



# Small fish, big impact: nutrition-sensitive approaches to fish agri-food systems

The Crawford Fund Conference | 14<sup>th</sup> August 2018

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AGRICULTURE AND FOOD  
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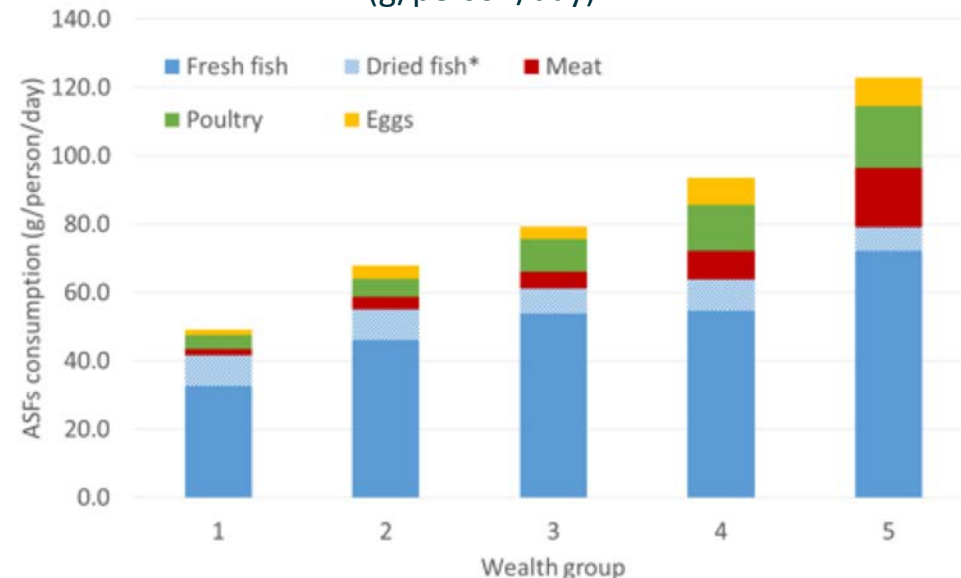


# Context in Bangladesh

- 160 million people
- Confluence of Ganges, Brahmaputra and Meghna rivers
- Extensive floodplains and aquatic resources
  - Lots of fish!
- Rice is the staple food + fish, pulses, vegetables
- ‘Machee bhatee Bangali’ – fish and rice make a Bengali

