Ocean/Aquatic Food Systems for Planetary Social Justice

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EARTH
OCEAN FOOD SYSTEMS
ETHOS

Our Global Food Challenges

Develop Ocean/Aquatic Food Systems for Planetary & Cultural Survival

Indigenous Leadership

Global Imperatives

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Global Imperatives

OVERALL IMPERATIVE

A transformation of food production systems is needed to meet the challenges of simultaneously adhering to the planetary dimensions, food security and food justice to advance human health and wellness...

GLOBAL IMPERATIVES

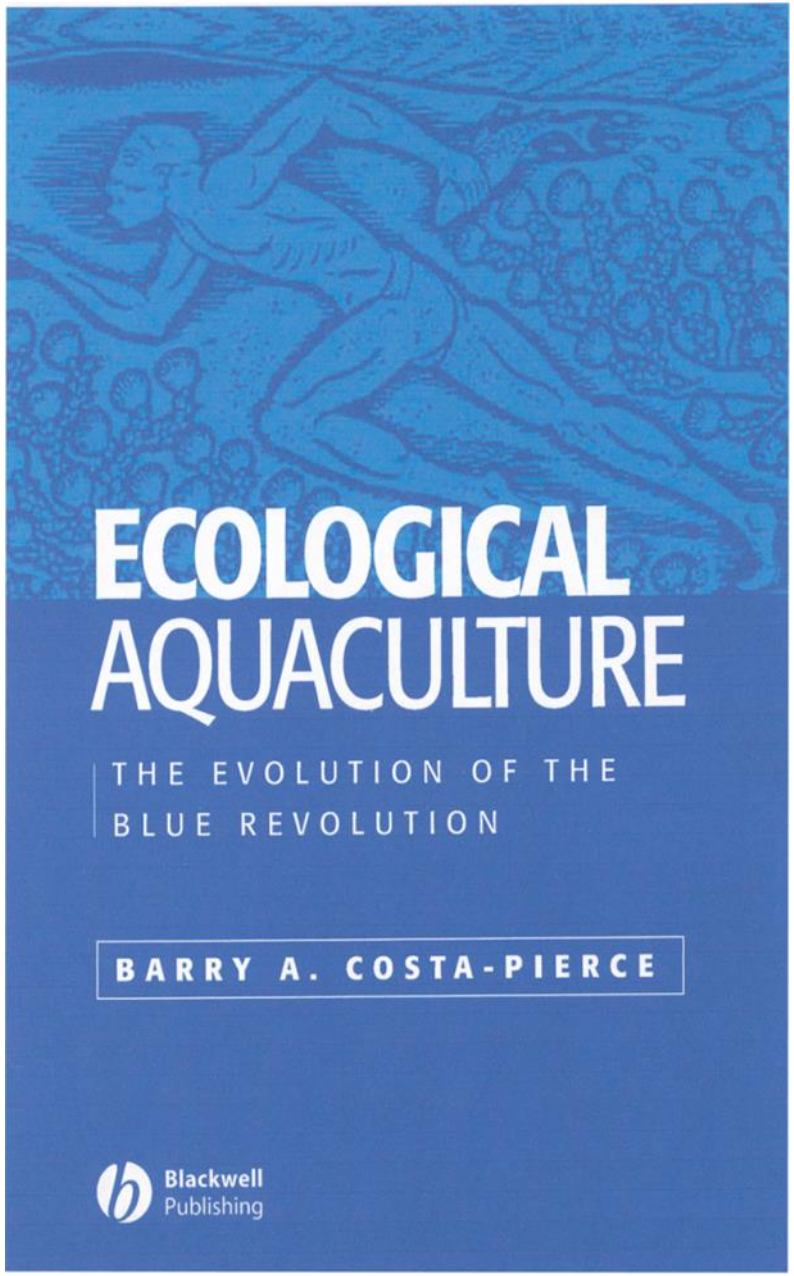
Freeze the Expansion of Agriculture

Accelerate the Supply & Delivery of Ocean Aquatic Foods via Aquaculture and Fisheries to Humanity to Save/Recover/Enhance the World's Biodiversity

Change Diets for Human Health & Wellness

Blue Foods, Blue Communities, Blue Economies…
Blue Revolutions
are nothing new…

Aquaculture is an ancient practice evolved from fisheries
Aquaculture is an integral part of our
planetary wisdoms, our cultural heritages…
an essential part of our past…and a vital part of our
future…



Indigenous communities can not only reclaim their past wisdom but also advance an alternative path to intensive, industrial aquaculture plus lead locally and globally the ecosystem approach to aquaculture advanced by the FAO...

