

Export Markets for Seaweed

January 15, 2019

Commercial Species

- According to the FAO, over 220 species of seaweed have commercial value
- About 10 species are intensively cultivated:
 - Brown: *Saccharina japonica*, *Undaria pinnatifida* and *Sargassum fusiforme*
 - Red: *Porphyra* spp., *Eucheuma* spp., *Kappaphycus alvarezii* and *Gracilaria* spp.
 - Green: *Enteromorpha clathrata*, *Monostroma nitidum* and *Caulerpa* spp.
 - Source: FAO, *The Global Status of Seaweed Production, Trade and Utilization*, Vol. 124, 2018

Farmed vs Wild

- In 2015, the global production of seaweed was 30.4 million mt.
- 29.4 million mt was farmed vs only 1.1 million mt from the wild
 - Driven by industrial extraction (hydrocolloid) industries
 - Source: FAO, The Global Status of Seaweed Production, Trade and Utilization, Vol. 124, 2018

Seaweed production

Aquaculture



China & Indonesia largest seaweed producers 23+ MT (aggregate)

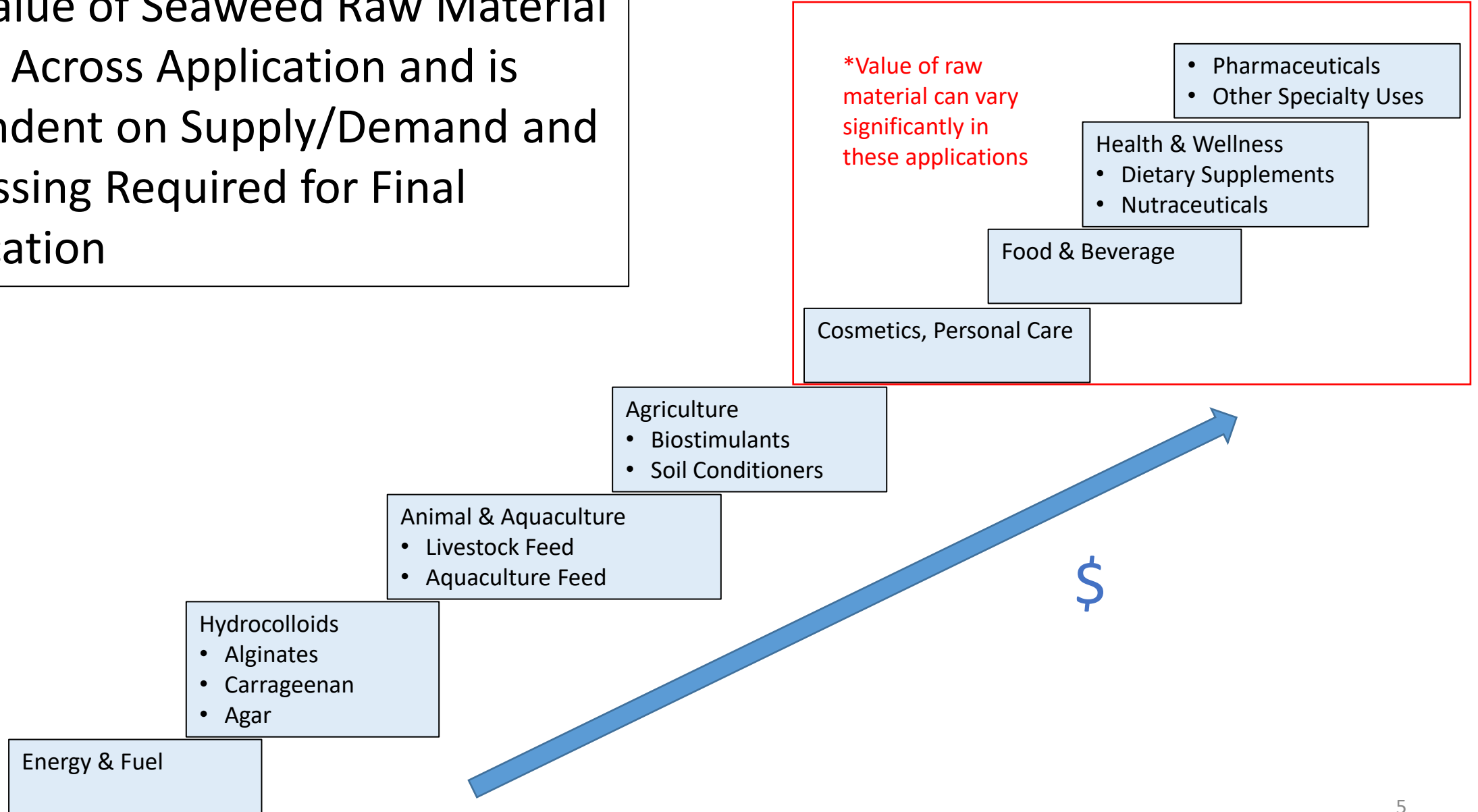
Fisheries



Chile, China & Norway lead exploitation of wild stocks of seaweeds.

Buschmann et al. EJOP. 2017

The Value of Seaweed Raw Material Varies Across Application and is Dependent on Supply/Demand and Processing Required for Final Application

