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Deutsches Institut für  
Entwicklungspolitik



German Development  
Institute

New Institutional Economics (NIÖ) Network Meeting

# **Governing the Water-Energy-Food Nexus**

Draft Programme

18 – 19 January 2018, Bonn



## Draft Programme

<b>Thursday</b> 18 <sup>th</sup> January 2018		
12:30 – 13:30	Lunch	
13:30 – 13:45	Welcome and introduction	Ines Dombrowsky (DIE)
<b>Session I</b>	<b>Theoretical approaches</b>	Chair: Ines Dombrowsky
13:45 – 14:30	Adapting the SES framework to serve a nexus perspective	Insa Theesfeld (MLU)
14:30 – 15:15	Determinants and performance of polycentric public service industries in environmental governance – Learning from EU transnational biofuels governance	Andreas Thiel (UKS), Christine Moser-Priewich
15:15 – 16:00	Indicators for 'good' solutions to wicked resource nexus problems	Sabrina Kirschke (UNU-Flores), Nina Hagemann (TU Dresden), Kristin Meyer, Lulu Zhang, Tamara Avellán (UNU-FLORES)
16:00 – 16:30	Coffee break	
<b>Session II</b>	<b>WEF-Nexus in developing countries I</b>	Chair: Insa Theesfeld (tbc)
16:30 – 17:15	Governing the Water-Land Nexus in Zambia: What does this mean?	Waltina Scheumann (DIE)
17:15 – 18:00	Governing the nexus between water, energy and food: consolidated insights by a DIE research project	Ines Dombrowsky, Waltina Scheumann, Babette Never, Hannah Janetschek (DIE)
18:30	Dinner at Café Bottler	
<b>Friday</b> 19 <sup>th</sup> January 2018		
<b>Session III</b>	<b>WEF-Nexus in developing countries II</b>	Chair: Heidi Wittmer (tbc)
09:00 – 09:45	Exploring a water-energy-food, and conservation nexus: the case of the Ili Delta, Kazakhstan	Volker Beckmann (EMAU)
09:45 – 10:30	Water for Irrigation, Groundwater Depletion and Political Economy of Energy Subsidy for Intensive Groundwater Pumping in Iran	Tinoush Jamali Jaghdani, Vasyl Kvartiuk (IAMO Halle)
10:30 – 11:00	Coffee break	
<b>Session IV</b>	<b>WEF-Nexus in the EU</b>	Chair: Volker Beckmann (tbc)
11:00 – 11:45	Institutional innovations for the governance of new bioeconomy value chains in Germany	Maria Proestou and Wibke Crewett (HUB)
11:45-12:30	Energy issues and wastewater treatment – EU member-states' different perspectives	Nathan Obermaier (UBA)
12:30 – 13:00	Wrap up of workshop and outlook	Ines Dombrowsky (DIE)
13:00 – 14:00	Lunch	

## Abstracts of presentations

### **Adapting the SES framework to serve a nexus perspective**

Insa Theesfeld

In the widely used heuristic framework – the Social-Ecological System (SES) framework, governance interactions between resources are not sufficiently addressed. Likewise, in scholarly literature, the land-water-food nexus has been primarily addressed from an ecological, hydrological or agronomic angle, with limited response to the governance interface between the input resources.

I intent to provide some conceptual ideas, easy to follow for those who are well familiar with the SES framework. I propose to adapt the SES framework integrating a nexus perspective: either 1) by adding a second-tier “governance nexus” variable inside the governance variable of an irrigation system; or 2) by adding a land resource unit and system outside the irrigation system. I will discuss the trade-offs of both ways.

In a joint study with Frederike Klümper (Klümper & Theesfeld, 2017), we address this gap empirically using the case of Tajikistan based on a farm household survey analysis of 306 farmers. We test four hypotheses, in each case two, represent the first or the second suggestion for adapting the SES framework. Results indicate e.g. that land system variables contribute to the willingness to cooperate in irrigation management. Specifically, formal land tenure has a positive effect on farmers paying for water as well as on the likelihood to invest time and effort in irrigation infrastructure, which is decisive for Tajikistan’s food and fiber production.

