

Offshore Aquaculture:
*Challenges and Opportunities for
Advancing Sustainable Seafood in
the Deep Blue Sea*

SeaWeb Seafood Summit, Feb. 1-3, 2016, St. Julian's, Malta

Aquatic food products are healthy

- Aquatic food products represent one of the world's most nutritious and healthy food sources.

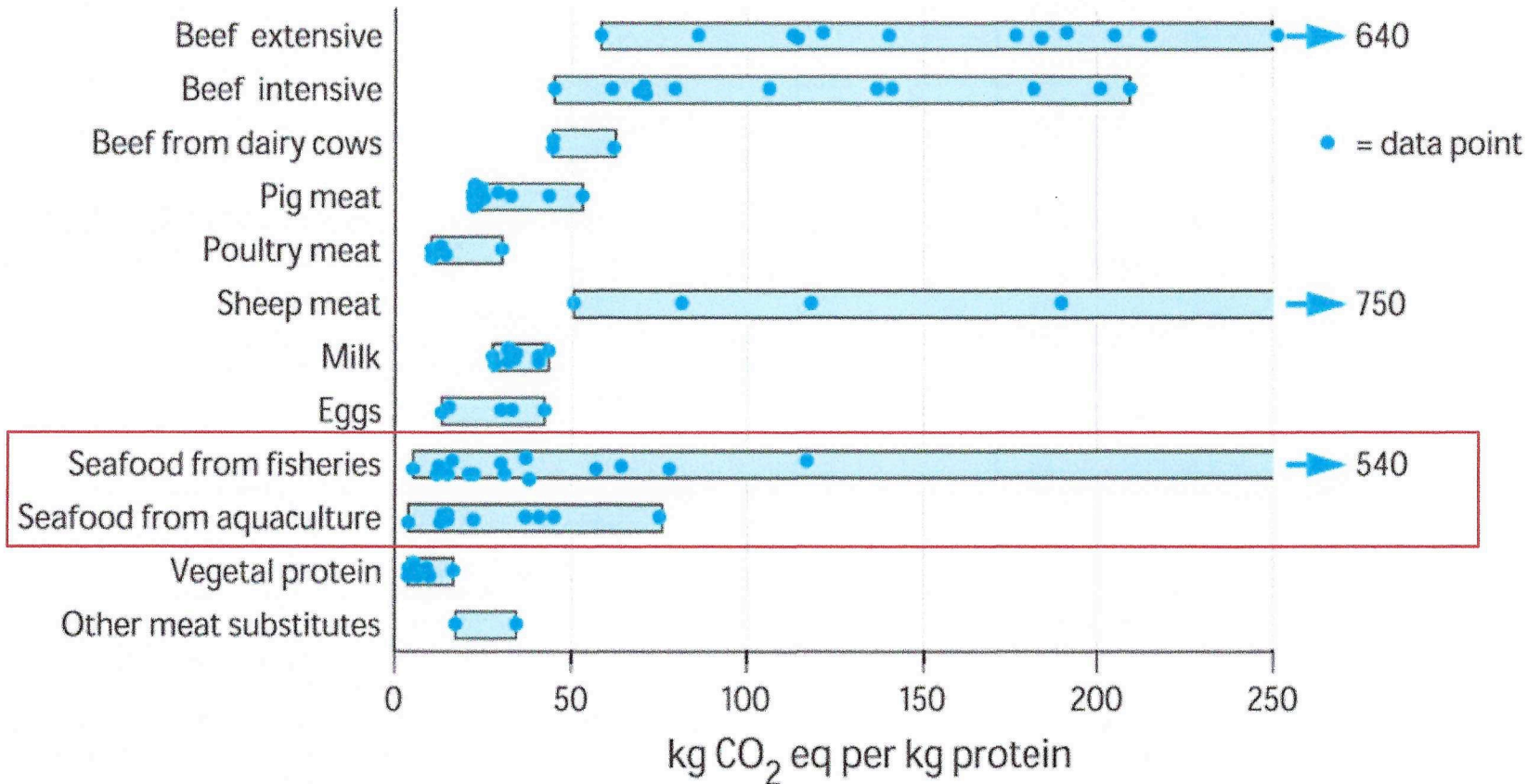
Fish consumption:

1. Reduces the risk of death from coronary heart disease.
1. May reduce the risk of multiple other adverse health outcomes, including stroke, non-fatal coronary heart disease events, congestive heart failure, atrial fibrillation, cognitive decline, depression, anxiety and inflammatory diseases.
1. May provide a greater nutritional impact than the sum of the health benefits of the individual nutrients consumed separately.



