The political ecology of uncertainty: the production of truth by juridical practices in hydropower development

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Abstract

The sustainable hydropower development program, launched by the Turkish state in early 2000s, has not only privatized rivers, by transferring the use rights of the stream flow to private companies, but also the hydropower sector by transferring the functions of state institutions to the private sector, including planning, designing, constructing and operating hydroelectric plants. This overwhelming program has faced strong opposition and local people have opened court cases to cancel emerging private hydropower projects in their areas. This legal struggle has transformed juridical knowledge-making into a process that produces environmental knowledge, and legitimizes it as official knowledge. By tracing the trajectory of the court case over the Cevizlik hydroelectricity plant and analyzing the scientific expert reports and court verdicts, this article discusses juridical knowledge-making under the uncertainty of natural conditions while demonstrating its strengths and limitations. I argue that the plurality of the knowledge produced through juridical knowledge-making practice reveals its political character. I conclude that the debates over juridical knowledge-making practices from the political ecology perspective can contribute to improving them, and help understand the future of rivers in Turkey under the pressure of hydropower development.

Key words: Political ecology, knowledge-making, juridical knowledge-making, uncertainty of knowledge, hydropower development, the İkizdere River, Turkey.

Résumé

Le programme de développement durable de l'hydroélectricité, lancé par l'Etat turc au début des années 2000, a non seulement privatisé les rivières en transférant les droits d'usage des flux aux entreprises privées, mais aussi le secteur hydroélectrique en transférant les fonctions des institutions publiques au secteur privé. Cela comprend la planification, la conception, la construction et l'exploitation des centrales hydroélectriques. Ce programme écrasant a fait face à une forte opposition, et les populations locales ont ouvert des procédures judiciaires pour annuler les projets hydroélectriques privés émergents dans leurs régions. Cette lutte juridique a transformé la connaissance juridique en un processus qui produit des connaissances environnementales et la légitime comme connaissance officielle. En traçant la trajectoire de l'affaire devant l'usine hydroélectrique de Cevizlik et en analysant les rapports d'experts scientifiques et les verdicts judiciaires, cet article aborde la connaissance juridique sous l'incertitude des conditions naturelles tout en démontrant ses forces et ses limites. Je soutiens que la pluralité des connaissances produites par la pratique de la connaissance juridique révèle son caractère politique. Je conclus que les débats sur les pratiques juridiques de connaissance du point de vue de l'écologie politique peuvent contribuer à leur amélioration et aider à comprendre l'avenir des fleuves en Turquie sous la pression du développement hydroélectrique.

Mots clés: Écologie politique, connaissance, prise de connaissance juridique, incertitude des connaissances, développement hydroélectrique, la fleuve İkizdere, Turquie.

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Resumen

El programa de desarrollo sustentable de energía hidroeléctrica, inaugurado por el estado de Turquía en los primeros años del 2000, ha privatizado no sólo ríos a través de transferencia de derechos de uso del flujo de corrientes a compañías privadas, sino también al sector de energía hidroeléctrica al transferir las funciones de las instituciones del estado al sector privado, incluyendo la planeación, el diseño, la construcción, y operación de plantas hidroeléctricas. Este agobiante programa ha enfrentado fuerte oposición y la población local ha abierto casos en la corte para cancelar los proyectos hidroeléctricos privados surgidos en sus áreas. Estas batallas legales han transformado la producción del conocimiento jurídico en un proceso que genera conocimiento ambiental, legitimándolo como conocimiento oficial. A través del seguimiento de la trayectoria del caso en la corte sobre la planta hidroeléctrica Cevizlik como un caso de estudio, y del análisis de los reportes científicos de expertos, así como los veredictos de la corte, este artículo examina la generación del conocimiento jurídico bajo la incertidumbre de las condiciones naturales, demostrando sus fortalezas y limitaciones. Expongo que la pluralidad del conocimiento producido a través de la práctica de generación de conocimiento jurídico revela su carácter político. Concluyo que los debates acerca de las prácticas de producción de conocimiento jurídico, desde la perspectiva de la ecología política, pueden contribuir a mejorar esas prácticas, y a un mejor entendimiento del futuro de los ríos de Turquía bajo la presión del desarrollo de energía hidroeléctrica.

Palabras Claves: Ecología política, generación de conocimiento, generación de conocimiento jurídico, incertidumbre del conocimiento, desarrollo de energía hidroeléctrica, el rio İkizdere, Turquía.

Özet

Türkiye'de 2000'li yılların başında devlet tarafından başlatılan sürdürülebilir hidroelektrik kalkınma programı sadece akarsuların kullanım haklarını özel şirketlere devrederek nehirleri özelleştirmekle kalmadı, hidroelektrik santrallerin planlanması, tasarımı, yapımı ve işletimi dahil olmak üzere devlet kurumlarınca yürütülen işlevleri özel sektöre devrederek hidroelektrik üretim sektörünü de özelleştirdi. Bu ezici program çok güçlü bir direnişle karşılaştı ve yerel halk kendi coğrafyalarında uygulanan özel hidroelektrik projelerini iptal ettirmek için davalar açmaya başladı. Bu hukuki mücadele hukuksal bilgi üretimini, çevresel bilgi üreten ve onu resmi bilgi olarak meşrulaştıran bir sürece dönüştürdü. Bu makale, Cevizlik hidroelektrik üretim santralına karşı açılan davanın gelişimini örnek bir vaka olarak inceleyip, uzmanlarca hazırlanan bilirkişi raporlarını ve mahkeme kararlarını analiz ederek, doğal şartlardan kaynaklı belirsizliklerin var olduğu durumlardaki hukuki bilgi üretimini ele almakta ve onun güçlü yanları ile kısıtlarını göstermektedir. Hukuki bilgi üretim pratiği ile üretilen bilgilerin çoğulluğunun bu pratiğin politik karakterini açığa çıkardığını iddia etmektedir. Hukuki bilgi üretim pratiğine politik ekoloji perspektifiyle bakarak yapılan tartışmalar, bu pratiğin iyileştirilmesine ve Türkiye'de hidroelektrik kalkınma programının baskısı altındaki nehirlerin geleceğini anlamamıza katkı sağlayacaktır.

Anahtar sözcükler: Politik ekoloji, bilgi üretimi, hukuki bilgi üretimi, bilginin belirsizliği, hidroelektrik üretimi, İkizdere Nehri, Türkiye.

1. Introduction

> *Dereyi susuz bırakıyorlar.* (Interview with a local resident, 2015)
> They dry out the river.
>
> *Bıraktıkları su çok az.* (Interview with a local resident, 2014)
> The water they release is too little.
>
> *Tüm suyu alıyorlar.* (Interview with a local resident, 2015)
> They take all the water.