### **The Determinants and Performance of Polycentric Public Service Industries in Environmental Governance: Learning from EU transnational biofuels governance**

**Andreas Thiel and Christine Moser-Priewich**

This paper develops a heuristic framework based on polycentricity for assessing the performance of governance. We see polycentric governance as the result of (constitutional) rules and meta-constitutional conditions that allow for voice, exit and self-organisation in relation to governance of goods and services, and variable social problem characteristics. First, we develop further the concept of Public Service Industries (PSIs) to delineate governance arrangements under analysis. Second, we outline how governance arrangements depend on particular social problem characteristics and how their performance relates to efficiency and effectiveness. We derive hypotheses concerning the way particular characteristics of social problems affect the configuration of PSIs and their performance in relation to efficiency and effectiveness. Further, we illustrate their verification for the case of a transnational governance arrangement for “sustainable” biofuel production in the European Union (EU). The case illustrates how the continuous, not place-bound production of climate protection results in a PSI of Coordinated Duplication. As a hypothesis, we argued that a PSI configured in that way bears great potential of efficient and cost effective governance. Nevertheless, our empirical assessment does not confirm this assessment. Yet, the efficiency of the PSI can be questioned because of a lack of meta-constitutional conditions underlying polycentricity. Consequently, the competitive dynamics largely result in an uptake of certification schemes, which run the risk of primarily aligning with the interests of those they monitor, making it inefficient from the perspective of consumer-citizens. The result of our assessment also illustrates the weaknesses of comparative institutional assessment.

## Indicators for 'good' solutions to wicked resource nexus problems

Sabrina Kirschke, Nina Hagemann, Kristin Meyer, Lulu Zhang, Tamara Avellán

Nexus problems such as an integrated management of several resources (e.g. water, soil and waste) or sectors (e.g. water, energy and food) are often described as being particularly wicked. In order to address such wicked nexus problems in practice, governance researchers have already proposed a potpourri of different governance strategies. Examples often refer to various participatory approaches, hinting at the involvement of various actors such as scientists and practitioners. However, the role of institutions, especially their design and enforcement, in addressing such wicked nexus problems has become increasingly important as well.

We argue here that this governance research on wicked nexus problems lacks a clear understanding of 'good' solutions to wicked problems. Governance research generally argues that such solutions are difficult or even impossible to grasp, given, for example, lacking agreements on the current and the targeted state, and high transaction costs for information acquisition and negotiation due to uncertainty and information asymmetry. However, failure to operationalize solutions is even less acceptable. The lacking definition of the dependent variable of solutions hinders the analysis of more or less useful governance strategies to address wicked resource nexus problems.

Picking up this research lack, this paper identifies indicators for 'good' policy responses to wicked nexus problems. We understand such 'good' policy responses to be present when one resource (e.g. water, soil, waste) or sector (e.g. water, energy, food) is made better off without affecting negatively other resources (e.g. water, soil, waste) or sectors (e.g. water, energy, food). However, since this end goal is difficult to measure, we define indicators for 'good' solutions in a more process-oriented way, along the concept of 'small wins'. Our research shows that such process-oriented small wins can be identified along the three core dimensions of wickedness: 'goal diversity', 'system complexity' and 'informational uncertainty'. In terms of goal diversity, one example indicator for a 'small win' is mentioning soil issues in water policies and backwards. An example indicator for a 'small win' with regards to system complexity is the development of interlinkages between sector-specific or resource-specific models.

At the workshop, we would like to put the whole set of indicators for 'good' solutions to wicked nexus problems for discussion. This lays the ground for future empirical work, in which we apply the full set of indicators to three cases of wicked resource nexus problems in China, Germany, and Latin America. All three cases regard the interlinkages between the resources of water and soil, affecting different sectors such as water and food. Preliminary analyses based on a small set of indicators suggest that only some indicators for good solutions to wicked problems are fulfilled in the different cases. In particular, respective policies that intend to address the wicked nexus problems consider to varying degrees goal conflicts and system complexity.