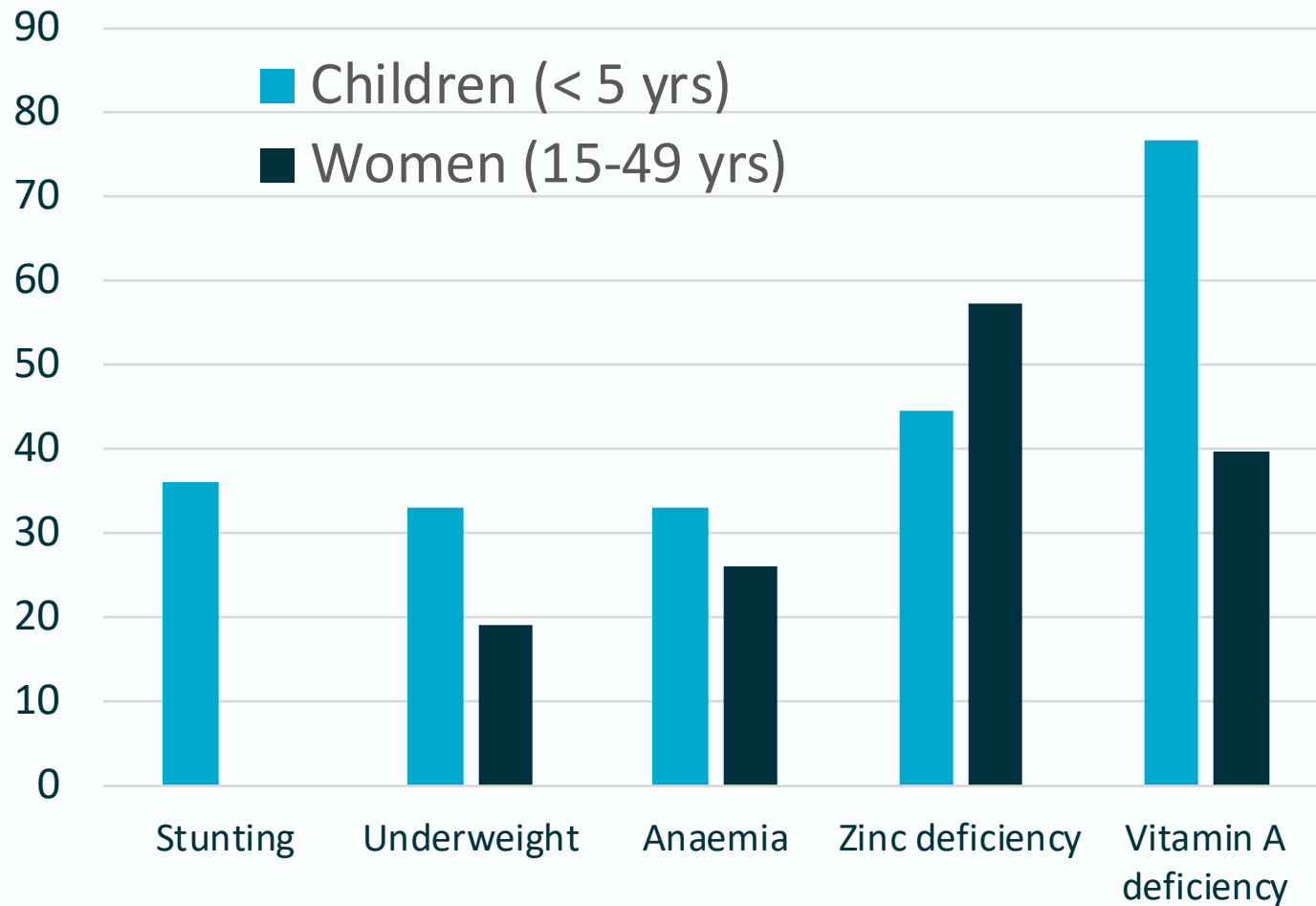


Animal source food consumption in Bangladesh  
(g/person/day)



(Bogard et al, *Public Health Nutrition*, 2016)