With the privatization of hydropower development in Turkey in the early 2000s, two mechanisms produce official knowledge for the hydropower sector. The first is the legislative framework driven by the political apparatus. Its legislative framework has been characterized as neoliberal for privatizing the rivers by

transferring the use rights of the stream flow to private companies to produce electricity, and privatizing the hydropower sector by transferring the functions of state institutions in charge of hydropower development to the private sector (Harris and Işlar 2013; Kibaroğlu *et al.* 2009). This includes planning, designing, constructing and operating hydropower infrastructure. One implicit consequence of this shift is that neoliberal policies have forced state institutions to relinquish their power over institutional knowledge-making to the private sector, and to take an auditing role (Strathern 2000) that has led to the politicization of official knowledge for the hydropower sector (Aksungur *et al.* 2011; IMO 2013; TMMOB 2011; Ülgen *et al*. 2011).

The second mechanism occurs when this all-encompassing program faces strong opposition. Local people have filed cases in the administrative courts seeking to cancel proposed private hydropower projects in their regions. Judges and scientific experts, who were commissioned by the courts to answer questions from the judiciary, have become key actors in producing and legitimizing official knowledge. In the courts, knowledge produced through the juridical knowledge-making practice for hydropower development contradicts and contests and replaces knowledge produced through institutional knowledge-making practices.

The court case for the Cevizlik hydroelectricity generation plant (hereafter Cevizlik HES) is one example of how juridical knowledge-making overruled institutional knowledge-making and became the dominant knowledge recognized by the court official. It demonstrated explicitly that juridical knowledge-making set a stage for the experts to become "a new type of spokesperson" for the environmental entities that have no voice (Latour 1998: 230). Scientific experts were given right by the court to exercise their power to produce truths that represent various elements of the İkizdere River and the İkizdere Valley (Figure 1), including the riverbed, the creeks, water, biodiversity, ecology, the tea gardens, and the trees and the ecological interrelations among them. The local people opposed "the truth" presented in the documents as the facts and the scientific knowledge, and questioned the qualifications of scientific experts. In other words, their struggle for truth has been, as stated by Foucault, "connected to knowledge and right" (Foucault 1980:132).

During the court case, the minimum water requirement (hereafter MWR), or *cansuyu*[2] and *telafi suyu*[3], became a focal point of legal arguments. MWR is the official answer to a fundamental question: how much of the river flow the hydropower companies must remain in the riverbed to sustain aquatic life after diverting the river for electricity production? This can be considered as a threshold of river exploitation. The institutional knowledge-making practice has initially set MWR to 150 L/s (liters per second), and the court raised it, first, to 500 L/s, and then to 2,800 L/s, and finally set to a lower flow, 2,600 L/s.

Dereyi kuruttu[4] is the most common complaint about the Cevizlik HES that I heard from the local people during my fieldwork in the İkizdere Valley. It was an intriguing situation for two reasons. First, Cevizlik HES was not the first run-of-the-river hydropower plant in the İkizdere Valley. The İkizdere hydroelectricity plant (hereafter the İkizdere HES), planned and constructed by the state upstream of the Cevizlik HES, has diverted water since it was put into operation in 1961, and the remaining water flows down the riverbed, which crosses the largest city in the İkizdere Valley from one end to the other in full view of the public. Second, although the Cevizlik HES was promoted as environmentally benign, being a run-of-the-river design (Bakış 2007), it blocks the river flow completely with its quasi-dam and has the capacity to regulate the river regime (Figure 2). When locals disagreed with the ministry on the low level of MWR, the court raised it significantly from the initial level. However, their concern about overexploitation of the İkizdere River has not been resolved, even after the involvement of the courts.

[2] Local people call the MWR *cansuyu*, metaphorically relating MWR to the minimum amount of water needed to keep a living being alive.

[3] Compensation water (translated by the author). The MWR is referred in the court documents as *telafi suyu*.

[4] It dried the river (translated by the author).

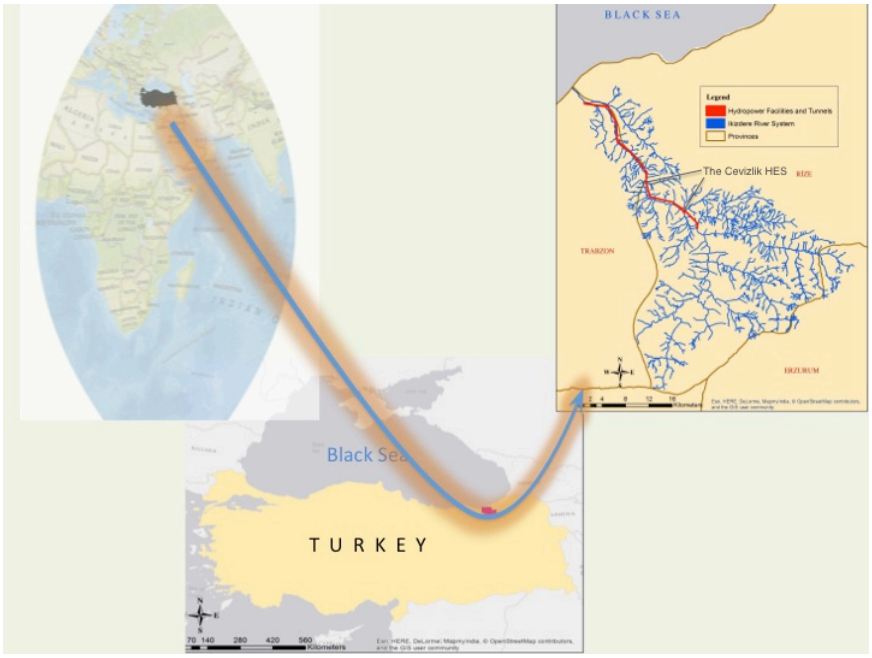

Figure 1: Locating the İkizdere Valley, and locating the Cevizlik HES in the İkizdere Valley. The infrastructure of the Cevizlik HES extends along the İkizdere River in the downstream direction.

Figure 2: The stream flow released by the İkizdere HES in low flow season (left), in high flow season (middle). The water intake facility of the Cevizlik HES blocking the river flow during low seasonal flow (right). All photos by the author.

Overexploitation of natural resources has been a major focus point of political ecology (Peet *et al.* 2011; Robbins 2012). As a result, there is a growing body of research contributing to the study of the politically charged and power-laden drivers of overexploitation, and the processes and the actors involved (Bakker and Bridge 2006; Blaikie 1985; Blaikie and Brookfield 1987; Castree 2003; Castree 2008; Dove 1995; Hecht and Cockburn 1989; Mansfield 2011). Political ecologists who study overexploitation of water resources have benefited from and contributed to this (Bakker 1999; Moore 2012; Swyngedouw 1999; Thompson *et al.* 1986). Several scholars have addressed concerns related to the relations between knowledge and power and focused on the social construction of knowledge, and the interdisciplinary aspect of the field

has allowed various theoretical and empirical contributions, including post-structural and critical science studies examining the role of knowledge, power, discourse and science, and explaining the political context of knowledge-making processes (Aronowitz 1998; Forsyth 2003; Foucault 1972; Foucault 1980; Mathews 2011; Peet and Watts 1996; Proctor and Schiebinger 2008).

