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Political ecology of inter-basin water transfers in Turkish water governance

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ABSTRACT. We explore the emergence of two contemporary mega water projects in Turkey that are designed to meet the demands of the country's major urban centers. Moreover, we analyze how policy makers in the water sector frame problems and solutions. We argue that these projects represent a tendency to depoliticize water management and steer away from controversial issues of water allocation by emphasizing large-scale, centralized, technical, and supply-oriented solutions. In doing so, urgent concerns are ignored regarding unsustainable water use, impacts on rural livelihoods, and institutional shortcomings in the water sector. These aspirations build heavily on prevailing discourses of modernity, development, and economic growth, and how urban centers are perceived as drivers of this growth. In the light of these tendencies, social and environmental implications are downplayed, even though the projects will change or already have changed the dynamics within urban-rural life and agricultural water resources practices. We develop an understanding of how such projects are presented as the only solution to problems of water scarcity in Turkey.

Key Words: *inter-basin water transfers; political ecology; Turkey; urban water; water governance*

INTRODUCTION

Providing water for the domestic and industrial needs of growing megacities is one of the biggest challenges facing current water governance. In many cases, satisfying demands of urban centers means exploiting the resources in surrounding areas where rural regions, some distant, have to provide the necessary resources to supply food, water, and energy to megacities. This arrangement puts significant and disproportionate pressure on rural ecological and social systems and threatens their long-term viability in many ways (Varis et al. 2006). Tacoli (2003) points out the rural-urban co-dependence by drawing attention to the reliance of rural populations on urban centers for access to education, health, and communication services, among other things, whereas urban populations primarily depend on the resources of rural regions for achieving, for example, food and water security and various types of energy production. While we recognize this inter-reliance, our current focus is primarily on the politics and consequences of the transfer of water resources from rural areas to urban centers.

In the case of Turkey, the rate of urban growth peaked in the 1980s, and the majority of Turkey's population now resides in urban areas. The population of Istanbul, by far the largest city in Turkey, is officially 13 million, with an annual growth rate of 3.3%. Ankara, Turkey's capital and second largest city, has a population of 5 million, with an annual growth rate of 2.4% (TUIK 2012). These two cities compose 30% of Turkey's total population. Within the context of service provision to these densely populated and ever-growing metropolises, Istanbul and Ankara suffer from inefficient institutional environments and inadequate infrastructure, as well as a lack of funding opportunities for addressing significant issues such as access to clean water (Franz et al. 2012).

In most countries, the conventional approach to meeting the growing requirements for water in urban areas and managing urban water supply systems is to deploy large-scale technologies (Bakker 2010). Government support for such strategies aimed at quenching the water demands of growing urban areas is often justified by reference to the symbolic and cultural importance of water as a public good, and its strategic political and territorial interest for the country. In many instances, large-scale water projects, which are planned, constructed, and operated by governments, are also framed as the symbolic infrastructure of the prestige of nations and amount to a "means of territorializing government power" (Bakker 2010:33). This political use of hydrological resources can be problematic for several reasons. First, large-scale water projects, because of the sheer quantity of resources and land needed for their development, are economically costly and have significant consequences for local and regional ecological processes, water quality, and human health (Lundqvist et al. 2003). Moreover, they can lead to the displacement of people, the loss of community identity, and even the loss of a nations' cultural heritage (Islar 2012*a*). The implementation of large-scale water projects might even lead to problems of political instability, particularly when it comes to a lack of effective participation by stakeholders and the disproportionate distribution of costs and benefits (Islar 2012*b*).

Among the varieties of large-scale water projects, the inter-basin transfer (IBT) of water resources is the most common supply-oriented, production-focused solution that has been deployed throughout the world to meet the water needs of growing urban centers (Gupta and van der Zaag 2007). Here, IBT refers to the "transfer of water from one geographically distinct river catchment, or basin, to another, or from one river to another" (Davies et al. 1992 cited in Gupta and van der Zaag 2007). These large-scale transfers of water resources between geographic regions come with many trade-offs. For example, Hussey and Pittock (2012) consider IBT as one of the prime examples of the trade-off between energy and water security, referring to the complex relationship between the often substantial amount of energy needed to treat, move, and distribute water between catchments or basins (and on to the urban centers they are meant to service) and the quantity and quality of water (and related use values). Other trade-offs exist between upstream and downstream users and ecosystems, with IBT often having disproportionately negative effects on downstream users (Hussey and Pittock 2012). Water transfers have been shown to have serious ecological impacts, from the alteration of up- and downstream habitats on individual rivers to problematic changes in the hydrological regimes and water quality of entire river basins (Meador 1992).

