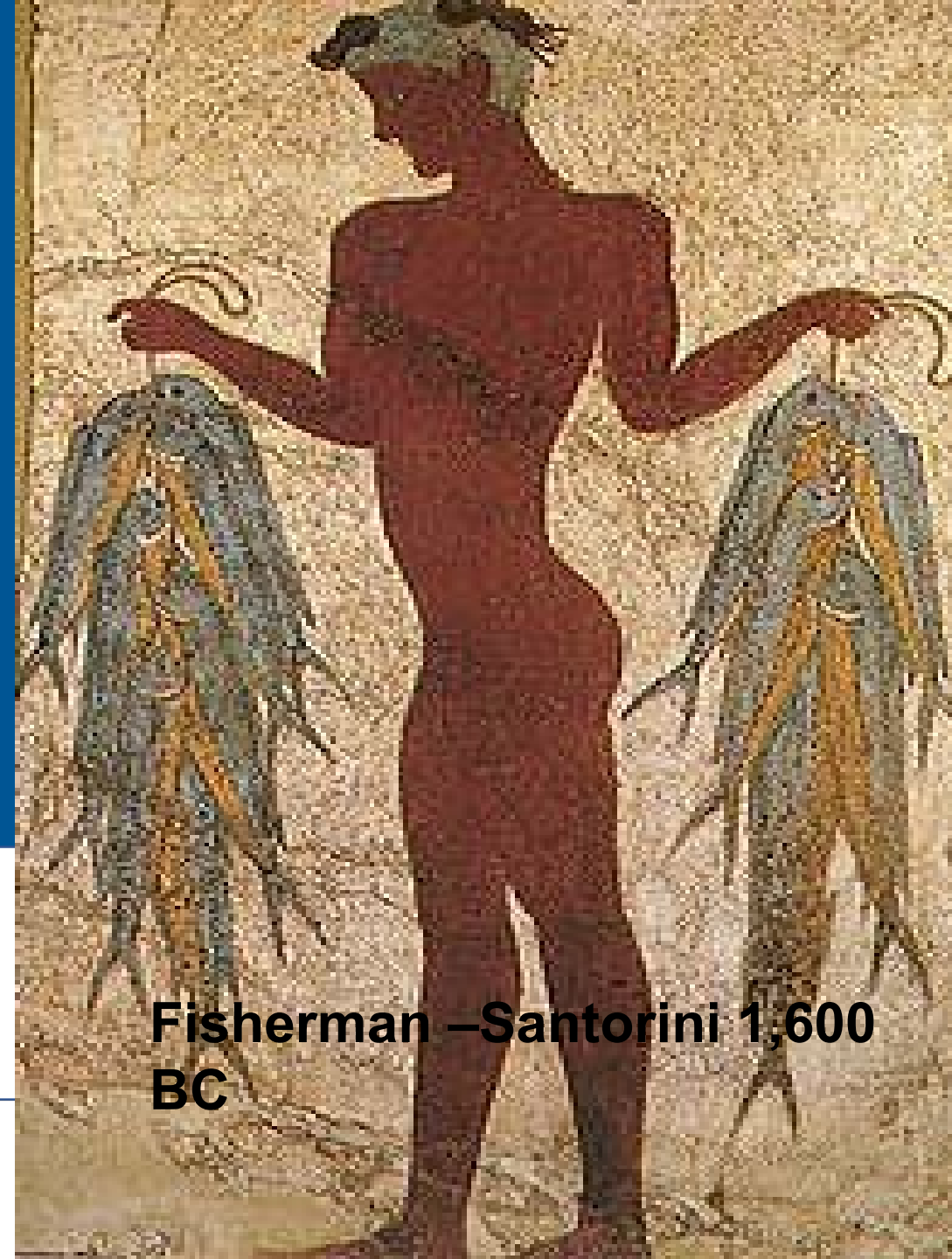




**SEAFOOD
NUTRITION
PARTNERSHIP®**
STATE OF THE SCIENCE
SYMPOSIUM

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**Fisherman – Santorini 1,600
BC**

THE BRAIN EVOLVED IN THE SEA 500-600 m.y.a.

It is 60% fat which requires marine fats – especially omega 3 DOCOSAHEAXENOIC ACID (DHA).

Dino flagellates have an eye spot and likely represent early single celled systems. They are rich in DHA including di-DHA lipids as in our eyes today.