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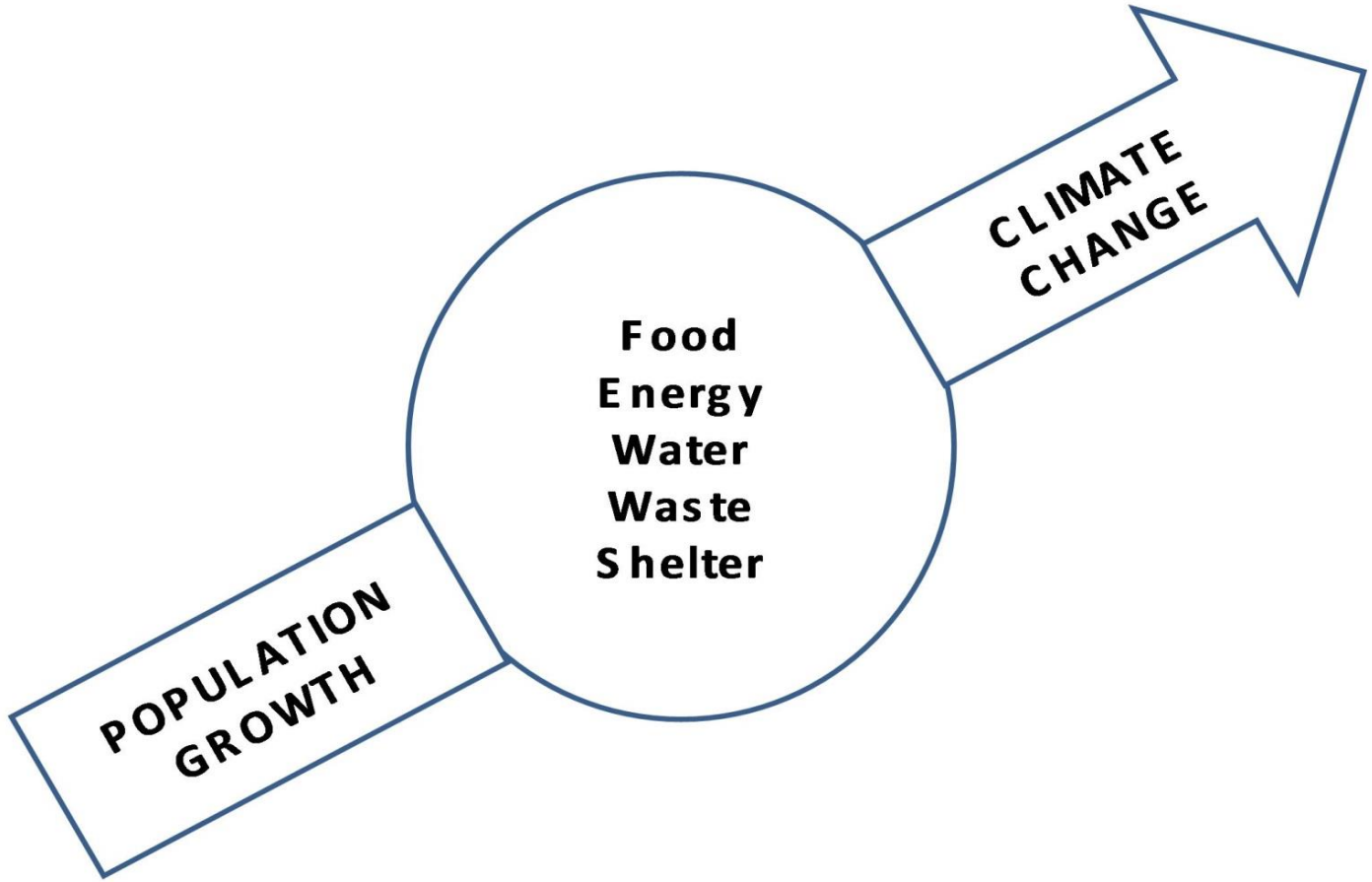
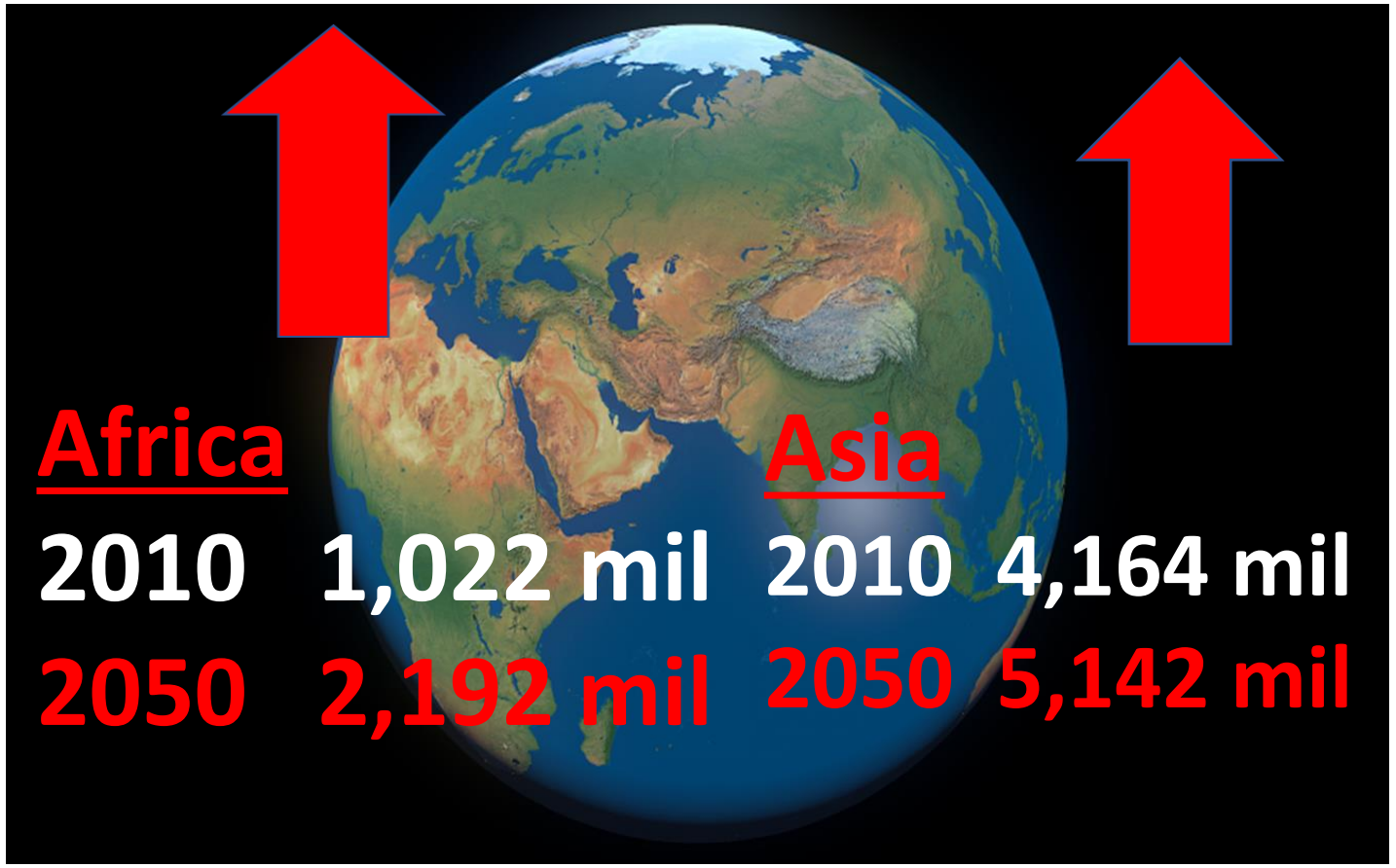

POPULATION GROWTH
Food
Energy
Water
Waste
Shelter
CLIMATE CHANGE



Europe **BILLIONS**

2010 738 mil
2050 719 mil ↓ 0.7

North America

2010 345 mil
2050 447 mil ↑ 0.5

Latin/South America

2010 590 mil
2050 751 mil ↑ 0.7

1.9

Chin et al. 2011. Special Section on Population. *Science* 333: 540-594.

The Global Village of 1000

714

- 589 Asia
- 125 Africa

150 Europe, Russia, Mideast

84 Latin/S. America

52 North America

Losses and Poisoning of Arable Lands

Destruction of Forests, Savannahs

Water, Nutrient Scarcities, Coastal Pollution

Social Justice/Exploitation

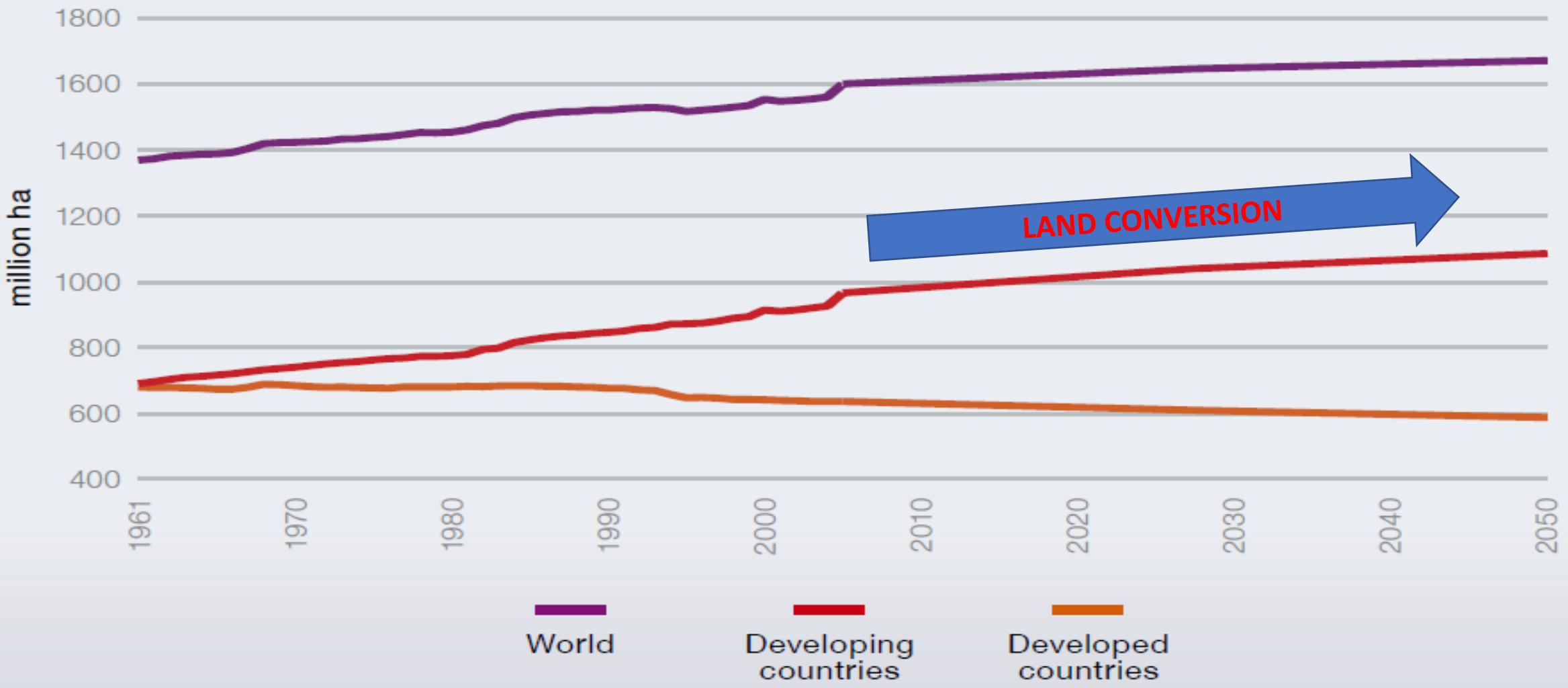
High Level Expert Forum - How to Feed the World in 2050