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This has been well documented in other cases, for example, the impacts of flow regulation and historical land use associated with inter-basin transfers of the Colorado River in the western United States (e.g., Wohl 2005). The distribution of benefits and costs connected to IBT projects, and the related social and environmental implications of this distribution, still remains a subject of concern for scientists, governments, and society at large. Despite these substantial challenges, in the Turkish context, IBT continues to be framed, designed, and implemented by state actors as a popular solution to the problem of water scarcity in Turkey's continually expanding urban centers.

Here, we explore the influential role of discursive-political framings, as well as the related social and ecological concerns associated with particular IBT projects in Turkey, as a means to understand how these issues are dealt with in policy practices and to take steps toward understanding the implications this can have for achieving socially and ecologically equitable and sustainable water services in Turkey. Drawing on popular, governmental, and academic literature, interviews, and previous research, our focus is primarily on two of the country's largest and most well-known water projects that involve IBT between two or more river basins: the Istanbul Greater Melen project and the Ankara Kizilirmak plan. We investigate the following research questions: How is the problem of water scarcity framed in the Turkish context, and how does this facilitate the development and implementation of IBT solutions? What are the actual and potential impacts of these solutions on society and ecology in the affected regions? We selected these projects based on their representative nature; they are among the most publicized, well-funded, and popularized IBTs in the context of Turkey. We argue that, as large-scale hydro-political projects, these examples could be viewed as political symbols that help state actors to gain legitimacy and political and economic support from other state institutions and/or their voting constituency (Molle 2008).

The critical stance we take emerges from our attempt to question taken-for-granted solutions to water scarcity issues in the urban context, such as the unproblematic adoption of IBT water projects in Turkey. Our aim is to contribute to the debate around just and equitable water services provision. We operationalize this critical approach through the lens of political ecology by inquiring, questioning, and reframing the problem definitions and related narratives embedded in these prevalent solutions, particularly those directed via national growth and development strategies (Sullivan and Stott 2000).

ANALYTICAL FRAMEWORK

Political ecology of inter-basin water transfers

Political ecology in general refers to "an approach to environmental politics that allows the successful integration of political analysis with the formation and dissemination of understandings of ecological reality" (Forsyth 2003:20). Political ecology provides the analytical tools needed to develop a critical perspective that helps uncover the often implicit connections and interactions between political decisions and/or policy choices, the social and cultural context in which they are imbedded, and their direct and indirect effect on the (mis-)management of natural resources. In this sense, political ecology emerged as a response to an "apolitical ecology" that often neglected to address or even acknowledge the power dimensions in human-environmental relations (Forsyth 2003). A significant difference between political ecology and other traditional ways of studying ecological systems is its dedication to "taking an explicitly normative approach rather than the one that claims the objectivity of disinterest" (Robbins 2011:13). The human use of the natural environment is a fundamentally political act, and political ecology puts those politics front and center, without losing sight of the social and ecological context in which these politics are conducted.

Much of the political-ecology-inspired water literature adopts what can be termed a "hydro-social" understanding (Wittfogel 1981, Worster 1985). Many studies focus on the social dimensions of water by looking at how power dynamics in social and political processes are fused into the physical and managerial aspects of water governance. For example, the works of Swyngedouw (2006) and Swyngedouw et al. (2002) attempt to draw attention to relations between social power and the hydrological cycle such as the rerouting of natural water courses through constructed channels, pipes, and dams. Because this water infrastructure is the result of social, political, economic, and cultural processes, we may say that the flows of water running through them are embedded, and indeed manifested, via the networks of social power relations such as political, economic, cultural, and discursive power (Islar 2012*b*). This means that the hydro-social cycle constitutes a flow of not only water, but also social relations. Hydro-social relations in our study are characterized by processes of political problem framing and decision making, influence, and investment strategies through which water is diverted from rivers, through pipelines, and on to urban centers (Swyngedouw 2006).