600 m.y.a there was no ozone layer. DHA absorbs light in the UV. The intense UV would have energized DHA's π -electrons in its array of 6 special, double bonds. With electron escape, the electrical impulses would have set the stage for the evolution of the nervous and then the central nervous system.

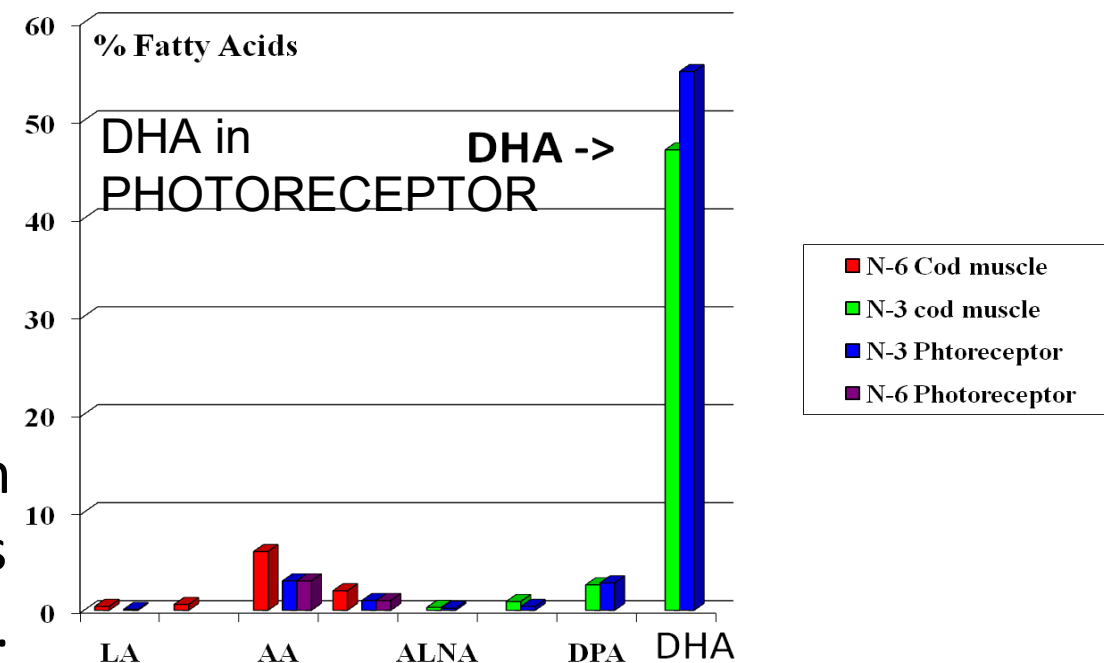
Marine chemistry used in the evolution of the brain in fish, cephalopods, amphibia, reptiles, birds, mammals has been highly conserved in throughout the 500 m.y.

Human Evolution

The evolution of the brain in the sea 500mya used DHA for signalling membranes. The only nutrients available for the construction and function of the brain were of marine origin. The brain still uses the same today. The land based foods are poor in DHA. This means human evolution required fish and sea foods.

“We need to save the oceans to save ourselves”

(Theme - World EXPO 2012 Joesu, S. Korea)



THE SHRINKING BRAIN.

Crawford and Marsh 2023 (Amazon)

CRANIAL CAPACITY CCs: The decline may have started with the introduction of land-based agriculture.

CHIMPANZEE 340 cc. (our genome differs only by 1.5%)
WILD FOODS FROM LAND AND SEA PROVIDED THE EPIGENETIC DRIVING FORCE FOR BUILDING LARGER AND LARGER BRAINS.