Office of the Director, Agricultural Development Economics Division

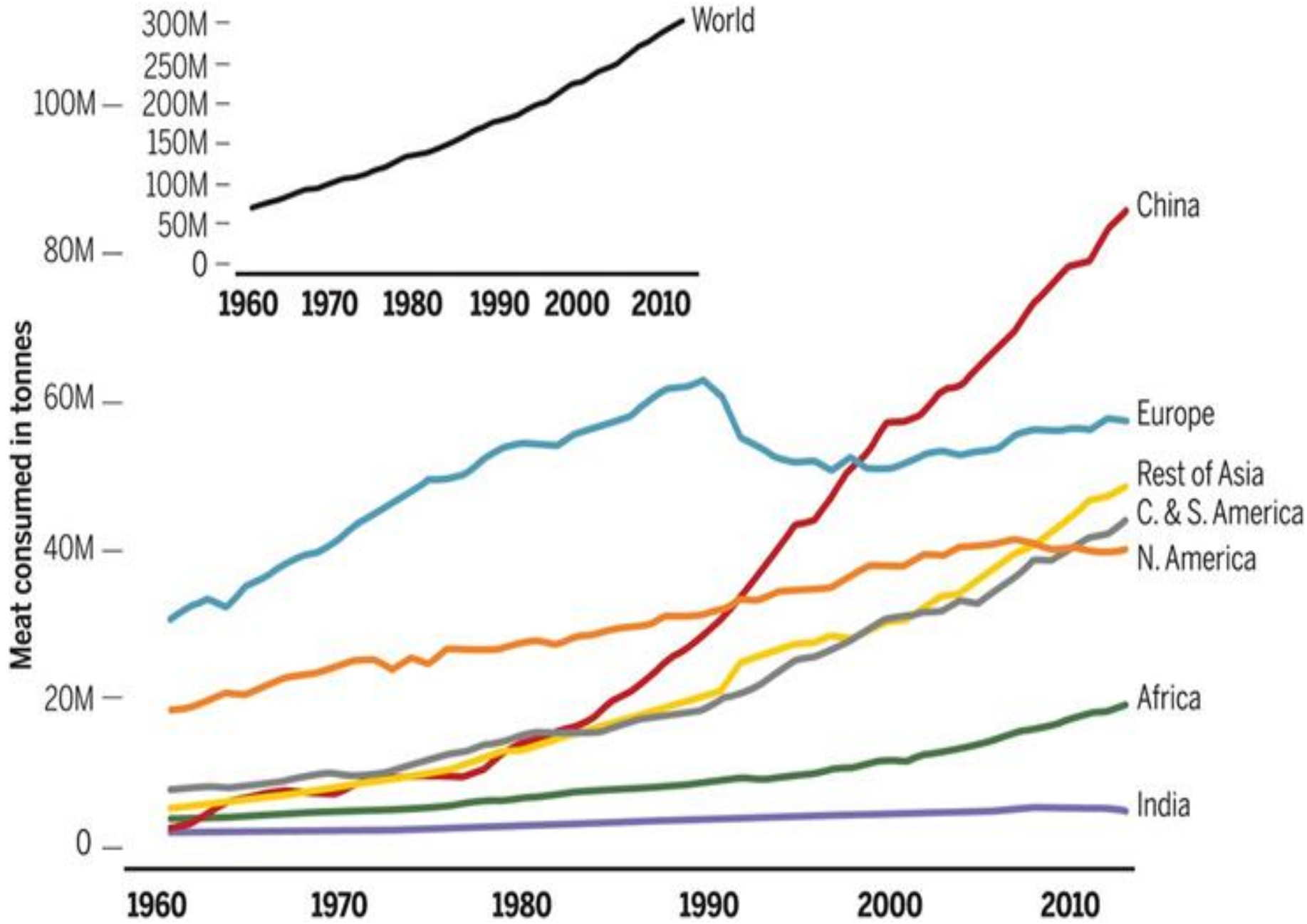
Economic and Social Development Department

Viale delle Terme di Caracalla, 00153 Rome, Italy

Arable land



Source: Bruinsma, 2009


World
300M
250M
200M
150M
100M
50M
0
1960
1970
1980
1990
2000
2010
Meat consumed in tonnes
100M
80M
60M
40M
20M
0
China
Europe
Rest of Asia
C. & S. America
N. America
Africa
India
1960
1970
1980
1990
2000
2010

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Global Imperatives

Ocean foods ecosystems for planetary survival in the anthropocene

BARRY A. COSTA-PIERCE
Department of Marine Sciences, Marine Science Center, University of New England, U.S.A.


70% of Our Planet is Water and
Produces Only 6% of Human Foods

Terrestrial Crops	MMT
Maize (Corn)	1,075
Wheat	750
Rice	486
Soybeans	350
Barley	146
subtotal	2810
Terrestrial Animals	
Pork	118
Poultry	118
Beef	70
Sheep	15
subtotal	321
Total Terrestrial Production	**3131**
Aquatic Crops	32
Aquatic Animals: Capture Fisheries	93
Aquatic Animals: Aquaculture	74
Total Aquatic Animals	167
Total Aquatic Production	**199**

199 MT water

3,131 MT land

Animals	FCRs (kg to kg)
Carps, tilapias, trouts, salmonids, breams, flounders, cobia, cod	1.3 to 1.5:1
Chickens	1.9:1
Pigs	2.8:1
Cattle	6 to 9:1

Animals	kg Grain to kg Protein
Poultry	38
Pigs	17
Cattle	61
FISH	**14**


EAT LESS
MEAT

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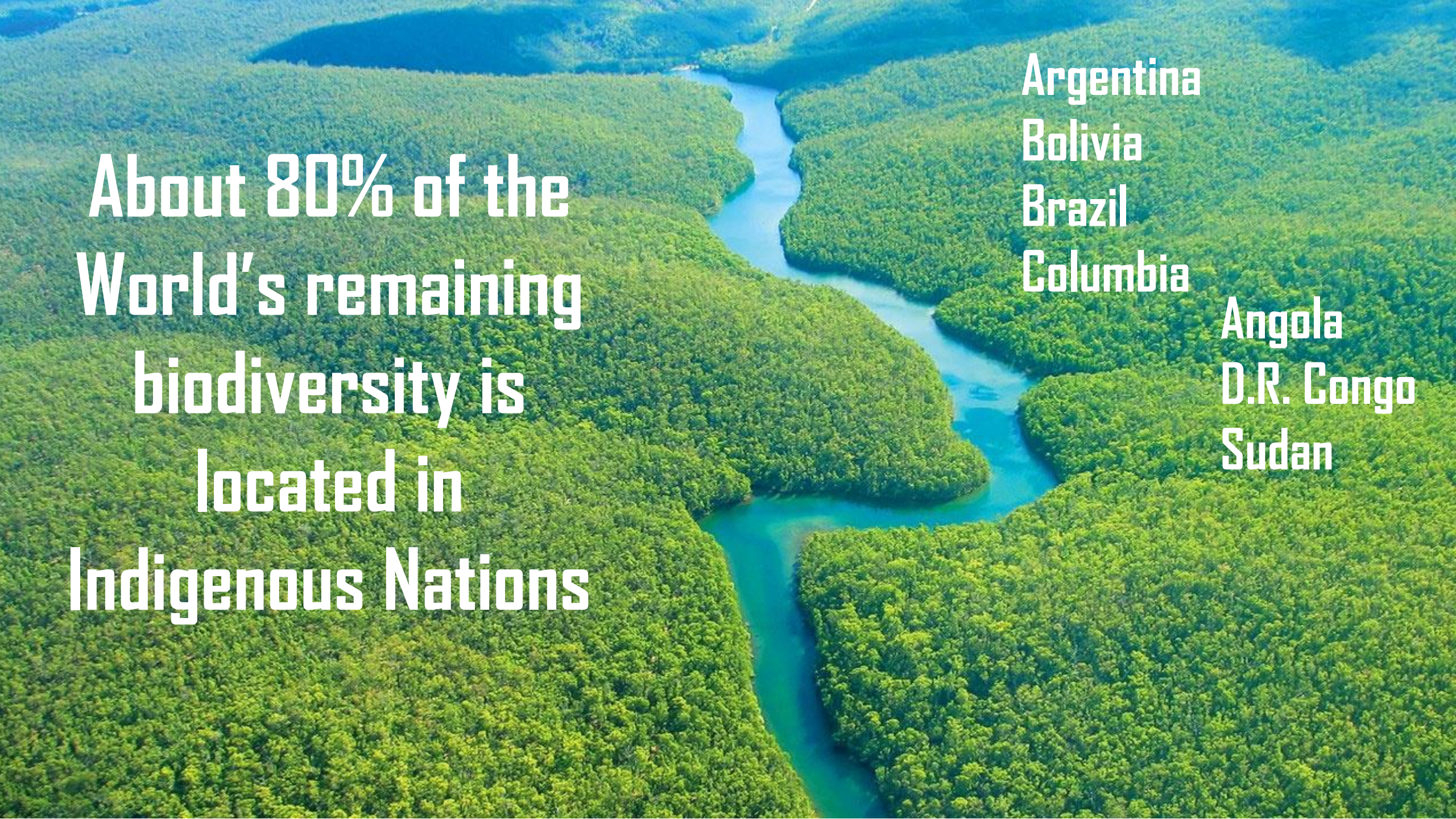
About 80% of the World's remaining biodiversity is located in Indigenous Nations
Argentina
Bolivia
Brazil
Columbia
Angola
D.R. Congo
Sudan

