How to Incorporate Environment in Water Resources Management: A river management approach for Çoruh Catchment Area

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1. Introduction

When water resource management is defined as a process of "optimizing the available natural water flows, including surface water and groundwater, to satisfy the competing needs of natural water cycles and human activities" (World Bank, 2011), it suggests managing things that cannot be managed (Jonker, 2002). A more suitable definition of water resource management can be managing people's activities in a manner that improves livelihoods without disrupting water cycles (ibid). Alongside the over-exploitation of water resources, devastation of environmental services and an increasing number of social conflicts, there is a growing body of work in the literature offering different approaches to water resource management, mainly integrated, participatory, adaptive and ecosystem based (De Groot and Lenders, 2006). However, implementation of these approaches demonstrates a wide gap between management practices and the objectives of sustainability (Rammel et al., 2007). This gap urges us to review these approaches carefully in order to determine both their short-falls and merits.

As a new approach to management, ecosystem-based management (ESBM) builds on existing management approaches of human activities affecting natural resources and natural cycles by recognizing the ecosystem as a third party (UNEP,

2011). ESBM reinforces the characteristic “co” in co-management and provides parties with a common footing before entering into their more adversarial roles (De Groot and Lenders, 2006:314). As a new approach to management, ESBM addresses shortcomings of traditional natural resource management, such as considering only single sectors or objectives and overlooking the value of ecosystem services (Tallis et al., 2010). What sets ESBM apart is its holistic and science-based approach to understanding how ecosystems work (Curtin and Prellezo, 2010). This approach recognizes ecological systems for what they are, the deep connectivity amongst all elements of the ecosystem including humans, as well as the underlying processes of producing the services people need and want (UNEP, 2011).

ESBM is based on solid knowledge and an understanding of ecological and social systems (ibid). Thus, the effectiveness of ESBM implementation depends crucially on data availability. Poor data poses a key challenge to its implementation as knowledge of complex ecological processes, interactions, cumulative effects and drivers depend on data acquisition. Poor data is the result of a lack of documented qualitative and quantitative information about the ecosystem, whether from published or unpublished research, experts, stakeholders, or local knowledge holders. Governance system characteristics may also pose a challenge to ESBM implementation. In weak governance contexts, the level of co-operation and co-ordination between government entities, the number of jurisdictions within the management region, and the ability of governments to enforce laws are factors inhibiting ESBM implementation. If laws do not exist or are not reliably enforced, rule of law is not stable, property rights are not defined or enforced, decision processes are not transparent and inclusive, and

stakeholders are in conflict over goals, the situation can be considered as weak governance (Tallis et al., 2010).

Under less than ideal conditions with poor data and weak governance, ESBM does not seem a productive management approach. However, as case examples to date have demonstrated, there is always an opportunity to progress towards ESBM regardless of how challenging the context may seem. There are cases with ample data; however, there are also cases of governance structures obstructing data sharing and access, and cases showing poor data conditions while stakeholder engagement has been fruitful in formalizing knowledge and meeting information requirements (see Samhourt et al., 2011; Tallis et al., 2010). These cases have inspired this study to investigate how ESBM can improve water resource management under poor data and poor governance conditions.

2. Implementation of Ecosystem-based Approach in Çoruh Catchment Area

2.1. Methodology

The case investigation (November 2011) started with an analysis of documents relevant to the Çoruh River Basin problem, i.e. reports of the State Hydraulic Works (SHW), the Ministry of Energy and Natural Resources (MoENR), the Union of Chambers of Engineers and Architects, and with determining the study area and the people involved. Interviews were conducted in Artvin (city), Yusufeli (town) and Altıparmak (village) with around 60 people from local authorities (governor, mayor and village governors, local tourism authority, local SHW authority), local communities, environmental NGOs, local councils, local organizations, as well as investors, scientists and researchers. The

interviewees were approached with three groups of semi-open questions about the real world, and the problem-oriented and solution-oriented loops, following the 10-staged SSDM framework. The first set of questions was aimed at their view on the problem situation in the Çoruh River Basin; the second set of questions targeted how they identify problematic sub-themes of the broader problem situation; and the third set of questions aimed to tap their suggestions on the solution of the problems. The most referred sub-theme was selected and analyzed as a sub-system in the rich picture by using the stages of the framework.