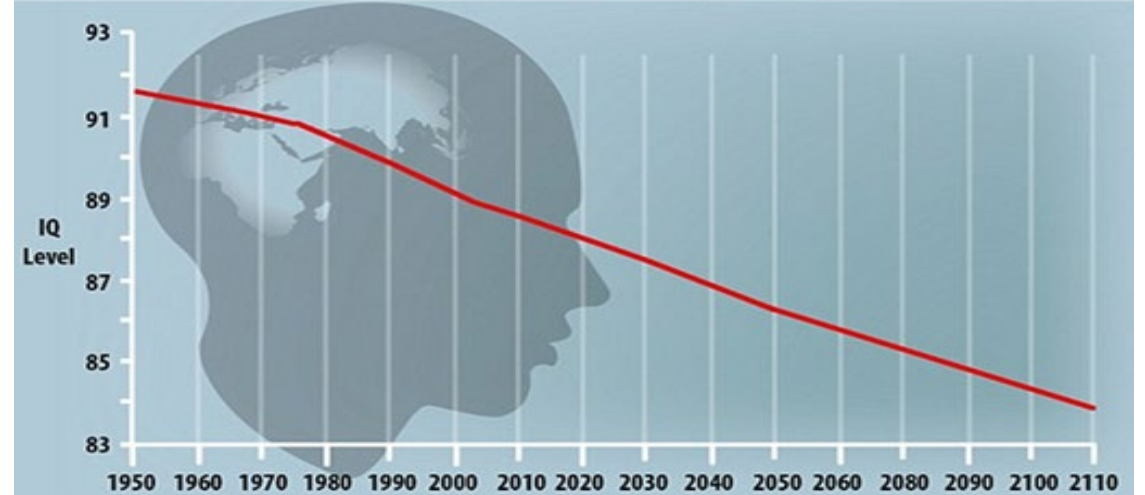
HERTO 160,000 – 200,000 y.a. 1,450 cc.
Cro-Magnon – 28,000 to 32,000 y.a. 1,500-1,700 cc.
2023 H. SAPIENS – 1,336 cc.

UK FISH LANDGINGS

1950 1 MILLION TONS.
2019 600,000 TONS POPULATION HAD INCREASED BY A THIRD. PER CAPITA REDUCTION 40%

DOES IT MATTER?

World IQ over time



© MailOnline/University of Hartford

Rise in Brain disorders

EU - 2004 €386 Billion
2010 €789 Billion

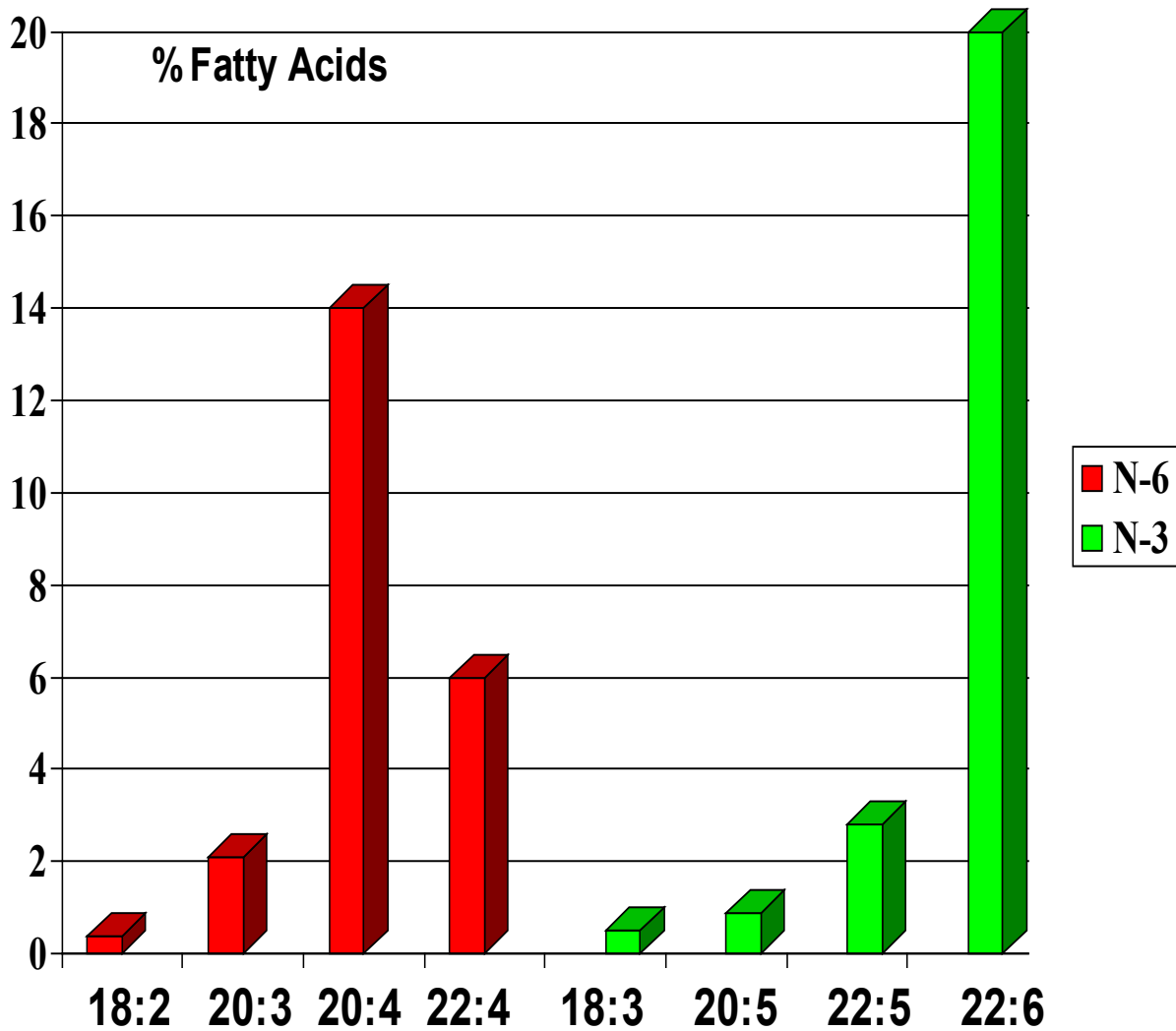
UK 2007 £77 Billion :
Greater than heart disease and cancer combined (DoH Data).

