



Kuliah Umum: Potensi Sumber Daya Hayati Laut

UNIVERSITAS BANGKA BELITUNG

FAKULTAS PERTANIAN, PERIKANAN DAN ILMU KELAUTAN

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Rumput Laut Indonesia: Biodiversitas, Produksi dan Potensi

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Saccharina japonica



Undaria pinnatifida



Sargassum fusiforme



Ulva clathrata



Caulerpa sp.



Monostroma nitidum



Euclerema spp.



Kappaphycus alvarezii



Gracilaria sp.



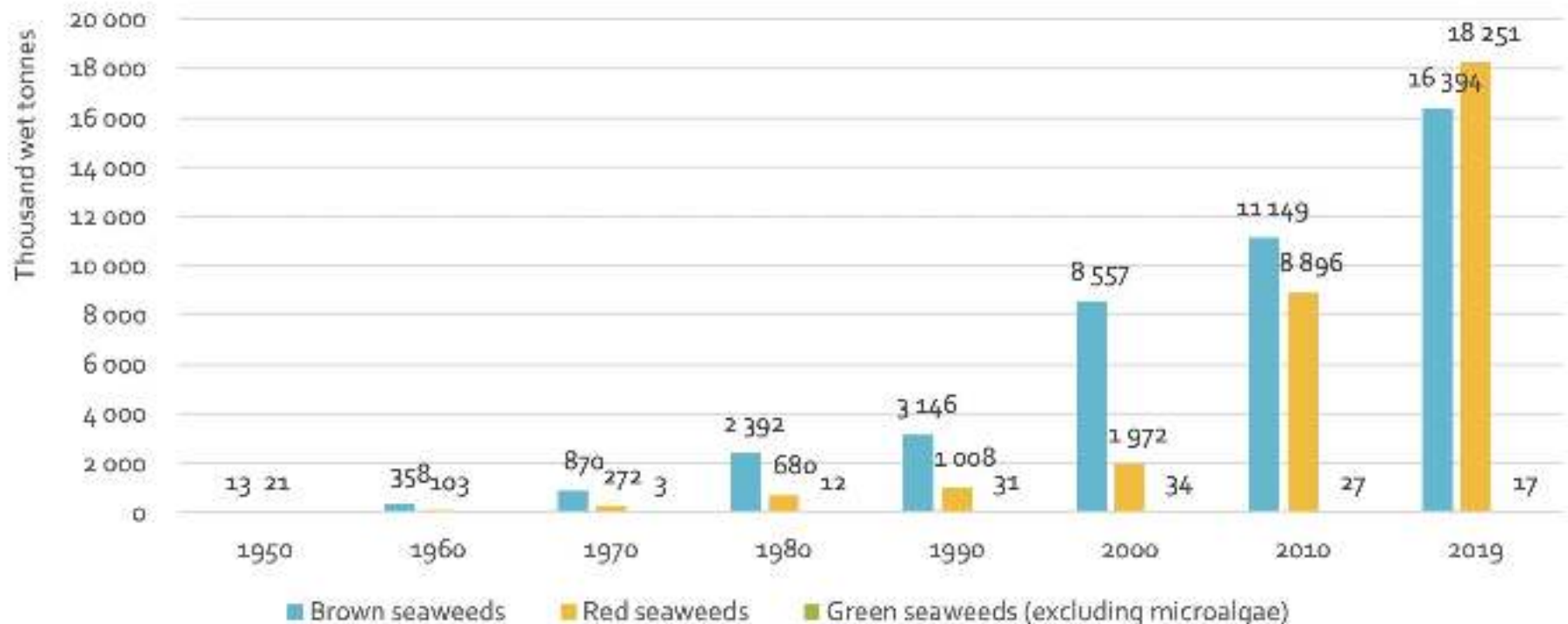
Porphyra spp.

Seaweed	Common name
Brown	
<i>Ascophyllum nodosum</i>	
<i>Fucus vesiculosus</i>	
<i>Fucus serratus</i>	
<i>Himantalia elongata</i>	Sea Spaghetti
<i>Undaria pinnatifida</i>	Wakame
<i>Laminaria digitata</i>	Kombu
<i>Laminaria saccharina</i>	Royal Kombu
<i>Laminaria japonica</i>	Kombu
<i>Alaria esculenta</i>	Atlantic Wakame
Red	
<i>Palmaria palmata</i>	Dulse
<i>Porphyra umbilicalis</i>	Nori
<i>Porphyra tenera</i>	
<i>Porphyra yezoensis</i>	
<i>Porphyra purpurea</i>	
<i>Porphyra lecinata</i>	
<i>Porphyra leucostica</i>	
<i>Porphyra crispus</i>	
<i>Chondrus crispus</i>	Picca, lichen
<i>Gracilaria verrucosa</i>	Ogonori
<i>Lithothamnium calcareum</i>	Maeri
Green	
<i>Ulva sp.</i>	Sea lettuce
<i>Enteromorpha sp.</i>	Aonori
<i>Mikroalga</i>	
<i>Spirulina sp.</i>	
<i>Odontella aurita</i>	
<i>Chlorella sp.</i>	

Edible seaweed (CEVA-Centre d'Étude & de Valorisation des Algues, 2019).

