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Improving science and policy in managing land-based sources of pollution

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ABSTRACT

Detailed scientific information about degraded systems and impacts of land-based sources of pollution [LBSP] including information about accelerating costs caused by degradation are readily available. Conveying and bringing this information to decision-makers and the public requires both efficient transmission of findings and institutional support for decision-making.

In 2010 the Global Environment Facility [GEF] developed a medium-sized project on ‘Enhancing the use of science in International Waters projects to improve projects results' to examine the role of science and technical analysis in transboundary water projects. This article follows up an analysis of the LBSP working group. The emphasis was on examining the science-policy interface in over forty projects dealing with LBSP. The analytical framework combined descriptive [scientific component-incorporation into project design and implementation], evaluative [extent of use of analytical tools] and prescriptive elements. Best practices for management of LBSP were identified. The prescriptive analysis discussed the importance of enhancing communication among scientists and policy makers. The authors conclude that a common framework [here the DPSIR, further developed as DPSWR approach]

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should be applied across projects to enable collective framing of the key environmental issues and working towards informal adaptive management.

1. Introduction

The general environmental, social and economic impacts of Land-Based Sources of Pollution [LBSP], including sewage, urban wastes, industrial discharge, agricultural runoff and a host of other sources are well known. Degraded coastal habitats and fishing grounds, reductions of the pleasures and economic benefits of coastal tourism, depleted fisheries, loss of species and human diseases and loss of life are among those impacts. Globally, the annual costs of these and other impacts amount to billions of dollars. Designing and implementing effective public policies and projects to address the impacts requires active stakeholder participation, huge financial investments, political will and valid technical analysis. Despite increased demand for technical analysis, there is an increased recognition that much of the analysis produced is not being effectively converted into policies, plans and projects that can prevent or reduce negative environmental, health and economic impacts [Pielke, 2007; Slaughter and Rhoades, 2005; Van Kerkhoff, 2005].

Interactions between those preparing technical analyses of LBSP and national and local policy makers and planners working on waste management or water management issues mirror relationships between technical analysts and policy makers in many different fields. While the need for improved communication is often highlighted, the more basic issue is a difference in their roles. Analysis involves the identification of various types of threats distributed over spaces based on key assumptions about short and long term environmental changes over time. Technical analysts describe a probabilistic range of possible future conditions. On the other hand, urban and coastal planners and policy makers often require real time actionable and solution-oriented knowledge. Given patterns of vulnerability, they need to know how to intervene to reduce the adverse impacts of waterway and coastal uses. Their challenge is to identify types and combinations of interventions that will have the greatest likelihood of reducing risks at the least cost and minimum social, economic and political disruption.

Successful development and transmission of technical information on land-based sources of pollution to policy makers is an important institutional issue in water management, arising out of key questions: what strategies of developing and disseminating technical information contribute to its successful use by policy makers and planners? How effectively are policy makers and planners using technical information about the impacts of land-based sources of pollution? How do they assess its validity and usefulness? How do they convert technical information about the risks, scope, and severity of potential impacts into cost-effective impact mitigation strategies? What types of policy responses and what combination of management tools are being developed and applied? How are they evaluated?

These and other similar questions motivated the development of a Global Environment Facility [GEF] research project to examine the role of science and technical analysis in transboundary water projects. The resulting International Waters [IW]: Science research project focuses on GEF-funded water projects involving underground aquifers, river basins and lakes, marine coasts, large marine ecosystems and open oceans. The overall objective of the project was to 'enhance through knowledge integration and information sharing tools – the use of science in the GEF IW focal area to strengthen priority-setting, knowledge sharing a results-based, adaptive management in on-going and future projects' [Mee et al., 2012, p. 42]. A research team composed primarily of scientists, but also donor agency representatives, planners and resource managers engaged in water management issues held an initial meeting in Macau in January 2010. Experts were subdivided into groups dealing with more specific water management issues: rivers, lakes and groundwater [aquifers], land-based sources of pollution; and large marine ecosystems and open oceans. Subsequent meetings of each group were held in early 2011. This article is based on the analysis of the LBSP team.

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