2010 £105 Billion

WELLCOME 2013 £113 Billion

TRUST: HIGHEST COST IN ALL 5 HEALTH AUDITS. NO ONE RESPONDED!

BRAIN ESSENTIAL FATTY ACID COMPOSITION ETHANOLAMINE PHOSPHOGLYCERIDES

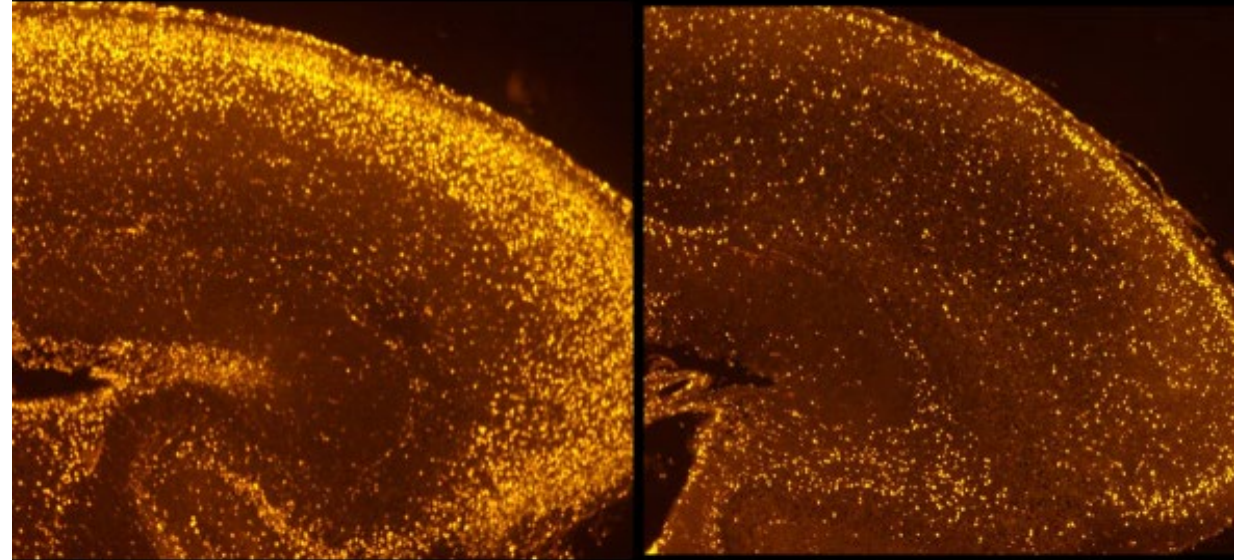


Crawford & Sinclair (1972) "Nutritional influences in the evolution of the mammalian brain" *Ciba Foundation Symposium* (1971), Ed K Elliot & J Knight, 267-292

Maternal DHA deficiency (of marine fat) in the developing brain restricts migration of cortical neurones.

Diet 59 with marine fat

Diet 61 (Deficient)



Yavin E, Himovishi E, Eilam R (2009) Delayed cell migration in the developing rat brain following maternal omega 3 alpha linolenic acid dietary deficiency. *J. neuroscience.* 162(4):1011-22.