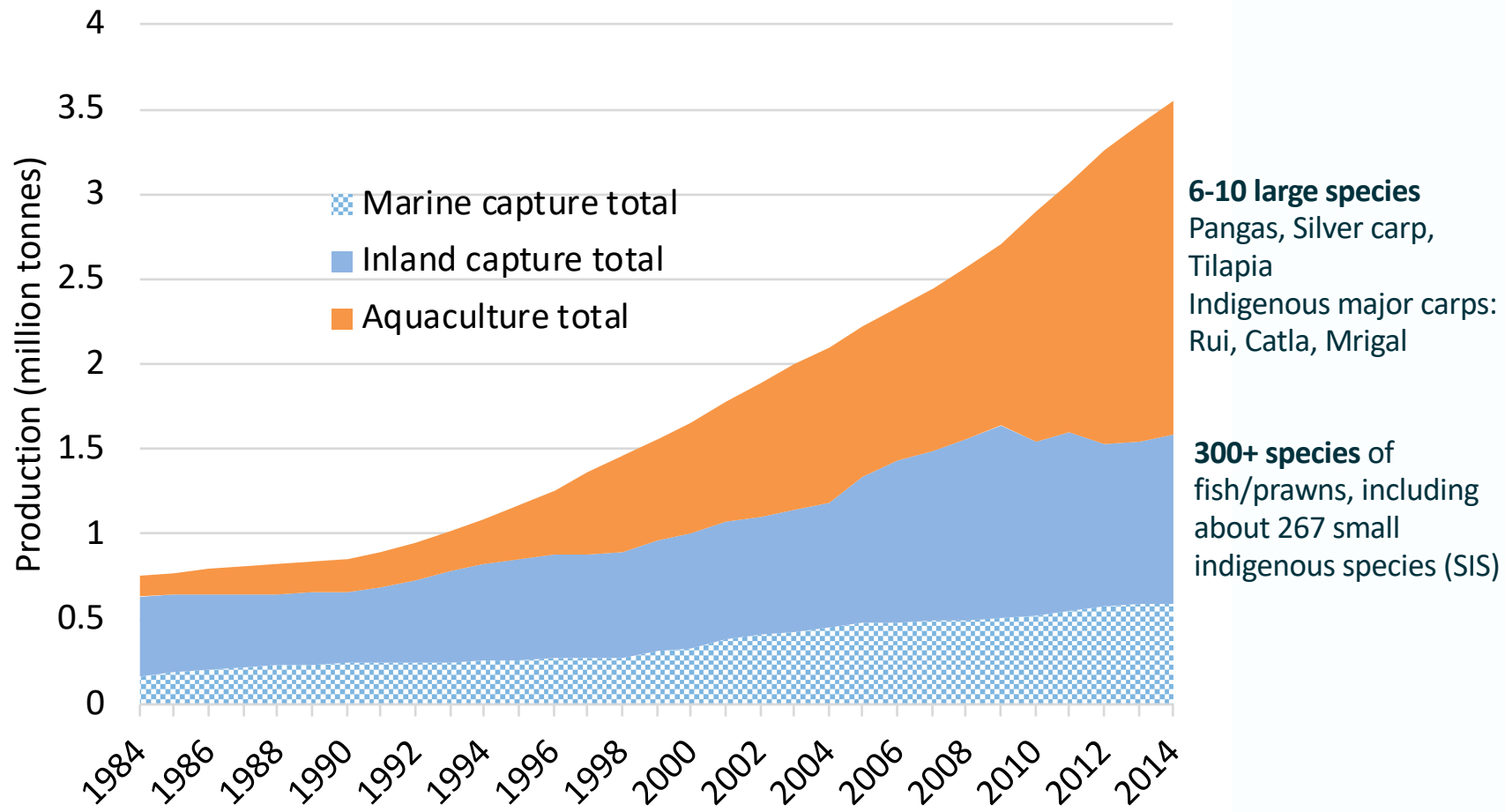
# Prevalence of malnutrition



(DHS, 2015; icddr,b, 2013)

# Fisheries in transition

## Capture fisheries and aquaculture production in Bangladesh over time



(DoF, Fisheries statistical year books, 1993-2015)

# Decline in capture fisheries

- Overfishing ( $\uparrow$  demand)
- Industrial pollution
- Urban encroachment
- Expansion of transport infrastructure
- Changes in water and land management:
  - Floodplains mechanically drained for agriculture =  $\downarrow$  area
  - Flood banks and enclosures for aquaculture prevent fish migration =  $\downarrow$  biomass  $\downarrow$  biodiversity



