Case study summaries

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The science-policy interface may be examined in a number of different decision contexts or settings, where there is a two-way flow of information and knowledge between scientific and policy-making domains. Broadly, we may consider three types of decision-making contexts that are of particular relevance with regard to global change: project-related decisions, operational management decisions and policy & planning decisions. In the first category, we can consider situations such as civil or related infrastructure; while in the second category we may have situations involving the management of resources (such as water or forests) and the third category captures a wide range of planning or regulatory activities that need to be informed by, and based upon scientific knowledge. The two proposed case studies focus on the second and third decision contexts, respectively.

1. Cyclone early warning systems

This case study looks at early warning systems for cyclones as an example of a science-policy interface, where the system is designed to provide cyclone warning in real-time to communities and households threatened by a cyclone, to enable effective and timely responses such as evacuation. The 'science' domain in the context of cyclone warning systems is the India Meteorological Department (IMD) that tracks the development and progression of cyclones in the Bay of Bengal and the Arabian Sea and provides this information to the domain of 'practice' i.e. the state and district administrative machinery which is responsible for managing evacuation during a cyclone and making other pre and post cyclone preparations. The part of state and district administration responsible for managing the natural calamities have their own knowledge base about which sets of population are vulnerable to the impending cyclone. Together with the information they receive from the IMD and their own knowledge base the state and district administration carry out the activities required to ensure safety of human lives from the impending cyclone. We can structure this case study by following the flow of knowledge and warning information through the system, and look at the following three dimensions.

<u>Knowledge – meaning, type, source</u>
The first set of issues to be understood would be about what is the relevant knowledge and warning information in the science and practice domains, and whether in any exchange of knowledge between the two domains, the concept of knowledge in these two domains match or not. For example, we may characterize the relevant knowledge / information in the two domains by posing the following questions:

For the science domain:
- What kind of knowledge about the possible cyclone occurrence is generated?
- How is this knowledge generated?
- Does the IMD expect to receive any feedback from the state and district administration and if yes, then do they act on that feedback?

For the practice domain:

- What is the existing knowledge base with the state and district administration about who is vulnerable to cyclones and how adequate is this knowledge base?
- What kind of knowledge does the district and state administration expect to receive from the science domain?
- Does the knowledge that they receive from the science domain actually improve practice?
- Does the state and district administration provide feedback to IMD and if yes then what kind of knowledge do they provide to IMD as feedback?

Flow of knowledge & information

Once the issue of what is meant by knowledge is addressed, the next issue to be understood is the flow of that knowledge *within* and *across* the domains of science and practice. Within the domain of science (IMD in case of cyclone warning systems in India), there is a flow of information that starts from observations (satellite and terrestrial) of cyclones, the assessment and modeling related to this information, the final production of an information / forecast / warning product from the scientists, and its communication to the state / district administration. With regard to the flow of information, we may explore the following questions:

- Who has (or generates) the knowledge?
- For whom is this knowledge generated?
- How does it reach the different actors both within and across domains? i.e. what are the mechanisms and channels for communication?
- What are the barriers to these channels of communication?

Institutional Interface

The flow of knowledge within and across science and practice domains does not happen in vacuum. The actors in these domains are located within certain institutions that have their own set of norms and values. The third set of questions is about understanding the interface between the science and practice communities in institutional terms, and to explore the way in which the nature of the institutions and the roles / interests of the actors involved would shape the science-practice interface.

The *method* for collecting data for this study would primarily be interviews with the different actors in the science and practice domains of the cyclone warning system.

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2. NATCOM: India's initial national communication to the UN Framework Convention on Climate Change (UNFCCC)

This case study examines the process by which India's initial national communication to the UNFCCC was produced. Article 12 of the UNFCCC requires that all Parties report on the steps being undertaken to implement the Convention, and the responsibilities / obligations. The national communication is an integral part of this reporting mechanism, and includes information on greenhouse gas emissions / inventories, and an assessment of climate change impacts and vulnerability.

An extensive and structured process was followed in India to produce the initial (first) national communication. A study of this process offers a good opportunity to examine a number of aspects of the science-practice interface, in particular, the structure (or lack thereof) of this interface and the dual (or multiple) roles of the actors involved in the interface. Often, when questions regarding the science-practice interface are framed, there is an implicit assumption that one can draw a clear distinction between the community of science and the community of practice i.e. they are separate from each other. This may not really be true. For example there are scientists who are policy makers and vice versa. When the scientist/policymaker moves from one domain to the other he/she carries tacit knowledge or embodied knowledge with him/her. This tacit knowledge, which is associated with a particular person, could sometimes play more important in the success of science-practice interface. This is evident in the domain of technology transfer where we say that the people are the carriers of technology and the success of technology transfer depends to large extent on the flow of person-associated tacit knowledge rather than merely the flow of formal knowledge. Therefore the interface between science and practice is rather fuzzy and probably cannot be defined very sharply.

Study of the NATCOM process provides the context to study the fuzziness of the interface. In answering this question we would first identify the functioning of the entire process of NATCOM and then identify the different actors and their roles in this process. The issue of dual roles of the actors becomes quite important here. For example, a scientist associated with NATCOM plays a dual role. On the one side he/she is scientist, with a responsibility to do science, but at the same time because they are a part of a particular process for formalizing knowledge in the form of an assessment and communication, they also have to play a role at the interface. How do these dual roles shape the science policy interface? Whether and how these dual roles improve/hinder understanding and flow of knowledge across the domains of science and practice are the questions that we seek to address in this study. Thus through this case-study we mainly try to understand how to characterize the fuzziness in the science practice interface.