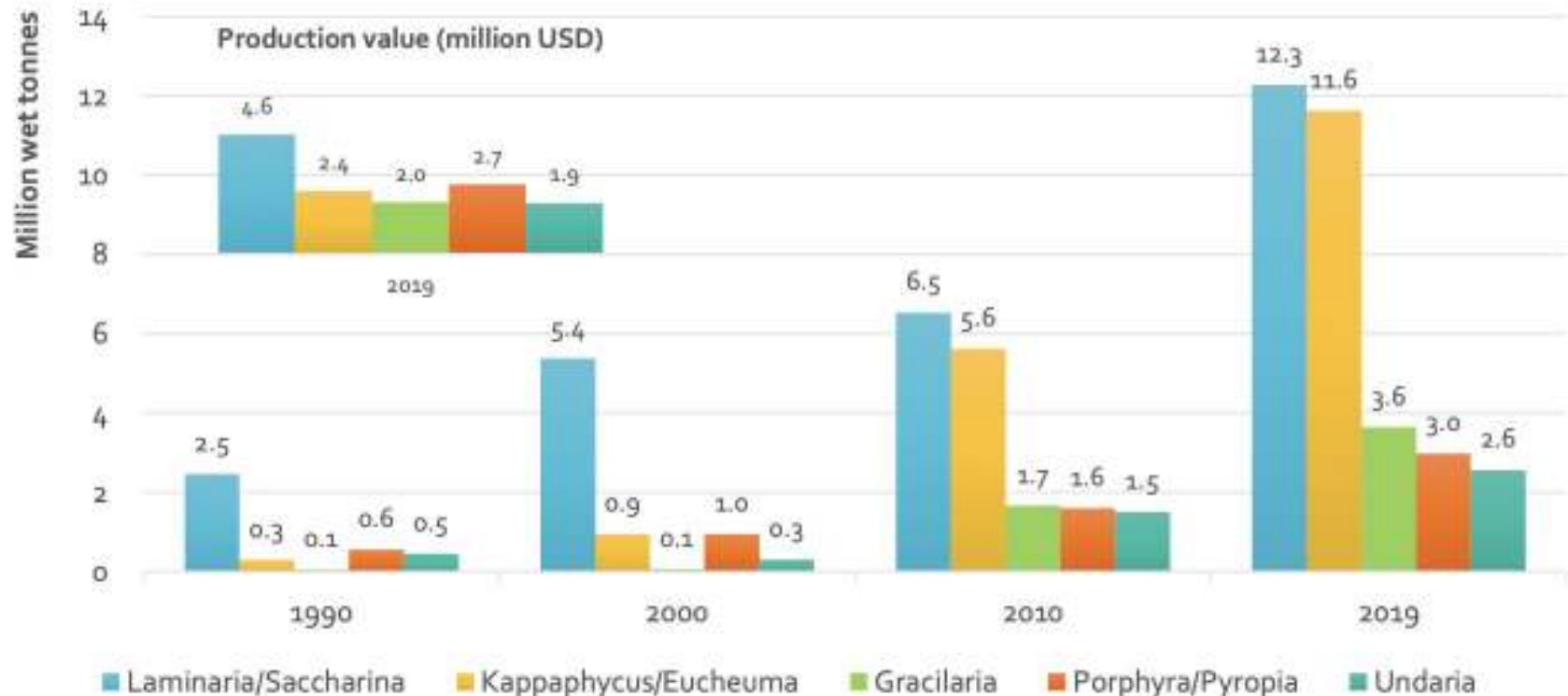
World **seaweed cultivation increased** from 4.2 million tonnes in **1990** to 34.7 million tonnes in **2019**. The growth was **contributed** by **brown seaweeds** cultivation (from 3.1 million tonnes to 16.4 million tonnes) and **red seaweeds** cultivation (from 1 million tonnes to 18.3 million tonnes), whereas **green seaweeds** cultivation **declined** from 31 000 tonnes to 17 000 tonnes.