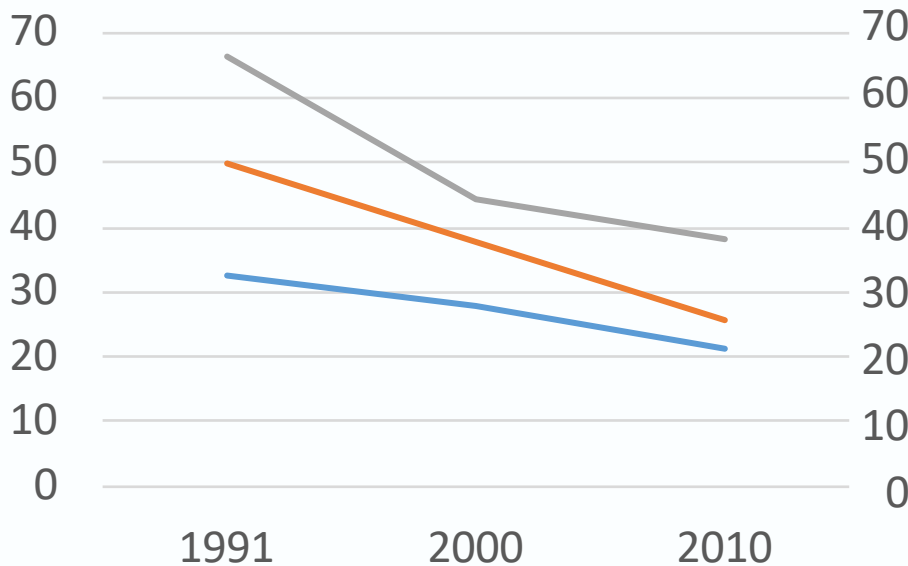
# Growth in aquaculture

- Focus of government and donor policies and programs
- Significant investments in research and technology
- Proliferation of hatcheries and fish traders
- Large ag extension network
- Significant private sector investment
- World's 5th largest producer of aquaculture products



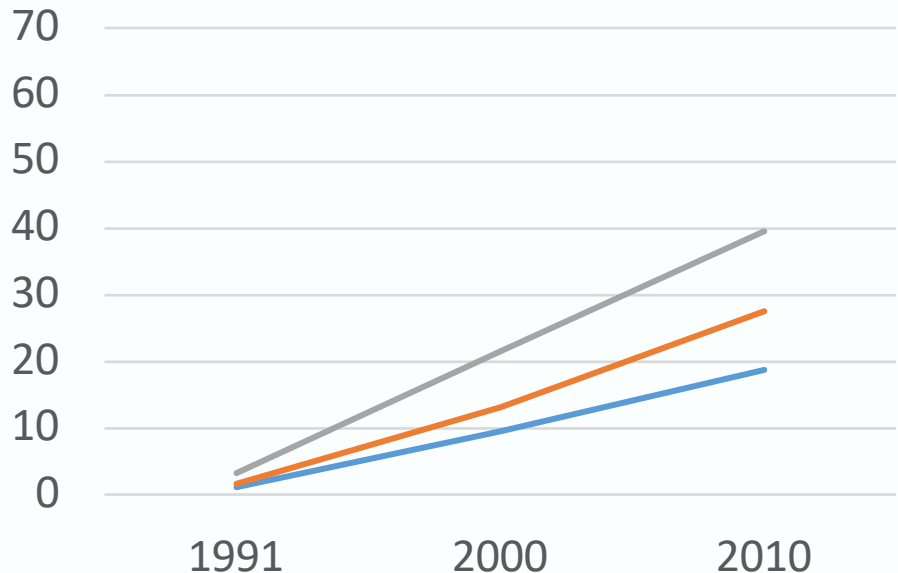
# Shifts in fish consumption over time

Consumption from capture fisheries  
(g/person/day)



— Extreme poor — Moderate poor  
— Non poor

Consumption from aquaculture  
(g/person/day)

