

The background of the slide is a teal-colored geometric pattern composed of various shades of blue and green triangles and squares. In the top right corner, there is a black square containing the white text 'AUT'.

AUT

# World seaweed utilisation

W. Lindsey White and Peter Wilson



## Context

- Zemke-White and Ohno, 1999 - reliable data on seaweed harvesting and farming was difficult to come by - extracted from the “Seaweeds of the World” edited by Alan Critchley and Masao Ohno.
- Food and Agriculture Organisation of the United Nations (FAO) has compiled a dataset of all reported fisheries and aquaculture landings from 1952 to present (the latest data is currently from 2012).
- While it is likely that these data are somewhat under-reporting the landings of various species, it is the most current and accurate dataset available.



## Summary

- Worldwide, some 264 species of seaweeds are used by humans, mainly for food and hydrocolloid production (e.g. alginates, agar and carrageenan), but also for medicines, paper, fertiliser and animal feed.

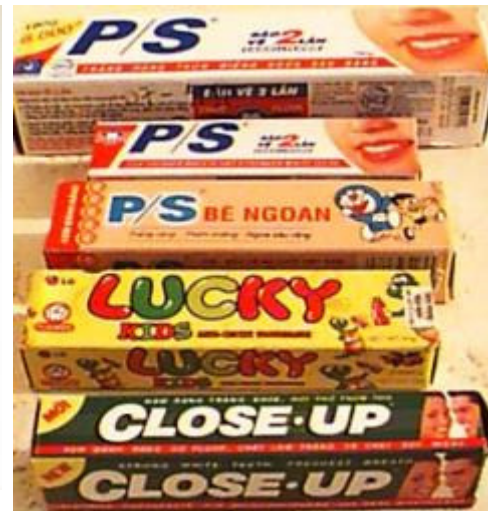


## Summary

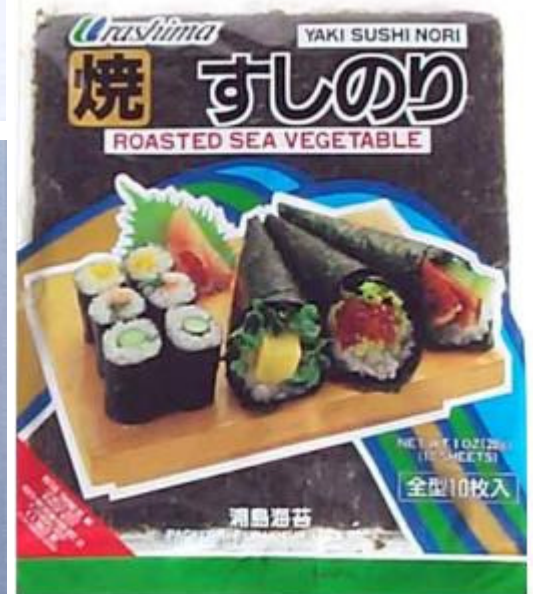
- Worldwide almost 21 million t of seaweeds were utilised, with less than 800,000 t of this being harvested from the wild and the remaining 94% produced by aquaculture.
- Dominated by just five taxa

Taxa	Cultured	Captured	Total
Chlorophyta	19,685	2,286	21,971
Phaeophyceae	7,842,533	659,975	8,502,508
Rhodophyta	12,238,771	130,122	12,368,893
Grand Total	20,100,989	792,383	20,893,372