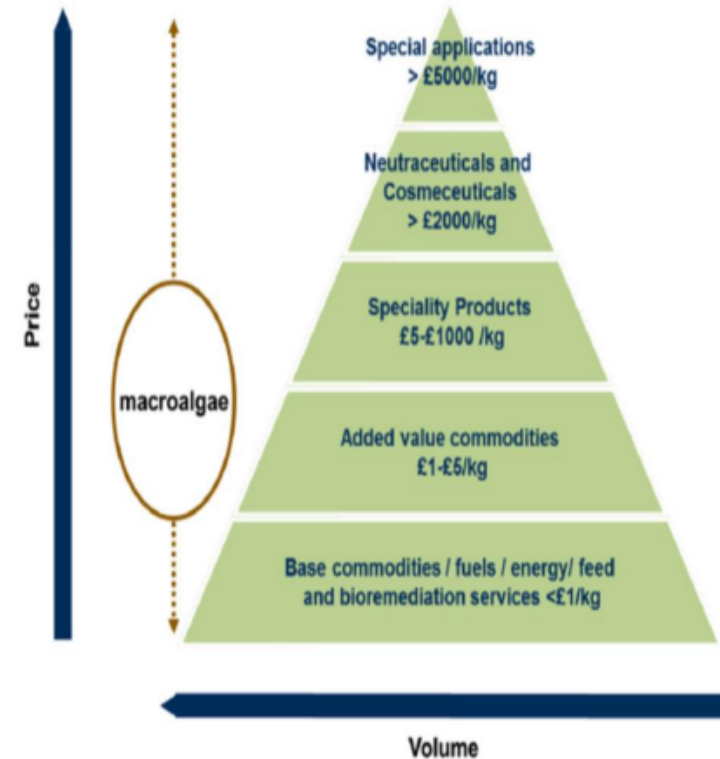


Value Chain

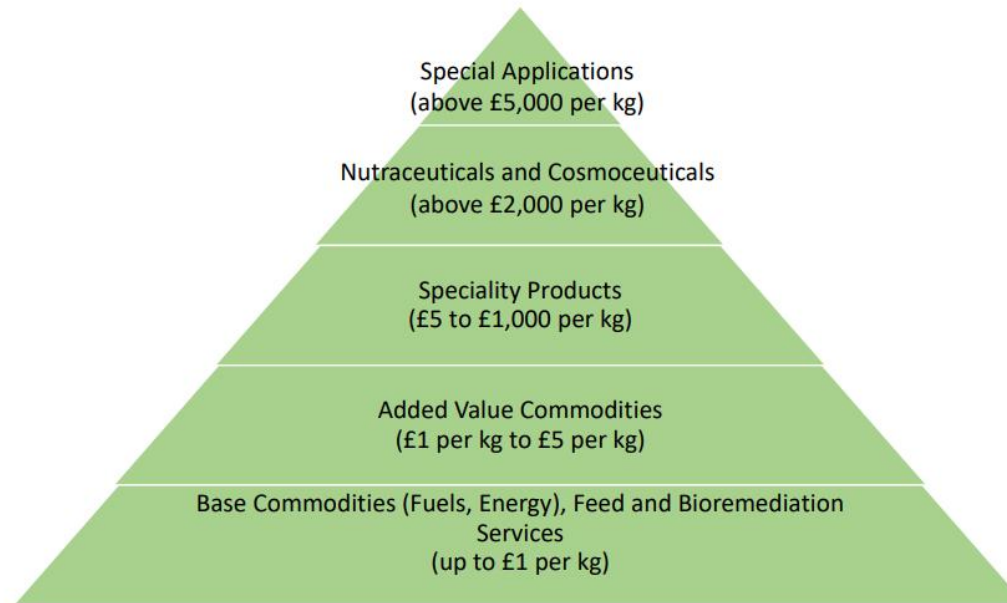
- The value chain for both bulk vs processed seaweed products depends on many factors:
 - Cultivation vs wild harvest
 - Harvesting (hand, mechanical)
 - Washing
 - Drying (solar, mechanical, freeze drying)
 - Quality Control
 - Milling
 - Blending
 - Extraction
 - Filtering
 - Drying
 - Packaging
 - Regulatory
 - Distribution

Seaweed products value pyramid

- < € 1/kg - dried & milled/flaked only
- Seaweed meals for feed and horticulture
- Food grade powders in bulk
- € 1-5/kg - more processing involved