In the context of IBT projects, hydro-social decisions are often shaped by influential politicians, financial considerations, concerns over urban economic growth, and institutional recognition and legitimacy at the national and international levels. As a response, Gupta and van der Zaag (2007) proposed a set of criteria to evaluate IBT schemes in the context of integrated water resources management. Two of these criteria are sustainability and good governance, emphasizing that design and implementation of such projects should be socially, environmentally, and economically sustainable, integrated across scales and levels, and adaptive to internal and external natural and social perturbations. In addition, attention to participatory approaches in decision making processes, as well as accountability to affected public actors, is considered necessary for evaluating the equity and sustainability of IBTs. With these criteria in mind, we provide a brief but instructive analysis of IBT projects in Turkey by looking specifically at the approaches and implications of socio-political problem framing, as well as the social-ecological concerns stemming from the design and implementation of these IBT projects in the Turkish context.

METHODS

Because the IBT projects we examine have not been finalized, but remain in the planning and implementation phases, we lack the hindsight (and much of the data) available to scholars such as Swyngedouw (2007), who adopt a historical approach to their analyses. With these limitations in mind, we chose a case study approach for several reasons. First, according to George and Bennett (2005:4–5), the case study is well suited to "process tracing" in that it helps link causes and outcomes, promotes

understanding of the sensitivity of concepts to particular contexts, and facilitates the detailed exploration of hypothesized causal mechanisms. The choice of sample cases is crucial in achieving these goals (Flyvberg 2011). Generally speaking, a typical average or representative case is not adequate if the researcher aims to clarify more profound causes underlying a given problem. For that reason, we chose our examples of IBT projects based on extensive background knowledge and building on previous work in the region (Islar 2013), rather than selecting cases on a purely random basis. The selected cases represent critical situations in that they are the most well-known, well-funded, and publically contentious IBT projects in Turkey today. According to Flyvberg (2011), a critical sample is defined as having strategic importance in relation to the general problem, in our case, the unproblematic adoption of large-scale solutions with well-documented social and ecological implications. The chosen IBT projects, namely the Melen and Kizilirmak IBT projects, stand out as the most ambitious, large-scale, and potentially influential projects of their respective regions because they are planned to bring water services to the country's largest urban metropolises.

Qualitative data were collected via six in-depth interviews with government officials, project designers, and local residents who are affected by these IBT projects, as well as through government and nongovernmental organization (NGO) reports and planning documents (DSI 2009, 2010, IMO 2009, Ozturk 2009, WWF Turkey 2012, Maden 2013). Relevant Turkish-language news articles focused on the IBT issue were also reviewed and analyzed to understand the general public discourse around IBT projects in Turkey. This material is subsidized by a literature review of Turkish political economy of water focusing on IBTs and hydropower development in the context of the rural-urban interface (e.g., Altinbilek 2006, Çinar 2006, Kibaroglu et al. 2009, Mutlu 2011, Scheumann et al. 2011). We employ document analysis, which involves the "searching-out of underlying themes in the materials being analyzed" (Bryman 2004:392), to help select, analyze, and understand media sources, government documents, and NGO reports, and draw on discourse analysis (Silverman 2010:46) as a tool to interpret the data derived from the interviews and political speeches. Yin (2009) argues that document analysis is particularly prudent in qualitative case studies because it facilitates the identification of important details about the topic of study. In our case, with the primary focus being the process, document analysis proved helpful in tracing changes in the processes of IBT development and implementation, especially in relation to the planning phase and related legal reforms. However, as Scheumann et al. (2011) recognize, a lack of public disclosure of some governmental documents in Turkey remains one of the reasons why monitoring of social and environmental impacts are difficult. To overcome these limitations, we conducted interviews with the various actors noted above.