World seaweed cultivation, 1950 -2019

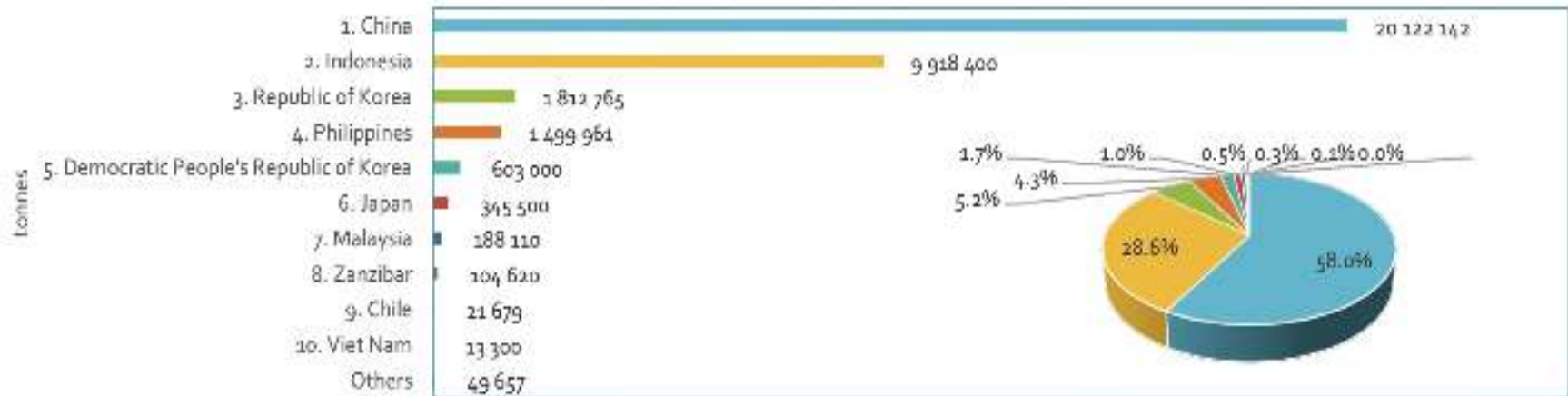


Five genera accounted for over **95 percent of world seaweed cultivation** production in 2019; they are *Laminaria/Saccharina* (35.4 percent); *Kappaphycus/Eucheuma* (33.5 percent); *Gracilaria* (10.5 percent); *Porphyra/Pyropia* (8.6 percent); and *Undaria* (7.4 percent).

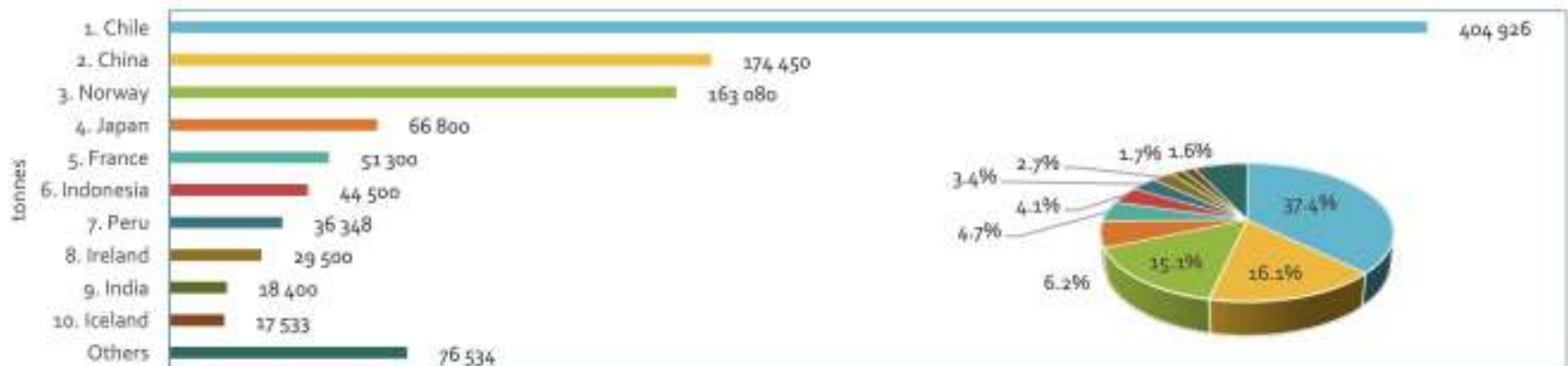
World seaweed cultivation production



Seaweeds cultivation: countries/territories with the highest production in 2019 (world production: 34679134 tonnes)



Seaweeds wild collection: countries/territories with the highest production in 2019 (world production: 1083370 tonnes)





Indonesian Seaweed



According to Atmadja and van Rein (791 species),
2014:

- 201 species of green seaweed
- 138 species of brown seaweed
- 452 species of red seaweed

According to Sibolga Expedition (782 species)
(Nontji, 2007)

- 179 species of green seaweed
- 134 species of brown seaweed
- 452 species of red seaweed



Halimeda



Turbinaria



Padina



Gigartina



Laurencia





Gracilaria sp



Eucheuma denticulatum



K. alvarezii varian Tambalang green



K. alvarezii varian Tambalang brown



Gelidium sp.



Sargassum sp.



Caulerpa sp.



Codium sp.



Ulva sp.



