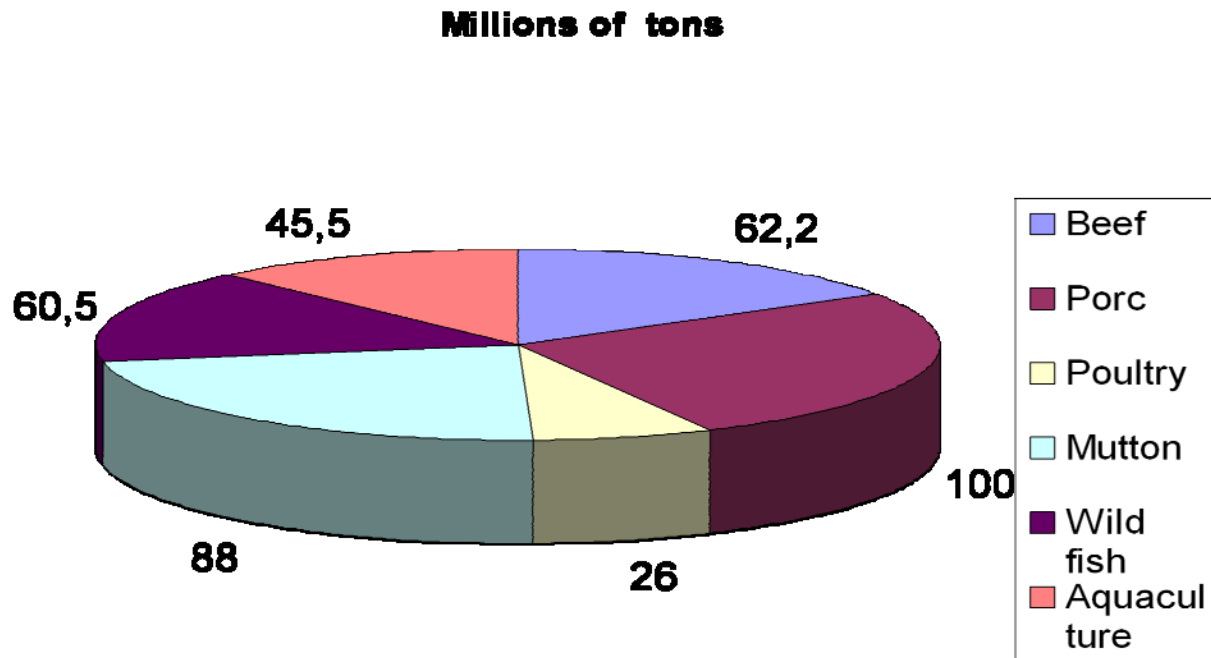


Aquaculture and food security, climate change and green growth

Recent trends in the consumption of animal proteins in the world



Production, commerce et consommation apparente en Europe (2005)

	Production(Kt)	Usages non alimentaires(Kt)	Importations(Kt)	Exportations(Kt)	Disponibilité alimentaire(Kt)	Population (millions)	Consommation (kg/ hab./an)
Europe des 15	6897	1495	10740	6517	9751	379	25,7
Europe des 12	727	84	859	634	883	105	8,4
USA	5447	1004	3679	1543	6586	291	22,6
Japon	5386	870	4297	382	8525	127	66,9
Chine	44183	9377	1741	3855	32691	1272	25,7
Inde	5908	339	5	495	5084	1049	4,8
Brésil	1073	76	269	134	1133	176	6,4

Fish farming in comparison with other farming production

100 Kg pellets will produce :

- 1,2 kg of sheep
- 13 kg of pig
- 20 kg of poultry
- ***50 kg of sea-bass or sea bream***
- ***65 kg of salmon***
- ***110 kg of trout***

New advances in fish feeds

- a better knowledge of nutritive needs
- a better feed production technology (extrusion, flotation)
- a larger use of plant proteins
- a larger use of fish factory wastes
- an important research activity on new components (microalgues)
(microalgues)

