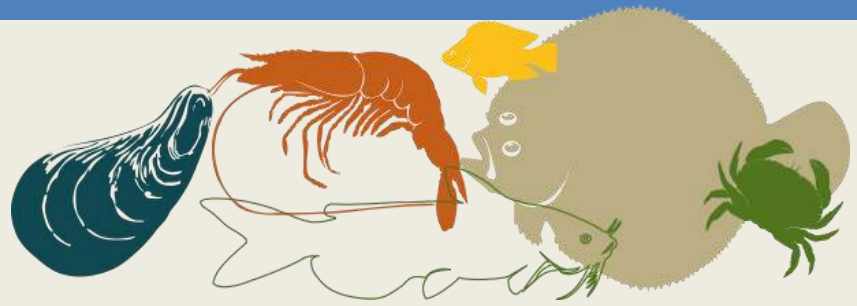




Food and Agriculture  
Organization of the  
United Nations

COMMISSION ON  
GENETIC RESOURCES  
FOR FOOD AND  
AGRICULTURE



# Contribution of Aquatic Genetic Resources to Food Security and Nutrition

Devin M. Bartley & Matthias Halwart  
Fisheries and Aquaculture Department

CGRFA Special Event  
Food security and genetic diversity  
FAO, 16 January 2015



- AqGR are food security in the developing world
  - one billion people worldwide rely on fish as their primary source of animal protein.
- AqGR for Food Security and Nutrition includes thousands of species
  - These species are found in the world's oceans, seas, lakes, reservoirs, rivers, rice paddies and other wetlands
  - They are also found in aquaculture facilities in marine, brackish and fresh waters.
- Unlike other sectors, all wild relatives of farmed aquatic species still exist in the wild and in their natural nutritional state
- WE NEED TO PRESERVE THIS DIVERSITY AND ACCESS TO IT

# AVAILABILITY WILD & FARMED AQUATIC SPECIES

	Wild Species*	Farmed species (2012)
<b>Finfish</b>	<b>31,000</b>	<b>354</b>
<b>Molluscs</b>	<b>85,000</b>	<b>102</b>
<b>Crustaceans</b>	<b>47,000</b>	<b>59</b>
<b>Seaweeds</b>	<b>13,000</b>	<b>~37</b>
<b>Total</b>	<b>176,000</b>	<b>567</b>



\*World Conservation Union (2010)



# Rice paddies – More AqGR than just rice!!



Amphibians	11
Crustaceans	11
Fishes	145
Molluscs	15
Reptiles/Amphibians	13
Plants	37
<b>TOTAL</b>	<b>232</b>





Food and Agriculture  
Organization of the  
United Nations

COMMISSION ON  
GENETIC RESOURCES  
FOR FOOD AND  
AGRICULTURE



## ACCESS

Fisheries are sources of AqGR

SSF especially important for food security

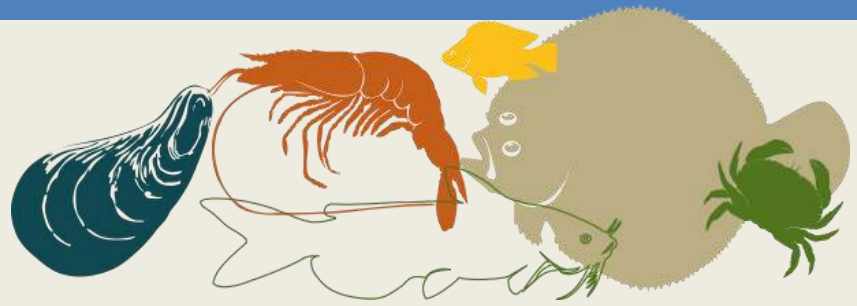
- **SSFs sustain 90 %** of the 120 million people dependent on fisheries, **97 %** of which live in tropical developing countries
- Half of the work-force is **women**
- **SSFs provide millions of livelihoods** (15 times more than LSFs), food, a vital social safety net maintaining the social fabric of coastal communities.