# *Euchuema/Kappaphycus*



*Porphyra spp.*



# *Gracilaria spp.*

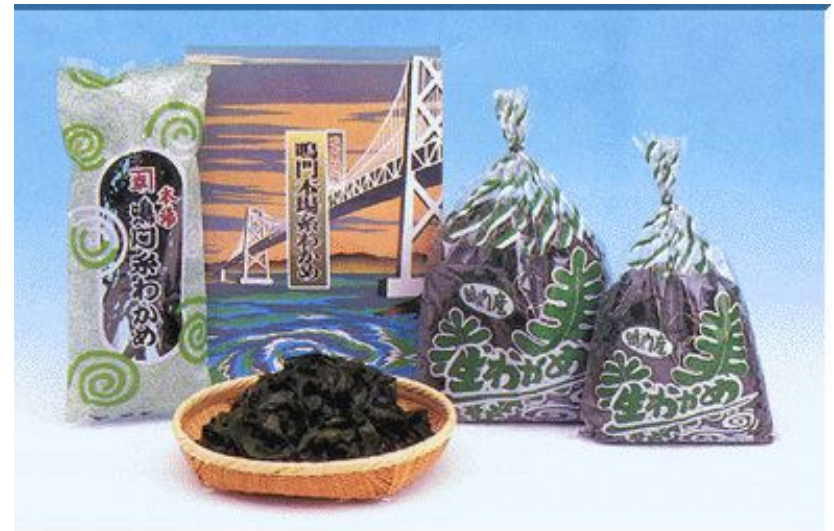


# *Laminaria/Saccharina*





# *Undaria pinnatifida*

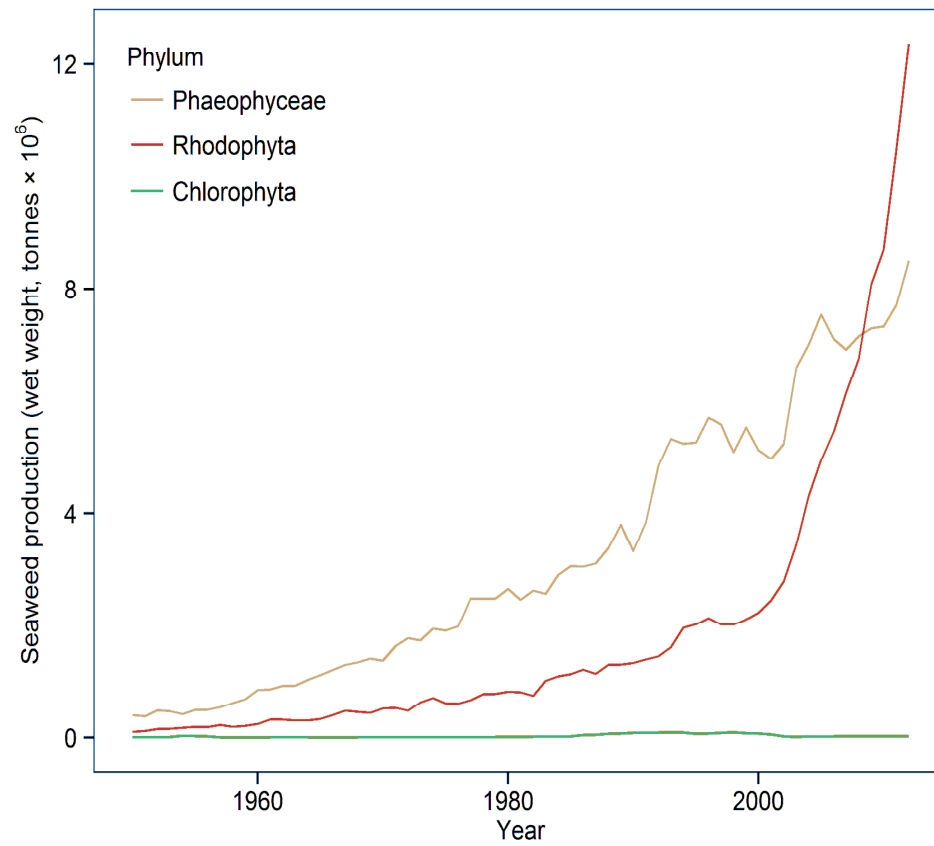




## Trends in production

- An interesting and important trend in terms of the sustainability (both ecological and economic) of the seaweed industry is the growth in seaweed farming as well as a decline in seaweed wild harvest.
- In 1995 around 3.9 million t was harvested, 52% of all seaweeds used. In 2012, only 792,383 t were harvested, comprising only 4% of all seaweed use.
- Much of this change is being driven by the growth in the seaweed farming industries of *Laminaria*, *Undaria*, *Gracilaria* and *Porphyra* in China, and *Euchuema/Kappaphycus* in Indonesia.