This article, situated at the intersection of knowledge, power, environmental science and uncertainty, will address the issue of determining the MWR. Building on the idea that nature is uncertain and that the ways this uncertainty is interpreted, assessed, acted on or ignored can serve particular political and discursive ends, I argue that the different MWRs, proposed by different experts and approved by the courts, as observed in the Cevizlik HES court case, are the outcomes of perticular problem definitions and solutions, that contradict and conflict. These "contradictory certainties" (Thompson *et al*. 2009: 2) have a political context that is embedded in juridical knowledge-making practices. I suggest that although juridical knowledge-making was assumed to be objective and based on scientific evidence, to correct the outcomes of politicized institutional knowledge-making, it had the power to enable the overexploitation of the river by the private sector.

My argument draws on an exploratory site visit in July 2013 and fieldwork from October 2014 to November 2015. The information presented in this article was collected using the analysis of Cevizlik HES court documents and official reports, policy analyses, and almost 100 semi-structured in-depth interviews with local people of the İkizdere Valley, scientists, experts working for environmental protection NGOs, lawyers, judges, state officials and people from hydropower sector. I had informal discussions with locals in coffee shops and other locations, and conducted focus groups using a participatory mapping exercise. I conducted a survey of 340 households in 27 settlements/sites[5] in the İkizdere Valley that were directly impacted by hydropower development. I conducted participant observation of the İkizdere River and its flow regime, as well as the timing and the amount of flow diverted and released by the hydropower plants.

This article is divided in five sections. In the second, I situate the MWR in a biophysical, institutional and social context. I discuss the background to hydropower development in Turkey, how the most recent wave of hydropower development differs from previous ones, and the implications of these differences for the İkizdere Valley. Then I move on to discuss the strong opposition towards hydropower development and why locals have taken the Cevizlik HES to court, describing the knowledge-making process of the administrative courts. I provide a contextual timeline of the court case while defining the "legal chains", as defined by Latour as a juridical way of establishing relations (Latour 2010: 222). Then I examine how experts have defined the MWR and what methodology they have suggested for calculating it, by focusing on the data used, the assumptions made, and the concepts and the methods of justification they apply. In the fourth section, I extend the focus to natural uncertainties that surfaced in determination of the MWR. By comparing the official Environmental Impact Assessment report (hereafter the EIA report) of the Cevizlik HES produced by the hydropower development program with two official studies, I critically compare how they have addressed these natural uncertainties and reveal how knowledge has been subjugated, disqualified and ignored (Foucault 1980). I conclude by suggesting that institutional and juridical knowledge-making have powerful and political roles in the escalating pressure to build run-of-the-river hydropower plants.

2. The Cevizlik HES court case: manifestations of juridical knowledge-making practices

The political, environmental and social context

> *HES Projeleri yağmur gibi yağmaya başladı… Yönetmelik cansuyu bırak diyor ama o da muallak bir konu.* (Interview with a state official, 2014)
>
> HES projects started to pour like a rain… The bylaw says to release *cansuyu* but it is a vague matter.

[5] Survey sites included Rüzgarlı, İkizdere, Ihlamur, Ayvalık, Gürdere, Cevizlik, Şimşirli, Güneyce, Soğuksu, Hurmalık, Kayabaşı, Çayırlı, Yokuşlu, İncirli, Ormanlı, Ağaçseven, Başköy, Keler, Korkut, Kireçli, Sarıkaya, Darılı, Pınaraltı, İkidere, Güresen, Denizgören and Yaylacılar.

Hydropower development is not a new phenomenon in Turkey. Generating hydropower by building big dams across major rivers has been a popular state energy policy since the 1930s. The İkizdere, the biggest river of the Eastern Black Sea Region, was the subject of hydropower development from the 1940s onwards, and in 1961 the state began operating a run-of-the-river type hydropower plant called İkizdere HES.

With a military coup in Turkey in 1980, a paradigmatic shift influenced by the worldwide trend in neoliberalization and globalization occurred in the policies and programs associated with the electricity sector and its subsidiary, the hydropower sector. Private investment took over in electricity generation, transmission and distribution (Baskan 2011; Tigrek and Kibaroglu 2011). The efforts of the state to privatize hydropower intensified in the İkizdere Valley in late 1990s, and included the İkizdere HES. However, strong local opposition halted the first attempt.

A second wave of privatization efforts was carried out by the AKP party[6] when it came to power by majority vote in 2002. When it subsequently gained the majority of the seats in parliament, it controlled the legal process. In this political context, the legislative framework, including an Environmental Impact Assessment (EIA) bylaw, was extensively restructured to open all the rivers and streams of Turkey to hydropower (Sekercioglu *et al.* 2011), while the role of the state was institutionalized toward "auditing" (Strathern 2000) within a wider context of development and management of renewable energy resources. A prominent example is the EIA report in the context of privatization of knowledge-making practices, described by the state official in the interview in 2015 as:

> *ÇED raporu "Taahhütler manzumesidir"... Bakanlık inceler, onar veya onamaz.*
> The EIA report is "a poem of commitments"… The ministry reviews it, and approves it or not.

Scholars argued that the legislative framework and practice that emerged have launched the "privatization of Turkey's rivers" (Harris and Islar 2013: 4), the privatization and greening of energy production (Erensu 2013), the "liberalization of Turkey's hydroelectricity sector" (Baskan 2011: 83) and the "liberalization and deregulation of the national energy and electricity sector" (Scheumann *et al.* 2011: xxv). It is also considered a part of "neoliberal" shift in environmental governance (Harris and Islar 2013; Turhan and Gündoğan 2017) and particularly in water resources management (Scheumann *et al.* 2011). The privatization of hydropower development has raised concerns about water abstraction, as multiple projects on the same river emerged from 2005-2011.

As the projects have been made public through the Environmental Impact Assessment procedure or have materialized in the valleys, another exploitative aspect of the program has appeared: the minimum water requirement (MWR). The run-of-the-river hydropower plants divert the river flow at the water-intake point from the river channel and inherently create a biophysical water scarcity in the section of the river channel that lies between the water-intake facility and the power station. The biophysical water scarcity is not only spatial but also temporal, because the MWR, which is a constant flow, replaces the natural flow and therefore alters the channel gradient, grain size, and sediment dynamics, and damages aquatic and riparian biota (Wohl 2000, 2010). The water scarcity issue, a consequence of the reduced constant MWR flow, has been further exacerbated by gaps in legislation, leaving the hydropower companies to set this critical threshold level until the state clarified it in 2009 as obligated for projects subject to the EIA process.

The 1961 İkizdere HES diverts water. But, locals know it can only do so for a certain portion of the river flow by means of its infrastructural design (Figure 2) (Çeçen 1962). But private hydropower projects, although they were promoted as environmentally benign with run-of-the-river designs[7] (Bakış 2007), their quasi-dams actually block the river flow completely and hold water, and therefore the private hydroelectricity plants have the capacity to regulate the river regime.

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[6] *Adalet ve Kalkınma Partisi*: the Justice and Development Party.

[7] For the definition of run-of-the-river hydropower plants please refer to International Energy Agency site at https://www.iea.org/topics/renewables/subtopics/hydropower.