INTER-BASIN TRANSFER PROJECTS IN TURKEY

Turkey is surrounded by three major water bodies: the Black Sea to the north, the Aegean Sea to the west, and the Mediterranean Sea to the south. Despite this close proximity to large water bodies, fresh water is not an abundant resource in the country. In fact, the per capita water availability is almost one-half of the world average (DSI 2009). Population growth and its distribution between urban and rural regions are considered by some to be major drivers of water policy in Turkey (Mutlu 2011). Nearly 75% of the Turkish population lives in urban areas, representing a significant increase in the proportion of urban population compared to the 1980s, when approximately 43% of the total population was urban (TUIK 2012). Moreover, a greater amount of the urban population is living in large metropolitan areas, in particular Istanbul, Ankara, and Izmir. Rapid urbanization has increased water stress levels in these urban centers and has forced policy makers and service providers to seek alternative water resources outside the cities' boundaries. Along with this increase in urban water demand, there is growing competition over the use of water between different sectors and spatial regions, an issue exacerbated by climate change and inefficient water policies and infrastructure. In addition, unplanned industrial activities have in some cases contaminated water resources around urban areas (DSI 2009). For instance, water reservoirs in and around Istanbul suffer from excessive nutrient loads and heavy metal concentrations as a result of poorly managed domestic and industrial activities such as farming and manufacturing (Baykal et al. 2000). Privatization of water supply services and IBT emergency plans might have the potential to satisfy growing urban water needs, but they might also have disproportionate and negative effects on rural areas where many of the desired water resources originate, e.g., via changes in water quality and quantity for up- and downstream ecosystems and/or the local communities that rely on these resources for sustenance and livelihoods (Islar 2012*a*).

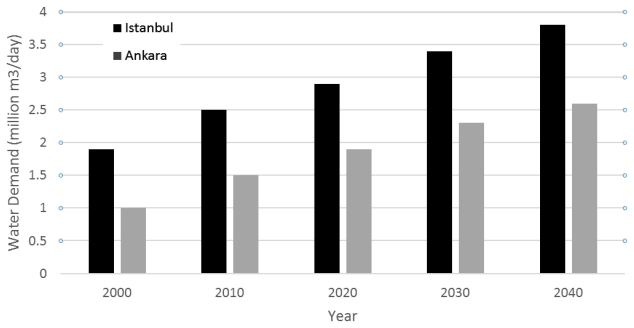
In his detailed historical account of IBTs, Meador (1992) shows that one of the oldest IBT projects in the world was built in 2500 B.C., connecting the Tigris and Euphrates rivers. Today, nearly 4500 years later, the same geographical region is host to Turkey's first, and most extensive, large-scale water development scheme, the Southeast Anatolian Project (GAP), with its 22 dams and 17 hydroelectricity plants. Over the past decade,the current Turkish government has shown tremendous interest in developing and implementing various mega-projects like GAP (Islar 2012*b*). The following two IBT projects are water-oriented examples of such large-scale plans that are publicized and promoted by the current government as purported means to supply the quantity of water required by the growing urban population and expanding industrial sector.

Istanbul and the Greater Melen project

Istanbul is the biggest metropolitan city of Turkey. It stretches between two continents and has a population of 13 million people. It also has serious water shortage problems. The city's population grew significantly in the 1980s, with an annual growth rate of 14.6% (TUIK 2012). Since the 1990s, the water supply of the city, including groundwater and springs, has not been able to meet the increasing demand associated with this huge increase in population, and future projections of water demand suggest this will not let up anytime soon (Fig. 1; Varis et al. 2006). Another challenge related to water use is that 40% of Turkey's industry, such as clothing and textile manufacturers, is located in Istanbul (Altinbilek 2006), and such industries consume large quantities of water. Apart from the high rate of population growth and the growing industrial sector, Istanbul also faces challenges related to the local geological and geographic context, which significantly affects water supply availability (Varis et al. 2006, Sekercioglu et

al. 2011). The city is divided by the Bosporus Strait, with one-third of the population living in geographic West Asia and the remaining two-thirds residing in continental Europe. So far, the city's water supply has been provided mainly via dams.

Fig. 1. Projected water demand for Istanbul and Ankara, Turkey.