2.2. Water Management Problems in the Çoruh Catchment Area

The Çoruh River is among the 10 fastest flowing rivers in the world, and the fastest flowing and the wildest river in Turkey (State Hydraulic Works Report, 2006). It rises at Civilikaya Hill, located in the Mescit Mountains at the North of the Erzurum Plateau and flows through East Anatolia and the East Black Sea Regions of Turkey to finally reach the Black Sea near Batumi Georgia (UNECE). It is 427 km long, 400 km of which lies within Turkey's borders (Kibaroglu and Tigrek, 2011). The Çoruh River Basin is one of the most picturesque yet under-developed and poorest regions of Turkey. The main economic activity in small towns and villages along the river is agriculture. Rural incomes from agricultural activities are one third of the average for the country as a whole (Akpinar et al., 2010). Increased tourist activities in the basin area, such as rafting on the Çoruh River, has significant economic impacts on the local economy.

The Çoruh River valley lies within the ecological zone of the Caucasus, which is considered one of the 35 hot spots of biodiversity in the world by the World Wildlife Fund and Conservation International. The valley is rich in plant-life and contains 104 nationally threatened plant species of which 67 are endemic to Turkey (Ozhatay et

al., 2005). The area surrounding the river is rich in wild life, including brown bear, bezoar goat, wild boar, wolf, jackal, fox, badger, otter, rabbit, partridge, wild rooster, woodcock, white-headed duck, stock dove and golden oriole (Conservation International Biodiversity Hotspots, 2011).

2.3. Legal and administrative background of the energy sector

The rich natural habitat and water resources of the region remained undisturbed until Turkey's Electricity Market Law No. 4628 was issued. Since then, private sector companies have been authorized by the State Hydraulics Authority to approve, monitor and control hydropower plants. The Ministry of Energy and the water authorities have promoted the use of the region's hydropower potential as economic and environmental panacea. They prefer hydropower and consider it a clean and renewable energy source to meet the country's energy demand and rapidly rising growth rate. Development of hydropower capacity to 3,132.7 MW in the Çoruh Basin was planned to correspond with 29.4% of the country's energy needs (Turkish Electricity Transmission Company Statistics, 2007). Alongside the energy plan, a number of new regulations were released to facilitate the licensing procedures for hydropower plant projects, the expropriation of local settlement areas for public purposes, and environmental impact assessment (EIA). These new regulations, the 2003 Water Use Rights Consensus Legislation, the 2005 Law of Utilization of Renewable Energy Resources (no. 5346) with revisions (no. 5496) in 2006, and revisions to the EIA Regulation (eliminating the requirement for EIA reports for plants smaller than 10 MW) in 2008 (no. 26939) have facilitated the boom in power plant projects in the basin. Currently, there are 10 dam projects for the Çoruh River, and more than 100 regulator-type dams (117 projects), and innumerable small river-type plant projects on its tributaries.

2.3.1. Legal and administrative background of water resource management

The following are the main regulations relevant to water resources in Turkey (Moroglu and Yazgan, 2008):

(1) Water Pollution Control Regulation (2004/25687)

(2) Control of Pollution by Dangerous Substances in Water and its Environment Regulation (2005/26005)

(3) Fisheries Regulation (1995/22223)

(4) Quality of Surface Water Intended for Drinking Water Regulation (75/440/AB)

(5) Protection of Waters from Nitrate Pollution from Agricultural Sources Regulation (2004/25377)

(6) Urban Waste Water Treatment Regulation (2006/26047)

(7) Water Intended for Human Consumption Regulation (2005/25730)

(8) Bathing Water Quality (76/10/AB)