frontiers | Frontiers in Sustainable Food Systems

HYPOTHESIS AND THEORY
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The Anthropology of Aquaculture

Barry Antonio Costa-Pierce [1,2,3]*

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Aquaculture is nothing new. It has a long, fascinating history that stretches from antiquity at least 8,000 years ago. What is new is the evolution of aquaculture in modern times into highly intensive monocultures which arose in the 1970–1980's. Modern aquaculture production has grown worldwide but remains concentrated in Asia due to the: (1) increased demands for aquatic foods as explosive population growth occurred in coastal cities with increasing affluence, (2) expansion of scientific and engineering breakthroughs, (3) high export values of aquatic foods, and (4) sharp decline of costs of global to local transport/shipping. The pioneering anthropologist Claude Levi-Strauss brought the idea of "structuralism" to anthropology: the concept that societies throughout history followed universal patterns of behavior. A qualitative document analysis of the key anthropological literature to assess aquaculture developments from antiquity to the beginning of the modern era was conducted to evaluate if there was adequate evidence to support a theory of anthropological "structuralism" for aquaculture in human history. Seven case studies of the cultural/environmental history of aquaculture were reviewed in diverse parts of the world (China, Australia, Egypt, Europe, South America, Canada/USA, Hawai'i). Analysis supports the structural theory that whenever the demands of aquatic/seafood-eating peoples exceeded the abilities of their indigenous fishery ecosystems to provide for them, they developed aquaculture. Modern aquaculture concepts and new communities of practice in "restoration aquaculture" have beginnings in Indigenous anthropology and archeology in aquaculture and point the way for Indigenous nations to engage as leaders of the United Nations Food and Agriculture Organization (FAO) ecosystem approach to aquaculture worldwide. Bringing ancient knowledge of Indigenous aquaculture into the modern context is an essential part of an alternative, "radical transformation" of modern aquaculture. There is an urgent need to develop and promote locally designed and culturally appropriate aquaculture systems that fit into the livelihoods of communities as part of a larger, diverse portfolio of food security.

Keywords: structuralism, Indigenous aquaculture, Indigenous anthropology, case studies, content analysis

OPEN ACCESS

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INTRODUCTION

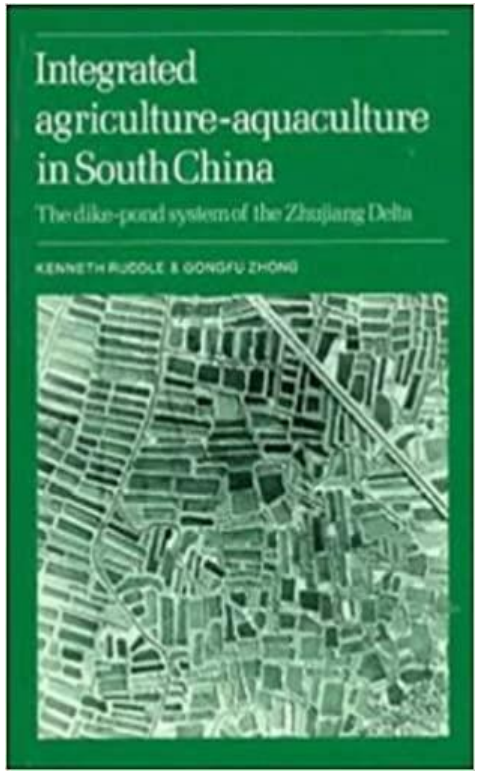
The pioneering anthropologist Claude Levi-Strauss brought the idea of "structuralism" to anthropology (Levi-Strauss, 1958)…

which is the concept is **that societies throughout history follow universal patterns of behavior.**

In the *Anthropology of Aquaculture* (Costa-Pierce 2022) I hypothesized that –

whenever the demands of sea/aquatic food-eating peoples exceeded the capacities of their indigenous marine/aquatic ecosystems to provide adequate aquatic resources for them…these cultures…throughout the world…developed aquaculture.