Brand A, Crawford MA, Yavin E. (2010) Retailoring docosahexaenoic acid-containing phospholipid species during impaired neurogenesis following omega-3 alpha-linolenic acid deprivation. *J Neurochem.* ;114(5):1393-404

x4

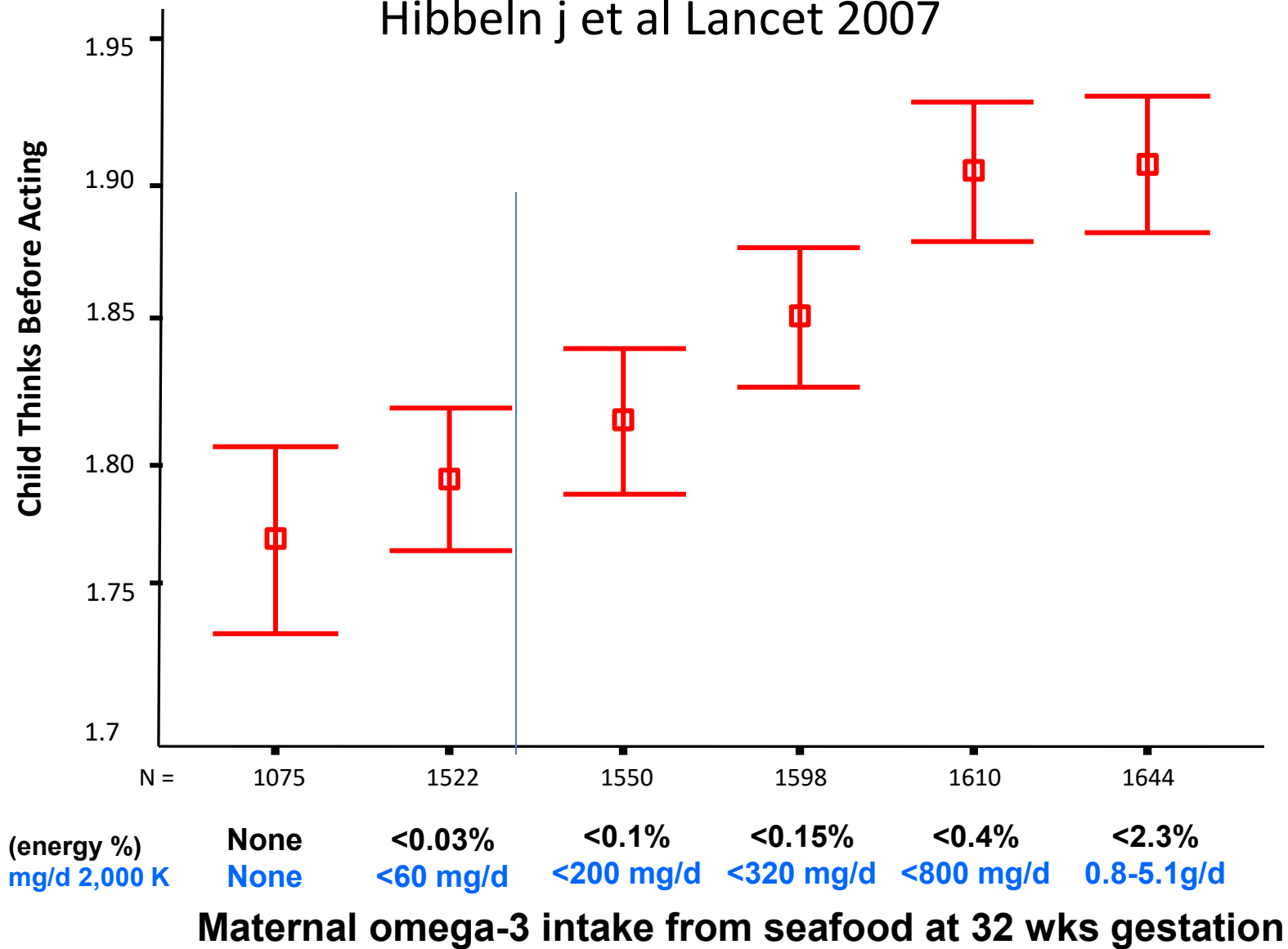
THERE IS AN ABUNDANCE OF ROBUST EVIDENCE SINCE THE 1970s THAT INADEQUATE DIETARY DHA RESULTS IN BEHAVIOURAL PATHOLOGY, AND REDUCED VISUAL, LEARNING AND COGNITIVE ABILITIES.