### The Water-Land Nexus in Zambia: cross-sectoral coordination as a governance issue

Waltina Scheumann

Zambia is endowed with abundant land and water resources the utilization of which bears huge potential for the country's economic development. Therefore, the Zambian Government has planned the gradual expansion of irrigated areas throughout the country to boost agricultural productivity to meet domestic food demands and to supply regional and international markets. While some river basins already experience severe water stress, changing land use from rain-fed to irrigation on a large scale may fuel competition where water resources are yet not fully utilized. But it is not only about water. The expansion of irrigation on a large-scale takes place in areas under customary land tenure generating conflicts between commercial investors and pre-existing smallholders, and between local people and the chiefs administering the land. These existing and emerging resource conflicts are the starting point of the study.

Common complaints raised in the Nexus discourse are 'silo thinking', 'lack of coordination', and 'fragmented policies' assuming they may give rise to supply crises. Coordination which carries the positive connotation of 'good governance', seems to be the way out of the dilemma. However, neither is cross-sector policy coordination automatically forthcoming nor is it easy to initiate. Key attributes of public administration such as specialization, differentiation, hierarchy, adherence to procedural rules and the dedication towards clients hinder cross-sectoral communication and coordination. Governments being aware of coordination

problems (including redundancies, gaps, inconsistencies) have deployed a range of coordination techniques which may lead to either 'positive' or 'negative' coordination. These are the two dominant strategies which Fritz Scharpf (1973) distinguished by pointing to the information and coordination costs involved (he assumed that negative coordination is the predominant type: if A creates a problem for B, B is included in decision-making but at a late stage thus limiting A's interference).

The Zambia study analyzes whether and what procedures, instruments, and mechanisms are at hand and used to coordinate sector policies / plans; whether the de facto use of them can be characterized along a continuum between positive and negative coordination; and how to adjust governance to move towards the positive end of the continuum. We refer to Elinor Ostrom's (1992) concept of Action Situations / Action Arenas as analytical units which allows to take account of the many independent, but interdependent decision-making arenas relevant for water-land based development strategies. We identified a focal arena (sub-sector irrigation) and several sub-ordinate arenas which are part of the multi-staged process in which decisions on land and water resources are made. Our analysis reveals that 'a lack of cross-sectoral coordination' is not always the key barrier to solving Nexus issues.

### **Governing the nexus between water, energy and food: consolidated insights by a DIE research project**

Ines Dombrowsky, Waltina Scheumann, Babette Never and Hannah Janetschek

Recent writings on governing the water-energy-food nexus have put forward a number of hypotheses regarding opportunities for and barriers to increasing policy coherence and reducing unintended intersectoral effects in the provision of water, energy and food security. This paper identifies main arguments in the literature and contrasts them with empirical insights from a range of nexus case studies carried out at in a DIE research project investigating how incentive structures, governance mechanisms and policy instruments may reduce negative intersectoral effects and promote synergies between sectors.

The study highlights that various governance mechanisms and policy instruments may play a key role in dealing with intersectoral interdependencies. Embedding a governance mechanism or policy instrument in an adequate and feasible combination of instruments increases the likelihood of effective implementation. Furthermore, in most cases nexus governance is multi-level governance as intersectoral effects and the influence of regulation, financing and interest usually extend beyond single levels of governance. Interests and power imbalances lead to a failure to take sufficient account of intersectoral interdependencies. A shortage of data limits the effectiveness of instruments and cooperation activities. It is concluded that effective nexus governance uses a practicable and socially acceptable combination of instruments to reduce negative intersectoral effects. In doing so it is important to take account of the spatial reach of intersectoral effects in the multilevel governance system and to ensure appropriate participation by the affected sectors and stakeholders.

