Food and Nutrition Security – implications for the G7

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Address to the representatives of the G7 Food Security Working Group during their meeting at Federal Ministry for Economic Cooperation and Development (BMZ)

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Overview

1. Food and Nutrition Security – broadening the Concept

2. Changing Drivers of Food and Nutrition In-Security

3. Policy Actions and Roles of G7
Food and Nutrition Security Concept

Food and Nutrition Security

Availability
- Production
  - Climate, Resources, Technology, Trade, ...

Stability
- Climate, Conflicts Resources

Access
- Income
  - Prices, Markets, Own supply, Transfers, Infrastructures, Trade, ...

Utilization
- Quality & Quantity
  - Health & sanitation, Public health, Care, ...

Innovation (technology, institutions)

Policy

a problem, if interlinkages among the 4 components are neglected
# Multiple World Food and Nutrition Problems

<table>
<thead>
<tr>
<th>Problems</th>
<th>Numbers of people</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunger (Under-Nutrition, calories)</td>
<td>ca. 0.8 Bill.</td>
<td>acute deficiency, political conflicts</td>
</tr>
<tr>
<td></td>
<td>(crude estimate)</td>
<td></td>
</tr>
<tr>
<td>Hidden Hunger (deficiencies of Micro-Nutrients, vitamins, iron etc.)</td>
<td>ca. 2 Billion</td>
<td>diseases, reduced productivity</td>
</tr>
<tr>
<td></td>
<td>(crude estimate)</td>
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<tr>
<td>Children‘s under-nutrition (the first 1000 days)</td>
<td>ca. 165 Mill.</td>
<td>stunting, reduced physical, cognitiv development. 3,1 Mio. death p.a.</td>
</tr>
<tr>
<td>Obesity and resulting chronic diseases</td>
<td>ca. 1 Billion</td>
<td>high costs of public health</td>
</tr>
</tbody>
</table>

Sources: The Lancet 6/2013; FAO 2013

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A global problem: micronutrient deficiency by regions

Source: GHI report, data from Lancet 2013

Percentage of population with selected micronutrient deficiencies
Different time subscripts „t“ are relevant for different nutrition problems

- **Long-term** (decade/year): nutritional status (stunting);

- **Medium-term** (months): nutrient deficiencies (Cal., micro-nutrients, weight loss);

- **Short-term** (weeks, days): nutrition shocks in early childhood;

and different health, brain & cognitive capacity effects under each time horizon

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Progress in reduction of hunger and child under-nutrition

Hunger world wide: (rough estimates only)
1990/92: 1014 Millions (19% of world population)
2011/14: 806 Millions (11% of world population)
Reduction of % rate: 0.4 % per annum

Stunted children in developing countries:
1990: 40% -- 2011: 26%
Reduction of absolute number by 2.1% p.a.
from 253 Mill. to 165 Mill
(successful country cases reduce at 4% p.a.)

Ending hunger by 2025/-30
is an ambitious but feasible goal
(excluding crises related hunger of about 3 %)

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Availablity

determined by supply and trade
The world food equation is risk prone

Supply = Demand

Supply
- Land (degradation)
- Water (scarcity)
- Productivity & technology
- Labor & farm structure
- Climate change

Demand
- Population (growth)
- Income (growth, urbanization)
- Poverty and inequality
- Consumer behavior, waste
- Bio-energy

Trade and Prices
- Supermarkets
- Protection
- Financial markets
- Food stocks

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Expected Global Agric. Production Growth

2.1% 2003-12 to 1.5% 2013-22

Source: OECD – FAO Agriculture Outlook 2013

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Climate change reduces agric. productivity and exacerbate under-nutrition

Impacts of climate change on the productivity of food crops in 2050

World Bank Publishers

2012 Global Hunger Index

Welthungerhilfe, IFPRI and Concern Worldwide

Source: Tim Wheeler and Joachim von Braun, Climate change impacts on global food security. Science, August 2013

Agriculture exacerbates Climate change: land use change and Nitrogen responsible for about 30% of Green house gas emission

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Land- and Soil Degradation - humankind impacts globally