At national level, the sustainable development of hydropower program has faced strong opposition, as have the introduced private hydropower projects on the local level (Erensu 2013; TMMOB 2011). MWR has become the source of major tension between the local people and hydropower companies. The issue has been the determination of the MWR through official knowledge-making practices, with the issue brought to the administrative courts to challenge the project-approval decision of the state and with debate over juridical knowledge-making (Aydemir 2013; Başkaya *et al.* 2011; Işlar 2012; TMMOB 2011). This is a non-violent, organized method of struggle.

In this context, the Cevizlik HES, the first private hydropower project introduced to the İkizdere Valley, has faced opposition from local communities located in the southern part of the Valley, where the project was planned. Its anticipated impact on livelihoods along the River and in the Valley were concerns raised among the local residents. They questioned the truthfulness, completeness, and rationality of knowledge about the infrastructure and its environmental and social consequences as presented in the EIA report, which was prepared by the hydropower company. The EIA report did not even state that the Cevizlik HES project leaves 12 km of the riverbed with reduced flow, a section extending from the Cevizlik water intake in the village of Gürdere to the power station near Soğuksu. Locals were not informed that the ministry had approved the EIA report. Therefore both the project and its legitimization created tension between the local people and the state, and the locals took the ministry's EIA decision to the administrative court on September 21, 2006, seeking cancellation of Cevizlik HES.

Court cases such as the Cevizlik HES were not common for the administrative courts at that time. The judges lacked environmental expertise, and cases like Cevizlik HES with diverse issues, environmental and social impacts with temporal and scalar dimensions, were difficult to comprehend and conceptualize. As a routine practice the courts in such cases select experts who are considered authorities in their fields, appoint them through a court order, and organize a one-day field trip. This is a juridical setting where all parties come together to address issues and ask questions of the experts, whose answers can support or refute the claims and arguments of the plaintiff and defendant, or bring clarification. The experts also make observations and collect data in the area subject to the court case, in order to answer the questions of the court. In the following 30 days, they prepare an expert report addressing all the questions raised by the court. The expert reports serve as scientific advice to the administrative courts.

It is important to recognize that the administrative courts are equipped with three types of power. First, they decide who will produce the expert reports; in other words, who is qualified to produce knowledge. Second, they have the power to give the right to produce knowledge to the experts that they appoint. This expert mechanism relies on a powerful notion that scientific knowledge is apolitical. However science, as a form of practice (Haraway 1997) and as a culture, "can never be completely disentangled from its enabling political, institutional and cultural conditions" (Braun 2002: 232), so scientific knowledge has a partial and political nature. Finally, the courts are required by law to ask official questions, and they are supposed to take into consideration the questions of both parties. This questioning process gives the administrative courts power in governing the juridical knowledge-production process (Foucault 1972).

In the following section, I analyze how the courts have exercised their power in the long legal battle between the local people and the ministry with the hydropower company over the Cevizlik HES in four phases, from 2006-2013.

The first phase: the Trabzon Administrative Court

The locals opened the court case in the Trabzon Administrative Court, since the project fell within its jurisdiction. In the opening petition, their arguments were twofold: 1) the EIA report was incomplete, not "science-based", and misrepresented the Cevizlik HES project and its potential impacts; and 2) there were gaps in the legislation and practice of the EIA process. They opposed the synthetic methods used to estimate the monthly average flows of the small creeks joining the İkizdere River along the section with reduced flow. They argued that *telafi suyu* was not sufficient to sustain the aquatic life and might particularly endanger an endemic fish species, known as the Natio Maria, an ecotype of Salma Trutta Labrax. The EIA report considered these hypothetical flows, averaging 2.5 m^3/s (cubic meters per second), and presented them as a supplement to *telafi suyu* released by the hydropower company.

In the EIA report, the hydropower company committed to release 150 liters a second (L/s) flow regularly as *telafi suyu* and to increase this fixed amount seasonally, supposedly aligned with migratory movements of the fish in the river, including 500 L/s released during the April-August period and 200 L/s in September. The locals required the ministry to explain the scientific methodology behind these numbers. The locals also presented to the court the different scientific methodologies for determining *telafi suyu*[8] that were suggested by the experts and accepted by other administrative courts. After receiving the responses of the ministry and the hydropower company to the initial petition, the Trabzon Administrative Court decided to carry out one-day field visit at the proposed site of the Cevizlik HES on December 15, 2006. This was a routine court practice. It appointed three scholars from the Environmental Engineering Department of a respected university.

Before the field visit, the plaintiff side handed to the court a list of questions for the experts about the issues that were either ignored or vague in the EIA report. The court covered these questions except the ones related to lack of basin planning and exclusion from consideration of the electricity transmission line, an integral part of all such schemes. On the other hand, the court extended its scope by asking for expert opinion on whether the Cevizlik HES would impact the tea gardens, sources of substantial local income. The field visit was carried out on May 7, 2007. During the visit, the experts requested additional data: long term stream flow data, measured at the stream gauging stations in the İkizdere Valley, and any official listing of species in the project area.

The experts delivered their report to the court on July 31, 2007. The Trabzon Administrative Court rejected the court case, but raised the *telafi suyu* to 500 L/s, as suggested by the experts on August 20, 2007. The legal reasoning for rejection was stated as the rejection of two claims: that the action would cause irrecoverable or irreparable damage to the plaintiff side, and that it was explicitly against the law. The locals appealed this decision to the (higher) Trabzon Regional Administrative Court. The Regional Court ratified the previous decision of the Trabzon Administrative Court on October 9, 2007. However, the following day, before the locals could take the court decision to Danıştay[9] (from now on The Council of State) for appeal, the Trabzon Administrative Court declared that the Cevizlik HES was no longer within their jurisdiction area, due to the recent establishment of an administrative court in Rize in June 2007, and so they forwarded the Cevizlik HES case to the Rize Administrative Court.

The second phase: the Rize Administrative Court

Construction of the Cevizlik HES began on January 2, 2008, while the court was sitting in Rize. The company informed the court on March 11, 2008 that they would commit to releasing 750 L/s as *telafi suyu* and the ministry approved the amount. When the Rize Administrative Court reviewed the case file on March 27, 2008, the court accepted the previous expert report prepared for the Trabzon Administrative Court, reduced the scope of the court case to the aquatic life of the river and in particular to the survival of the Salmo Labrax fish species, and appointed a single expert from the department of aquaculture at the local university.

The second one-day field trip was held on June 25, 2008, six months after the start of the construction of the Cevizlik HES. Before the field trip, the plaintiff side handed over a list of questions, seeking justification of methods and more comprehensive and detailed ecological analysis of the impacts of the minimum flow. They informed the court that the ministry had applied a different methodology for other hydropower projects that estimated higher MWRs[10], and requested the use of that methodology for the Cevizlik HES. The report delivered on July 18, 2008 was restricted to the issue of aquatic impacts. It argued that *telafi suyu* was insufficient for the Salma Trutta Labrax Natio Marina (hereafter *Karadeniz Alası*) and proposed to increase it to 2,800 L/s. The Rize Administrative Court accepted the argument that the *telafi suyu*

[8] Prepared for determining *telafi suyu* for the Dilek-Güroluk HES in the Fırtına Valley and for the Rüzgarlı I and II HES in the upstream of the İkizdere HES in the İkizdere Valley.