### **Water for Irrigation, Groundwater Depletion and Political Economy of Energy Subsidy for Intensive Groundwater Pumping in Iran**

Tinoush Jamali Jaghdani and Vasyl Kvartiuk

The depletion of groundwater resources due to irrigation water pumping in Iran has become a serious problem which threatens both rural life and sustainable development in the country. The latest estimates show that 70% of groundwater resources have been overexploited in the last 15 years. In 2015, the use of groundwater for irrigation expanded to include almost 700000 permitted confined and unconfined wells, and 200000-300000 non-permitted wells. Such use has become one of the primary reasons behind the devastation of groundwater resources, both quantitatively and qualitatively. For many years, huge energy consumption subsidies (electricity or gasoline) have been provided for pumping irrigation water from aquifers. The resulting cheap energy makes deep water pumping possible and huge investment in deepening and relocating wells feasible.

This study focuses on the Iranian government's unsuccessful efforts to reform pricing policy in December 2010 when they

attempted to eliminate some of the tremendous subsidies which were devoted to irrigation water pumping. The government was more successful with the partial elimination of subsidies for domestic and industrial usage rather than the agriculture sector. By considering the developments before and after the implementation of the subsidy reform policy, our study focuses on the political economy of groundwater irrigation. The results of this study show that without a deep understanding of the key institutions and stakeholders which are affected by energy subsidies for groundwater pumping, this problem can't be solved quickly and the extreme depletion of groundwater resources will continue. By neglecting the political economy, future attempts at crafting functioning policy to eliminate subsidies in this sector will not be successful.

### **Institutional innovations for the governance of new bioeconomy value chains in Germany**

Maria Proestou and Wibke Crewett

The agricultural and forestry sector are main providers of raw materials for the growing bioeconomy sector in general and its bioenergy sub-sector in particular. While the existing bioeconomy strategies at EU and national level promote further sector development there is a lack of policies that constrain negative side effects in rural spaces. The German Renewable Energy Act has, for example, brought about rapid landscape change and contributed to the consolidation of agrarian structural change on favour of large-scale land use. In our paper, we identify new institutions that support sustainable rural development in energy spaces including the protection of farms that operate at smaller scales. We conduct a mixed methods study in four German regions, which we identify by means of statistical analysis of land market dynamics, bioeconomy intensity and agrarian structural change. We use interviews with local bioeconomy experts to analyse bioeconomy effects for small-scale land managers, such as small farm owners. We explore existing and discuss new formal and informal institutional and organizational solutions for small-scale land use in energy spaces. Finally, we propose a set of innovative institutions for the governance of biomass energy spaces that support agrarian structural diversity.

### **Energy issues and wastewater treatment – EU member-states' different perspectives**

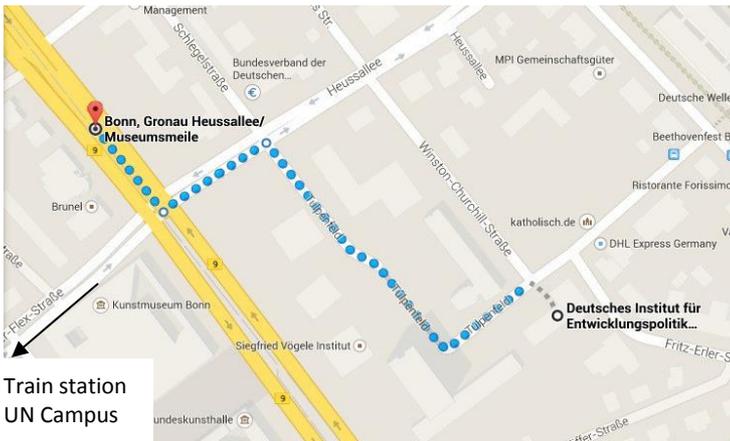
Nathan Obermaier

The Horizon 2020 funded PowerStep project targets the transformation of energy demanding sewage treatment plants to power production facilities. This transformation needs energy savings on the one hand and an enhanced power generation out of renewable energy sources on the other. Increasing the share of power from renewable energy sources and improving the energy efficiency are both measures in line with the set EC targets towards a sustainable Europe 2050 – PowerStep enables municipalities to improve their contribution to counter the global challenges set up by climate change.

The various innovative processes will be demonstrated in six full-scale case studies located in four European countries. Individual technologies in both the electricity and the wastewater section will merge into an integrative and innovative system that guarantees a high quality wastewater treatment with an additional power generation. The analyzed technologies include an enhanced carbon extraction, innovative nitrogen removal processes, power-to-gas and a smart grid approach, heat-to-power concepts and innovative process water treatment.