Sinclair AJ. Docosahexaenoic acid and the brain- what is its role? *Asia Pac J Clin Nutr.* 2019;28(4):675-688. doi: 10.6133/apjcn.201912_28(4).0002. PMID: 31826363.

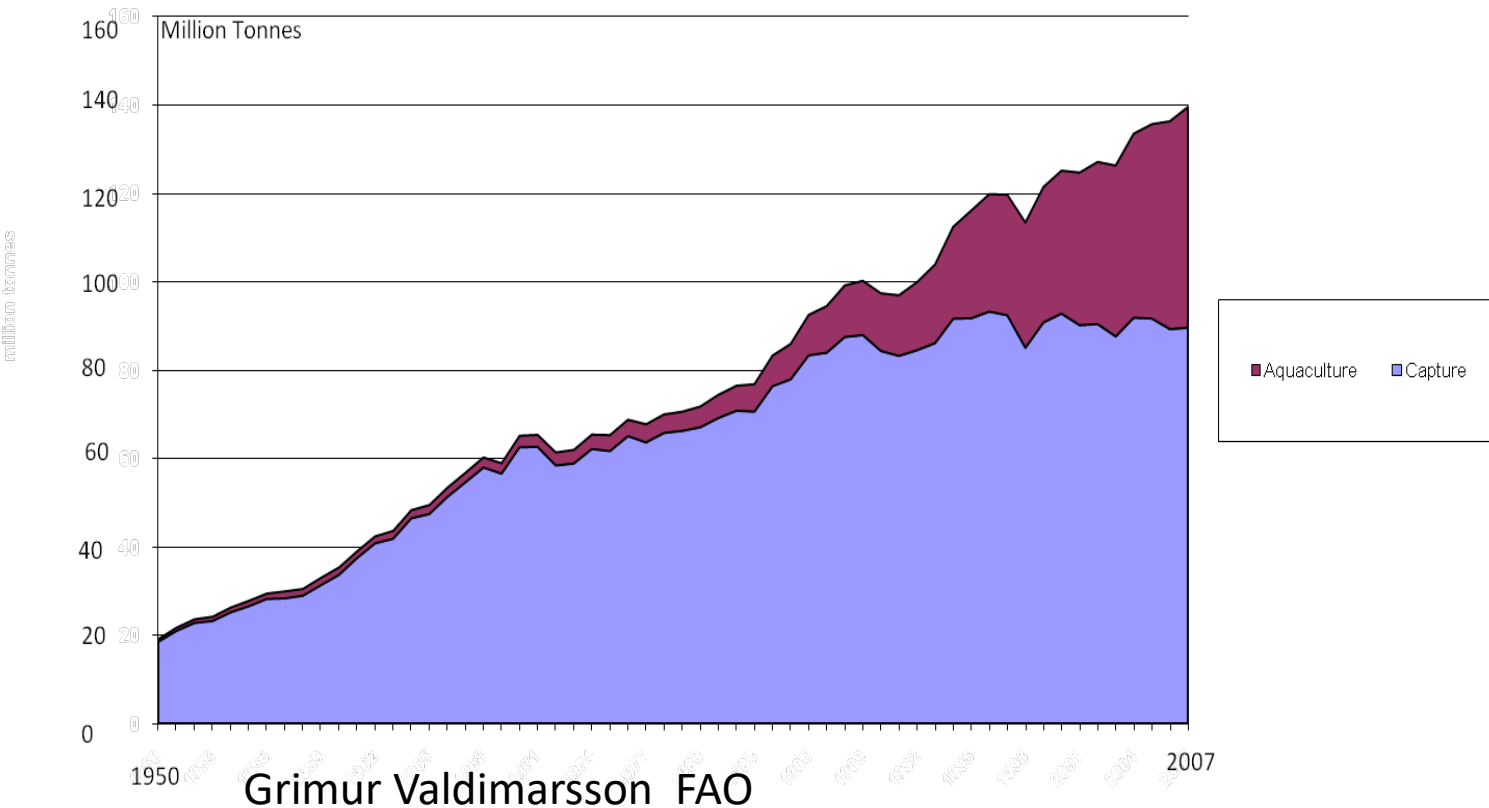


ALSPAC: Child thinks before acting (8 y) and Omega-3 intake as sea food by mother in pregnancy (32 w)

Hibbeln j et al Lancet 2007



World capture & aquaculture production.
Aquaculture of carnivorous fish depends on the wild
catch a limited resource. Now land animal products
(chickens, vegetable oils) are being used.