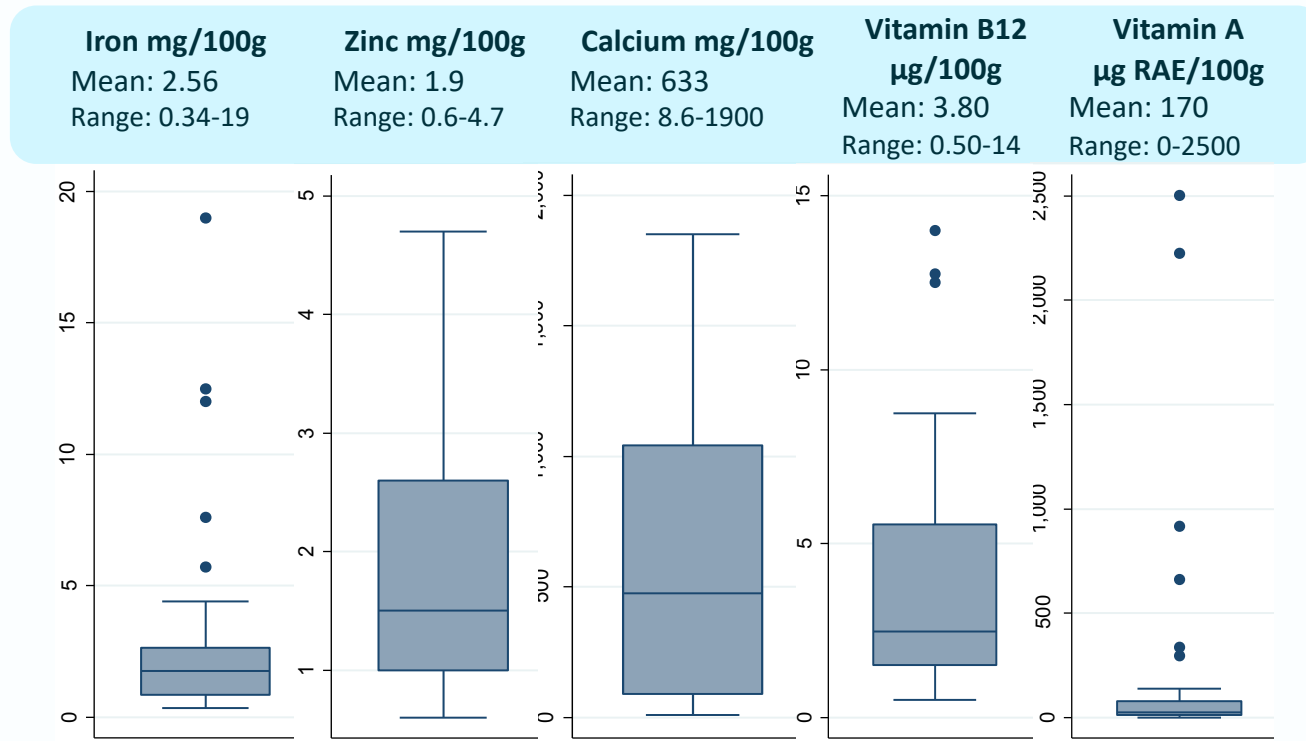


— Extreme poor — Moderate poor  
— Non poor

(Bogard et al, *PLOS ONE*, 2017)

# Nutritional value of fish

- Similar content of protein across all fish species
- Large variability in **micronutrient** content across species
- In general, non-farmed species (particularly small indigenous fish) were **more nutritious** than commonly farmed species