Source: Bao et al. ZEF, 2014  Joachim von Braun 2015
Innovation feeds the world

Sources of productivity growth in world agriculture

Beitrag von

- TFP
- Input intensification
- Irrigation
- Land expansion

The needed technology innovations for sustainable intensification

1. Crops – plant breeding and bio-technologies (incl. genetics) for:
   • Yield and biomass quantity and quality
   • Micro-nutrient quality (Bio-fortification)
   • Climate-smartness (drought and temperature)
   • Disease resistance
   • Nutrient efficiency

2. Livestock production innovations (feeding, breeding, etc.)

3. Mechanization for precision and labor productivity

4. Institutional agenda combined with above (incl. Small farm transformation)

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Stability of food and nutrition
Determined by prices and supply- and demand shocks
Changed price regime - a consequence of changes in the global food equation

Prices have increased and remain volatile  
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Volatility: a risk for nutritional status

A panel regression.

Data: Low and middle income countries Worldbank development indicators: GDP, WHO: Sanitation, Breastfeeding, Stunting, Underweight. ILO: Food price indices 1990 - 2012

significant at *** 1%, ** 5%, * 10% level; country fixed effects included.

<table>
<thead>
<tr>
<th></th>
<th>Underweight</th>
<th>Stunting</th>
</tr>
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<tbody>
<tr>
<td>Log GDP (PPP/cap)</td>
<td>-4.408*</td>
<td>-6.292*</td>
</tr>
<tr>
<td></td>
<td>(2.605)</td>
<td>(3.238)</td>
</tr>
<tr>
<td>Improved Sanitation</td>
<td>-0.327***</td>
<td>-0.375***</td>
</tr>
<tr>
<td></td>
<td>(0.109)</td>
<td>(0.114)</td>
</tr>
<tr>
<td>Food Price Volatility (CV of FPI)</td>
<td>9.904***</td>
<td>3.894**</td>
</tr>
<tr>
<td></td>
<td>(1.490)</td>
<td>(1.619)</td>
</tr>
<tr>
<td>Female/male school enrolment</td>
<td>-0.156***</td>
<td>-0.213*</td>
</tr>
<tr>
<td></td>
<td>(0.0710)</td>
<td>(0.108)</td>
</tr>
<tr>
<td>N</td>
<td>300</td>
<td>291</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.430</td>
<td>0.392</td>
</tr>
<tr>
<td>Number of countries</td>
<td>93</td>
<td>92</td>
</tr>
</tbody>
</table>

Source: Kalkuhl et al. 2013 (ZEF)
Most countries now build high stocks: e.g. China, India

Both countries have high stocks and influence global prices

At least need more transparency on stocking data

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Source: AMIS
availability, stability, access, utilization

Access to food
Determined by income (purchasing power, incl. transfers), rights & inclusion (marginality), agro-ecology and infrastructures
The Ultra-poor (people below 0.63 US$, 0.5€ / day)

2008 Ultra poor: 234 million

- Sub-Saharan Africa: 70%
- South Asia: 15%
- Latin America and the Caribbean: 8%
- Middle East and North Africa: 0%
- Europe and Central Asia: 0%
- East Asia and Pacific: 7%

Source: Akhter Ahmed et.al. Ch 6
Social protection and nutritional and health improvement

• Safety nets
  ➢ Nutrition support
  ➢ Conditional/unconditional transfers
  ➢ Employment guarantees

• Health insurance (huge reforms and innovations in coverage in China and India past 10 years)

• SUN (scaling up nutrition): Interventions (pre-school -1000 days- and school)

• Water and sanitation programs

• Innovative micro-nutrient distribution systems

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availability, stability, access, utilization

Utilization
Determined by nutritional value of foods, food safety, access to good nutrition, and health, and water and sanitation environment

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### Better Value Chains for Nutritious Foods

