



Water, food, energy nexus: **Understanding the linkages** between water, energy and food R, **Towards nexus solutions**

ecdpm

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Two major initiatives on the nexus





ERD 2011/2012 to be launched in May 2012

Bonn nexus conference

The great acceleration / anthropocene



Steffen et al



Interlinkages & Feedbacks

Constraining and potentially being affected by interlinked Sustainable Development Goals

e.g. climate change: $CO_2 < 350$ ppm biodiversity loss < 0.00001 % / year freshwater use < 4000 km³ / year cropland < 15 % of land area P < 11 million tons / year

Focus areas for priority attention

- 1. Green jobs, youth employment and social inclusion
- 2. Energy access, efficiency, sustainability
- 3. Food security and sustainable agriculture
- 4. Water

5. Sustainable cities

6. Management of the oceans, fisheries and other marine resources

7. Improved resilience and disaster preparedness

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> "sustainable intensification" e.g. through irrigation, fertilization, mechanisation

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e.g. climate change: $CO_2 < 350$ ppm

freshwater use < 4000 km³ / year

	photo voltaics	concentrating solar power	gas	coal / oil / nuclear	hydropower	biofuels
m ³ / MWh	~ 0	~ 2	~ 1	~ 2	∼ 60 variable	~ 180 variable

renewables can threaten water security

1 liter of biofuels requires as much water as feeding 1 person 1 day

- 2. Energy access, efficiency, sustainability
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carbon capture and storage (CCS) may increase water demand by 90%

e.g. climate change: $CO_2 < 350$ ppm

freshwater use < 4000 km³ / year

New water can threaten energy efficiency and access



A nexus approach

Resilience pillars: diversity & redundancy for adaptation & transformation

biodiversity loss < 0.00001 % / year

freshwater use < 4000 km³ / year

cropland < 15 % of land area



A nexus approach



Resilience pillars: diversity & redundancy for adaptation & transformation

Multi-functional systems, promoting recycling, reducing wastage e.g. agro-forestry crop-livestock-biofuel integration green agriculture

insurance against future shocks



Framing solutions for water, energy and food security

A transformation is required in four areas:

- Manage **demand** to reflect scarcity (e.g. change food wastage);
- Expand quality and quantity of **supply** (e.g. renewable energy, soils, water storage);
- Promote use **efficiencies** (Productive, allocative, nexus-wide);
- Improve resilience to shocks and protect poorest

Challenges for public, private and global governance

- **Public:** co-ordination, regulatory/incentive, public expenditure;
- **Private:** resource supply and resource use;
- **Global:** global rules, institutions, and financial resources.

Managing the water-energy-land (WEL) nexus:

- **Optimising across nexus**, rather than maximising one issue at a time;
- Integrated, WEL-nexus approach avoids perverse solutions and promotes innovative solutions.

Managing the WEL nexus: why is it relevant?



The case of Lake Naivasha in Kenya WEL nexus thinking leads to innovative solutions





Inter-ministerial coordination around the WEL nexus: examples

- Land policy in SSA: whilst there are sound land policies e.g. in Ethiopia, Madagascar, Mozambique, and Zambia, lack of strong public administrative capacities to manage intersectoral complexities; Sierra Leone had better designed land deals.
- National Planning Committee in South Africa: stimulates debate on crossministerial policy choices (including policy challenges at the intersection of water, agricultural, land and energy sectors);
- China and transition to a low-carbon economy: Top-down policy steer promotes interest / policy bundling

Success factors:

Leadership, capacity, institution building, path dependency



Nexus thinking

- Bonn Nexus Conference 2011, launch of Nexus Resource Platform 2012
- European Report on Development 2011/2012
- UNSG HLP on Global Sustainability 2012
- WEF and private sector initiatives
- Rio+20 zero draft
- Public, private and global policy making