[9] Danıştay plays the role of Supreme Court for administrative law. In Turkey, administrative law is separate from the criminal and civil law and administrative courts exercise administrative law.

[10] Paşalar HES on the Çağlayan River was given as an example. The Çağlayan River is in the Eastern Black Sea Region and shares similar biological and physical characteristics with the İkizdere River. In a court case opened to cancel Paşalar HES, the court decided that the minimum flow must be 25% of the average flow.

given in the EIA report was insufficient for the protection and sustainability of biodiversity as well as for the sustainability of the ecological balance, and for the continuity of the aquatic life in the river. It cancelled "the EIA approved" decision of the ministry on December 23, 2008. Then, the court set *telafi suyu* to 2,800 L/s, while stating that all other environmental impacts questioned in the claims put forward by the locals were unproblematic.

The third phase: the appeal against the court decision

All sides appealed this second-phase decision of the court for different reasons, but the common denominator was *telafi suyu*. The ministry argued that Salmo Trutta Labrax Natio Marina prefers the Fırtına River[11] over the İkizdere River for breeding and hatching, and claimed that the fish population in the latter is low compared to other localities in the region, referring to an official study carried out in 2001. The hydropower company pointed to the difference in the minimum flows proposed by two expert groups, and argued that 2,300 L/s difference was a result of ignoring the synthetic stream flows given in the EIA report. The arguments on the plaintiff side concerned the method employed to calculate *telafi suyu*. However, the plaintiffs also reminded the court of issues not addressed by the Rize Administrative Court, including the lack of a river basin plan for the İkizdere River, exclusion of the electricity transmission infrastructure and its impacts from the EIA process, and the pitfalls in legislation.

Meanwhile, the hydropower company handed a project assessment report to the court, prepared by their engineers working in the construction of the Cevizlik HES. The report detailed how far the construction activities had progressed and listed the possible risks and damage that might occur to endanger public safety if they were stopped. It was a part of a "sunk cost" argument, as Plater describes:

> Worried about citizen opposition, project promoters try to get as much construction done and spend as much money as possible before opponents can bring effective questions to bear. It's a basic rule of any enterprise, public or private: "a rolling stone gathers momentum." The object is to push a project until it exists as a concrete reality. Citizens get demoralized, and project promoters can say, "It's too late to turn back now." "Regrettably," the disingenuous argument goes, "by now too much has been done, too much money spent, too little of value remains, to permit considerations of any alternatives at this late date." (2013:112)

During the appeal phase the construction of the Cevizlik HES marched forward. The hydropower company submitted a second EIA report to the ministry on February 10, 2009 and contradicting its previous figures, stated that the *telafi suyu* must be 2,800 L/s. The Ministry approved the report and new MWR amount, and again awarded "EIA Approved" status to the Cevizlik HES, officially legitimizing the construction activities. The Cevizlik HES was open for electricity production on May 28, 2010. Meanwhile, the Council of State went into restructuring, which delayed a decision until December 28, 2011, when the assigned circle of judges overruled the decision of the court on the basis of the apparent conflict in *telafi suyu* calculated by two different groups of experts. The judges returned the case for rehearing and suggested the Rize Administrative Court get the opinion of a third group of experts.

The fourth phase: re-hearing in the Rize Administrative Court

By the time the Cevizlik HES case returned to the Rize Administrative Court on September 25, 2012, cancellation of the project was out of the question and *telafi suyu* was the only viable and tangible issue that the court could resolve. This time, the court selected three experts in the field of aquaculture from two different universities. At the time, the number of operating HES in the İkizdere Valley had reached five, and twenty-two more projects were approved by the state. Under the circumstances, two issues from the original petition remained unresolved: insufficient *telafi suyu* and the lack of river basin planning. One day before the

[11] The Fırtına River is another primary river in the Eastern Black Sea Region, similar to the İkizdere River in geographical and morphological characteristics.

next field visit, the hydropower company requested a correction of the question form in such a way that instead of asking the experts to make a new estimate, it would ask them decide between the two amounts given in the past reports. This meant that the *telafi suyu* could not be raised beyond 2800 L/s, and indeed would be reduced from that number. And while the official question posed by the court concerned the determination of "sufficient" *telafi suyu* for aquatic life, the term "sufficient" was not explicitly defined.

The last field trip was conducted on February 1, 2013, approximately three years after the Cevizlik HES was put into operation, and on March 1 the experts confirmed 2,600 L/s as *telafi suyu*. On August 6 of 2013 the Rize Administrative Court cancelled "the EIA approved" decision of the Ministry based on the conflict over *telafi suyu* between the first EIA report and the last expert report, and fixed it at 2,600 L/s (Figure 3).

Who can speak for nature? The experts, appointed by the Administrative Courts

The Courts' selection of experts had an immense impact on their decisions. I argue that the Court narrowed down the scope of the Cevizlik HES court case by selecting experts from the fields of environmental engineering and aquaculture. These experts overextended their authority from their area of expertise to other fields.

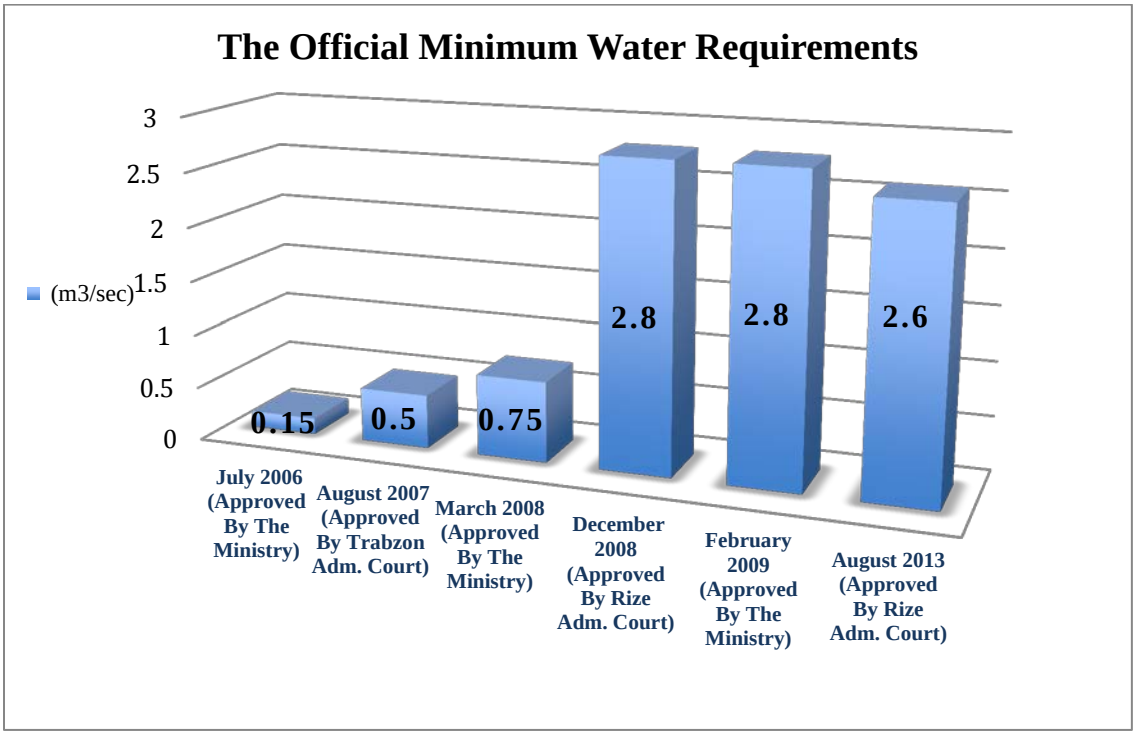

Figure 3: The increase of the official minimum water requirement over the course of the Cevizlik HES court case.