Natural stock biomass





SULAWESI SELATAN

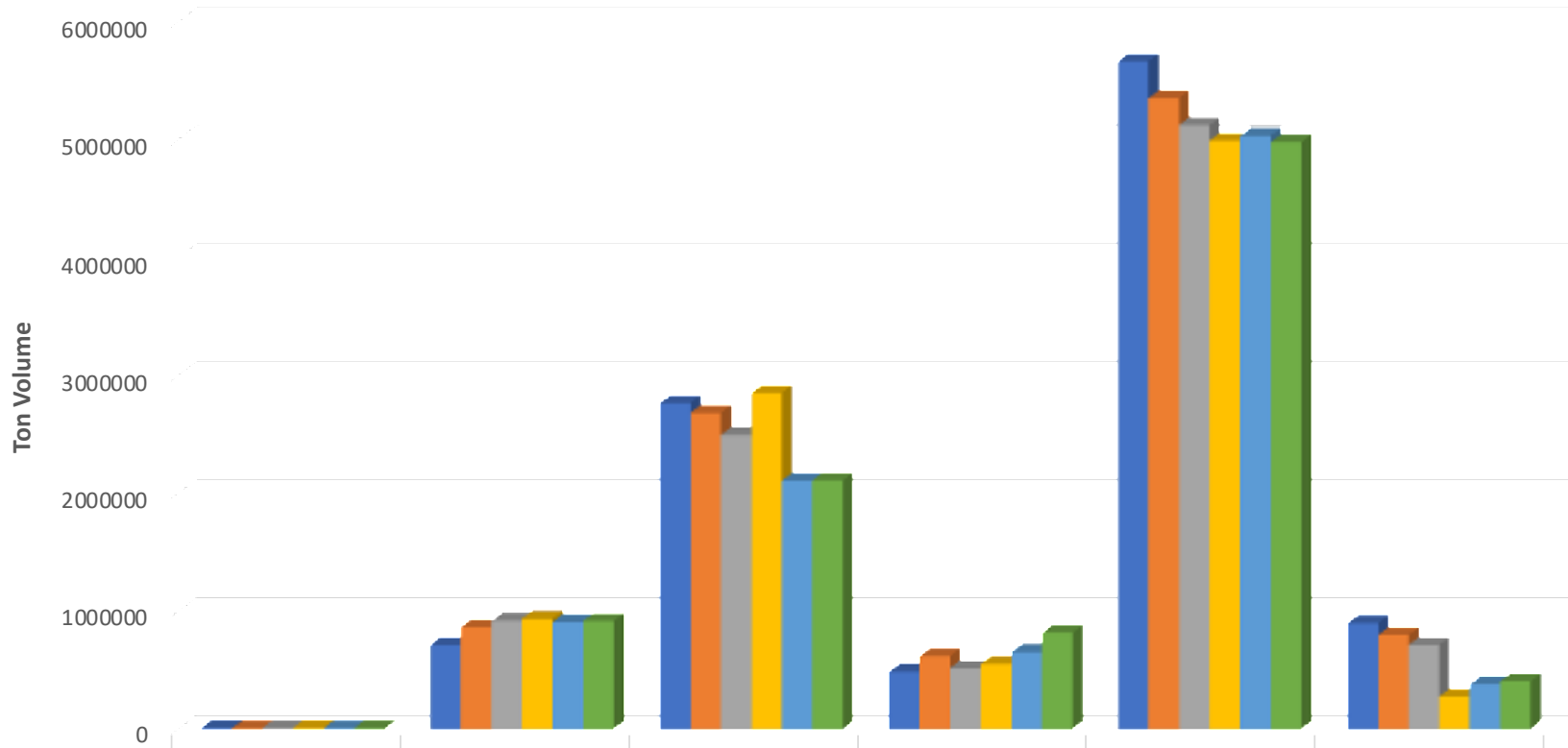
NUSA TENGGARA TIMUR

MALUKU

LAMPUNG

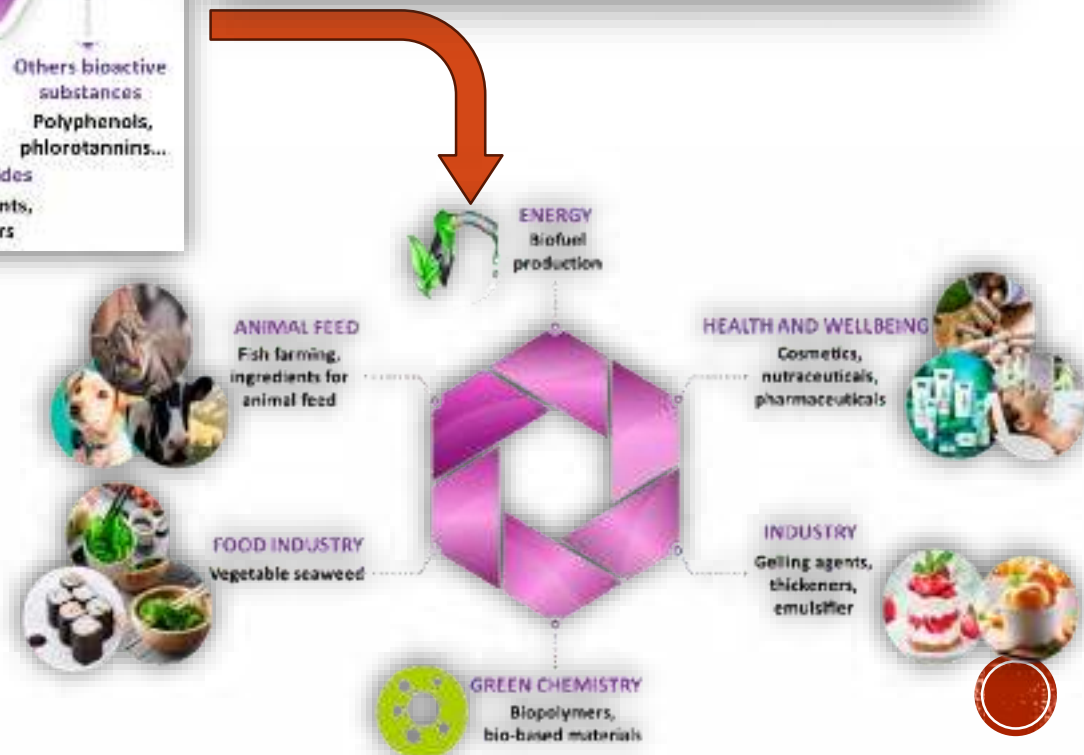
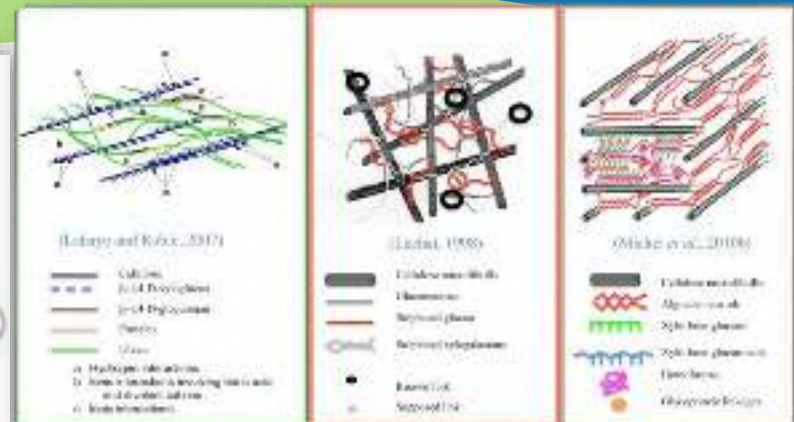
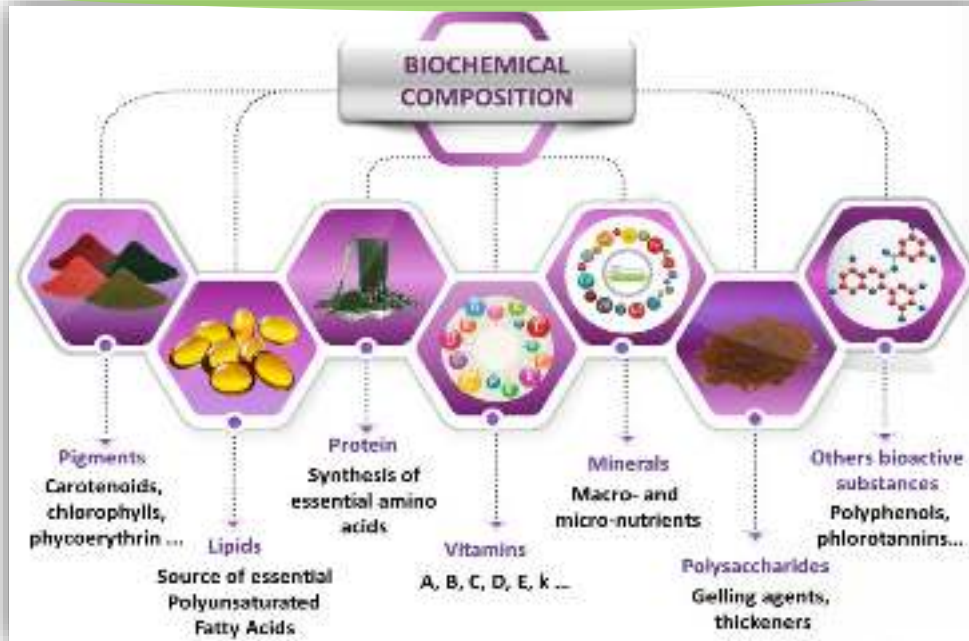
KALIMANTAN UTARA

JAWA TIMUR



	PULAU SUMATERA	PULAU JAWA	PULAU BALI-NUSA TENGGARA	PULAU KALIMANTAN	PULAU SULAWESI	PULAU MALUKU-PAPUA
■ 2017	13577.17	717545.26	2765070.88	486914.4	5666474	897970.4
■ 2018	5870.82	867849.72	2680673.47	618355.8	5351182.56	796270.05
■ 2019	9232.02	919857.31	2493351.18	517897.77	5122865.32	712782.37
■ 2020	9577.3	937640.76	2853158.69	551418.05	4992069.61	274556.4
■ 2021	6754.68	909161	2107040.47	655231.65	5032604.88	381238.64
■ 2022	8733.36	917314.17	2111858.15	814677.14	4977314.06	404370.73

BIOCHEMICALS OF SEAWEED WITH APPLICATIONS



Food

Dried & fresh seaweed

- Salads, spaghetti, burger (source of energy, protein & vitamins)

Biostimulant

Extract- Bioactive compound

- Seed treatment (stimulation of plant growth, protection against abiotic stress)

Applications



Additives

Extract – Polysaccharides
(Hydrocolloids:
agar, carrageenan and
alginate)

- Gelatine substitutes, processed meat, dairy product, etc (food & beverages)

Cosmetic

Extract – Polysaccharides
(Hydrocolloids:
agar, carrageenan and
alginate)

Extract- Bioactive compound

- Anti-aging moisturizer, toothpaste

Animal feed

Dried seaweed

- Livestock feed, supplements, aquafeed supplements, pet food additives (positive immune response & gut health, improvement of digestive processes)

Bio-packaging / Bio-material

Extract – Polysaccharides
(Hydrocolloids:
agar, carrageenan and
alginate)

- Plastic film and food container

Pharmaceuticals & nutraceuticals

Extract- Bioactive compound
Extract – Polysaccharides
(Hydrocolloids:
agar, carrageenan and
alginate)