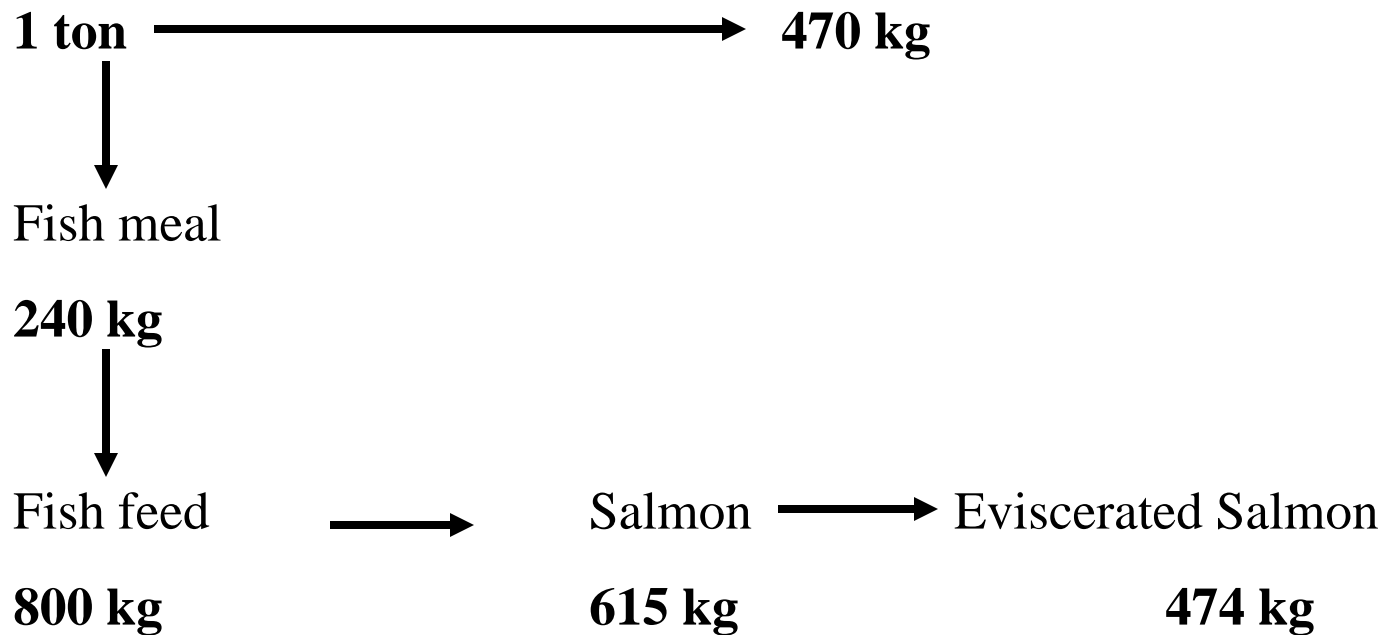
At the end, an improvement of the *feed conversion rate* (2 in 1980 for trout to 0.9 in 2005)

Do not forget that in fisheries, you need 10 to 70 kg of small fishes for producing 1 kg of carnivorous fishes

