Healthier diets from sustainable food systems: is this always a win-win?

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True of False
(for low and middle income countries)

• Dietary diversity is the best indicator to use to follow whether food system transformations lead to healthier diets

• A diet rich in plant-based foods and with fewer animal source foods confers with both improved health and environmental benefits

• A protein transition (shift from animal sourced to plant sourced protein) is needed for better climate and public health
Food Systems: narratives on sense of urgency

<table>
<thead>
<tr>
<th>The state of play</th>
<th>What is the failure about?</th>
<th>What is threatened and needs to be fixed?</th>
<th>Where do the priorities for action stand?</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Graph" /></td>
<td>Inability of the system to feed the future world population</td>
<td>Food security</td>
<td>Closing the yield gap</td>
</tr>
<tr>
<td><img src="image2.png" alt="Graph" /></td>
<td>Inability of the system to deliver a healthy diet</td>
<td>Nutrition security and health</td>
<td>Closing the nutrient gap and ensuring the quality of diet</td>
</tr>
<tr>
<td><img src="image3.png" alt="Graph" /></td>
<td>Inability of the system to produce equal and equitable benefits</td>
<td>Social justice, democratic process, small-scale actors</td>
<td>Decentralization, grass-roots autonomy</td>
</tr>
<tr>
<td><img src="image4.png" alt="Graph" /></td>
<td>Unsustainability of the system and its impact on the environment</td>
<td>Natural resources, agrobiodiversity, energy-water-carbon efficiency</td>
<td>Reducing the food-print of the system on the environment</td>
</tr>
</tbody>
</table>

Bene et al, World Development 2019
Biophysical and environmental drivers
- Natural resource capital
- Ecosystem services
- Climate change

Innovation, technology and infrastructure drivers
- Innovation technology
- Infrastructure

Political and economic drivers
- Conflicts and humanitarian crises
- Food prices and volatility
- Land tenure

Socio-cultural drivers
- Culture
- Religions & rituals
- Social traditions
- Women’s empowerment

Demographic drivers
- Population growth
- Changing age distribution
- Urbanization
- Migration & forced displacement

Food supply chains
- Production systems
  - Farmers, indigenous owners, fishers, finance
- Storage and distribution
  - Transporters, agribusiness
- Processing and packaging
  - Packing plants, small and medium enterprises
- Retail and markets
  - Retailers, vendors, food outlet owners, traders, restaurateurs, wholesalers

Food environments
- Indoor and outdoor environments
- Physical access and physical access
- Economic access (affordability)
- Promotion, advertising and information
- Food quality and safety

Consumer behaviour
- Choosing where and what food to acquire, prepare, cook, store and eat

Diets
- Quantity
- Quality
- Diversity
- Safety

Nutrition and health outcomes
- Social
- Economic
- Environmental

Political and institutional actions

Sustainable Development Goals
Availability
Access
Utilization

CFS, HLPE 2017
CFS, HLPE 2017
What is a healthy diet?
A healthy diet should optimise health

- Not too little
  - Adequacy
- Diversity
- Not too much
  - Moderation
- Safety

Dariush Mozaffarian Circulation. 2016;133:187-225
Risks in Bangladesh

- Critical boundaries of consumption
  - Low fruit intake: Consumption between 200 - 300 g per day
  - Low whole grains: Consumption between 100 – 150 g per day
  - Low vegetables: At least consumption between 290 – 430 g per day
  - Low nuts and seeds: Consumption between 16 – 25 g per day
  - Low seafood omega-3 fatty acids: Consumption between 200 – 300 mg per day
  - High sodium: 24 h urinary sodium 1-5 g per day
  - Low fiber: Consumption between 19 – 28 g per day
  - Low milk: Consumption between 350 – 520 g per day
  - High transfatty acids: Consumption between 0% – 1% of total daily energy per day
  - Low PUFA: Consumption between 9% – 13% of total daily energy per day
  - Low legumes: Consumption between 50 - 70 g per day
  - High processed meats: Consumption between 0 - 4 g per day
  - High sweetened beverages: Consumption between 0 - 5 g per day
  - High red meat: Consumption between 18 - 27 g per day
  - Low in calcium: Consumption between 1.00 – 1.50 g per day

Top 10 diseases in Bangladesh

1. Cardiovascular diseases
2. Neonatal disorders
3. Diarrhoea, lower respiratory, and other common infectious diseases
4. Other non-communicable diseases
5. Mental and substance use disorders
6. Musculoskeletal disorders
7. Diabetes, urogenital, blood, and endocrine diseases
8. Neoplasms
9. Unintentional injuries
10. Neurological disorders

Technical recommendations

need translation to a Diet that is adequate, diverse, low in unhealthy components, and being affordable, acceptable and safe
Food based dietary guidelines

Goals of dietary guideline
- Improve nutritional status of Bangladeshi population and prevent nutritional deficiency diseases.
- Ensure adequate nutritional status of pregnant and lactating women.
- Prevent and control chronic diet-related disorders.
- Maintain health of the elderly and increase life expectancy.