The Trabzon Administrative Court appointed the first group of experts, a team of environmental engineers working together in the same department at one of the most respected universities of Turkey. The local plaintiffs presented to the court evidence of the biased position of these engineers toward the hydropower development, and requested the court assemble a new, diverse group of experts, consisting of a geological engineer, a landscape engineer, and an expert on forest and river ecology. The court ignored their request without any explanation.

The Rize Administrative Court, in an unorthodox decision, decided to rely on the scientific knowledge of a single expert from a local university, who studied fresh water fish species in the rivers of Rize region. The locals raised their concerns about whether a fisheries expert would be eligible to answer questions related to river, riparian and forest ecology, and repeated their request for a diverse group of experts.

When the Council of State returned the Cevizlik HES court file to the Rize Administrative Court for the rehearing, the scope of the court case was reduced to the amount of *telafi suyu* required for sustaining the existing conditions of aquatic life and ecological balance of the river. Although the concepts of aquatic life and ecological balance call for knowledge about ecosystem diversity and river ecology, the court again appointed three aquaculture experts.

Who can speak for nature? The experts, consulted by the plaintiff and the defendant

In the course of the court case, the local people and the hydropower company consulted scholars for scientific evidence to justify their claims and disprove those of the other side. The hydropower company submitted to the Trabzon Administrative Court a report prepared by scholars who studied the fish and aquatic species.[12] However, the scope of the report, which included river hydrology, ecosystems, and biodiversity did not fall with these scholars' area of expertise. It was also highly controversial that the report accepted as true the stream-flow data provided by the municipality of Güneyce. On the other hand, the local people contacted the department of aquaculture of another university asking for a scientific opinion to validate their concern that the Cevizlik HES would reduce the river flow in a 12 kilometer section of the riverbed, and thus would impact the biodiversity of the river, particularly the local fish species. Their question was directed to scholars in the field of inland waters biology, but was responded to by scholars of the taxonomy of inland waters and planktonology. These experts determined that the Cevizlik HES would need to assure a flow of at least 1 m^3/s to protect the local fish species. Giving a single figure without providing any scientific context for the method of calculation undermined both the reliability of this figure, and credibility of the scholars as scientific authorities. Finally, locals consulted a marine scientist from another university to check the hydrological calculations of the *telafi suyu* done by the first expert group. This scholar demonstrated that the first group of experts took the cross-section of the İkizdere riverbed to be a rectangle, a bold assumption that required validation.

3. Contradictory certainties: determining the minimum water requirement

> *HES ÇED Raporunda can suyu 150 litre idi. 33 m^3 debisi[13] olan bir derede 150 litre.... Bunu bakanlık onayladı...Kavga dövüş mahkemeler falan 2,800 litreye çıkardık...Mahkemede önce 500 litre yaptılar. Bir öbür mahkemede 1000 litreye çıktı. Sonra yine itirazlar falan. Şu an 2,800 litreye çıktı. Yani 150 litreyi Bakanlıkta onaylayan yetkili sonuçta 2,800 litreyi de onayladı. 2,800 litre de yetersiz.*
>
> In the Environmental Impact Assessment report the *cansuyu* was 150 liters. For a river with 33 m^3 average stream flow, 150 liters… The ministry has approved it… After a long struggle and fights, courts and so forth, we were able to raise it to 2,800 liters. The court fixed it first to 500 liters. The following court increased it to 1,000 liters. Again objections and so forth… Now it has been raised to 2,800 liters. In short, the ministry, who had approved 150 liters, has approved 2,800 liters as well. However, 2,800 liters is insufficient also. (Interview with a local person, 2015)

[12] *İyidere (İkizdere) Deresi'nin Biyolojik Çeşitlilik Açısından Değerlendirilmesi*, 'The Assessment of İyidere (İkizdere) River from the Perspective of Biodiversity' (translated by the author), was submitted to the court on June 4, 2007.

[13] 1 m^3 water is equal to 1,000 liters of water.

Experts in this case reached "contradictory certainties" - a concept Thompson *et al*. (2007) use to describe the problems with plural definitions and solutions that contradict and contend with each other. A straightforward explanation is that the experts approached the MWR problem from the perspective of their field of expertise, defined it within that context and suggested solutions which were bounded by their problem definitions. However, Thompson *et al.* argue that in order to explain why plural definitions and solutions contradict and contend with each other, these problems must be analyzed from the perspective of the uncertainty embedded in the context of the problem, and in the decision-making. Building on this line of argument, I examine the methodologies of the experts by considering two environmental uncertainties that appeared in the court case: the stream flows and the water required for the sustainability of the aquatic life in the İkizdere River. I then reveal how these have been acknowledged and incorporated into the problem definitions and solutions of the experts. I also examine the data used, the assumptions made, the concepts utilized, and the methods of justification selected in the methodologies of the experts.

The first expert group introduced a new concept, *ekolojik ihtiyaç debisi*[14] (Q), to replace *telafi suyu*. They suggested a formula to calculate it as follows:

Q = Avg. daily min. flow – 3 x standard deviation of daily min. flow.

This formulation acknowledges that daily minimum flows have a stochastic nature, represented best by the normal distribution curve. Then, it employs the three-sigma rule, which states that the stream flow values that fall within the three standard deviations of the average daily minimum flow include "nearly all" values. They used the average and standard deviation of the daily minimum flows, measured by the state at nearest downstream stream flow gauging station, over a period of 42 years.

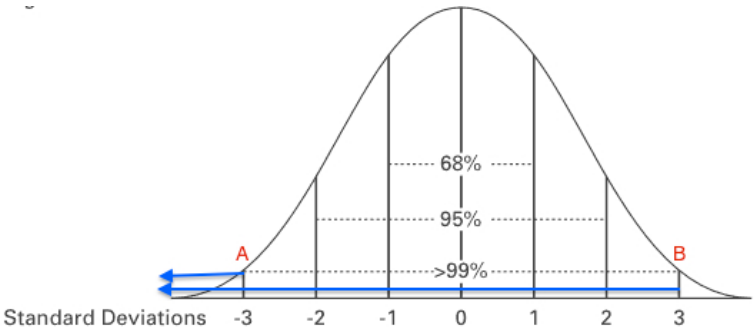

Figure 4. Illustrating the three-sigma rule. When the measured values are plotted on a graph and the average or mean value of variable is shown as zero, the plotted values within three standard deviations from the mean represent 99% of the values.