- Specialist feed & horticulture products
- Higher quality food grade powders
- €5-1000/kg – depending on purity & use
- Hydrocolloids/bioactive extracts
- >€2000/kg High purity bioactive extracts (polyphenols/polysaccharides) for nutra/cosmeceutical/research.



Desire to increase the value of seaweed & seaweed extracts- functional food?



Value Pyramid for Algal Derived Products (modified from Subitec Value Pyramid for Algae Product Markets in Bruton et al, 2009)



- Seaweed Pyramid

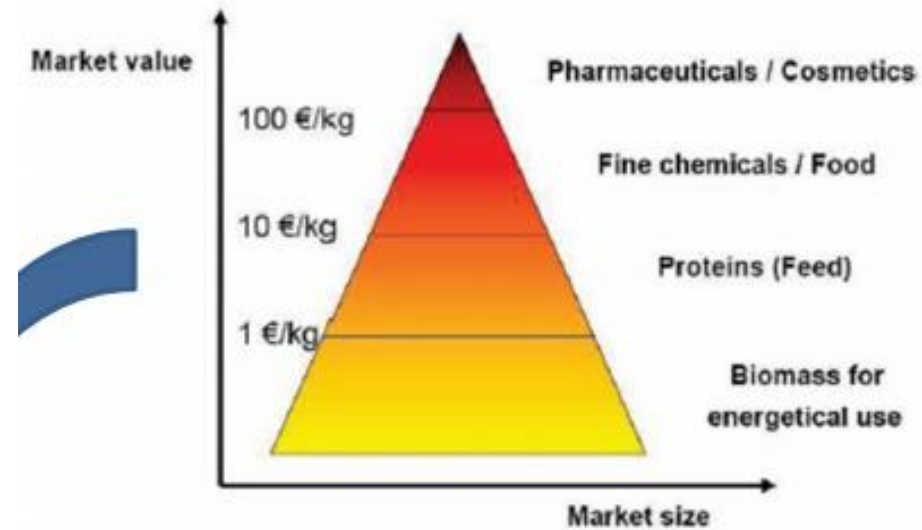


Figure 19: Value Pyramid for Algae Product Markets (Subitec)