# Growth in main taxa

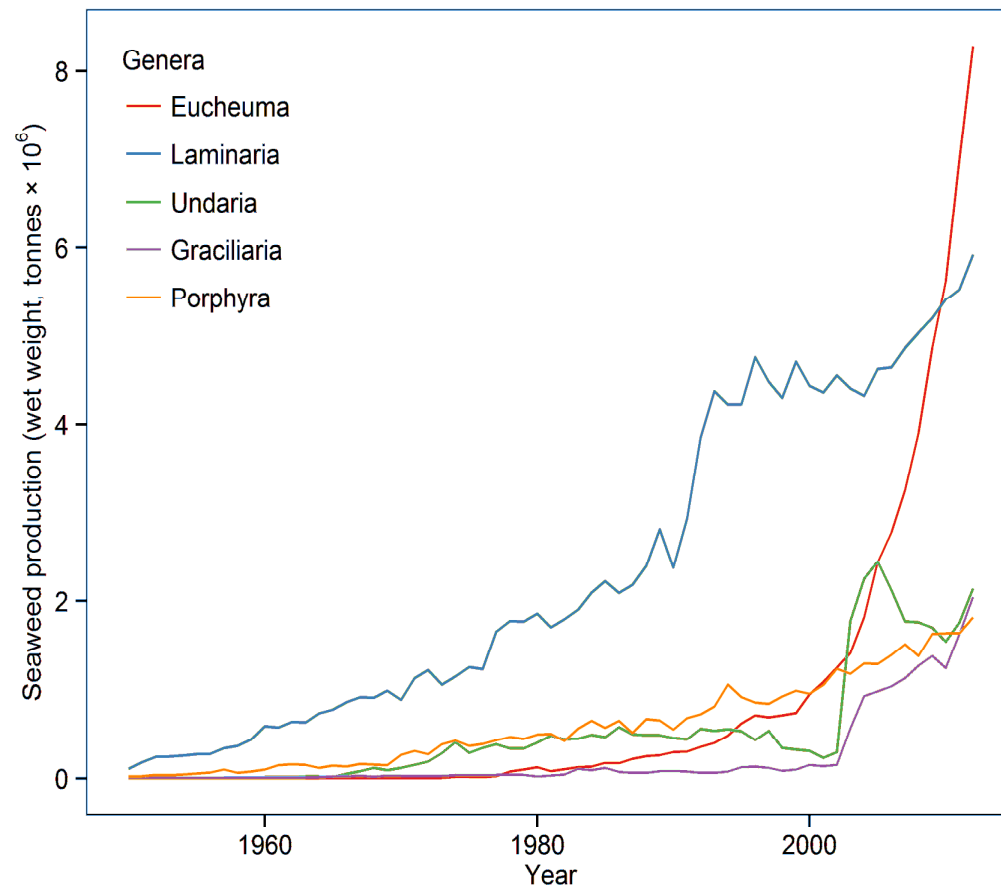




## Trends in production

- An interesting and important trend in terms of the sustainability (both ecological and economic) of the seaweed industry is the growth in seaweed farming as well as a decline in seaweed wild harvest.
- In 1995 around 3.9 million t was harvested, 52% of all seaweeds used. In 2012, only 792,383 t were harvested, comprising only 4% of all seaweed use.
- Much of this change is being driven by the growth in the seaweed farming industries of *Laminaria*, *Undaria*, *Gracilaria* and *Porphyra* in China, and *Euchuema/Kappaphycus* in Indonesia.