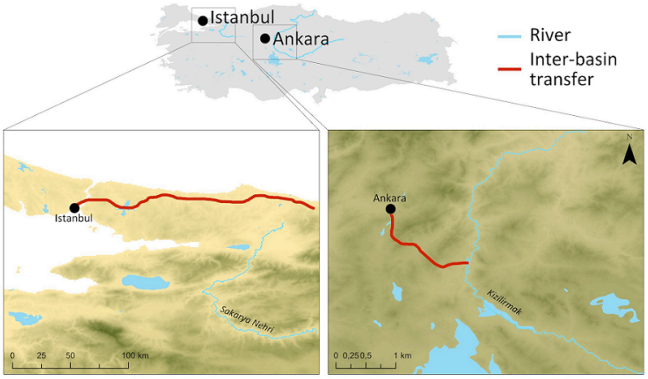
There are various plans to meet the growing water demand in Istanbul, most of which are based on the importation or transfer of water resources from rivers in adjacent drainage basins. One of the major IBT-oriented models, the Melen project, is the second largest water transfer scheme after the GAP in Turkey (Kalkan and Yanik 2004). After a drought in 2007, and the related stress on urban water resources, the idea of this project began to be developed and gradually implemented. The project is planned to draw water from the Melen River, located 180 km east of Istanbul in Duzce province, situated in the Black Sea region (DSI 2010; Fig. 2). In the first stage of the project, approximately 235 km of pipeline was constructed, and the annual 268-million m^3 of water needed to meet the demands for industrial and domestic water has been provided. The second stage of this project is still under construction. According to second-phase planning documents (DSI 2010), the water treatment plant is to be located near the Ömerli reservoir and will treat some 720,000 m^3/d of water. The treated water will be transferred to the Kagithane treatment plant, located on the other side of the Bosphorus Strait, through an undersea tunnel (Kalkan and Yanik 2004, IMO 2009).

The total cost of the Melen project is projected to be USD 1.18 billion, and foreign sources are expected to finance the majority of these costs. A loan of USD 900 million has been secured from the Japanese Bank for International Cooperation (DSI 2010). A consortium of Japanese, British, and Turkish companies share the engineering, consultation, and monitoring services of the Melen supply project (Kalkan and Yanik 2004). This dependence on foreign credit sources for finance can be problematic for timely completion of such projects because it has the potential to interrupt the planning and implementation processes; for example, progress on the Melen project periodically slows when the Turkish government delays down-payments to the lending institution.

Ankara and the Kizilirmak plan

The Turkish capital of Ankara, located in Central Anatolia, a region internationally recognized as a biodiversity hot spot (Myers et al. 2000, Sekercioglu et al. 2011), is the second largest city in Turkey, with a population of approximately 4.5 million people. Despite its semi-arid climate, Ankara is better situated geographically in terms of water resources compared to Istanbul because the city is located between two large river basins, Sakarya to the west and Kizilirmak to the east. Regardless of the benefits of Anatolia's location, many small streams and water systems were not protected during early city planning (Tigrek and Kibaroglu 2011), and now the city is facing a serious drought problem due to climate change, population growth, and inefficient water management practices. For example, Ankara experienced a serious drought between 2006 and 2008, which resulted in Mayor Melih Gokcek being heavily criticized for the mismanagement of water resources when he asked residents to "wash your hair, not your bodies" (Worldwatch Institute 2012). Furthermore, Ankara's growing demand for water will put additional pressure on the already stressed infrastructure (Fig. 1).

Fig. 2. Location of inter-basin water transfer projects in Melen and Kizilirmak, Turkey.



Because of these concerns, the main water agency, State Hydraulic Affairs (DSI), prepared a water supply master plan to implement water provisioning infrastructure on two rivers: the Gerede River, to be used until 2024, and the Kizilirmak River, to be used by approximately 2027 to meet the future water demands of the growing city. The Kizilirmak River, which is the longest river in Turkey, is seen by some as a long-term but not a preferred solution because of high levels of various contaminants (Tigrek and Kibaroglu 2011). An emergency plan has been developed and designed for Kizilirmak that aims to transfer water from the river to Ankara through 128 km of pipeline. Construction of several kilometers of tunnel and other necessary infrastructure was partly completed by March 2008 (Tigrek and Kibaroglu 2011; see Fig. 2). However, there are competing views on the quality of Kizilirmak water. Recent studies have shown the water in the Kizilirmak River to have high levels of sulphate, chlorate, and various heavy metals because of run-off from widespread agriculture and livestock breeding, contamination from solid waste dumping sites, and excessive salinity from local geological features (e.g., Ayaz et al. 2013). WWF Turkey (2012) has also argued that emergency situations and time limitations have forced policy makers to prioritize this project over public health. Moreover, as Franz et al. (2012) argue, the large catchment area

makes pollution difficult to track, leading to inadequate monitoring and control of contaminants. In response to such concerns, Mayor Gokcek publically drank the diverted Kizilirmak water, arguing that it had been treated and thus had been cleared of these contaminants, hoping to squash negative public perceptions and maintain support for the IBT project (Radikal Gazetesi 2008).