GHG Emissions and Protein Production

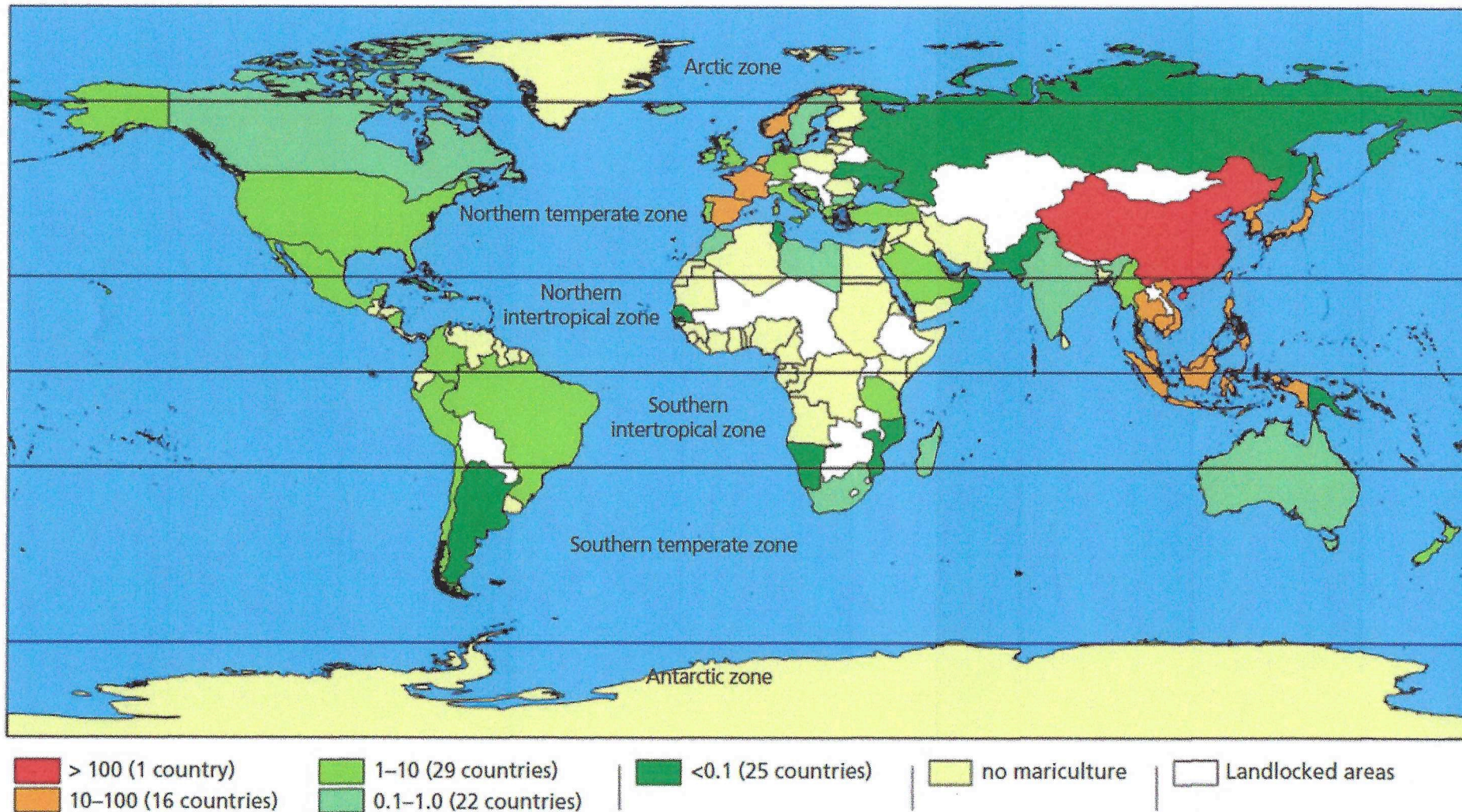
Review of 52 Life Cycle Analyses



Nijdam et al. 2012 *Food Policy* 37: 760-770

51% produce $<1 \text{ t km}^{-1}$ of coastline

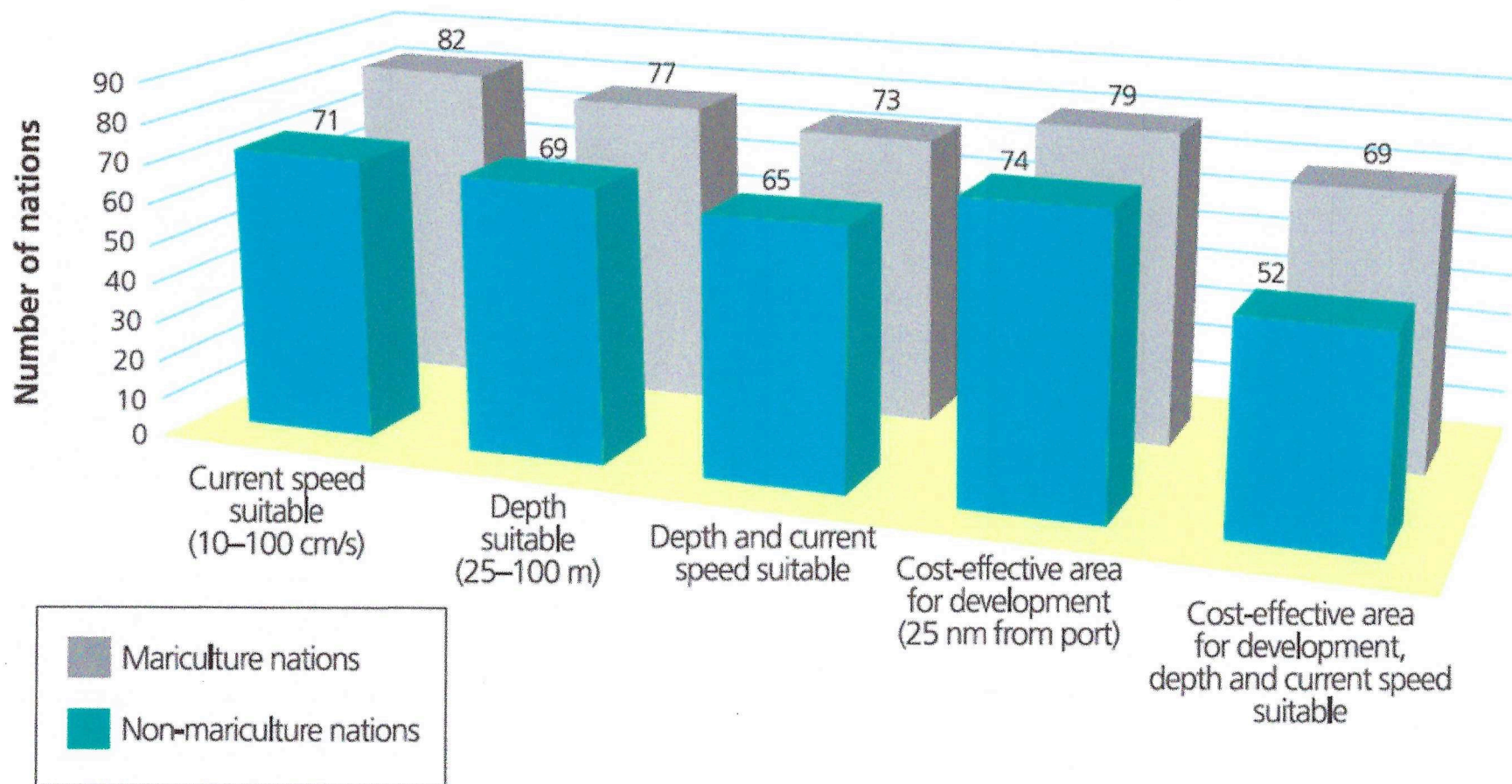
Intensity of mariculture production (2004–2008) in tonnes per kilometre of coastline and numbers of countries in the range



Kapetsky et al. 2013


FAO Fisheries and Aquaculture Technical Paper No. 549

Offshore mariculture potential for sea cages and longlines by numbers of nations meeting depth, current speed and cost-effective area for development criteria



Kapetsky et al. 2013

FAO Fisheries and Aquaculture Technical Paper No. 549



Vol. 436|14 July 2005

nature

COMMENTARY

When will we tame the oceans?

In fisheries across the world, fish stocks are declining fast. Future preservation and management of the ocean's resources will require a transformation of our relationship with the seas, argues **John Marra**.

Panelists:



Neil Sims :

Marine biologist, Co-founder of Kona Blue Water Farms and Kampachi Farms, founding President of Ocean Stewards Institute, Member of Technical Advisory Group of Aquaculture Stewardship council.



Donna Lanzetta:

**Attorney, Entrepreneur, CEO of Manna Fish Farms
Member: Ocean Stewards Institute, Global Aquaculture Alliance, World Aquaculture Society, and US Aquaculture Society**



David O'Brien:

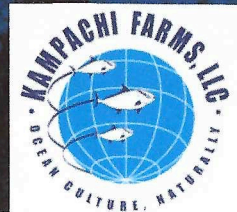
Deputy Director in NOAA Fisheries Office of Aquaculture



TEN YEARS AFTER ...

... moving further, deeper offshore? Beyond the blue horizon?

... Or swimming in circles? All adrift ... ?