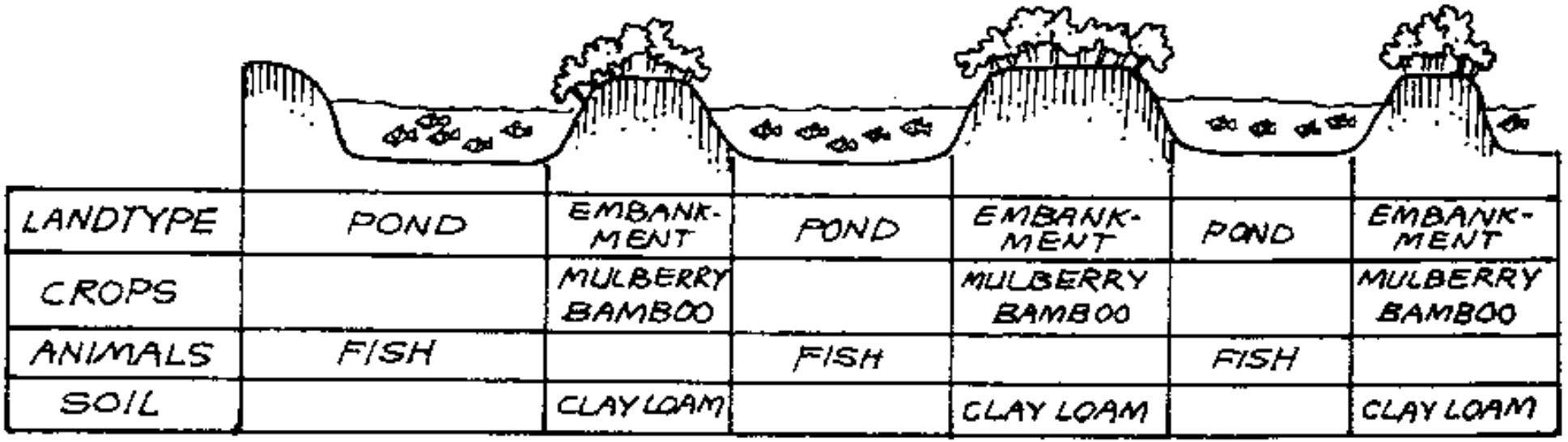

WWW.NEWS.CN



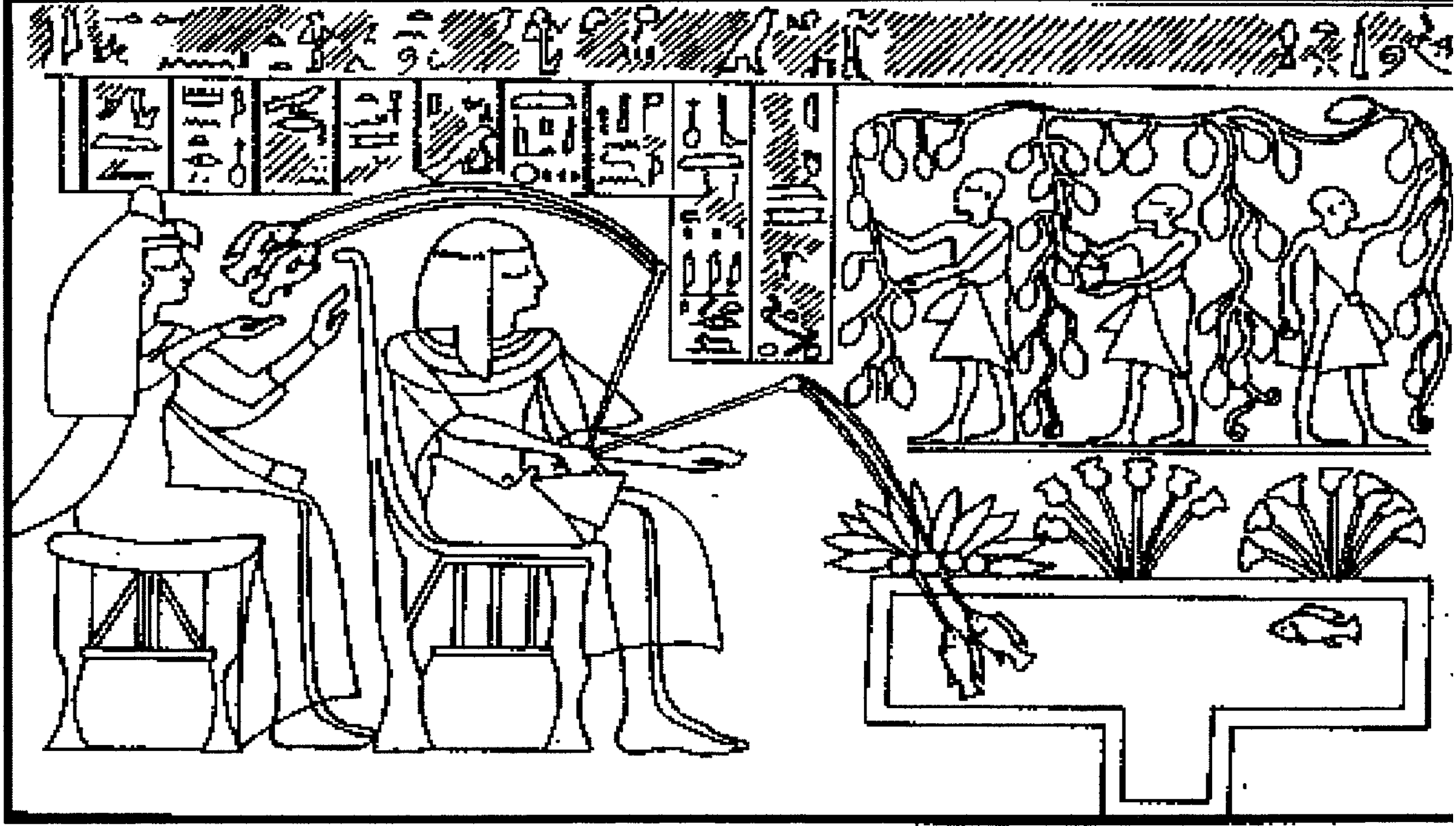
Ken Ruddle. 1988. *Integrated Agriculture-Aquaculture in South China: The Dike-Pond System of the Zhujiang Delta*

Mulberry-dike systems

Mulberry trees – silkworms – silk – pupae – fish feeds – rich muds – Mulberry trees



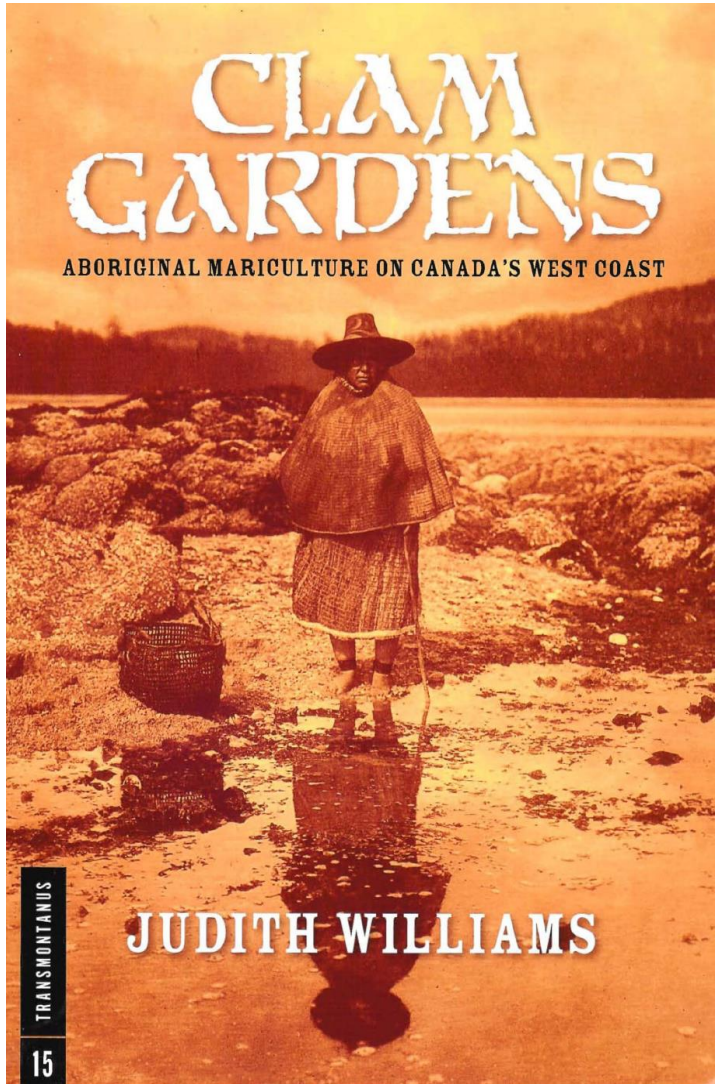
FAO “Globally Important Agricultural Heritage System”