Food and Agriculture  
Organization of the  
United Nations

COMMISSION ON  
GENETIC RESOURCES  
FOR FOOD AND  
AGRICULTURE

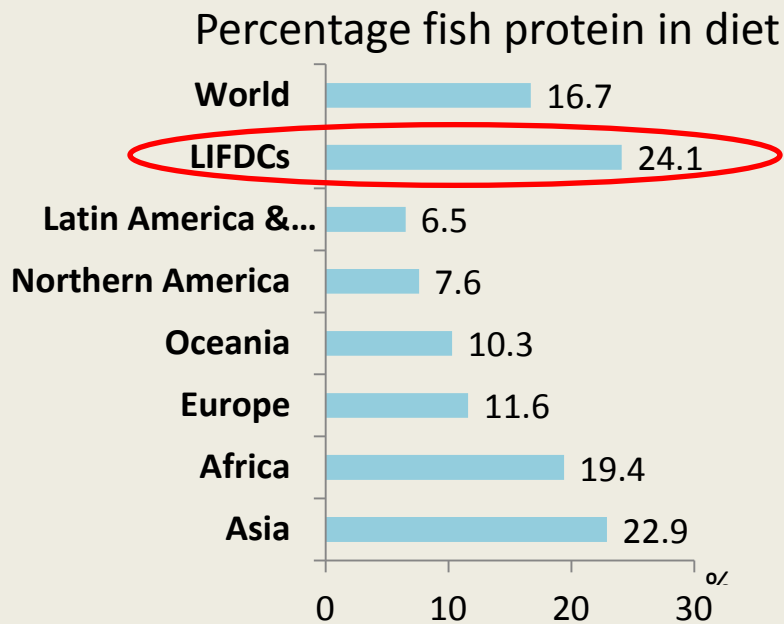


## Aquaculture & AqGR

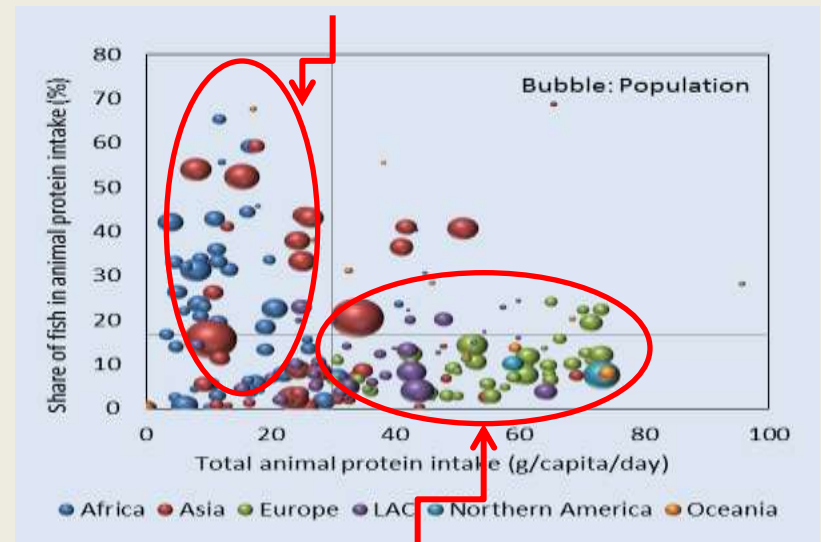
- Aquaculture is the fastest growing food production sector;
- About 50% of consumed fish comes from aquaculture
- More species are being farmed and domesticated than ever before!
- Aquaculture is the main reason for the deliberate introduction of non-native aquatic species providing additional access to AqGR—
  - FAO maintains records on over 5000 international introductions of alien species
  - The vast majority have not caused environmental harm and have produced positive social and economic impacts

# UTILIZATION

Important in the developing world – where animal protein use is low, AqGR provide an important source of nutrition



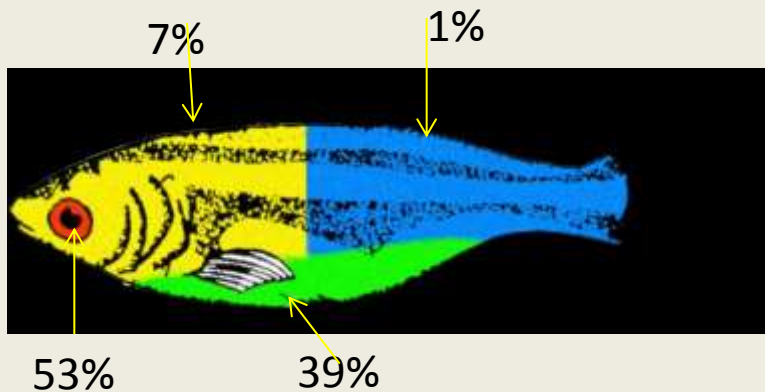
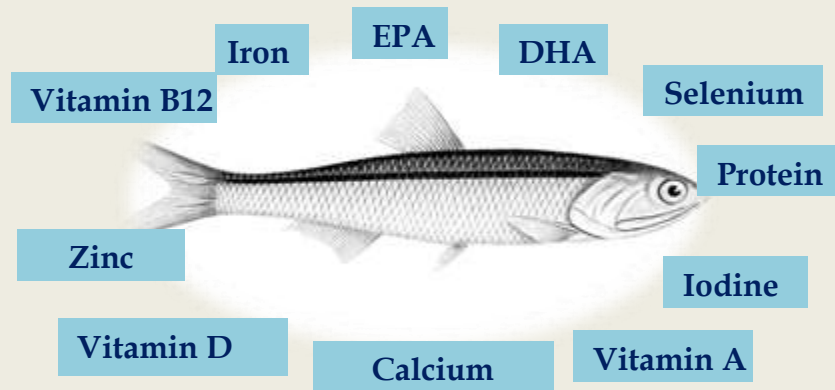
Developing countries with low total protein in diet – high % of fish in diet



