The Water-Food-Energy Nexus

Concept & Potential for Nexus-based Development Solutions

Clemens Breisinger
Development Strategy and Governance Division
Middle East and North Africa Program Office, Cairo, Egypt
International Food Policy Research Institute

G20 Meeting of the Agriculture Chief Scientists, Saudi Arabia

February 19, 2020
Achieving WEF Security goals in a dynamic world

Present
Unmet demands!
- 0.9 billion people have no access to clean water
- 1.1 billion people have no access to electricity
- 1 billion people have insufficient food supply

Future
Increasing demands!
- Due to population growth, economic development and changing consumption patterns
- The uncertainties of global change exacerbate the difficulty in achieving these goals

To meet global food demand by 2050, agricultural production must increase by 60%

UNDESA, 2014; CCAFS, n.d.
WEF in the context of the Sustainable Development Goals

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice and Strong Institutions
17. Partnerships for the Goals

Developed in collaboration with TROLLSBACK COMPANY | TheGlobalGoals@trollback.com | +1.212.529.1010
For queries on usage, contact: dpicampaigns@un.org

UN, 2015
Ringler et al 2019
Example SDG 2: Hunger and undernutrition persist AND alarming rise in overnutrition

**Undernourished population (millions)**
- Africa
- Asia
- World

**Stunted children (millions)**
- Developing countries
- Africa
- Asia

**Overweight children (millions)**
- Developing countries
- Africa
- Asia


Ringler et al 2019
The WEF sectors are closely related

Examples of interconnections:

- Agriculture accounts for 70% of total global freshwater withdrawals
- 90% of energy produced today is water-intensive
- Agriculture & food chain account for 33% of global energy demand

Adapted from: Water - A Global Innovation Outlook Report, IBM, 2009

UNU, 2013
Single-mindedly pursuing individual goals may interfere with other goals

Example: Increasing electricity production
- Higher energy security
- More abstraction of water for cooling
- Less water for other sectors and the environment
- Less water security

Example: Intensifying agricultural production
- Higher food security
- Competition for land resources (e.g. biofuels vs. crops as food)
- More use of fertilisers
- Contamination of water resources
- Less water security downstream

→ Need for a systematic WEF Nexus approach!
Regional Solutions: The need for Trade and Cooperation
Regional collaboration around WEF is important, but is not happening enough

Regional collaboration around water, energy and food is important for future adequate provision of resources

<table>
<thead>
<tr>
<th></th>
<th>Sudan</th>
<th>Egypt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>90.9%</td>
<td>69.7%</td>
</tr>
<tr>
<td>Agree</td>
<td>0.0%</td>
<td>24.2%</td>
</tr>
<tr>
<td>Neutral</td>
<td>4.5%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Disagree</td>
<td>4.5%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Ongoing regional cooperation is adequate to minimize tradeoffs and exploit synergies


Source: Ringler et al 2019
Potential for Nexus Solutions at National Level
Possible measures for Nexus implementation at National Level

1. Join institutions (ministries, agencies, etc.)
2. Build joint committees and informal working groups
3. Strengthen interfaces within a given institution
4. Establish science-based policy
5. Engage other institutions with regional competence
6. Introduce legislation and norms that stipulate a Nexus approach

TOWARDS NEXUS IMPLEMENTATION

WEF Nexus Background
Ringler et al 2019
Modeling-based WEF solutions are critical for sound policy making and investment decisions

Example: Quantitative Foresight Modeling – IFPRI’s IMPACT Model

- Linked climate, water, crop and economic models
- Estimates of production, consumption, hunger, and environmental impacts

Projections out to 2050

Main take-away messages

- The WEF sectors are closely related and **integrated nexus solutions are usually more effective**. In fact, single-mindedly pursuing individual goals may interfere with other goals.

- **Regional collaboration** around WEF and shared resources is important but is not happening enough.

- At country levels, opportunities for a WEF nexus approach exist at **institutional, legislative, policy and scientific levels**.

- We need to move from declarations (e.g. G20 AMM Declaration 2017) to **concrete commitments and implementation**.