Budj Bim Cultural Landscape
UNESCO World Heritage Site


AUSTRALIA
SOUTH AUSTRALIA
NEW SOUTH WALES
AUSTRALIAN CAPITAL TERRITORY
VICTORIA

Canada



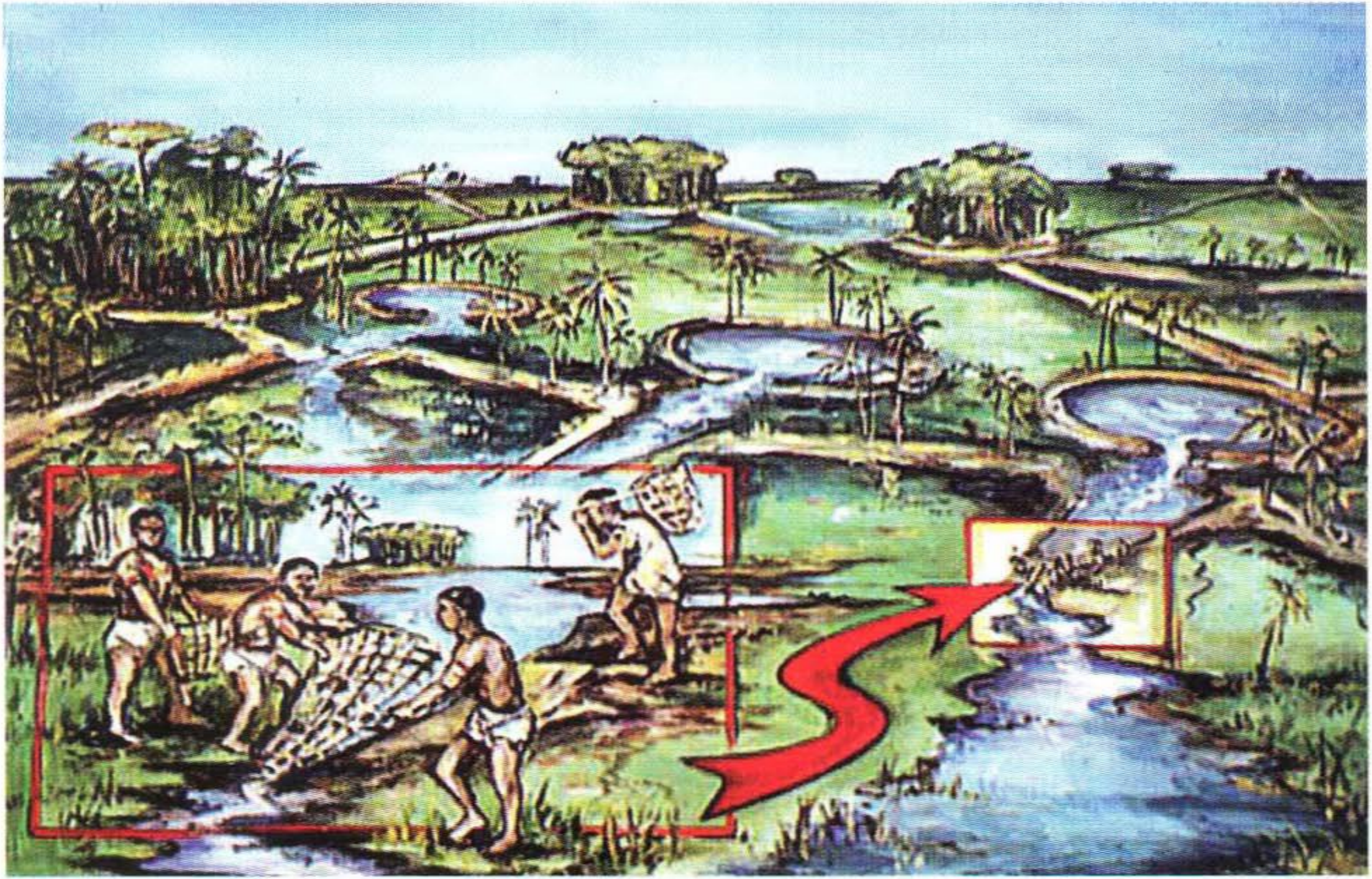
B. Reid
"Raven and First Men"

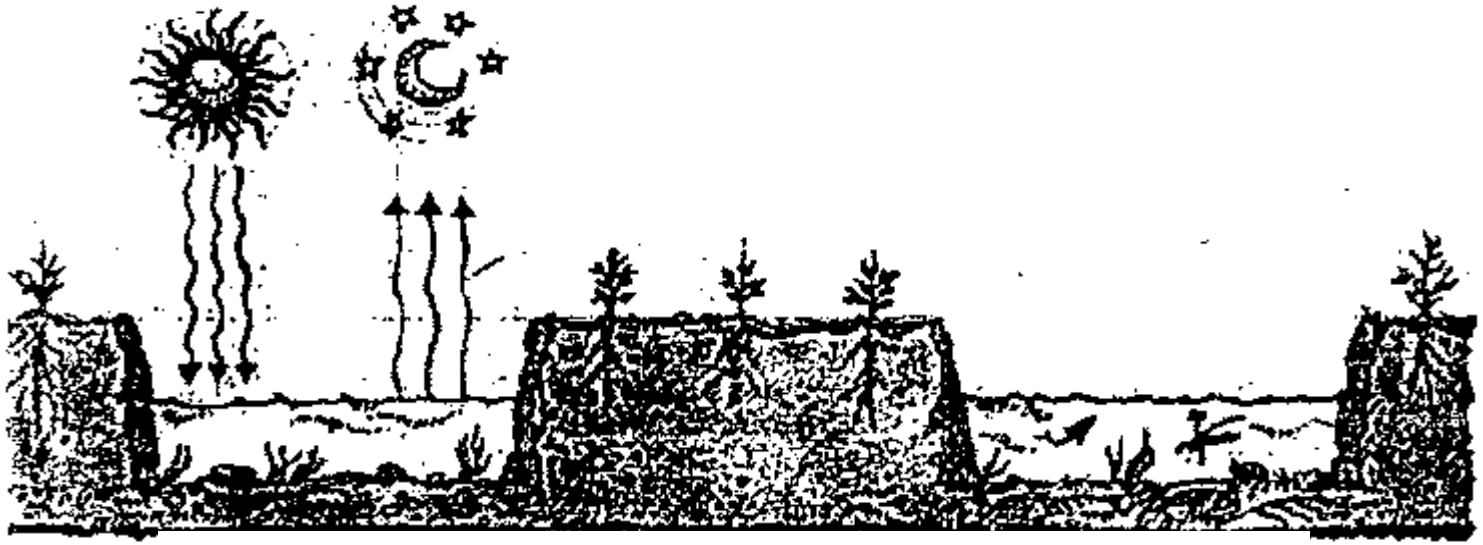
Ancient First Nation clam gardens in the Broughton Archipelago cultivating butter clams

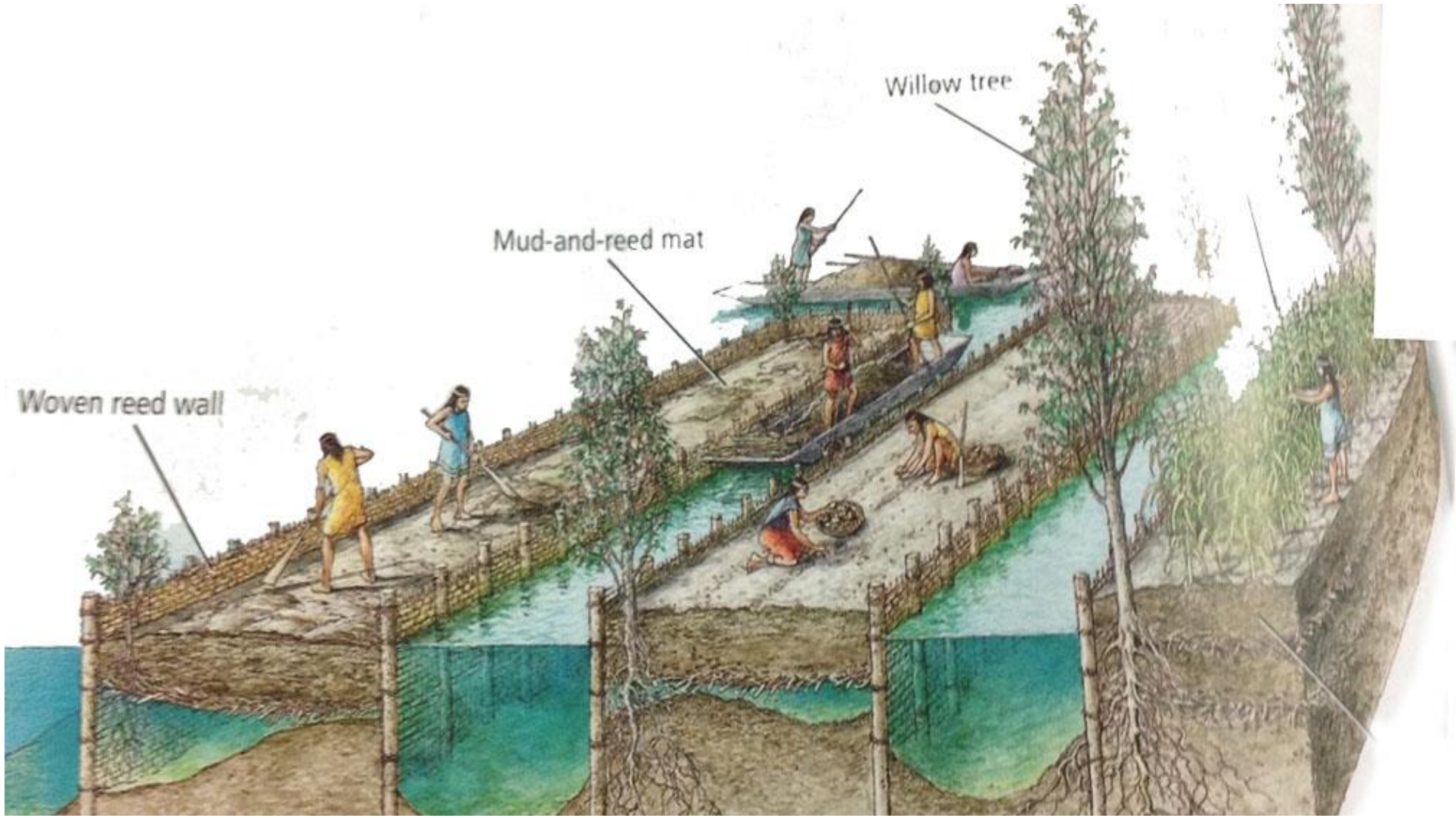
The Beni is ~78,000 km^2 (30,000 miles^2) of raised agricultural fields integrated with fish/irrigation canals