Among other tasks, the wastewater treatment research section of the German Federal Environment Agency deals with the analysis of the various European and National directives and ordinances in both the energy and the wastewater sector. This regulatory framework significantly determines incentives, barriers and influences the implementation success of the PowerStep system.

## Public transport to DIE (Tulpenfeld 6, 53113 Bonn)



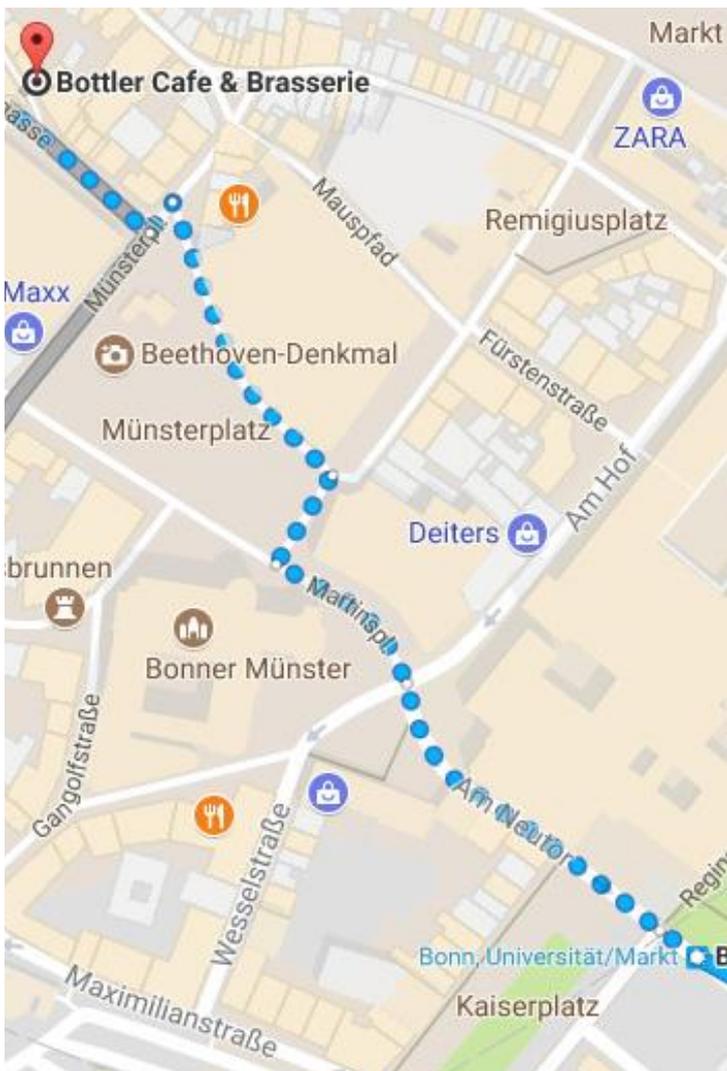
5 minutes walk from subway stop "Heussallee/ Museumsmühle"

- turn left into Heussallee or walk straight (depending on exit) towards the WHO tower
- turn right and cross the Tulpenfeld complex
- turn left, the DIE is straight ahead to your right

10 minute walk from train station "Bonn UN Campus"

- walk straight down Genscherallee
- cross Friedrich-Ebert-Allee and walk down Heussallee towards the WHO tower
- turn right and cross the Tulpenfeld complex
- turn left, the DIE is straight ahead to your right

## Public transport from DIE (Tulpenfeld 6, 53113 Bonn) to Café Bottler



- take line 66 direction Siegburg / line 63 direction Köln / line 16 direction Tannenbusch
- get off at stop Universitätsplatz / Markt
- turn in the direction of the city center and walk down Am Neutor
- cross "Am Hof" and walk across Martinsplatz
- stay to the right when crossing Münsterplatz and walk enter Vivatsgasse
- walk down Vivatsgasse, Café Bottler is to your right