- Food supplement (nutrient health supplement)

Biofuels

Extract – Ethanol, Methane,
Hydrogen

- Biodiesel for cars

- Mostly-known application and also one of the biggest market for seaweed in Indonesia is *Hydrocolloids (as additives)*

**Extract – Polysaccharides
(Hydrocolloids:
agar, carrageenan and
alginate)**



Extract- Bioactive compound

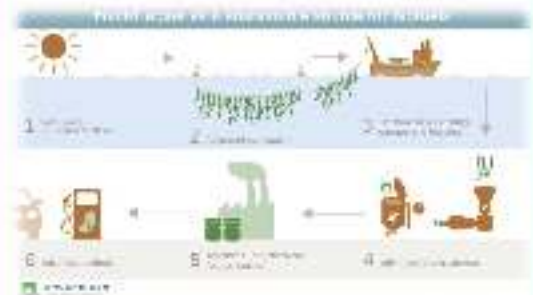


HEAL Omega Seaweed
with Omega-3
Essential Fatty Acids
Omega-6 Fatty Acids
Omega-9 Fatty Acids
Omega-10 Fatty Acids
Omega-11 Fatty Acids
Omega-12 Fatty Acids
Omega-13 Fatty Acids
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Omega-100 Fatty Acids



Applications: Actual & Prospect

**Extract – Ethanol, Methane,
Hydrogen**



Dried & fresh seaweed





Seaweed-based products – Home and Small Industries



Seaweed-based wrap called
Edible Plastic by Dr. Nooryawati



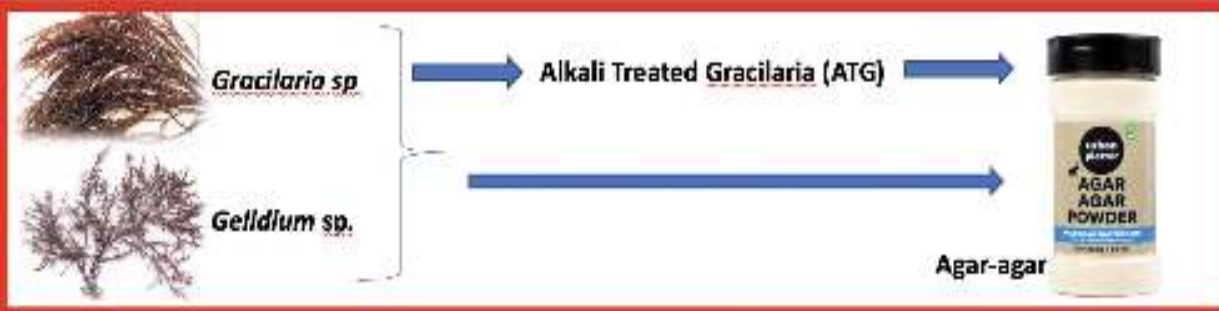
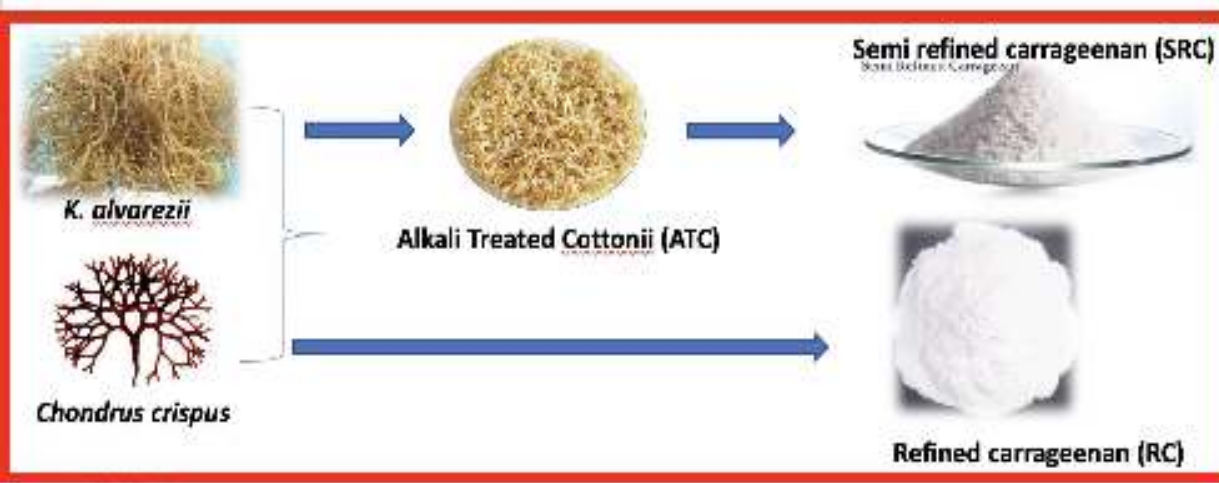
Ulva Tea