Developed countries with high total protein in diet – high % of other protein in diet



# Fish = great nutrition



Distribution of vitamin A

*even better nutrition when you eat it all!*

*Aquaculture feeding practices  
can increase nutrient content of farmed fish*





Food and Agriculture  
Organization of the  
United Nations

COMMISSION ON  
GENETIC RESOURCES  
FOR FOOD AND  
AGRICULTURE



## STABILITY

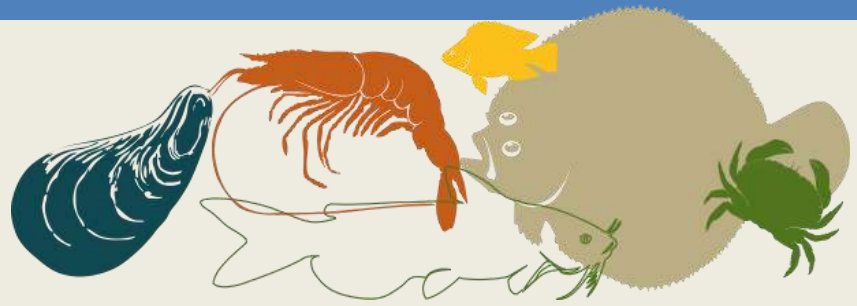
### Trade offs - within the Fisheries sector

- Replacing wild caught fish that are usually eaten whole with farmed fish or large-scale commercial fish
  - **Loss of nutrition because only fillets are eaten**
  - **Potential loss of access because farming requires ownership, commercial fishing needs space, thus excluding some traditional users from the resource**
  - **Commercially important fish provide foreign exchange**
  - **Money to buy other food – but poorest of the poor won't have this opportunity**
  - **Improving aquaculture production efficiency through breeding programmes would meet the expected food gap with little extra land, water or feed!**



## Trade offs - with other sectors

- Water for irrigation or hydro-electric decreases suitability for fish
  - 470 million people live downstream of dams and are impacted by how water is managed
- Replacing fishery production lost from habitat destruction or degradation would require much more land and resources at a much higher financial and environmental cost
  - To replace the Mekong River fish protein with beef would require using 40% more land and 39% more water
  - To replace the other nutrients would require even more resources.
- Realizing the importance of AqGR we can ensure stability



# Stability and AqGR

- Habitats provide AqGR and link to many farming systems, therefore habitats and access to water must remain stable
- **Inland fish are the most threatened group of vertebrates used by humans – definitely not stable under current water management programmes.**
- Fish Farming – stable now, but could change.
  - as it grows needs to not only target high value carnivorous species for international markets
  - Avoid selecting out the nutrients or selecting in nutrient poor compounds,
- Market stability – when other food production systems fail – for any reason – small scale fisheries provide safety net that allows people to still have food – **as long as habitat is maintained.**



Food and Agriculture  
Organization of the  
United Nations

COMMISSION ON  
GENETIC RESOURCES  
FOR FOOD AND  
AGRICULTURE



# Take home

- All wild relatives of farmed aquatic species still exist and the vast majority of AgGR is found in natural water bodies.
- Habitat supports this AqGR and needs to be maintained – but habitat is being lost and degraded
- Fish provide a diversity of nutrients not easily found in other foods
- Where protein availability is low, fish play an important role in nutrition security
- There is a huge diversity of products from AqGR contributing to food security
  - Non-native species
  - small fish eaten whole for local food security
  - Commercial fisheries and aquaculture of larger high value species for income and foreign exchange



**Food and Agriculture  
Organization of the  
United Nations**

COMMISSION ON  
GENETIC RESOURCES  
FOR FOOD AND  
AGRICULTURE



# Thank you