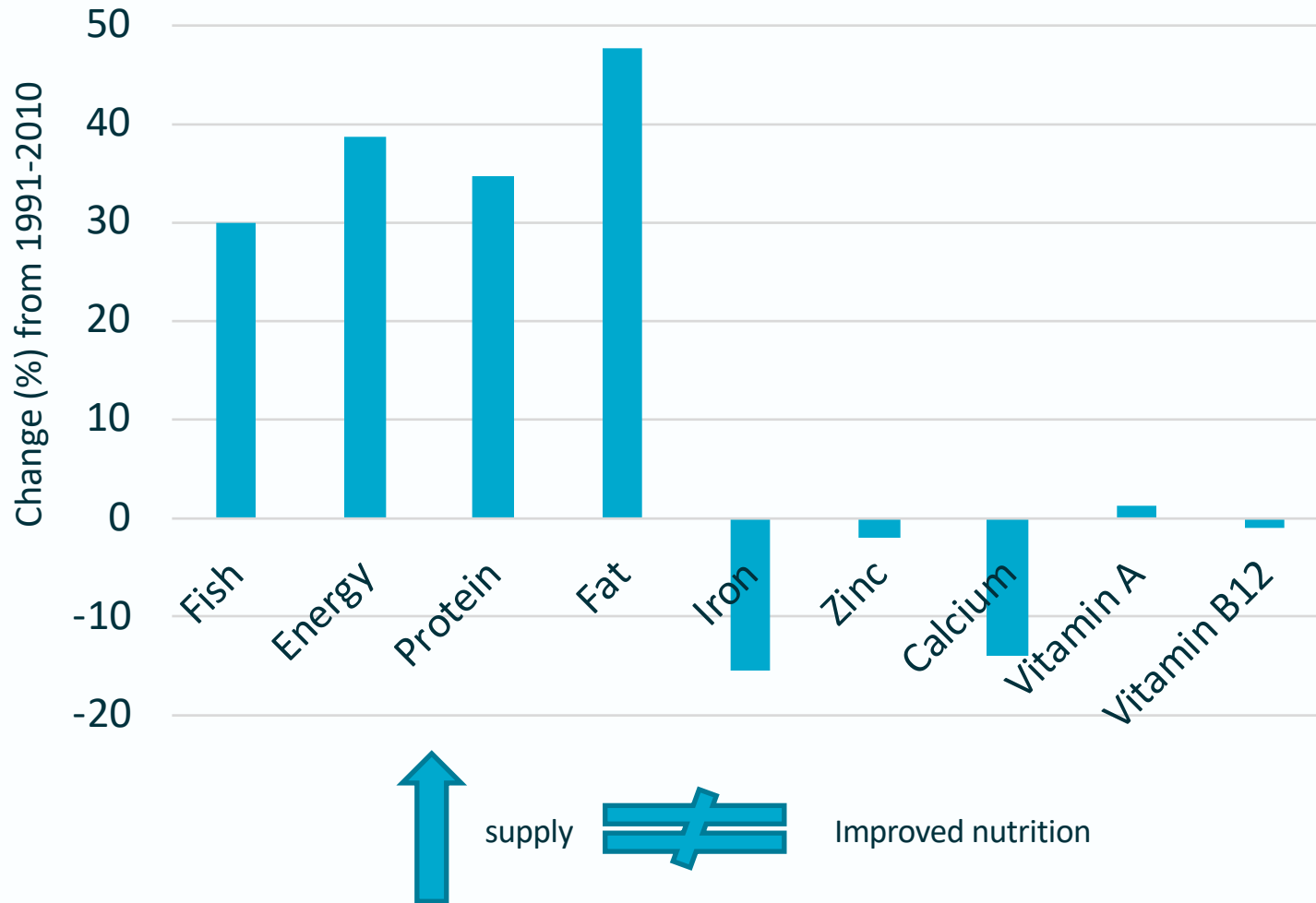


Has  $\uparrow$  availability of farmed fish offset  $\downarrow$  in nutrient-rich small fish from capture fisheries in terms of nutrition?

(Bogard et al, *J Food Composition & Analysis*, 2015)