However, the EU Water Framework Directive (2000/EC/60) (WFD) is the most ambitious and complex piece of legislation about water resources, the adoption of which was commenced in 2005 and which has not been completed yet in Turkey (Sumer and Muluk, 2011). The WFD has been designed to be the centre piece of legislation for the management of European waters (ibid) and is considered to be the “constitution” of water-related legislation in the European Union (Cicek, 2010). It demands a fundamental change in the way water resource planning and management is understood (Estevan and Naredo in Mencio et al., 2010). WDF aims to cope with the problems of excessive use and quality reduction of water and requires Member States to aim to achieve ‘good ecological and chemical status’ in surface waters and ‘good chemical and quantitative status’ in ground waters by 2015 (WFD 2000/EC/60). In addition, it also requires that no deterioration in water status takes place and that the objectives of protected areas are met (Van Wijk et al., 2003). The WFD promotes integrated

management of water resources to support environmentally sound development and to reduce problems associated with excessive water abstraction, pollution, floods and droughts. The Directive provides the framework for water policy decision-making within the river basin (catchment) context. It requires the integration of industrial, agricultural, rural development, nature conservation and forestry programmes at the river basin level. Implementation of the WFD also requires the efforts of local government as well as NGOs and stakeholders. Environmental NGOs, public authorities and the private sector offer considerable support for the principles and purpose of the WFD (Moroglu and Yazgan, 2008).

Although some aspects of the Water Quality Acquis are already covered by Turkish legislation, only limited development in transposition of the WFD has been reported, especially concerning water quality (Water Framework Directive in Turkey, 2006). Significant efforts are needed in order to achieve full compliance with and implementation by the WFD (EC Turkey Progress Report 2005). However, there are institutional obstructions for a full transposition and implementation of the WFD in Turkey. The institutional structure for water management is complex and fragmented; it does not provide sufficient guarantees for implementation, and river basin-based management has not been set up yet (Moroglu and Yazgan, 2008). Decision-making within water management is highly centralized. The main governmental actors at the national level are the Ministry of Environment and Urban Planning (MoEUP), the General Directorate of State Hydraulic Works (SHW) of the Ministry of Forestry and Water Affairs (MoFWA), the Ministry of Agriculture an Rural Affairs (MoARA), the Ministry of Health (MoH) and the State Planning Organization (SPO).

Within the complex administrative structure of Turkey, the Ministry of Environment and Forestry (MoEF) is responsible for water pollution control, while SHW is responsible for the development and management of water resources. MoARA

has some water management tasks related to agriculture (e.g. fisheries), and MoH is responsible for drinking and bathing water quality. The SPO develops National Development Plans under the auspices of the Prime Minister (Moroglu and Yazgan, 2008). Division of responsibilities for water management among the relevant institutions and limited co-ordination between sectoral ministries on environmental matters are the cause of inadequate water resource management in Turkey.

2.4. *Challenges to ESBM Implementation in the Çoruh Catchment Area*

The government and the water authorities expected to enjoy socio-economic benefits from the hydropower projects. However, the hydropower plants, the ones under construction and those already in operation, have resulted in cumulative negative impacts and socio-ecological problems rather than offered benefits. The construction of one plant immediately after another, starting very near the source of the Çoruh River, has resulted in the deterioration of a nature reserve and of the high levels of biodiversity, and has threatened local residents of the surrounding villages.

Construction activities, including tree cutting, excavation, filling areas, road construction, blasting, and construction and excavation of supply channels have resulted in a large amount of damage to the basin area. The damage includes the loss of the riparian zone, the destruction of wetlands and the deforestation of the riparian forests. The construction of 1–6 km long water pipe-lines in extremely steep mountainous areas has resulted in tree cutting, erosion, excavated material and its dumping; also, the construction of water tunnels results in waste water in the tunnel site and excavations (Baskaya et al., 2011). Due to habitat fragmentation and alteration caused by these construction projects, fish and wild animal routes have been disrupted. Another impact

of the plant construction projects is the danger of flooding of the highly productive agricultural land surrounding the river.

The water basin ecosystem has been harmed by inadequate environmental flow, as well as by waste, dust and noise resulting from construction. The amount of environmental flow released into the river basin to ensure the continuity of natural life and its monthly distribution does not correspond to the right amount of water. The calculation method (Tennant Method) for environmental flow is borrowed from another country, the USA, with different climate conditions and slope. It is applied subsequently to the environmental flow calculations for each project without adjusting for the conditions of the Çoruh River Basin (ibid). Thus, inadequate water releases from the dams affect aquatic life and the basin ecosystems that depend heavily on the hydrological characteristics of the river environment (ibid). Unfortunately, effective assessments of the negative impacts on the ecosystems in the basin are not available. Regardless of the quality of the environmental assessments, almost all EIA reports on the hydropower plant projects have been approved by the authorities. Lack of a cumulative impact assessment for all projects in the basin is a major problem that needs to be addressed as a priority before the problem with the individual EIA reports for each single project.