1. Eat a well-balanced diet with a variety of foods at each meal;
2. Use in moderation foods high in fat and minimize fats and oils in food preparation;
3. Limit salt intake and condiments and use only iodized salt;
4. Take less sugar, sweets or sweetened drinks;
5. Drink plenty of water daily;
6. Consume safe and clean foods and beverages;
7. Maintain desired body weight through a balanced food intake and regular physical activity;
8. Adopt and follow appropriate preparation and cooking practices and follow healthy eating habits;
9. Eat additional food and take extra care during pregnancy and lactation;
10. Practise exclusive breastfeeding for the first six months of life; introduce appropriate complementary foods after completion of 6 months and continue complementary feeding along with breastfeeding up to 2 years.

Key Messages
- Eat rice or wheat or a combination of cereals around 270-450 g which is equivalent to 9-15 servings daily.
- Eat rice or roti with legumes or fish/poultry/egg every day for better nutritional value.
- Do not discard water from cooked rice as they contain water soluble vitamins.
- Try to consume unpolished/brown rice and whole wheat atta because it contains nutrients such as protein, fat, dietary fibre, minerals and vitamins.
A Healthy Eating Index is a measure of diet quality to assess and evaluate the extent to which populations are following the dietary guidelines.

Dutch Eatscore
Challenges and solutions

• Technical recommendations: Best available evidence from science, for non-communicable diseases mainly from HIC and men

• FBDGs: Missing in most LLMIC (African) countries
  Use of ‘proxies’: Mediterranean diet, DASH diet, EAT Lancet paper

• Index Overall index not available, combination of indexes
  Use of ‘proxies”: dietary diversity score (women, children), HEI,
  Data availability; use of non-food intake data (LSMS)
Household dietary Diversity Score – HDDS

Average HDDS - Rural, Urban

<table>
<thead>
<tr>
<th>Country</th>
<th>Average HDDS - Rural, Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>6.7</td>
</tr>
<tr>
<td>Nigeria</td>
<td>10</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>10.68</td>
</tr>
<tr>
<td>Vietnam</td>
<td>10.2</td>
</tr>
</tbody>
</table>

* Rural

Country Average HDDS

- Ethiopia 6.7
- Nigeria 9
- Bangladesh 10*
- Vietnam 10.2

Talsma et al, 2019
HDDS – Food groups

Household food groups consumption

- CEREALS
- WHITE ROOTS AND TUBERS
- VEGETABLES
- FRUITS
- MEAT
- EGGS
- FISH AND OTHER SEAFOOD
- LEGUMES, NUTS, SEEDS
- MILK AND MILK PRODUCTS
- OILS AND FATS
- SWEETS
- SPICES, CONDIMENTS AND BEVERAGES

Bangladesh compared to Vietnam

Talsma et al, 2019
GBD – intake

Household intake

Talsma et al, 2019
### Sustainable diets

<table>
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<tr>
<th>Earth system process</th>
<th>Control variable</th>
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<tbody>
<tr>
<td>Climate change</td>
<td>GHG emissions</td>
</tr>
<tr>
<td>Land-system change</td>
<td>Cropland use</td>
</tr>
<tr>
<td>Freshwater use</td>
<td>Water use</td>
</tr>
<tr>
<td>Nitrogen cycling</td>
<td>N application</td>
</tr>
<tr>
<td>Phosphorus cycling</td>
<td>P application</td>
</tr>
<tr>
<td>Biodiversity loss</td>
<td>Extinction rate</td>
</tr>
</tbody>
</table>

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(Poore and Nemeck, Science, 2018)
Sustainable diets

(Behrens et al, PNAS, 2017)
Sustainable diets

High-income nations
⇒ Decreased env. impacts driven by reductions in calories and diet pattern change

Low-income nations
⇒ Increased env. impacts associated with increased intake in animal products

(Behrens et al, PNAS, 2017)
Which diet is more sustainable?

**Junk/Western diet** vs **Healthy/ Mediterranean diet**

- **Energy density**
  - Junk/Western diet: 300 kcal/100g
  - Healthy/Mediterranean diet: 125 kcal/100g (WRCF/IARC recommendation)

- **Quantity for 2000 kcal**
  - Junk/Western diet: 0.66 kg
  - Healthy/Mediterranean diet: 1.60 kg
The protein transition
The protein transition
The Great Protein Fiasco in the 70’s

• From 1950’s much publicised world protein “gap”, “crises”, or “problem” to be the No1 nutrition problem of the 20th Century, appeared to be wrong

  • Most diets low in both protein and energy, with energy deficit being worse
  • At such low energy intakes, valuable proteins are utilized as energy source
  • If consuming ‘normal’ diet, protein content and quality most often adequate
  • Estimated protein requirements were far too high
  • Most children also infected, with diarrhoea and parasites, contributing to malnutrition.
  • At that time: increasingly argued that it is unethical to continue to spend resources in producing protein-rich foods, reducing problem of malnutrition from a social and political problem to a technical, particularly a medical, problem

THE LANCET, JULY 13, 1974

Dogma Disputed

THE GREAT PROTEIN FIASCO
DONALD S. MCLAREN
Nutrition Research Laboratory, School of Medicine, American University of Beirut, Beirut, Lebanon

Summary The concept of the much-publicised world protein “gap”, “crisis”, or “problem” arose from the description of kwashiorkor in Africa in the 1930s and the assumption, which has turned out to be wrong, that malnutrition in children existed an of undern town correspond workers in war the W.H.O. an surveys, the in Africa and other a much-qu serious an medical an firmly set “protein r on the rural was pri
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