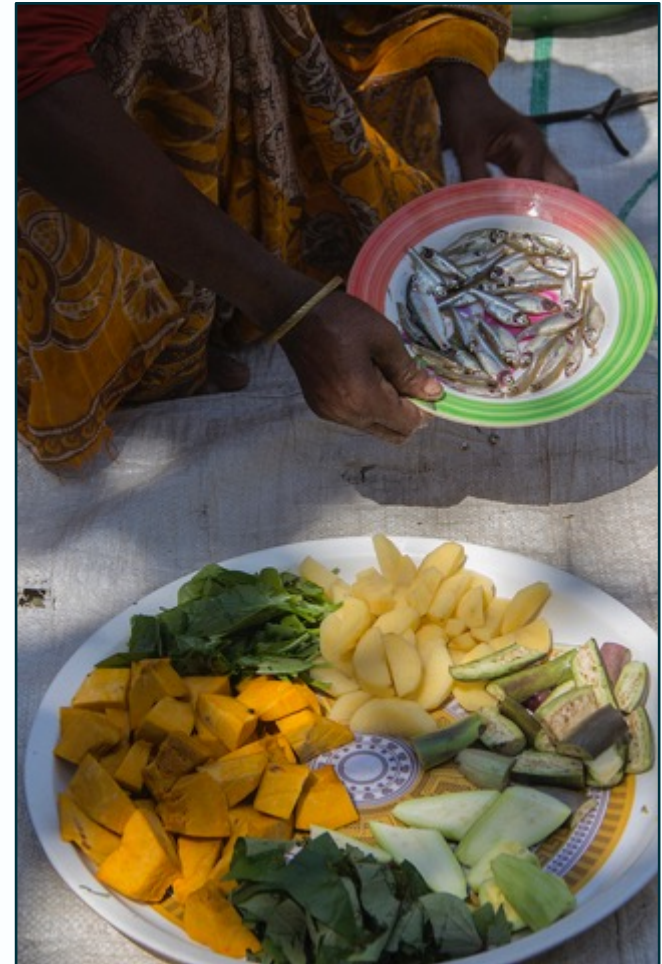
# Change in nutrient intakes from fish 1991-2010



(Bogard et al, *PLOS ONE*, 2017)

# Implications for policy and programs

- Aquaculture has played a central role in maintaining availability and affordability of fish
  - But some unintended consequences from focusing on **quantity** rather than **quality**
- Fisheries (both capture fisheries and aquaculture) must embrace a **nutrition-sensitive approach**





# Nutrition-sensitive fish agri-food systems in Bangladesh: Approaches and Lessons Learnt



# Approach: Polyculture of diverse large and small fish species

- Homestead Ponds  
Isolated /Connected to Rice Fields
- Enhanced Stocking of Large and Small Fish in Wetlands Waterbodies



## Focus on:

- Partial Frequent Harvesting of Small Amounts of Small Fish
- Household Consumption of Small Fish, especially in Women and Young Children
- Sale of Large Carp Species for Household Income



# Approach: Integrating vegetable production

Micronutrient-rich seasonal vegetables,  
with focus on orange sweet potato (OSP)

- Pond dyke
- Homestead garden



# Approach: Women's engagement in production and harvesting

- Manage household ponds
- Harvest small fish with mola gill net for household consumption
- Produce, harvest, sell, cook and feed fish, OSP and other vegetables
- Women can make the gill net and earn income from selling to others



# Approach: Transforming norms, attitudes and practices

- Household approach
- Work load sharing among household members
- Men - responsible for food shopping
- Mothers-in-law - in charge of kitchen and food distribution among household members



# Approach: Social behaviour change communication, nutrition and hygiene messaging

- Small Fish and Vegetables in Diets of Women and Young Child
- Essential Nutrition Actions (ENA)
- Essential Hygiene Actions (EHA)



# Lessons Learnt

## Strengthening family and community engagement

- Men and women in decision-making
  - Women's and men's work load sharing
  - Intra-household food allocation
  - Men's purchase of foods
- 
- Community women as promoters for production and consumption
    - empowered
    - status
    - physical mobility
- 
- Adoption of pond aquaculture and OSP production by non-project households



# Lessons Learnt

## Increased Fish Production and Diversity of Species

- Large increases in nutrient-rich small fish production
- 3.5 fold increase in total fish production in household ponds
- 2 fold increase in fish production from waterbodies
- Increased production of dried small fish from waterbodies



# Lessons Learnt



## Increased Household Income

- Sale of Fish
- Sale of Vegetables

# Lessons Learnt



## Increased Fish and Vegetable Intake and Dietary Diversity

- Quantity and frequency of intake

In women and in children, starting with complementary feeding from 6 months of age



# Thank you

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