Susan Holdt

Source: Dr. Susan Holdt, National Food Institute at the Technical University of Denmark

Top Markets

- According to the FAO, key export markets for dried and processed seaweeds in 2016 were imported by almost 100 markets worldwide
 - 1 million mt valued at \$US 4 Billion
- 35 countries represented nearly 80% of the global seaweed trade
 - Carrageenan
- China, the EU, Japan and the USA are the top importers

Table 22. Top four importers of dried seaweed and hydrocolloid products, 2014–2016

	Weight in tonnes; Value in USD					
	2014		2015		2016	
	Weight	Value	Weight	Value	Weight	Value
China	257 959	377 389	234 424	250 727	252 683	255 775
European Union	154 924	725 090	167 170	688 326	178 467	613 162
Japan	51 880	296 750	48 705	272 589	49 718	312 749
United States of America	38 102	256 442	38 278	253 227	40 861	209 143
Total	502 865	1 655 671	488 577	1 464 869	521 729	1 390 829

Source: Relevant National Statistics.

Table 21. Seaweed imports into the top thirty-five countries, 2013–2016

	Weight in tonnes; value in USD thousands					
	2014		2015		2016	
	Weight	Value	Weight	Value	Weight	Value
Edible seaweed	247 527	692 978	251 709	633 915	250 735	648 719
Non-edible seaweed	244 514	348 059	244 777	271 209	245 381	269 473
Carrageenan	115 467	913 486	111 852	891 776	110 555	759 844
Agar agar	11 738	243 316	11 771	231 958	12 052	225 624
Total	619 246	2 197 839	620 109	2 028 858	618 723	1 903 660

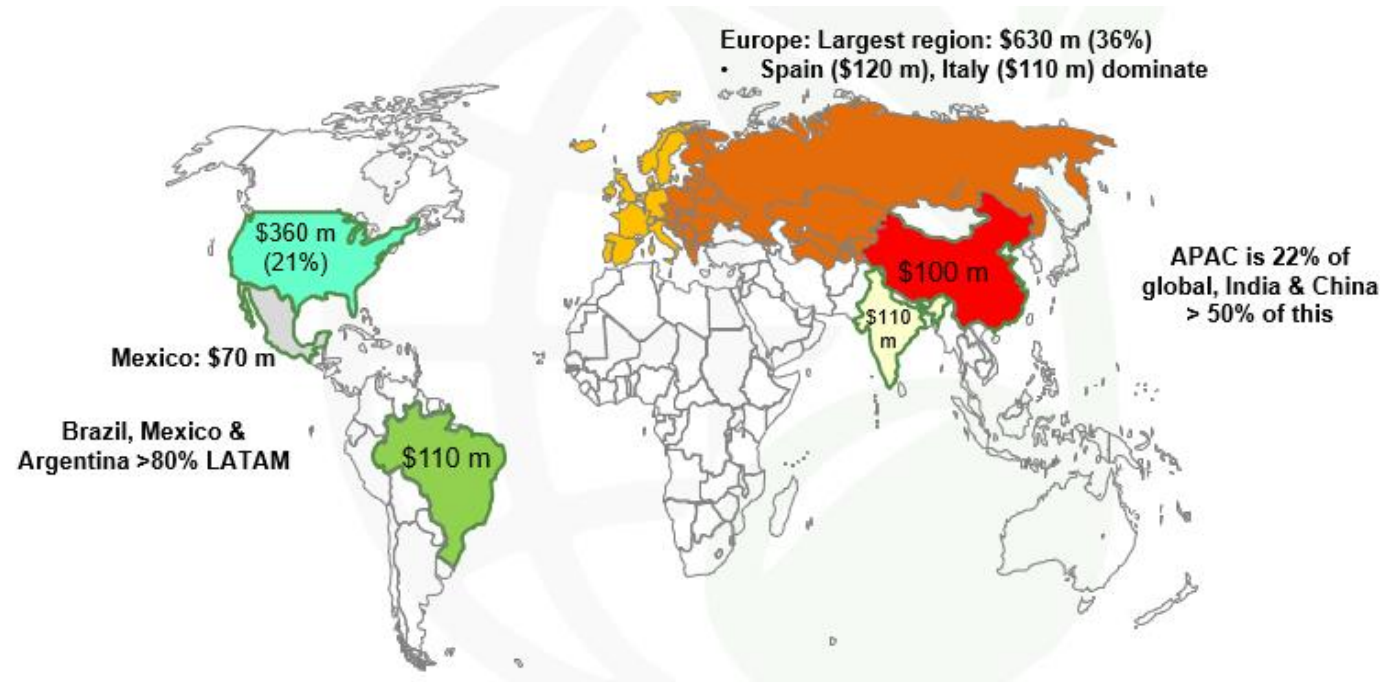
Source: Various sources of sources of national statistics.