Mann, C.C. 2008. Ancient earthmovers of the Amazon. Science 321: 1148 – 1152.

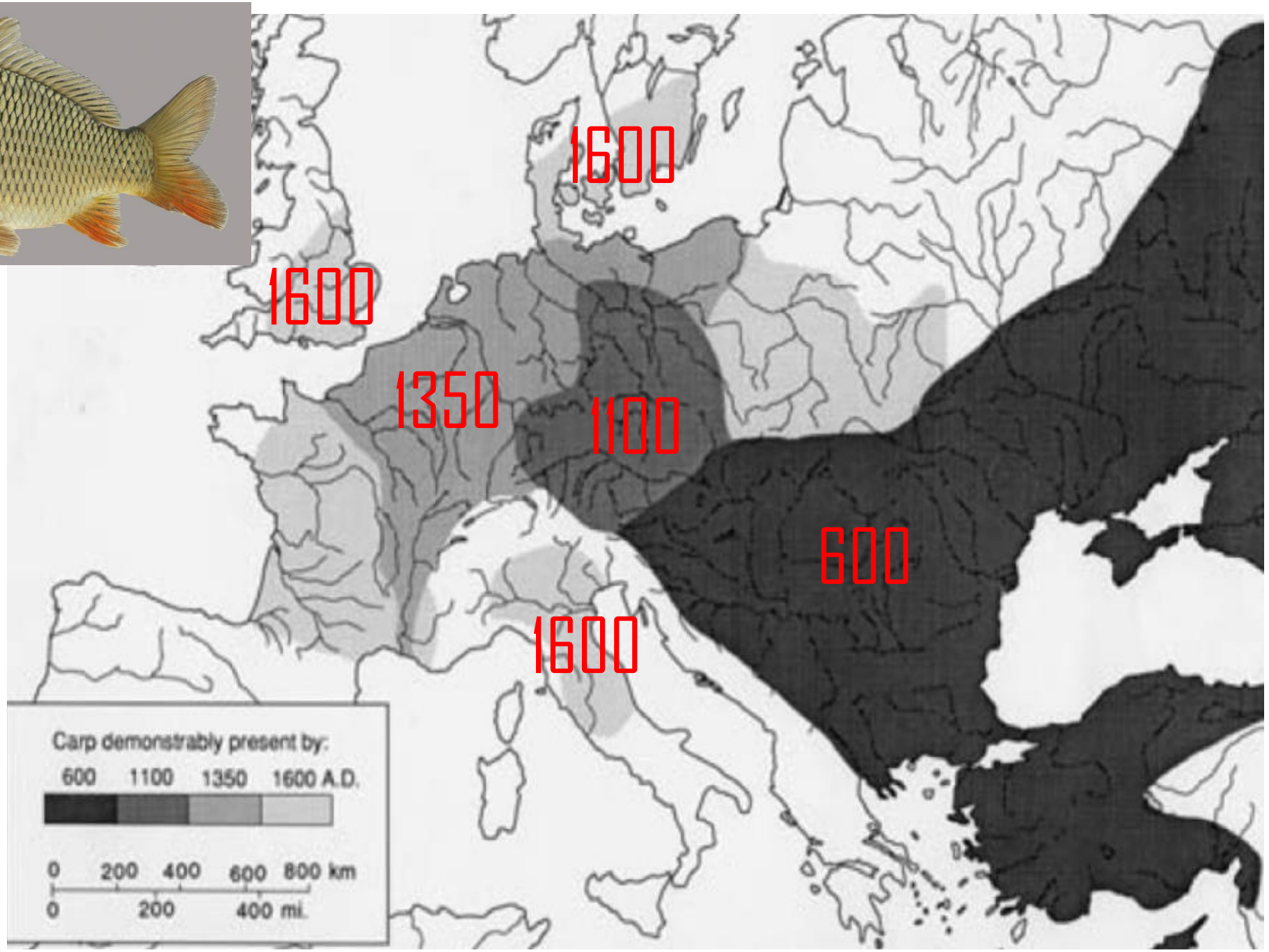
Life in the Llanos. An artist's conception of a settlement in the Llanos de Mojos, some 2 millennia ago. (painting by Dan Brinkmeier)






Willow tree
Mud-and-reed mat
Woven reed wall

The demand for fish increased dramatically in Europe as Christianity became dominant in the 5th and 6th centuries and taboos on eating terrestrial “flesh” were enforced. The only meats that could be eaten on fasting days were cold-blooded animals such as fish, crustaceans, and shellfish. People were allowed to substitute fish for meat for about 130 days (35%)

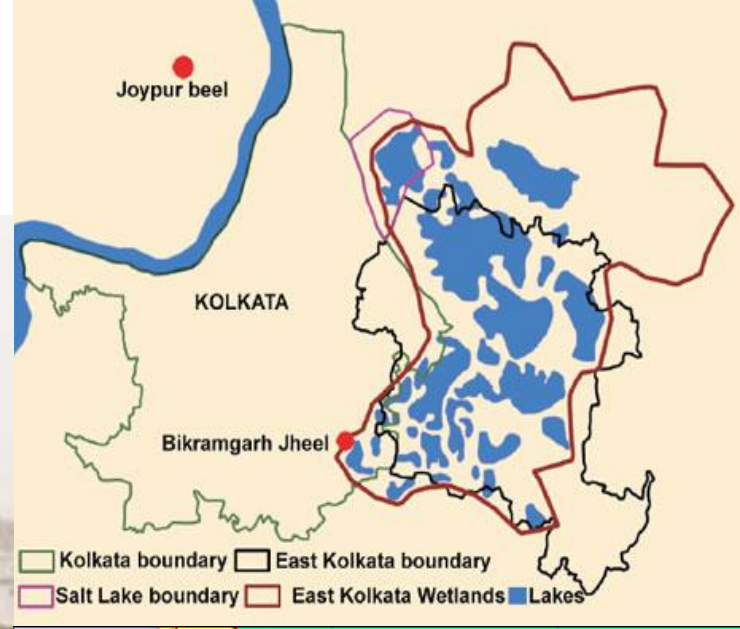

1600
1600
1350
1100
600
1600
Carp demonstrably present by:
600 1100 1350 1600 A.D.
0 200 400 600 800 km
0 200 400 mi.

