



## Discussion Minutes

### C2: Network approaches to study the Nexus

**Chair:** Claudia Pahl-Wostl

**Speakers:** Örjan Bodin, Martin Franz, Nicolas Schlitz, Kathrin Knüppe, Christian Stein

**Minutes:** Johannes Halbe

### Presentation notes:

#### **Örjan Bodin - A social-ecological network approach to analyze benefits and constraints in collaborative governance of the WEF Nexus**

Örjan Bodin defined the challenge of nexus management: usually, there is no single user who is responsible for managing a system. Thus, several people have to be involved. One way to do that is to try to come up with a management or governance system (institutional fit). The social-ecological network approach can help to analyze these systems. How can these systems be described? By describing the system as a social-ecological network, we should be precise about whether the system is interconnected or not interconnected. Örjan Bodin proposes to analyze small system configurations instead of a whole system. An example can be two actors that use a resource. How can this miniature network approach be used? Some link between actors is needed, for instance to agree on something. Simple structural representations of the network can be helpful to analyze the likelihood of successful management of social-ecological systems and test hypotheses. One finding is that tight feedbacks would be a preferred system structure that is not successful in all cases, but its likelihood to be successful is higher.

#### Questions:

*Q1: Could you say a few words about the method of how to quantify the linkages?*

An example could be fishermen who use different gear types. In this case, aggregations are developed of fishermen who are using different gear types (80% of the catches) and their main targeted fish species. As a next step, it is asked how frequently there is exchange between fishermen who have different gear types. As another step, interactions in the food web (prey -predators) can be included.

*Q2: If the network structures are favorable, does it mean that they induce more sustainable resource management?*

It is more an indication, which is quite coarse grained. You usually think about success in a more fine grained resolution (e.g., forest patches). However, in this research, the more coarse grained representation was considered to be good enough to say that it is sustainable. As a next step, you could be more specific on what is meant by successful management.



*Q3: How much effort is it to get the data? Is it possible to get 20-30 cases in the next few years?*

Yes, it takes some time, but there are ways. You could look at cases where you can get data, or use archive data (e.g., from email communication). Often, it is required to adapt the research to data availability.

### **Martin Franz & Nicolas Schlitz - Globalization and the Water-Energy-Food Nexus – the Potential of the Global Production Networks Approach for Analysis of Society-Nature Interrelations**

Martin Franz highlighted the conceptual and empirical difficulties in nexus-relevant analyses. This is reflected in a growing number of analytical frameworks since the 1990s. The value chain and production network approaches were developed to deal with the container view on regional/national level and provide a more encompassing view on global change. The global production networks (GPN) and global value chain approaches were most successful to analyze the links between production, trade and consumption. GPN connect various elements of social-ecological systems, such as actors and resource flows. Various case studies have applied a GPN approach. There is the problem though that the role of resources and environment is usually included in a very abstract way. Thus, the combination of GPN with WEF nexus can potentially overcome deficiencies in both approaches. This requires conceptual scrutiny. The network metaphor could be used for global production processes and combined with the WEF concept for a more detailed view on the ecological and resources systems. To sum up, a combination of both approaches has the potential to overcome current constraints of the GPN and WEF nexus approach.

#### Questions:

*Q1: On slide 8 - Why is the nexus at the left side and not integrated into the GPN?*

Originally, we thought to include the nexus to the inputs of the GPN. However, we decided for this graphical representation as we wanted to show that the WEF nexus is important to the whole GPN. We linked the WEF nexus to different actors, which is a simplification, of course. In the future, we will rethink this representation as the WEF nexus is part of the overall system.

*Q2: Where can this approach be applied? At the regional or at the national level?*

The approach should not provide a container view on one region, but help to focus more on interdependencies. For instance, the WEF nexus on the Weser-Ems region includes various links to other regions with regard to power structures, productions and resources. The focus of this research is on the network itself, which does not stop at a regional boundary. For instance, it is interesting to look at a regional food network and how it is connected to a larger networks.

*Q3: Have you thought about what we can actually do with the knowledge about the system?*

The research can show constraints of a region to implement change, which can be power constellations for instance (e.g., in the use of hydropower). In addition, we can learn how a change at one point in the system could have impact on other points. In the end, we can also find out what a region can accomplish given the various constraints.



### **Kathrin Knüppe - Analyzing the governance of ecosystem services from a nexus prospect**

Kathrin Knüppe highlighted that more attention should be paid to the governance of ecosystem services' tradeoff and synergies. The Management and transition Framework (MTF) was presented as a suitable analytical framework to analyze the governance of ecosystem services. "Action situations" are used as a key concept to grasp management and governance processes. Thus, action situations can produce institutions and operational outcomes that impact ecosystem services. The MTF distinguishes between changes in the state and management of ecosystem services. Kathrin Knüppe demonstrated how data is inserted in the MTF and how different kinds of queries support data analysis. Thereby, the MTF allows for the analysis of transformation processes at multiple time and scale dimensions. An in-depth understanding of the MTF as well as resources for expert interviews is needed to generate meaningful results.

