the remaining food activities define the denominator and the residual Agri class. Where a country's ISIC profile is incomplete (for example, an economy reporting only meat processing), the routine substitutes a structurally comparable country's ratios so that the processed total is still fully allocated.

6 The Assembly Pipeline

The complete construction is implemented as a single reproducible routine. Its logical sequence is as follows; each step writes an intermediate table consumed by the next, and the final cells are integrated into the GTAP database alongside the trade-side disaggregation.

1. Load the ASFIS–FGEM concordance, mapping every FAO species to a model commodity and flagging processed and feed uses.
2. Aggregate FAO quantities into aquaculture and capture volumes by commodity × region, and the world aquaculture volume by commodity.
3. Aggregate FAO aquaculture values by commodity and region to obtain the observed aquaculture value per cell; retain a world aquaculture unit price (and a quantity-weighted mean for species farmed nowhere) as a fallback.

4. Derive the capture–aquaculture coefficient k by commodity from national statistics, applying the three-case rule of Section 5.4.

5. Fix the aquaculture cells (fsq) to the observed FAO country values; compute the capture residual as DOMSALES net of fixed aquaculture; distribute that residual across species by capture-value share to obtain fsh; verify that fsq + fsh sums to the control total.

6. Allocate the crops total into laver and other; allocate the processed total into fish food, feed, and residual via ISIC ratios.

7. Assemble the 121-row commodity matrix in fixed order and integrate it, with the trade-side data, into the GTAP-HS base.

A by-product of step 4 is a diagnostic table of national aquaculture and capture unit prices and their ratios, which is exported for inspection. This makes the most judgement-laden input — the relative pricing of wild versus farmed output — fully auditable rather than buried inside the build.

7 Internal Consistency and Validation

Two properties make the constructed database trustworthy for downstream simulation. The first is exact preservation of control totals: by the sequential construction of Section 5.1, the disaggregated fishery, processed-food, and crops cells each sum to their respective GTAP DOMSALES totals for every region, so no value is created or lost in disaggregation.

The second is the exact reproduction of observed aquaculture values. Because the sequential allocation fixes the fsq cells to the FAO country figures, each region's farmed total in the raw blocks equals its FAO aquaculture value by construction (subject only to the rare downward scaling noted above). It is important to note that this equality holds for the 38 finfish-and-shellfish species that constitute the raw aquaculture block: seaweed and laver are routed to the crops blocks (Crp_Laver, Crp_Oth) and a small number of items such as jellyfish and sea cucumber to the processed block, consistent with the sector structure of Section 2. For Korea, of roughly 3,070 million USD in total FAO aquaculture value, about 768 million (laver, other seaweed, and minor items) is allocated to the crops and processed blocks, leaving about 2,302 million in the raw aquaculture block. The full FAO total is therefore preserved across the database, distributed to the economically appropriate blocks rather than forced into the fishery raw block.

8 Concluding Remarks

This paper has documented a transparent and reproducible methodology for building a species-level fishery database for GTAP-HS, with the value-based domestic-production routine (VDMK) as its central contribution. The procedure fixes each region's aquaculture total to the observed FAO country value, resolves the FAO value/quantity asymmetry through a dimensionless capture-to-aquaculture price coefficient grounded in national statistics, handles species without an observed ratio through a documented three-case rule, and preserves the GTAP control totals exactly. The resulting 121-commodity database supports commodity-specific policy simulation that an aggregated fishery sector cannot.

Two extensions are natural. First, the relative-price coefficient k is currently anchored to Korean statistics and applied across regions; richer results would follow from country-specific coefficients wherever national surveys report both production methods. Second, the capture side still relies on the region aquaculture price scaled by k as a proxy for unobserved capture prices; where reliable national capture-value data exist, these could replace the proxy directly. Both refinements operate within the same value-preserving architecture — in which aquaculture totals are fixed to observed FAO country values — and would not disturb the database's internal consistency.

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A Appendix: Disaggregated Production by Region and Species

All values in USD million, base year (3-year mean 2022–2024). Rows are ordered by block: wild-capture raw (Fsh), aquaculture raw (Fsq), processed (Fod), and seaweed/crops (Crp, laver first). "–" denotes a value below 0.05.