Photograph courtesy of Bruce Lum, Kamehameha Schools


Integrated Agriculture-Aquaculture Farming Ecosystem

East Kolkata (Calcutta) Aquaculture Wetlands
4000 ha ~8,000 MT fish (carps)/year

Ramsar Convention on Wetlands of International Importance



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CONCLUSIONS: Global Imperatives

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Freeze the Expansion of Agriculture

Accelerate the Supply & Delivery of Ocean Aquatic Foods via Aquaculture to Humanity to Save/Recover/Enhance the World's Biodiversity

Change Diets for Human Health & Wellness

SUSTAINABLE DEVELOPMENT GOALS

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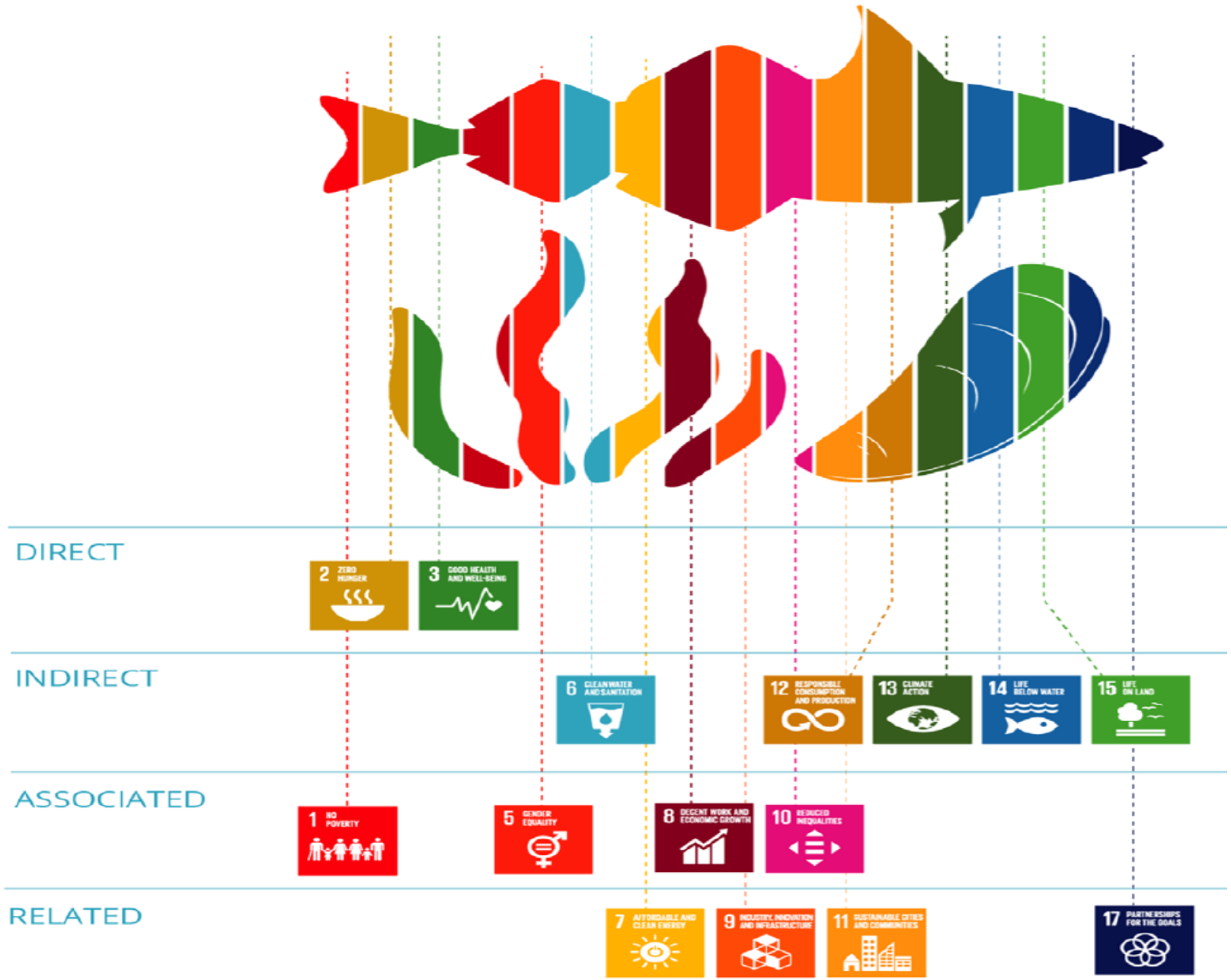
REVIEW ARTICLE

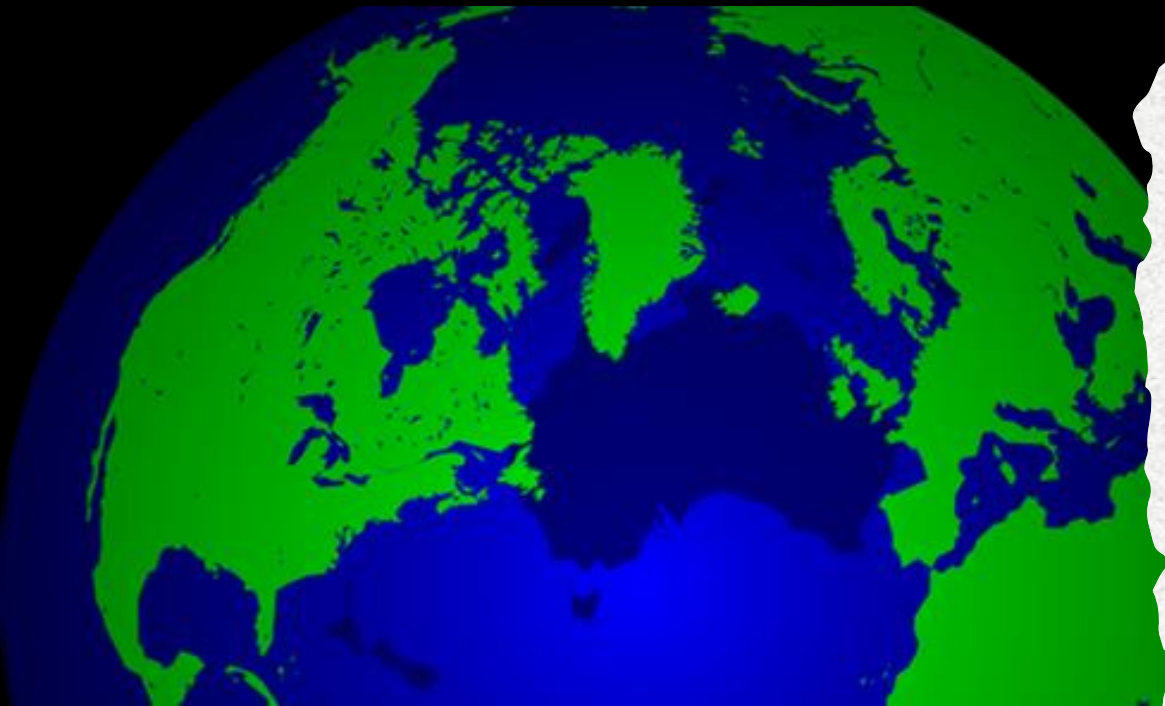
Perspectives on aquaculture's contribution to the Sustainable Development Goals for improved human and planetary health

Max Troell[1,2] | Barry Costa-Pierce[3] | Selina Stead[4] | Richard S. Cottrell[5] | Cecile Brugere[6] | Anna K. Farmery[7] | David C. Little[8] | Åsa Strand[9] | Roger Pullin[10] | Doris Soto[11,12] | Malcolm Beveridge[13] | Khalid Salie[14] | Jorge Dresdner[12] | Patricia Moraes-Valenti[15] | Julia Blanchard[16,17] | Philip James[18] | Rodrigue Yossa[19] | Edward Allison[19,20] | Christopher Devaney[8] | Uwe Barg[21]

AQUACULTURE AND THE SDGs



Earth Charter



We stand at a critical moment in Earth's history, a time when humanity must choose its future. As the world becomes increasingly interdependent and fragile, the future at once holds great peril and great promise. To move forward we must recognize that in the midst of a magnificent diversity of cultures and life forms we are one human family and one Earth community with a common destiny. We must join together to bring forth a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace. Towards this end, it is imperative that we, the peoples of Earth, declare our responsibility to one another, to the greater community of life, and to future generations.

Ecological Aquaculture Foundation
https://oceanfoods.org

Thank you !
Tusen Takk !
Mahalo !
Muchas Gracias !

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