#### Activities
- **Inputs into Food Production**
  - Seeds, fertilizer, pesticide, irrigation, organic matter, equipment, crop selection
- **Food Production**
  - Farming practices, (tillage practices, irrigation frequency, cultivation), harvest and post-harvest techniques
- **Food Storage & Home Processing**
  - At or Near the Farm: Home or warehouse storage & processing
- **Industrial Food Processing**
  - Industrial: Food storage & manufacturing
- **Distribution, Transport & Trade**
  - Bulk packaging and transport to market
- **Food Retailing, Marketing & Promotion**
  - Point of Purchase
- **Food Preparation & Catering**
  - Point of Consumption

#### Nutrition Opportunity
- Deliver micronutrient fertilizers, diverse horticultural seeds, biofortification
- Crop diversification; Limited research on effect of farming practices on nutrient content of crops
- Commodity storage that reduces exposure to heat and sun. Reduced milling and polishing time.
- Fortification, reduced milling and polishing time
- Nutrition-sensitive bulk packaging and transport
- Nutrition sensitive retail packaging and branding, Promoting importance of good nutrition
- Promoting importance of good nutrition. At home fortification

#### Value Chain Actors
- **Crop researchers and agricultural scientists, extension services, Seed companies, fertilizer companies farmer cooperatives, agrochemical and farm machinery companies**
- **Farmers, agricultural laborers, cooperative extension services, equipment manufacturers**
- **Granaries, local millers, crushers, storage container companies, cooperative extension services**
- **Processed food manufacturers, industrial mills**
- **Importers, exporters, brokers, traders, wholesalers**
- **Informal & formal food retailers, restaurant, food service, advertising, media & communications companies**
- **Consumers, restaurant, and food service companies**
The relevance of long-term cognitive impacts of under-nutrition is known

malnourished kids (stunting) have lower skills at a given age

Note: VF: verbal fluency; DF: design fluency; WM: working memory; AN: adequately nourished; MN: malnourished

Source: Kar et al., Behavioral and Brain Functions, 2008

And: longitudinal follow up on randomized control study by Hoddinott et.al. Gutemala (about 30 years), etc. : showing strong educational performance gains and huge long run income gains from early childhood nutrition interventions

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Why so little action taken on “bread and brain” linkages so far?

1. Is it too complicated (ignorance) ?
2. Sectoral silos (political economy of nutrition) ?
3. Are brain (cognitive) constraints matter of tabu/stigma ?
4. Scientific controversies:

Difficult to establish causalities in multi-causal contexts
1- water, sanitation - health interactions with nutrition;
2- separating biological / nutritional from socio-cultural factors, etc.

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Multiple **policy failures** lead to low supply and demand for **public Nutrition-services**

Public policy failure on supply (S) and demand (D) side

\[ S_{\text{policy}} = D_{\text{policy}} \]

- lack of public policy incentives for S
- Lack of incentive for quality and efficiency of public services for FNS  S
- lack of users‘ effective political voice for D

**Result:** both S and D clear at low levels

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On Policy Failure: Governance deficiencies relate to Nutrient Deficiencies

Micronutrient deficiencies

Voice and accountability deficiencies

Children <1000 days have no political voice, except through their care givers, who often also have no political voice

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Multiple market failures lead to low supply and demand for private sector Nutrition services.

The market for MNs: failure on supply (S) and demand (D) side because of hidden benefits.

\[ S_{market} = D_{market} \]

**Price**

- lack of private sector incentives in S
- lack of users’ D due to lack of awareness
- no efficient price formation for FNS goods and services
Strategic food and nutrition security agenda

1. **Risk prevention:** Promotion of agriculture productivity across value chains with research and technology and investment (public and private) to address price levels and risks on supply side in sustainable ways. Growth and jobs.

2. **Risk management:** Facilitation of reduced market volatility and spikes with stocks, more trade openness, appropriate regulation, and related international cooperation.

3. **Social and nutritional protection:** Productive safety nets, (conditional) cash transfers; expanded action for nutrition security of children.

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Potential Roles of G7

Comprehensive actions at scale, that facilitate ending hunger by 2025, and accelerate reduction of malnutrition ...

1. Scaling up funding for public goods / actions that governments and private sector will not do at scale (crises; long term issues)

2. Global coalition building for learning and joint actions – PPP and civil society, science, SUN

3. Actions that address the growing security and conflict related FNS problems (fragile states etc.)

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