A BOLD NEW INITIATIVE

MARINE AGRICULTURE
Farming the seas and sea
beds

Sea Bed Kelp Farming —Bali, Indonesia. The kelp farmers are making more money than inland farmers: they are also providing iodine and DHA..





**Hunting & Gathering is a Neanderthal
technique. It has Reached its Limit.**

**Marine Agriculture : Shiraishijima
Island's Marine Ranching Project in
Okayama**

Takehiro Tanaka

Director of Fisheries Division,

Department of Agriculture, Forest and Fisheries

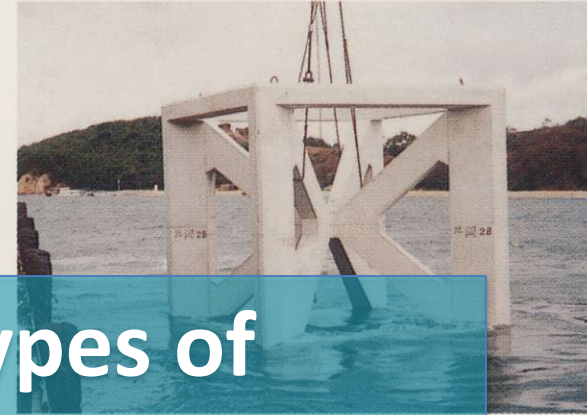
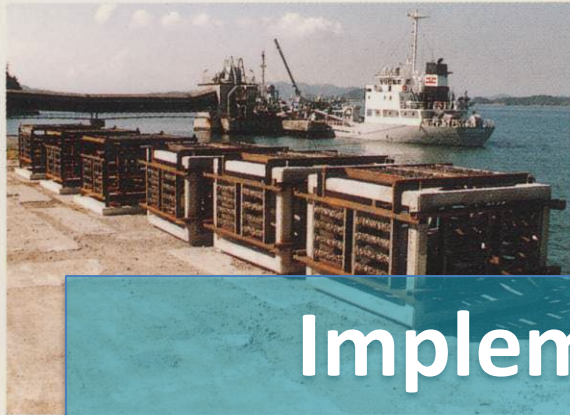
Okayama Prefectural Government, Japan.

Toubi Area Regional Fishing Ground Recovery Project Image Diagram



Artificial Reefs

生息環境の整備に用いた魚礁



Implementing several types of artificial Reefs to provide habitats suitable for different species of fish and also different life stages of fish

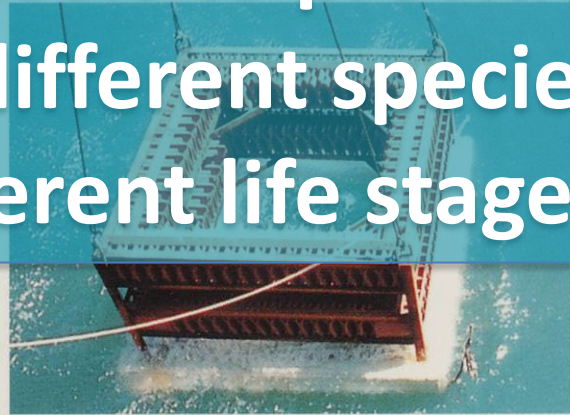
幼稚魚のための魚礁

成魚のための魚礁

産卵のための魚礁



親魚のための魚礁



キジハタのための魚礁



クロダイのための魚礁

LAND - GREEN PASTURE



Marine Agriculture: Pasture Development

(Dr. Takahero Tanaka)



Eel Grass (*Zostera marina*)

Working with local fishers



We have been working with local fishers and communities to revitalize the eel grass habitat

Last century, science and food policy focussed on protein and body growth.

H. Sapiens is about brain growth not body growth.



Note the similar sizes of the brain case of the 1 year old and his mother

Note the sizes of the hands.

The brain is the first priority on H. sapiens

Body = protein
Brain = lipids.

Priority for food policy is the brain specific lipid.

Thank you for listening - however listening is not enough. Action is required.

We are responsible for the mental health and wellbeing of the children about to be born.



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I thank also all the many wonderful people with whom I have worked since the early 70s and before in Africa where I learnt of the supreme importance of specific nutrition for the health of the brain .