Wild-Capture Raw (Fsh)

Species	KOR	USA	CHN	JPN	MEX	CAN	IDN	EUR	ASEAN	ROW
Abalone	1.5	–	–	0.6	1.5	–	–	1.2	2.5	22.5
Anchovy	645.3	6.2	4,171	51.3	573.3	–	1,233	869.7	1,787	8,040
Carp	4.1	1.0	–	–	6.2	0.6	–	48.4	43.0	95.1
Catfsh	0.6	5.6	–	–	2.8	0.2	403.0	5.1	266.2	305.0
Clams	89.4	208.7	–	6,217	9.8	111.9	–	1,157	477.5	1,152
Cobia	–	–	–	–	0.2	–	–	–	26.6	42.4
Cods	54.0	603.3	–	17.9	20.2	181.5	–	6,459	–	4,395
Crab	1,209	487.3	10,762	25.1	89.8	1,065	785.3	55.9	7,346	530.9
Eels	0.7	0.3	–	0.2	0.1	1.6	–	31.7	266.6	44.1
Flatfsh	21.7	12.0	–	3.6	–	–	–	1.7	147.8	34.3
Herrings	194.7	1,561	67.2	51.1	356.2	389.6	–	7,057	1,207	5,386
Jmk	30.4	0.3	344.7	7.9	1.6	–	599.9	108.3	811.3	322.0
Mackerel	164.5	1.7	748.7	36.8	22.0	0.3	1,359	503.5	1,811	950.8
Mussels	2.7	13.9	–	–	1.6	–	–	53.9	2.5	18.7
Ocn_Anm	6.0	4.2	–	–	5.9	–	–	26.1	34.7	23.0
Octopus	81.7	0.3	743.2	10.8	45.4	0.2	309.8	219.3	326.6	187.2
Oth_fsh	831.8	429.9	13,525	146.0	63.1	198.0	9,316	1,544	12,497	3,594
Oth_Msc	6.5	23.1	1,084	35.7	0.8	33.2	566.8	195.1	1,161	89.1
OthCrust	189.8	0.7	797.2	5.3	1.8	–	199.9	42.8	36.7	1,179
Oyster	14.2	45.2	–	–	5.8	1.5	–	6.6	1.4	5.1
Plaice	126.1	414.2	–	0.5	–	141.8	–	705.4	1.3	467.8
Pollock	127.5	2,765	–	62.0	–	47.9	–	195.0	–	3,868
Ry_skt	35.9	44.5	0.9	6.4	20.5	2.3	215.8	124.9	670.4	176.2
Salmon	4.6	2,106	–	140.7	–	148.0	–	141.8	–	2,969
Sardines	152.9	3.4	571.5	304.8	433.4	–	–	1,350	–	2,691
Scallops	0.1	114.5	–	60.1	2.8	356.2	–	428.8	14.4	110.1
Sea_uch	–	3.3	1.9	3.2	2.2	14.4	–	10.3	1.7	28.7
Seabass	13.9	4.8	–	1.4	22.1	1.0	–	40.3	172.9	392.3
Seabream	27.9	18.7	317.5	11.3	45.2	–	244.4	197.0	4,724	500.7
Sharks	–	147.8	2.6	0.1	57.0	1.0	–	889.4	333.0	362.8
Shrimps	143.2	281.6	6,646	17.4	24.6	348.9	1,932	1,113	2,897	534.3
Sole	19.0	10.0	8.2	–	–	15.6	–	315.7	317.4	158.1
Spearfsh	12.4	6.7	37.1	4.8	2.2	7.1	233.3	326.3	410.5	216.4
Squid	451.9	143.0	6,903	24.2	4.3	0.2	2,551	584.7	3,782	1,953

Species	KOR	USA	CHN	JPN	MEX	CAN	IDN	EUR	ASEAN	ROW
Tilapia	–	0.3	–	–	10.3	–	–	–	397.2	456.4
Toothfsh	17.4	–	–	0.1	–	–	–	63.0	–	33.6
Trout	–	0.1	–	–	–	8.0	–	36.7	1.9	2.7
Tunas	200.1	28.7	131.5	27.0	11.5	2.0	208.4	435.8	2,686	479.6
Total	**4,882**	**9,498**	**46,863**	**7,274**	**1,844**	**3,078**	**20,157**	**25,342**	**44,663**	**41,818**

Aquaculture Raw (Fsq)