Apart from the ecological problems, it has been observed that dam projects in the Çoruh basin result in significant social problems. Approximately 30 villages have been expropriated for the dams to be built. The affected people have moved to cities throughout the country where they are struggling to survive. Expropriation sums paid to landowners were higher per acre than in Central Anatolia due to higher value of land in the catchment area. However, as families owned usually small, but productive plots, the

total amounts paid to landowners were small. While some landowners still await compensation payment, landless residents were left to find new lives without any compensation or support whatsoever as no resettlement or income restoration scheme was developed. The insecurity of the population about their fate in the wake of the projected dams is a major social problem, as is the lack of meaningful participation of local people in decisions made about these projects. Local and central authorities are reluctant to notify and consult local people and NGOs, and there is no genuine scheme to share the benefits of the projects with the affected population. In some cases, NGOs are prohibited from calling for public hearings on the impacts of dams and hydropower plants. Despite the prevailing disputes over the social and environmental problems, there is no response from the ministries to pleas for a slowing down of plant constructions.

2.5. Findings of the Case Study

"Lack of strategic planning for regional energy development" has been expressed by the respondents as the most important problematic theme in the rich picture of the problem situation of the Çoruh catchments area. The Ministry of Energy and Natural Resources declares that "it is our mission to ensure efficient, safe and environmentally sensitive use of energy and natural resources in a way that reduces external dependency of our country, and makes the greatest contribution to our country's welfare" (Strategic Energy Plan 2010–2014). On the other hand, the Ministry aims at utilizing maximum hydropower potential for electricity generation and promotes development of hydropower plant projects without considering the adverse impacts on the environment and the aquatic ecosystems in and around the Çoruh River. The Strategic Energy Plan (2010 and 2014) considers hydropower as a clean, renewable, lasting and efficient

domestic resource with low operational costs and no fuel costs, which is not externally dependent and, therefore, can serve as a fuse for energy prices. The Electricity Energy Market and Supply Security Strategy Paper (2009) outlines the long-term energy targets and emphasizes maximum use of hydropower potential for the period until 2023.

The energy plan formulation currently used by the Ministry of Energy and Natural Resources of Turkey sees hydropower as renewable and everlasting, thus the best energy source to meet the demand in the Eastern Black Sea Region. It promotes the development of a large number of hydropower projects on the Çoruh River despite the opposition of the majority of the local residents and leads to conflicts between the locals and the authorities. Implementation of these projects affects all elements of the Çoruh Catchment Area which are ecosystems, including local residents. However, this problematic energy policy is implemented ceaselessly as planned regardless of the complaints from locals and experts.

4. Conclusions

This research has dealt with increasing the awareness and organization among local community members, whose interview responses have informed the study. The local community members who live in the Çoruh catchments area have identified key pressures on themselves and on their environment and criticized the unsustainable progress of the hydropower plant projects in their areas. They have marked the conflicts between the declared mission of the Ministry of Energy and Natural Resources, which addresses sustainable use of energy and natural resources, and actual approach, which ignores information flows about the impacts on the ecological and socio-cultural resources in the basin area. Subsequently, the local respondents have urged the energy

planning authority to exercise the political will to open up to the information flow from local communities and experts.

The most desired change suggested by the respondents has been stakeholder engagement in the policy-making process. The respondents have expressed their willingness to share experiences and information with the authorities to guard their environment from the adverse impacts of booming hydropower projects. The respondents have also suggested some long-term changes to improve the problem situation in the Çoruh River Basin. One of these changes has been suggested as the enforcement of existing national and international regulations in Turkey's legal system, which would imply development of integrated basin management plans, assessment of cumulative impacts rather than assessing impacts of single projects, and protection of water resources and water rights. Another change has been suggested as the priority-setting approach of the planners and policy-makers to give equal weight to environmental, economic and socio-cultural components.

This research reveals that establishing an effective information flow between the local community members and the planning authority is of vital importance; hence, the political will of the planners is the key condition to improve the problem situation in the areas under poor data and weak governance conditions. The research addresses the role of the strategic decision-makers in utilizing ESBM and underlines the fact that progress towards ESBM is possible even in a challenging data and governance context.

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