Possible use of Pacific jack mackerel from Peru

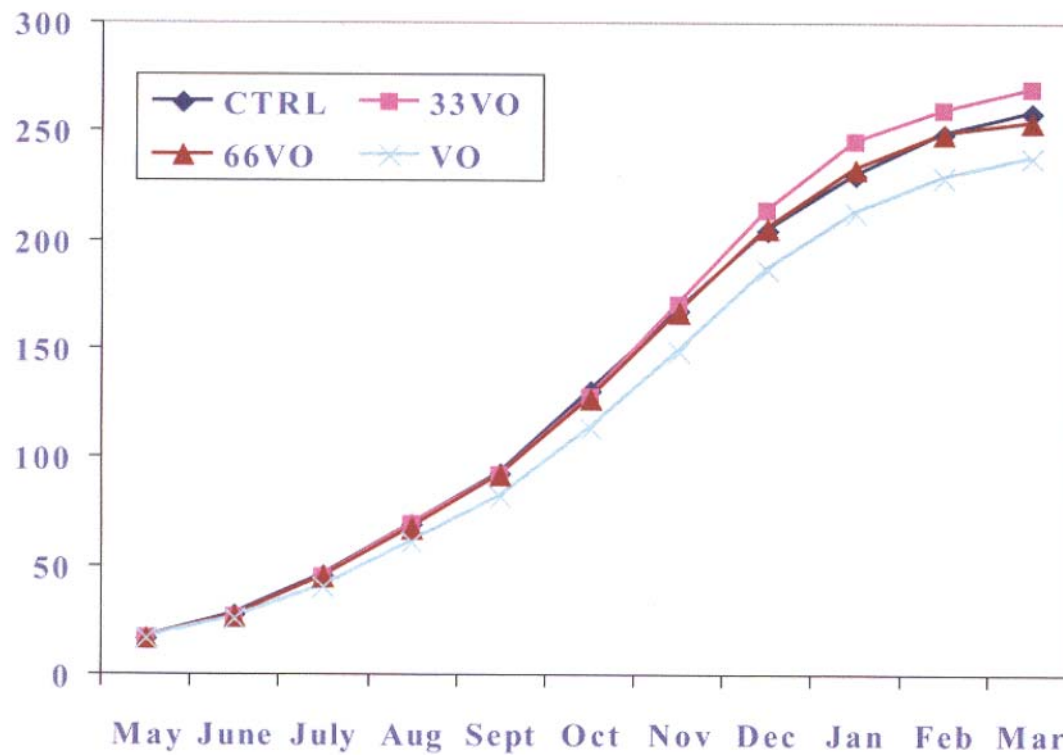
Pacific jack mackerel

Usable meat for direct consumption



New sources of ingredients for fish feeds

Replacement of fish oils by plant oils for sea-
breams

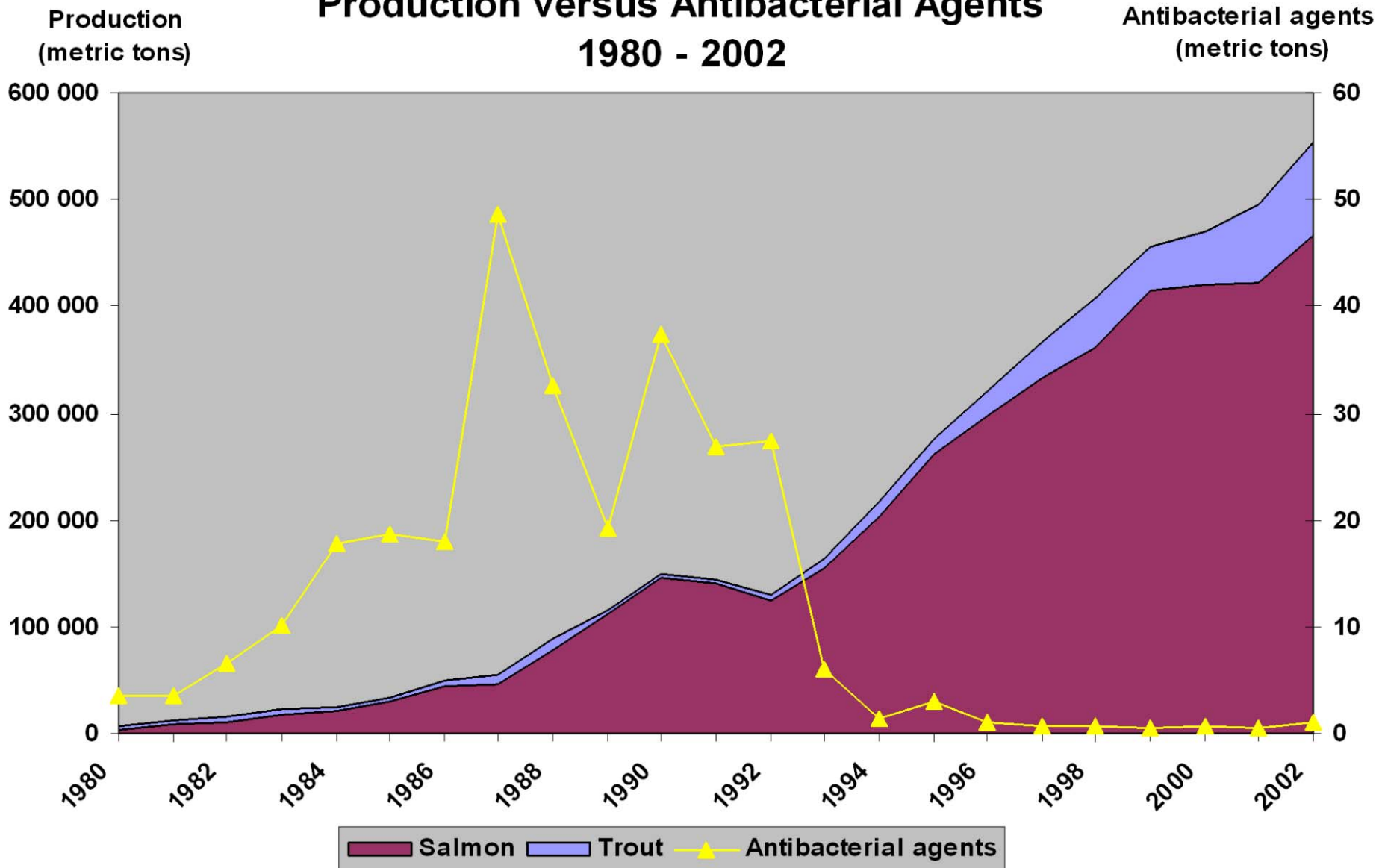


Aquaculture and climate changes

- A limited emission of greenhouses gas, in comparison with beef meat and with some fishing activities
- A limited impact on deforestation
- A limited amount of liquid and solid wastes per kg of meat produced
- A better adaptation to the climate change due to the specific physiology of fishes