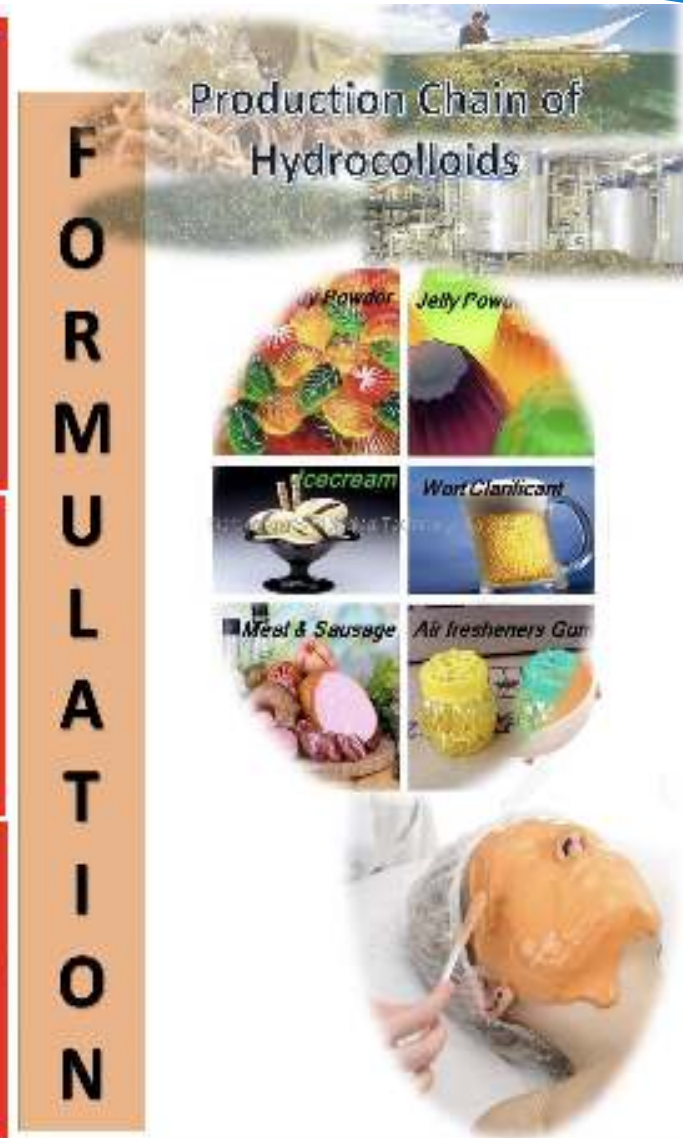
INDONESIAN SEAWEED AS HYDROCOLLOIDS





Production Chain of Hydrocolloids

F O R M U L A T I O N



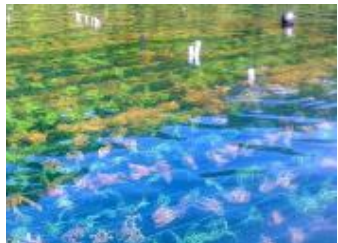
- Fruit Powder
- Jelly Powder
- Icecream
- Wart Clarificant
- Meat & Sausage
- Air fresheners Gant