Species	KOR	USA	CHN	JPN	MEX	CAN	IDN	EUR	ASEAN	ROW
Abalone	432.0	6.3	2,434	–	0.6	–	–	0.1	0.2	103.3
Anchovy	–	–	–	–	–	–	–	–	–	–
Carp	0.1	2.3	34,077	6.4	12.9	–	1,395	253.8	1,431	2,753
Catfsh	12.0	434.9	2,196	–	2.4	–	1,439	30.4	4,863	1,603
Clams	51.9	247.9	11,606	127.3	0.1	–	–	314.6	160.9	112.6
Cobia	–	–	92.3	–	–	–	–	–	23.1	27.2
Cods	–	–	–	–	–	–	–	–	–	38.1
Crab	–	–	14,886	–	0.1	–	57.2	0.1	1,365	70.7
Eels	383.4	1.4	1,748	594.9	–	–	–	35.2	1.0	65.9
Flatfsh	514.3	–	331.4	22.1	–	–	–	–	–	0.1
Herrings	–	–	–	–	–	–	1.9	–	–	–
Jmk	0.2	–	2,438	58.9	1.0	–	–	–	53.2	0.5
Mackerel	4.6	–	–	–	–	–	–	–	–	–
Mussels	21.8	19.5	487.9	–	0.6	32.5	5.5	448.8	39.3	1,958
Ocn_Anm	47.0	–	6,008	9.7	0.8	–	–	0.1	108.2	22.0
Octopus	–	–	–	–	–	–	–	–	–	–
Oth_fsh	239.7	54.3	49,151	1,145	4.9	159.6	18,983	196.4	8,015	6,692
Oth_Msc	29.4	–	1,323	7.7	–	2.2	–	0.1	4.0	173.6
OthCrust	–	232.1	32,663	–	–	–	–	0.1	–	3.7
Oyster	223.5	289.4	8,577	258.9	21.2	50.5	5.5	564.3	29.7	812.4
Plaice	69.8	–	513.2	–	–	–	–	133.5	–	26.4
Pollock	–	–	–	–	–	–	–	–	–	–
Ry_skt	–	–	–	–	–	–	–	–	–	–
Salmon	1.6	60.1	7.5	132.1	–	743.0	–	155.7	–	23,036
Sardines	–	–	–	–	–	–	–	–	–	–
Scallops	23.5	–	5,732	319.5	–	0.6	–	–	–	152.4
Sea_uch	–	–	43.5	–	–	–	–	–	–	8.6
Seabass	9.1	26.0	625.7	–	13.2	–	18.0	708.1	389.9	1,555

Species	KOR	USA	CHN	JPN	MEX	CAN	IDN	EUR	ASEAN	ROW
Seabream	99.3	–	379.7	462.5	1.1	–	–	696.7	81.8	1,346
Sharks	–	58.6	915.2	–	–	–	–	25.9	34.7	177.3
Shrimps	110.3	15.3	28,248	57.5	930.4	–	5,521	9.6	16,035	8,054
Sole	–	–	–	–	–	–	–	31.8	33.2	4.0
Spearfsh	–	–	–	–	–	–	–	–	–	–
Squid	–	–	–	–	–	–	–	–	–	–
Tilapia	1.8	44.6	5,864	–	109.2	–	43.7	–	3,869	5,437
Toothfsh	–	–	–	–	–	–	–	–	–	–
Trout	27.1	97.3	137.9	38.9	9.4	1.2	8.1	865.4	–	5,021
Tunas	–	–	–	386.4	38.0	–	–	483.4	–	135.8
Total	**2,302**	**1,590**	**210,486**	**3,628**	**1,146**	**989.7**	**27,478**	**4,954**	**36,536**	**59,389**

Processed Seafood (Fod)