DISCUSSION

The politics of problem framing

It is important to acknowledge that the process of problem framing can be highly political, from which the dynamics of social and political power become embedded in the rules, procedures, and outcomes of decision making. For example, competition between different state institutions over the securing of financial resources or the establishment of the dominant and desirable discourse that serves their respective (and often competing) interests can have significant influence on the problem-framing process. In the two cases of large-scale IBT water projects, the problem has been defined as stemming from natural drought conditions and general water scarcity, rather than increasing water demands or historical urbanizations patterns. As a result, the problem solutions are designed in relation to this understanding, i.e., the transferring of water from areas with less scarcity to those with more. From a political ecology perspective, the framing of such water scarcity problems as being solely a function of natural conditions is overly simplistic; perhaps more problematic is that such an approach to problem framing serves to depoliticize the decision-making process and can impede the development or adoption of alternative perspectives and related solutions (Bakker 2000, Swnygedouw 2004, Kaika 2005). An example of the connection between depoliticized problem framing and solution development comes from the Turkish Minister of Forestry and Water, who stated that the "Melen project is the insurance of Istanbulites drinking water. As Melen is another river basin and situated in a different climatic zone, it can provide water even if there is drought in Istanbul" (Haber 7 2012). In this context, the fact that water scarcity is "a function of water demands and hence partly socially produced" (Otero et al. 2011:1298) is neglected, resulting in solution options that do not acknowledge or address the social drivers of water scarcity.

In line with the hydro-social perspective, water scarcity in the Turkish context is not solely an outcome of natural conditions, but instead, partly a consequence of social, economic, and political relations, including increases in industrial activities and expanding urban populations, both of which facilitate the depletion of water sources in urban centers. The leading engineer of Istanbul's Melen project also supports the idea that the project is crucial for securing Istanbul's future water supply until 2040. Partly because the Melen project is the second biggest water scheme in Turkey after the GAP, the project attracts many investors such as Turkish construction and engineering companies. Within the current problem framing, the popularity of the project among Turkish business elites and urban residents limits the ability of decision makers to look for alternative solution options such as improving faulty infrastructure or imposing taxes on industrial water use as a means to cope with inadequate water supply and manage demand. Instead, the Melen project is discussed and designed as the only viable solution, while its existing and potential social and ecological impacts are downplayed.

In the case of Ankara, water has remained a critical issue for at least a decade, and controversial solutions, similar to those proposed in Istanbul, have been developed and promoted as a means to alleviate persistent water scarcity. Among the possible solutions, the proposal to transfer water from the distant Kizilirmak River has dominated media and public discourse despite the high environmental and economic costs foreseen by experts such as the Chamber of Mechanical Engineers in Turkey (IMO 2009). In the dominant public discourse, the water crisis of 2006 has been framed as an outcome of natural processes resulting from climate change, as the mayor of Ankara clearly expressed: "We experience more droughts as result of global warming, we need to accelerate the Kizilirmak project" (Hurriyet Gazette 2007). Within this problem framing, it is argued that a large-scale solution like IBT is inevitable and part of the "common sense" way to alleviate water scarcity in Ankara (Yucel 2008). However, the Turkish Chamber of Civil Engineers (IMO 2009) has argued that water in the region is not scarce but poorly managed. The cost of treating the Kizilirmak water for drinking purposes is said to be greater than the cost of repairing faulty infrastructure such as leaking pipes; thus, the framing of the issue in terms of water scarcity can be seen as actually obscuring and depoliticizing the social drivers of perceived scarcity, such as increasing water demand stemming from expanding industrial activities and the growing urban population, in favor of potentially more problematic and costly strategies like IBT (IMO 2009, Franz et al. 2012).

