SWP
Stiftung Wissenschaft und Politik
Deutsches Institut für Internationale Politik und Sicherheit
Berlin

The Water-Energy-Food-Nexus

Christian Wagner



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The Water-Energy-Food Nexus

1. Understanding the Nexus

2. Sectoral Challenges and Linkages
   - Water
   - Energy
   - Food
   - The Himalaya region
   - Urbanization

3. Prospects and Challenges

1. Understanding the Nexus

- Starting point: water, energy, and food sectors are inextricably linked
  (*by observation, extrapolation, and projection*)

- Global debate on Water-Energy-Food-Nexus« (*WEF-Nexus)*
  - World Economic Forum 2008/2009
  - Bonn Nexus Conference 2011
  - United Nations Post 2015 Agenda Sustainable Development Goals (SDG)

- Linkages are not new!

- But:
  - World population more than 7 billion people:
    - more than 50 percent of global population in cities
    - 1.0 billion lack access to safe water
    - 2.5 billion lack access to sustainable sanitation
    - 1.0 billion suffer from hunger
    - 2.5 billion lack access to modern forms of energy

- Increasing demands for basic services

- Rising expectations for higher living standards:
  Middle classes with new lifestyles that consume
  - more energy
  - more water
  - different mix of food

- New Uncertainties: climate change

- Projection until 2030:
  - 50 percent more energy
  - 40 percent more water
  - 35 percent more food

- **What's new?**

- More obvious and urgent: Better services and higher standards only to be achieved by a more conscious stewardship of vital resources

- Old paradigm of sector approach ('silo'), „uninformed and unconcerned about its effects on the others" is no longer workable

2. Sectoral Challenges and Linkages

- *Water Sector*: high awareness towards the *WEF-Nexus*
  - 2030: 40 percent higher water demand than supply
  - water scarcity increases energy consumption:
    - water supply, processing, transport

Traffic in Dhaka

- *Energy Sector*:
  - 10 to 15 percent of water used for energy supply
  - new non-conventional energy sources are water-intensive

At present:
- priority to the national security of supply
- strong market logics
- fragmented actor and institutional landscape

Sectoral Challenges and Linkages

- *Food Sector*:
  - 70 percent of water used for agriculture
  - rise in meat consumption because of changed nutrition patterns
  - "virtual water export": food production for export
  - rising demand and only modest increase in supply = higher prices

  - 25 percent increase in oil price will increase food prices by 5 percent

  - EU has reduced subsidies for bio-fuels because of problems in land and water use which have an impact on food supply

The Himalaya-region

Increasing risk complexity through interactions between

the sectors, globalization/ growing interdependence, and

impact of climate change

20 percent of global population dependents from water supply from the Himalaya
- "Water-Stress" in parts of China, India, and Pakistan
- China: increase of agricultural production by 25 percent until 2025
- Water supply per capita in India has fallen by 70 percent since 1950

Melting of Himalaya glaciers with negative repercussions
- water inflow in Ganges and Yellow river
- agricultural production

Change in Monsoon patterns with far reaching consequences
- migration, urbanisation
- domestic tensions
- national conflicts on water distribution

Urbanization

2nd wave of urbanization:
- 50 percent of global population in cities (Africa / Asia)
- 3 billion people in span of 80 years into cities (1970-2050) [1750-1950: 400 Million]
- mostly in small and intermediate cities (100.000 to 1 million)
- proliferation of slums (2003: 1 billion in slums)

Cities as engines of growth and development:
- consume 80 percent of global material and energy supply
- produce 75 percent of global carbon emissions

Urban ecosystems generating only 0.2 % of global freshwater supply but serve 4-5 billion people

2nd wave of urbanization needs transition to sustainable, resource-efficient development

3. Prospects and Challenges

- More international cooperation and coherence within international, national and local policies
- *Risk-Governance* should consider physical-technical, political and social dimensions (poverty, questions of distribution) of supply risks
- Climate- and demographic policy offer starting points for global and networked solutions:

Challenges of Implementation

Not so good news:

- Full integration of the *WEF-Nexus* increases complexity, slows down processes and creates new problems of bureaucracy
- what new forms of coordination / integration are necessary to achieve WEF-compatible results?
- Economic / national trade-offs may lead to blockades and national solutions
- Hardly transferable, no blue print, no panacea: most challenges are context specific in terms of climate, production system, governance structures and social capital

Not so bad news: Starting Points for Nexus Policies

- increase resource productivity
- using waste as resource
- integrating poverty alleviation and green growth
- coherence of governance, institutions, policies
- capacity building and awareness raising
- agenda setting and reinforcement of political acting (e.g. SDG)

Thank you for your attention!