# Growth in main taxa

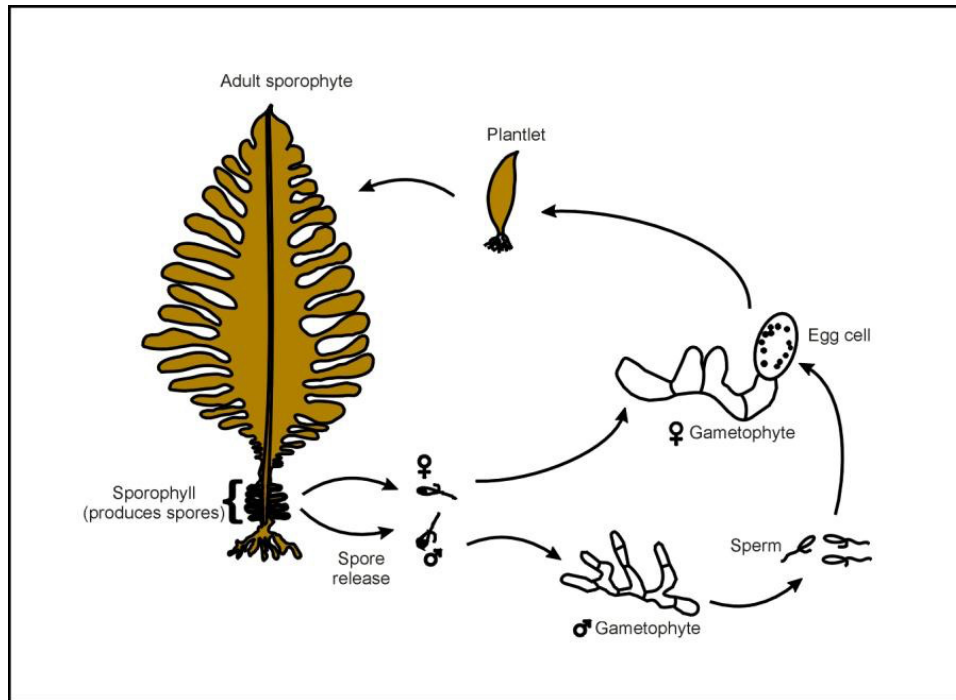




## Trends in production

- There has been a massive increase in the amount of seaweed used since 1995
- 7,546,754 t in 1995 increasing by 176% to 20,893,372 in 2012.
- This is largely driven by growth in the seaweed farming activities of Indonesia, China and the Philippines.
  - Indonesia, *Euchuma/Kappaphycus* farming increased from around 50,000 t to over 5.7 million t
  - China, *Undaria* was not cultured until the early 2000s and they are now producing 1.75 million t, *Laminaria* increased by over 1 million tonnes; *Gracilaria* was barely farmed at all in 1995 and in 2012 China produced 1.9 million tonnes and finally, *Porphyra* from increased from ~200,000 to over 1.1 million t.
  - Philippines, *Euchuema* farming increased from around 100,000 t in 1995 to over 1.1 million t in 2012.

# Free living gametophytes





# Economics

Genus	Price range (US\$)	Production (t dry wt)	Lower estimate	Upper estimate
Eucheuma	500-1500	2236896	\$1,118,448,338	\$3,355,345,013
Laminaria	5000-7000	1184365	\$5,921,828,000	\$8,290,559,200
Undaria	5000-7000	321249	\$1,606,245,750	\$2,248,744,050
Grailaria	500-1000	307129	\$153,564,750	\$307,129,500
Porphyra	5000-7000	272227	\$1,361,135,250	\$1,905,589,350
Total			\$10,161,222,088	\$16,107,367,113



# New Zealand

- Despite the long coastline and clean waters, very little seaweed utilisation





# Government regulation of seaweed utilisation

- 1940s - Beachcast red seaweed = agar
- 1985 - moratorium on fishing permits - remains in place
- 1992 - special permits for abalone and mussel farmers
- 2009 - all beach cast in North Island under permit
- 2010 - *Macrocystis pyrifera* under permit

# *Undaria pinnatifida* in NZ

- 1980s - invader
- 1990s - what do we do?
- 2000s - "unwanted organism"
- 2010s - harvest from mussel farms