Social and ecological concerns

IBTs are generally perceived as solutions designed exclusively for meeting the needs of urban centers. For example, Sjömander Magnusson (2005) argues that IBTs illustrate the "predatory" nature of urban areas, referring to the disproportionate impact of such projects on the ecological integrity of the generally rural locales from where the water is imported (Gupta and van der Zaag 2007). The lack of an integrated approach in the planning, design, and implementation of these inter-basin projects means that they often fail to address the conflicting interests and disproportionate distribution of costs and benefits, often leading to conflicts between different users and potentially adversely affecting environmental quality and livelihoods, with the rural poor often assuming the majority of the environmental and social burden (Islar 2013). The most recent environmental impact assessment report for the Melen project stated that the project's prolonged planning period and related uncertainty has prevented local people from making long-term investments in their region, leading to migration from rural areas to bigger cities, even before the project started (Ozturk 2009). Along with these already existing social impacts, the Melen project is expected to flood five villages and affect the sources of income for many residents, ranging from agriculture to industry. For instance, the head engineer of the Melen project acknowledged that after the project began, it was requested that the region's textile dyeing activities be constrained to prevent pollution of the Melen water, a good example of the trade-offs associated with IBT projects. As interviews showed, there has also been significant social resistance in the Duzce region and other areas along the Melen River basin affected by the project related to various social and ecological impacts, something the head engineer and other project supporters seem unwilling to acknowledge.

Other procedural problems require more attention, particularly the issue of land expropriation for the construction of dams, reservoirs, and pipelines. There have been cases in which people whose land was expropriated for the construction of the project have waited for their compensation for almost seven years, and in some cases still do not know when they will be paid, leading to much discontent (Sari 2012). As a result, the land expropriation process and the resettlement of 16 villages have become a question of national importance, remaining a central discussion point in the halls of the national parliament (Kavis 2012).

Beyond these social impacts, Meador (1992) has recognized that IBTs have the potential to introduce nonindigenous aquatic organisms to affected river systems because of the breakdown of biogeographic barriers between river basins. This has also been acknowledged by the recent WWF report on IBTs; at least 11 endemic species are under threat by the Melen project (WWF Turkey 2012). Another potential ecological impact of IBTs is the reduction in water quality. For instance, in the case of the Ankara Kizilirmak project, the concerns are mostly centered on the quality of the Kizilirmak River and the increases in concentrations of heavy metals. When this water is used for domestic needs, it can have serious implications for public health (IMO 2009). However, compared to the other alternatives, the Kizilirmak project requires less resettlement and thus has fewer social implications for the rural population who live in the vicinity (Franz et al. 2012), yet another example of IBT social and environmental trade-offs.

CONCLUSION

In the context of Istanbul and Ankara, the problem of water scarcity is being linked more to climate change and natural scarcity and less to the increasing levels of industrial activity, the increasing demand from the expanding urban population, and the faulty and poorly maintained infrastructure such as leaking water pipes, leading to disproportionate considerations of the trade-offs associated with such large-scale IBT projects. Because the government perceives urban centers as drivers of national economic development, the growth-centered narrative is used to justify dominant solutions such as IBTs for water scarcity. From this perspective, we argue that the existing and potential social and ecological implications for the areas where the water is sourced are not adequately assessed or even acknowledged. In both cases, technocratic and top-down decision-making processes have dominated. Exclusionary tendencies of the country's decision makers and technocratic elite have reduced the potential for public participation and debate, which if conducted, might facilitate the identification and potential resolution of the controversial issues regarding long-term environmental effects, land-use changes, and other social implications.

Sustainable governance of water resources is an integral part of long-term solutions to current challenges facing expanding urban environments and the rural communities and ecosystems on which they rely. However, in the Turkish context, inadequate water infrastructure and management, expanding industrial activities, potentially counter-productive political ambitions from local to national levels, disproportionate sharing of costs and benefits, and dependency on foreign financial resources are not adequately addressed or discussed sufficiently before these mega-projects are proposed as silver-bullet solutions, leading to unresolved trade-offs and conflict. Further research should focus more on the political economy (and political ecology) of mega-projects to understand better why this particular large-scale water development approach is almost always promoted over alternative and potentially more effective regulation and management solutions, as well as to support the implementation of more equitable and sustainable water governance strategies in Turkey and elsewhere.

Responses to this article can be read online at:
http://www.ecologyandsociety.org/issues/responses.php/6885

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