A very « soft » control of diseases (an example from Norway)

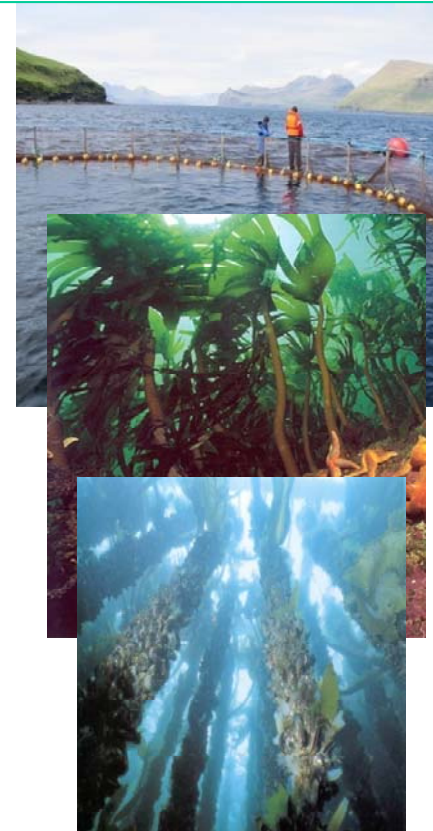
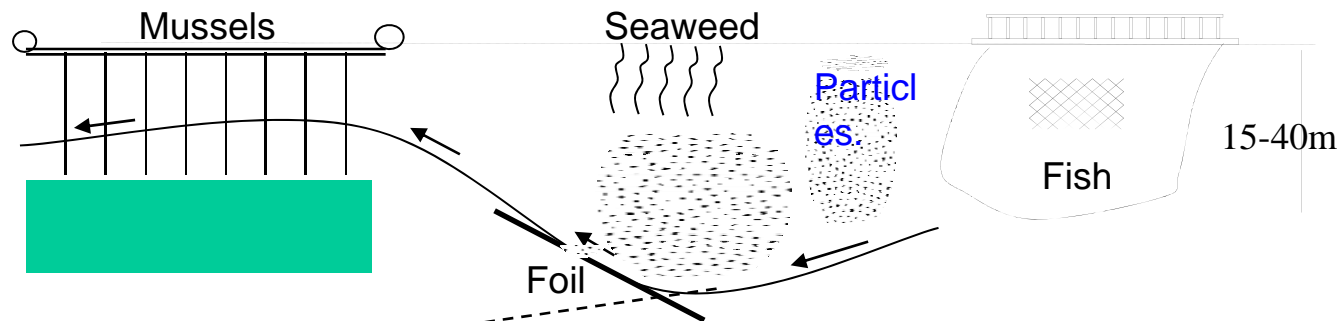
Production versus Antibacterial Agents 1980 - 2002



Integrated systems decreasing the impact on the environment (example for Norway)

Integrated aquaculture production includes culture of species from different trophic levels:

- Intensively fed aquaculture (salmon)
- "Photosynthetic aquaculture" (seaweed)
- Filtering species culture (mussels)



Within the same location! →

Value added and sustainable culture
Optimal utilisation of nutrient input