Top Markets

- The most dynamic import market is for dried seaweeds for the production of hydrocolloids (alginates, carrageenan, agar).
- The trade for edible seaweed is mostly conducted in countries in the Far East (China, Japan, Rep. Korea and Taiwan).
- China has emerged as the largest importer of edible and non-edible seaweed for further processing, influencing international market prices for dried seaweed.

Seaweed Extracts in Agriculture

- The Biostimulant markets was valued at \$US 1.75 billion in 2015
 - The top 10 countries account for nearly 2/3 of this
 - Europe is the largest region of use, the USA the single largest country market
 - Seaweed extracts accounted for about 1/3 of this in 2015



Source: Dunham Trimmer LLC

Animal & Aquaculture



- Seaweed meal is used in the production of feeds for production & show animals, pets and aquaculture
- *Ascophyllum nodosum* is a popular species for these applications but the market is very competitive
- Key markets for animal use include Europe and North America
- Key markets for aquaculture (e.g., shrimp and abalone) include Asia and the Middle East
- The CIF value for dried/milled meal is quite low at hundreds of \$US/mt
- Aside from increasing quality demands (and the need for manufacturer certifications), the regulatory environment can be quite challenging

Edible Seaweed Markets

- While edible seaweeds are consumed around the world, the largest share of the trade in edible seaweeds is conducted in the Far East: Japan, China, Republic of Korea and Taiwan.
- Several core species account for a large share of the edible seaweeds consumed: *Undaria pinnatifida* (Wakame), *Saccharina japonica* (Kombu) and *Porphyra* spp. (Nori)
- A number of speciality species are also traded globally, with Japan being a significant consumer of these.



Edible Seaweed Markets

- Japanese food manufacturers import many different specialty seaweeds in dried format from countries such as China, Korea & Chile to produce dried kaiso and fresh daily seaweed salads

Japan: Imports of seaweed and other algae fit for human consumption (HS 121221), weight in tonnes; value in USD thousands, 2012–2016										
Origin	2012		2013		2014		2015		2016	
	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value
China	24 434	120 233	23 382	111 954	22 275	103 471	22 604	91 709	24 967	113 657
Korea, Republic of	11 935	86 863	7 074	62 041	8 812	72 318	7 077	68 545	7 763	93 608
Brazil	99	205	135	278	127	304	118	301	110	280
Chile	69	1 934	81	2 427	62	1 739	116	2 462	60	1 863
Viet Nam	32	420	42	507	85	605	196	679	47	494
Argentina	10	40	26	138	16	63	20	79	20	82
Russian Federation	69	458	27	122	22	120	11	27	11	50
France	1	7	0	0	1	4	1	11	5	21
China, Hong Kong SAR	0	0	0	0	0	0	0	0	4	26
Taiwan, Province of China	32	517	6	107	15	269	18	316	2	33
India	0	0	0	0	0	0	2	47	1	12
Ireland	0	0	0	0	0	7	0	0	0	21
United States of America	1	119	1	103	1	96	1	61	0	34
Sweden	0	0	0	0	0	0	0	0	0	24
Spain	0	0	0	0	0	0	0	0	0	2
Philippines	5	20	0	3	0	2	0	4	0	0
Thailand	0	0	0	0	12	53	0	0	0	0
Tonga	210	315	0	0	0	0	18	32	0	0
Australia	0	0	0	2	0	11	0	0	0	0
Canada	0	0	1	5	0	0	0	2	0	0
Total, including other countries	36 900	211 155	30 670	177 688	31 450	179 062	30 900	164 276	32 990	210 207