Supply chain of world trade as hydrocolloid

Domestic and Foreign Trade



Seedling and planting



Cultivation



Harvest and Post-harvest

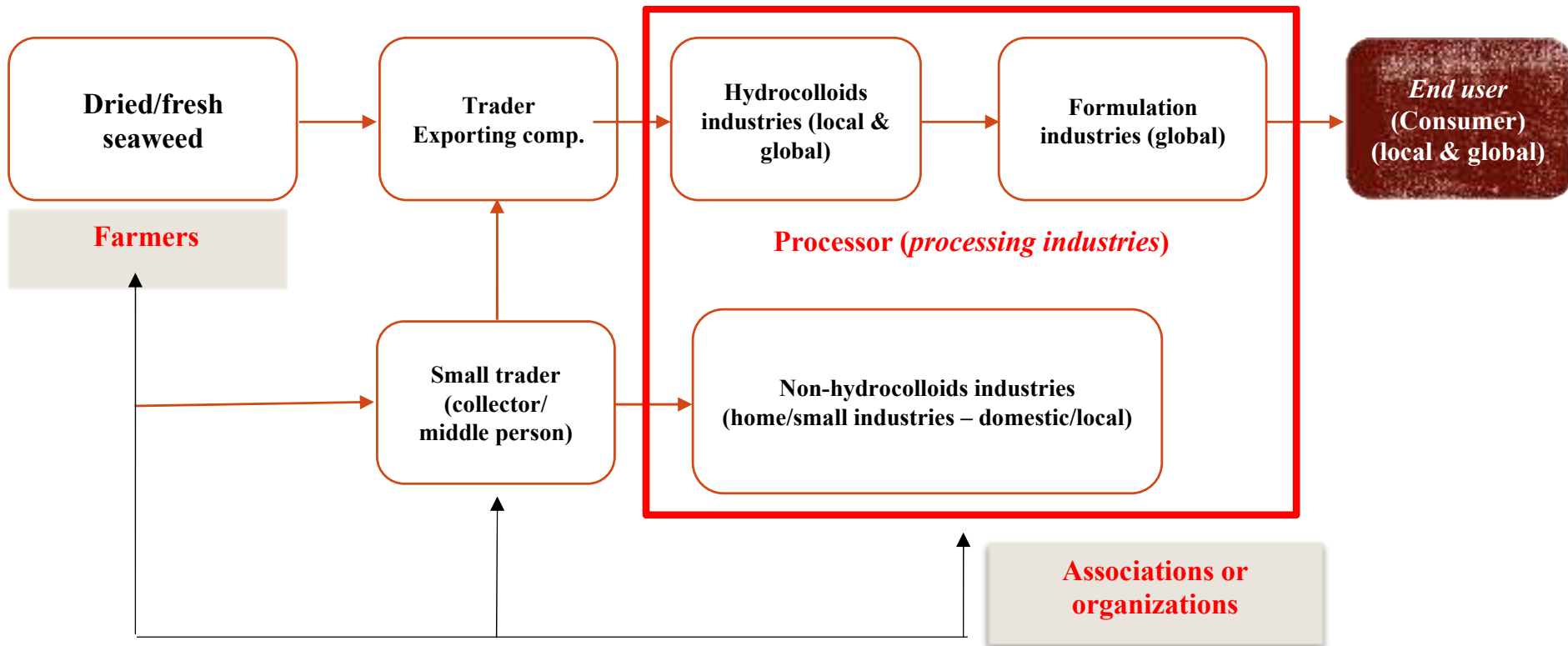


Processing Industry (Domestic and Foreign)

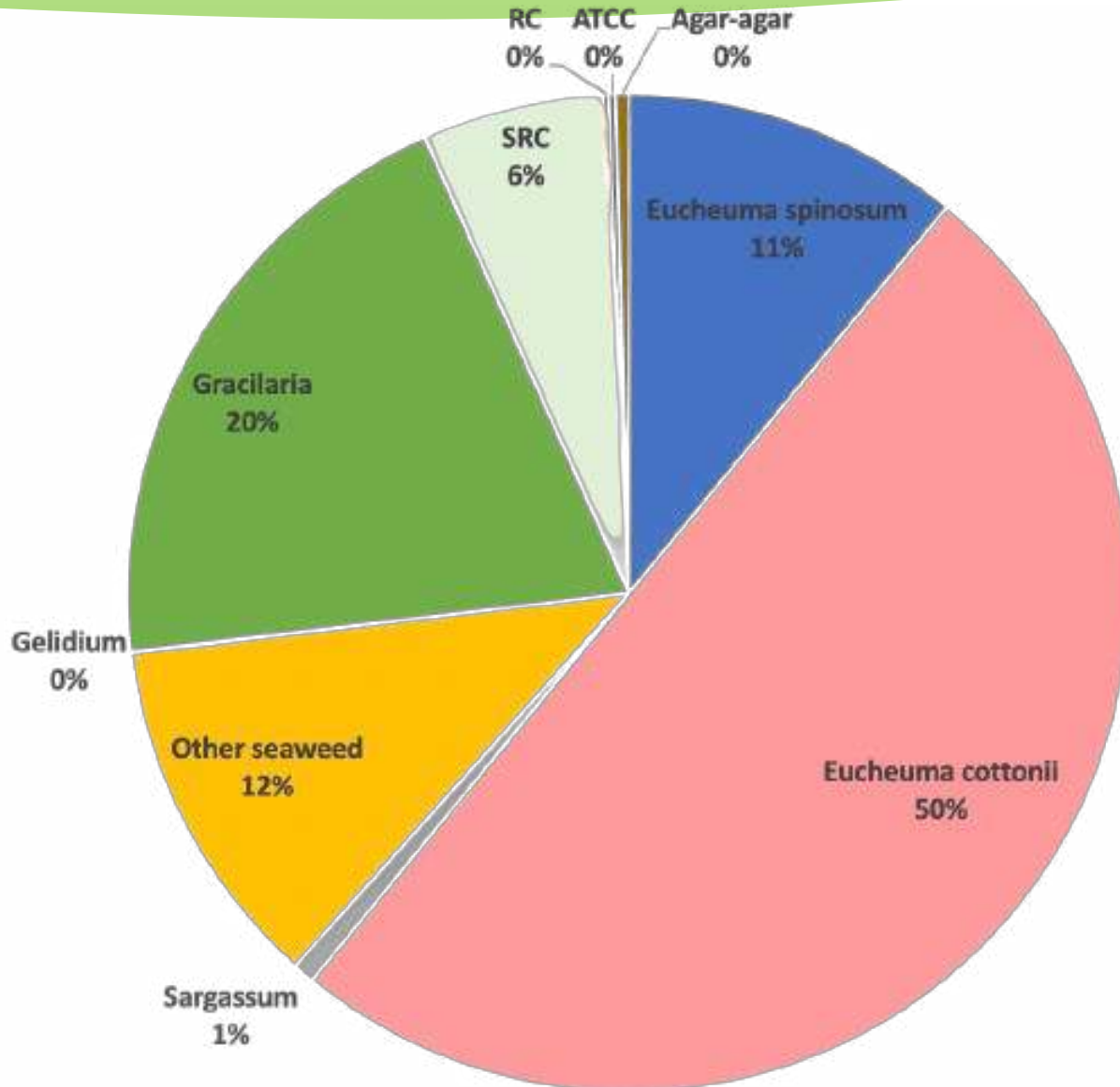


Formulating Industry and Product Application (Foreign)





Classification of exported products



Export in 2020



Say seaweed...



Thank you