This formulation is misleading in two ways. First, the experts have misinterpreted the three-sigma method. Their formula calculates value A as 1,000 L/s and sets it as MWR (Figure 4). They claimed that there is a 1% probability that any measured minimum flow can be lower than A. However this reasoning contradicts the 3-sigma rule by not taking into account "nearly all" observed daily minimum flows. In other words, the probability that any measured daily minimum flow will be higher than 1,000 L/s is more than 99%. If B was taken as the MWR, any measured minimum daily flow would have been lower than that with more than 99% probability.

Second, the model was based on questionable data. The experts accepted the average stream flow of the Gürdere creek presented in the debated EIA report. The Gürdere creek joins the İkizdere River approximately 200 meters downstream of the point where the Cevizlik HES diverts the river flow. Neither the

[14] The ecologically required flow.

General Directorate of Water Works (hereafter DSI), nor the General Directorate of Electrical Power Sources Survey and Development Administration (hereafter EIEI) had taken its flow into account in their studies in the past. The Gürdere creek appeared in the EIA report with a hypothetical average flow of 0.5 m^3/s and the experts deducted it from 1 m^3/s, concluding that the company must release 0.5 m^3/s.

The second expert approached the same scientific inquiry from the perspective of fisheries, his field of expertise. While acknowledging (but not citing) the existence of various methodologies applied in different countries, he argued that their implementation to the rivers in the region is unacceptable scientifically and rationally, because of local particularities. He casually connected the MWR to the fish species and accepted the depth of the water as an indicator of sustainability of the fish species, in particular Salmo Labrax. He formulated the MWR with three variables as follows:

MWR = Depth of water x stream velocity x avg. width of the riverbed.

Drawing on his empirical studies in the region, he claimed that the stream flow in the section of the İkizdere River between the water-intake facility and the power station of the Cevizlik HES must be 30 cm deep. He assumed that the stream velocity is 1 m/s, that the average width of the riverbed is 10 m, and thus calculated the MWR as 3 m^3/s. Then, like previous experts, he took into account the Gürdere creek. However, he assumed its average flow as 0.2 m^3/s, but without any justification. By deducting this from his original value for MWR, he reached the conclusion that the hydropower company must release 2.8 m^3/s.

The third and last group of experts appointed by the administrative court applied the same formulation as the second expert. However, they reached a different amount, 2.8 m^3/s for the overall MWR, the difference (3.0 versus 2.8 m^3/s) lying in the assumptions. They claimed that the depth of the water in the riverbed must at least be 35 cm because only this depth can assure the stability of water temperature and sustainability of the food chain, two critical factors influencing the survival of fish species. As for the average flow velocity, they picked 0.8 m/s by simply assuming between 0.5 m/s and 0.8 m/s in the calculation of the minimum flow requirement at the time of low flows. They contradicted the assumptions of the second expert, stating that 1 m/s as average stream velocity is extraordinarily high and 30 cm is a low estimate for average water depth. However, they did not justify these new assumptions. And, like their peer experts, they took into account the Gürdere stream. They used the 0.2 m^3/s as its average flow, and after deducting it from the original value, they declared that the hydropower company must release 2.6 m^3/s.

The debate over the MWR heated up as both the locals and the hydropower company presented to the court expert reports that were written by different groups of scientists from various academic institutions. The earliest expert report was prepared by an aquaculture expert on December 1, 2005 for the Rüzgarlı creek, a small stream joining the İkizdere River at approximately 4-5 km upstream of the water intake facility of the Cevizlik HES. His formulation, centered on the continuity of the aquatic life, relied on one variable, the average minimum flow. He stated that MWR must be approximately one quarter of average of minimum flows measured over the period of 40-50 years. However, since the Rüzgarlı creek has not been gauged and therefore there is no real data, he suggested replacing stream flow data with measurable minimum water depth. His hypothetical methodology, influenced by his well-disciplined gaze that causally links the MWR to the living conditions of the Salmo Trutta Labrax, replaced the notion of minimum water requirement for river and riparian ecology.

When the average water depth emerged in court discussions as a key variable in determining the MWR, the lawyer representing local plaintiffs appealed to an institute of marine sciences to conduct a scientific evaluation of the suggested methods. The report of the institute revealed that the cross-section of the riverbed is a critical parameter in the calculation and whether it is taken as a rectangle or a trapezoid significantly changes the result and must be taken into consideration. It is important to note that none of the scientists who used water depth in their calculations specified this crucial detail in their reports, nor identified or justified their assumptions.

The locals applied to another university for a scientific opinion about the minimum flow, and experts in aquaculture suggested another amount: 1 m^3/s. They justified this calculation using arguments about

migrating fish species and conceptualized the river stream as the medium in which fish species migrate, thus assuming causal relations linking the amount of water in the bed to physical movement of the migrating fish and to their breeding and hatching functions.

The hydropower company also presented to the court a report that was prepared by experts, based on data collected during a four-day field survey. These experts confirmed the MWR given in the EIA report, 150 L/s, as sufficient for the aquatic life in the river based on the results of the empirical data they collected. However, this field survey raised eyebrows. During four days, they measured stream flow, water temperature, dissolved oxygen, water conductivity and pH, and counted the fish along sections of the river 100 m in length at 29 stations. Five of the stations were in the project zone, whereas others were at points extending from Artvin to Trabzon. Moreover, two controversial aspects appeared in their reports. First, they claimed to have measured the stream flows of the small creeks flowing to the İkizdere River as 6.546 m^3/s, significantly higher than the 2.5 m^3/s stated in the EIA report. Second, they stated the total flow of small creeks was 4.45 m^3/s[15] in the report given by the municipality of Güneyce.[16] These features of the expert reports demonstrate the degree to which scientific studies can be politicized and undermine the accountability of the experts.

4. Politics of knowledge: fixing the natural uncertainties

The stream flows: natural vs. synthetic

> *Dereler canlı organizmalardır. Hareketlilerdir. Değişim içindedirler. Aylık olarak takip edilmeliler. Kendi doğaları vardır. Bir dere bir başka dereye benzemez. Derenin doğasını çok iyi bilmek lazım. Dereyi tanımak zaman ister. Gözlem yapmak gerekir. Havzalar da birbirinden farklıdır. Araklı'nın yağışı İkizdere yağışından farklıdır. Yağış rejimleri, derelerin karakterleri, iklimsel özellikler Karadeniz bölgesinde havzadan havzaya değişir. Dere yatağına göre de farklı akar. Taş ve kayalık zeminde akan dere farklıdır. Kum veya toprak zeminde akan farklıdır.*
>
> Rivers are living organisms. They are dynamic. They are in continuous change. They must be followed monthly. They have their unique nature. One river is different than the other. It is very important to know the nature of a river. It takes a long time to get to know a river. Observations must be done. Similarly, the basins are different from each other. The precipitation regime in Araklı[17] is different than the regime in İkizdere. In the Eastern Black Sea Region, the characteristics of the basins, their precipitation regimes and climatic characteristics change from basin to basin. The river flows differently in different type of riverbeds. The stream the river on a rocky or stony riverbed flows different than one on the colluvial or sandy surface. (Interview with a state official, 2014)