#### Questions:

*Q1: Can ecosystem services induce some actions in the social system, and can action situations affect ecosystem services as well?*

Yes, action situations can take place due to a bad state of an ecosystem service. It is possible both ways – thus, management actions can also affect ecosystem services.

*Q2: Can groundwater extraction by local farmers be an action situation?*

Groundwater extraction is more an outcome that influences action situations, such as the introduction of certain policies or cropping patterns.

*Q3: If there is a problem, you can conceptualize it in different ways. Some persons would say that something is an action situation, another person might think that it is a problem variable instead. Thus, it might be problematic if different people fill the database together, as they might have different interpretations.*

It is right that it is sometimes difficult to define an action situation. This can also make it difficult to report back the findings to experts. Nevertheless, the database helps to systematically analyze a complex system. But it is still qualitative research, which to a certain extent depend on the interpretation of the researcher.

The MTF bases upon collaboration with Elinor Ostrom - this supported the consistence of the MTF, as it is linked to Ostrom's IDD framework. In the end, you have to be very explicit about assumptions, such as the chosen time horizon.

### **Christian Stein - Networks and the Nexus: a case study from the Upper Blue Nile**

Christian Stein highlights that the nexus is still an immature concept. Aspects that is not theorized yet are the social linkages in the nexus. There are different approaches to look at the nexus, such as the policy network theory that explains how different actors have to come together to deal with a problem. A particular issue is the drawing of boundaries in the nexus. A helpful concept in this respect can be problem networks that can help in the conceptualization of nexus interactions. Christian Stein presents a case study from Ethiopia in which he applied a nexus framing. To analyze



the key challenges in the network, he developed issue networks with stakeholders. In a second step, he sat down with key actors to further understand actors and their relationships in the issue networks. Ego maps were applied to specify relationships between actors from energy, agriculture, water, environmental sectors. Christian Stein concludes that there are different types of network research approaches. Network research can produce boundary objects that facilitate discussions between actors. Political economy analysis could be particularly helpful to analyze influence of actors

#### Questions:

*Q1: Did you face any restrictions in your work with NGOs in Ethiopia?*

I did not face substantial restrictions in contacting and talking to them. But there are restrictions for NGOs themselves, as they cannot talk freely. In general, it was difficult to talk to governmental actors.

*Q2: Are the presented network approaches similar to netmaps?*

We also used netmaps, but I was only presenting the ego network approach. For instance, we built a netmap on nexus challenges with regard to agriculture water availability .

*Q3: As you have done both approaches - which one is easiest to conduct?*

I would not say that netmaps are much harder to do in comparison to ego networks. In this case study, netmaps were built by sub-groups in different workshops. This worked quite well. In these workshops, stakeholders were challenged by other stakeholder, which was interesting as it stimulated learning processes.

## **General discussion:**

*Introduction by Claudia Pahl-Wostl*

The talks showed different network theories, frameworks and methodologies. Network approaches can be very powerful in analyzing the status quo with respect to how change can be supported and what are the constraints for change. The linking of narratives to social networks can be a particularly useful approach.

#### Questions:

*Q1: In terms of research gaps: I am wondering about the possibility to link the GPN perspective and more structured social network analysis. I haven't seen any research in this direction...*

Social networks are already used in research on GPN by some researchers. What could be also interesting to be combined is research on human-environment interactions and power structures in order to find out underlying impediments for structural change.

*Q2: Do you get strategic responses from stakeholders when you apply a network approach? Can ego networks also be a tool for action research?*

Netmap is a step towards a network approach that can be used as an action research tool. To avoid strategic responses you can check the information provided by comparing it to information offered



by other actors. The possibility to really influence a network actively is higher for approaches that foster direct engagement with stakeholders rather than online surveys.

*Q3: How do certain extreme events or changes in the ecosystem change the social network?*

On the one hand, the problem of social networks is that problems evolve over time and data is often only available for a certain point in time. It is difficult to get more data, as interviewees can get bored. On the other hand, some networks do not change quite slow so that a low temporal resolution is acceptable. While the gathering of data for quantitative network analysis often takes quite a lot of time, qualitative networks can sometimes be done in the scope of a workshop. IN workshops you can furthermore ask deeper about the reasons for the network and in which direction should it be changed. The perception of people on the network can be crucial information as the perception has some impact on how people behave.