Source: Japan Ministry of Finance.



Seaweed Salad

10g

Edible Seaweed Markets

- Much of the seaweed (“kaiso”) salads are consumed in Japan but manufacturers also export to countries around the world
- Quality and taste/mouthfeel standards are significant barriers to overcome for suppliers wishing to enter this market
- Pricing varies based on the species & quality – traditional species are traded at \$US 5-6/kg CIF
- High demand species are not used in large quantities (tens of mt annually) but command higher pricing than traditional seaweeds
 - For example, Chilean Tosaka nori (*Meristotheca papulosa*) trades at approx. \$US 25/kg CIF but poor quality is affecting its use by kaiso manufacturers



Edible Seaweed Markets

- According to the FAO, the European Union is the 2nd largest import market for edible seaweeds in 2016
- The UK was the leading importer, followed by France, Italy and Germany
 - Source: The Global Status of Seaweed Production, Trade and Utilization, FAO, 2018

European Union (Member Organization): Imports of seaweed and other algae fit for human consumption (HS 121221), value in USD thousands, 2012–2016					
EU Importers	2012	2013	2014	2015	2016
France	27 763 154	25 894 571	26 503 645	9 418 614	9 593 275
Germany	6 496 309	10 516 537	5 026 151	5 060 414	5 712 664
United Kingdom	5 127 273	7 893 205	12 536 313	15 649 753	11 063 558
Italy	4 414 736	5 946 233	5 605 016	6 084 607	6 135 337
Netherlands	5 249 378	4 771 251	4 292 228	5 572 915	4 888 185
Austria	1 955 813	3 476 894	3 120 315	3 213 609	3 977 272
Spain	1 694 752	2 410 943	5 370 966	3 938 116	5 026 766
Denmark	1 767 371	2 207 093	1 962 891	1 632 288	1 759 901
Ireland	3 420 696	1 831 834	326 096	316 941	198 035
Belgium	1 621 542	1 768 939	3 032 944	2 489 172	2 534 891
Sweden	1 121 118	1 164 027	1 207 476	1 262 014	1 480 835
Poland	831 927	1 161 263	1 453 515	1 693 216	2 656 844
Hungary	993 677	954 942	116518	49 042	72 326
Czech Rep.	594750	600 321	608 233	861056	643 979
Finland	407 461	570 176	655 761	606 839	756 935
Greece	406 306	463 591	918 542	420 193	226 790
Portugal	498 281	429 454	921 556	702 019	794 768
Latvia	356 916	372 693	360 717	316 556	336 877
Lithuania	362 687	360 705	442 144	322 646	340 226
Romania	471 937	329 136	310 179	319 859	392 895
Slovakia	203 480	224 863	160 232	114 361	193 730
Bulgaria	151 072	211 956	146 792	139 067	152 585
Estonia	163 733	188 014	176 006	100 722	62 343
Slovenia	99 497	177 755	197 807	134 144	68 661
Cyprus	164 129	123 101	92 542	78 007	206 924
Luxembourg	56 070	104 206	114 351	106 340	168 877
Serbia	40 487	96 119	30 247	9 889	27 816
Croatia	105 066	70 966	66 880	65 632	60 939
Malta	23 900	41 596	57 457	48 148	128 194
Total EU-28 imports	66 563 518	74 362 384	75 813 520	60 726 179	59 662 428

Source: EUROSTAT.

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