Species	KOR	USA	CHN	JPN	MEX	CAN	IDN	EUR	ASEAN	ROW
Abalone	193.5	1.2	386.7	0.8	0.5	–	–	0.2	0.2	13.4
Agri	42,012	558,711	1,043,981	108,193	48,976	30,352	78,368	530,604	183,691	507,925
Anchovy	323.0	3.1	536.9	65.0	161.2	–	46.6	152.9	157.0	1,958
Carp	2.1	0.9	5,415	0.7	2.6	0.2	126.2	79.5	222.2	233.3
Catfsh	5.6	84.1	348.9	–	1.0	0.1	145.5	9.4	765.9	196.6
Clams	67.9	150.9	1,844	7,884	2.8	41.4	–	291.3	66.5	289.1
Cobia	–	–	14.7	–	0.1	–	–	–	5.9	12.4
Cods	27.0	302.3	–	22.7	5.7	67.2	–	1,135	–	1,073
Crab	605.0	244.1	3,751	31.8	25.3	394.4	34.9	9.9	853.8	134.7
Eels	171.5	0.4	277.7	63.6	–	0.6	–	15.4	23.6	15.8
feed	7,100	23,199	91,754	18,283	5,442	2,722	5,429	71,903	11,757	41,196
Flatfsh	240.4	6.0	52.7	6.9	–	–	–	0.3	13.0	8.4
Herrings	97.4	782.1	8.7	64.7	100.2	144.2	0.2	1,241	106.0	1,312
Jellyfsh	6.6	–	313.6	–	31.5	–	–	0.1	65.2	7.6
Jmk	15.3	0.2	431.8	16.2	0.5	–	22.7	19.0	79.4	78.5
Laver	257.5	–	243.9	56.0	–	–	–	–	–	0.1
Mackerel	84.4	0.9	96.4	46.6	6.2	0.1	51.4	88.5	159.1	231.6
Mussels	11.1	10.6	77.5	–	0.5	9.5	0.5	135.0	6.2	154.0
Ocn_Anm	24.0	2.1	954.8	1.0	1.7	–	–	4.6	19.6	7.3
Octopus	40.9	0.2	95.7	13.7	12.8	0.1	11.7	38.6	28.7	45.6
Oth_fsh	523.3	225.5	9,552	306.8	18.1	119.7	2,070	326.3	2,322	1,386
Oth_Msc	16.4	11.6	349.7	46.1	0.2	12.9	21.4	34.3	102.6	34.9

Species	KOR	USA	CHN	JPN	MEX	CAN	IDN	EUR	ASEAN	ROW
OthCrust	95.0	43.7	5,293	6.8	0.5	–	7.6	7.5	3.2	287.6
Oyster	106.9	76.7	1,363	27.6	3.1	15.2	0.5	158.9	4.7	63.3
Plaice	94.3	207.5	81.5	0.6	–	52.5	–	161.3	0.1	116.0
Pollock	63.8	1,385	–	78.5	–	17.7	–	34.3	–	942.2
Ry_skt	18.0	22.3	0.1	8.1	5.8	0.9	8.2	22.0	58.9	42.9
Salmon	3.0	1,067	1.2	192.1	–	270.9	–	68.4	–	2,481
Sardines	76.5	1.7	73.6	385.8	121.9	–	–	237.3	–	655.4
Scallops	10.5	57.4	910.9	110.2	0.8	132.0	–	75.4	1.3	38.5
Sea_ccb	13.4	1.7	345.5	4.8	0.2	26.5	–	0.2	8.8	24.0
Sea_uch	–	1.7	7.1	4.1	0.6	5.3	–	1.8	0.1	7.7
Seabass	11.0	7.3	99.4	1.7	7.1	0.4	1.6	205.1	74.7	214.2
Seaweeds	81.8	1.7	2,069	121.5	0.3	1.8	0.5	144.6	374.9	57.1
Sharks	–	85.0	145.8	0.2	16.0	0.4	–	163.6	34.6	101.9
Shrimps	120.9	144.0	5,344	28.2	69.3	129.1	572.6	198.3	2,703	744.8
Sole	9.5	5.0	1.1	–	–	5.8	–	64.4	32.9	38.8
Spearfsh	6.2	3.4	4.8	6.1	0.6	2.6	8.8	57.4	36.1	52.7
Squid	226.2	71.6	888.6	30.7	1.2	0.1	96.5	102.8	332.3	475.8
Tilapia	0.8	8.5	931.8	–	10.2	–	4.0	–	625.6	526.1
Toothfsh	8.7	–	–	0.2	–	–	–	11.1	–	8.2
Trout	12.1	18.2	21.9	4.1	0.6	3.3	0.7	248.4	0.2	383.9
Tunas	100.1	14.4	16.9	75.3	5.8	0.7	7.9	211.8	236.0	127.2
Total	**52,883**	**586,960**	**1,178,086**	**136,189**	**55,033**	**34,530**	**87,036**	**608,262**	**204,971**	**563,703**

Seaweed / Crops (Crp)

Species	KOR	USA	CHN	JPN	MEX	CAN	IDN	EUR	ASEAN	ROW
Laver	576.9	–	1,535	526.0	–	–	–	–	–	0.6
Oth	557.4	14,968	43,118	4,041	1,289	231.7	26,919	23,033	21,508	27,918
Total	**1,134**	**14,968**	**44,653**	**4,567**	**1,289**	**231.7**	**26,919**	**23,033**	**21,508**	**27,918**