SEATTLE, 2006:

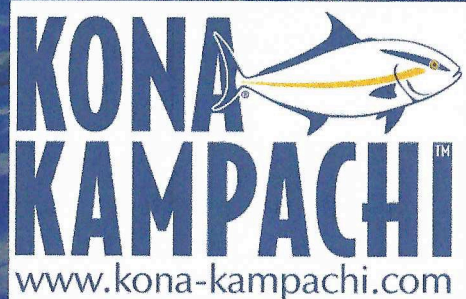
Product quality, POPs

Environmental impacts

Conflicts with fishing

Commercial viability

Scalability



neil@kampachifarm.com

MALTA, 2016:

Mozaffarian and Rimm (2006)

Worm, et al. (2006)

“Four Fish”, Paul Greenberg (2010)

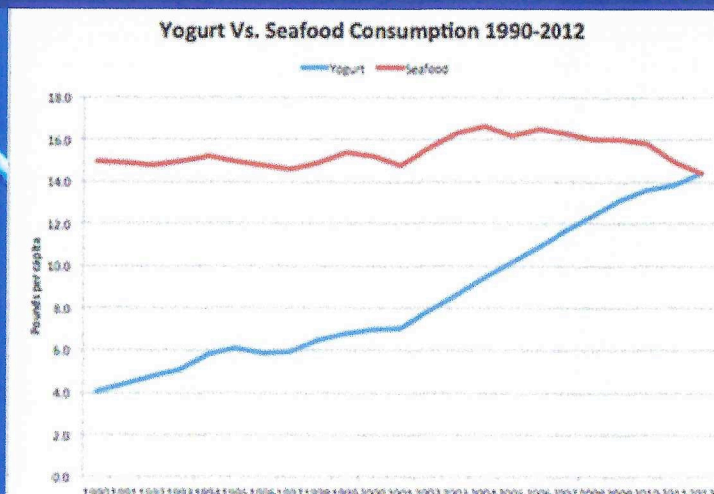
“Blue Frontiers”, Conservation International (2012)

Tamar Haspel, Washington Post (2013)

Price and Morris (2013)

Rust, et al. (2014)

John Sackton, Seafoodnews.com (2015)



SUPPORT AND PERMITS

MANNA FISH FARMS

OFFSHORE INTEGRATED MULTI-TROPHIC AQUACULTURE

<http://mannafishfarms.com/>



Striving to be the first open ocean farm on the East Coast of the United States.

Issues, Laws, and Agencies

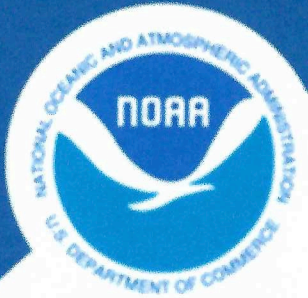
Issues	Laws	Regulatory agencies
Fisheries management, protection of habitat, marine mammals, and endangered species	Magnuson-Stevens Fishery Conservation Management Act Marine Mammal Protection Act Endangered Species Act National Environmental Policy Act Coastal Zone Management Act National Marine Sanctuaries Act	NOAA (NMFS) NOAA (NMFS) NOAA (NMFS), FWS USEPA, NOAA (NMFS), USACE NOAA (National Ocean Service) NOAA (National Ocean Service)
Nutrient discharge	Clean Water Act, NPDES discharge permits Safe Drinking Water Act Marine Protection, Research, and Sanctuaries Act	USEPA, USACE USEPA USEPA, NOAA (NMFS), USACE
Siting, hazards to navigation, permitting and construction of structures, transporting product	Rivers and Harbors Act Lacey Act 14 U.S.C. 83 (marking structures in navigable waters) Outer Continental Shelf Lands Act	USACE FWS U.S. Coast Guard Bureau of Safety and Environmental Enforcement and Bureau of Ocean Energy Management
Seafood safety, feed ingredients, animal health, use of veterinary drugs	Federal Insecticide, Fungicide, and Rodenticide Act Federal Food, Drug, and Cosmetic Act Food Safety Modernization Act Hazard Analysis and Critical Control Points Program Surveillance and Monitoring Program	USEPA USFDA USFDA USFDA USFDA
Health management, best management practices	Animal Health Protection Act Virus Serum Toxin Act 9 CFR 101-124 (regulations on the spread of disease)	USDA (APHIS) USDA (APHIS) USDA (APHIS)
Escapes, broodstock management, monitoring and reporting	Magnuson-Stevens Fishery Conservation and Management Act State and local regulations with requirements for reporting and response	NOAA (NMFS) State and local agencies

(Rust et al. 2014)

Multipronged Strategy



Proud recipient of a 20% capital equipment / match grant from New York State Empire Development, through the Long Island Regional Economic Development Council.



**NOAA
FISHERIES**

Offshore Aquaculture US Policy Perspectives



Presented by: David O'Brien, Deputy Director, NOAA Aquaculture



Gulf of Mexico Aquaculture Fishery Management Plan

- First regional scale system for offshore aquaculture
- Developed under US wild fisheries law
- Establishes interagency agreements and processes to guide review
- Framework for other regions