The İkizdere Valley is one of the most studied rivers of the Eastern Black Sea Region. Since the 1950s the EIEI and DSI have carried out various technical studies to estimate its hydropower potential and to determine how to utilize it. In 1953 EIEI set up the first stream-gauging station in the İkizdere Valley, İyidere-İkizdere Station, during the preliminary planning stage of the İkizdere HES, in order to estimate the hydropower potential of the İkizdere River before proceeding with the infrastructure design process. The following year, EIEI opened two additional stream-gauging stations: İyidere-Şimşirli and Cimilderesi-İkizdere. The Cimilderesi-İkizdere Station was established as a temporary station to collect stream data from

[15] *"Ardarda dere yatağına karışan yan kolların toplam debisi Cevizlik Hidroelektrik Enerji Projesi ÇED Raporunda 2,500 lt/sn, Güneyce Belediye Başkanlığının verilerine göre 4,450 lt/sn, çalışmalarımıza göre de 6,546 lt/sn'ye ulaşması sürdürülebilir bir yaşam için elverişli bulunmuştur"* quoted in *İyidere (İkizdere) Deresi'nin Biyolojik Çeşitlilik Açısından Değerlendirilmesi* (p. 14).

[16] Güneyce is a town located along the İkizdere River within the impact zone of the Cevizlik HES.

[17] The Araklı Valley is another river basin near the city of Trabzon in the Eastern Black Sea Region.

the Cimil tributary, where one of the water intake facilities was being planned. New streamflow gauging stations were established upstream of the İkizdere HES in the following years.

The long-term stream flow data indicate that the İkizdere River has the characteristics of a mountain river (Wohl 2000; 2010) with two prominent flow qualities (Figure 5) that demonstrate the natural uncertainty of the stream flows. First, flow is strongly seasonal and driven by snowmelt, with peak flows in April, May and June. In July, the stream flow at the gauging station starts to decline significantly and in August water volume in the river continues its decline. From September to March, most of the peaks and all of the minimum flows are less than the average flow. Second, there is a significant gap between the measured minimum and peak flows within a month, driven by the rains and the rises in temperature, accelerating the snowmelt. This gap gets larger during the high flow months (for example, the peak flows can be five times higher than respective minimum flows) while it is reduced during the low flow months.

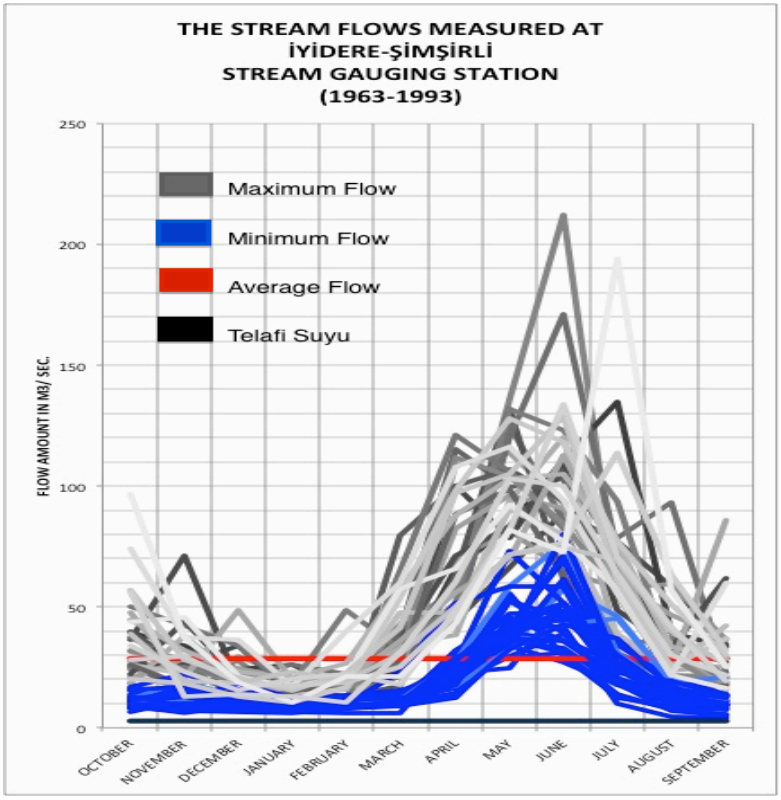

Figure 5: The data period is from 1963 to 1993, recorded at the İyidere-Şimşirli gauging station, which best represents the flow at the Cevizlik HES water-intake facility. The stream flow is measured at predetermined intervals and recorded. The peaks and the minimum flows plotted on the graph are the highest and lowest of the recorded stream flows within a respective month. The average flow of a month is the average of the set of recorded measurements in a month. The *telafi suyu* is 2.6 m^3/s as approved by the final court.

Two technical reports on the İkizdere River, produced at different times, one under the supervision of EIEI,[18] and another by DSI staff[19], demonstrate how natural uncertainty of stream flows has been reflected in

[18] The İyidere Basin Development Plan was prepared two years after EIEI did a preliminary study in 1969. EIEI was the institution in charge of the study and with a consulting firm, did various technical and field inspection and data collection missions before designing several alternative hydropower schemes in the İkizdere Valley.

institutional knowledge-making practice in the past. The general practice of DSI and EIEI was to set up steam flow gauging stations on the rivers that were considered for hydropower development, to collect the stream flow data, and to base the hydropower development and planning on real long-term stream flow records, and if and when the estimation of the stream flows was required, to document explicitly the reason and the estimation methodology. However, the uncertainty of stream flows has been buried with the sustainable development of hydropower program and replaced with synthetically generated constant flows, indicating a form of discursive power as described by Foucault (1972).

Since 2003, when private companies were first allowed to develop projects on any river, they engaged engineering firms for project development and planning and for the EIA report preparation. When these firms approached a river to estimate its hydropower potential they faced the reality that DSI and EIE have set up the system of stream flow gauging stations according to their development plans, and that the stations are located only on the significant rivers and their tributaries. The lack of actual stream flow data led the companies to apply the synthetic stream flow calculation methodology extensively to approximate stream flows. However, both the suitability and specific methodology of the synthetic stream flow approach have created conflicts, as revealed and amplified in the Cevizlik HES court case.

The private firm that prepared the Cevizlik EIA report utilized the creeks joining the İkizdere River in between the water-intake facility and the power station to justify the 150 L/s as MWR. They estimated their annual flow by using real flow values coming from the gauging stations, located on the main body of the river, instead of setting up gauging stations to collect data directly from these creeks. When the locals opposed the method, the hydropower company defended their choice of methodology by saying that:

> *Bu yöntemler yüz yıla yakın bir süredir Dünyada ve Türkiye'mizde kullanılmaktadır ve kullanılmaya da devam edecektir. Bu dereler üzerinde hidrolog marifeti ile birkaç kez debi ölçmenin daha doğru sonuç vereceğini iler sürmek mantıklı değildir*.[20]
>
> These methods have been used around the world and in Turkey for about a century. It is not rational to argue that a hydrologist collecting stream flow over and over from these rivers will produce truer results.[21]

It is known that synthetic stream flow generation is a common and important tool in water resource planning and modeling (Stedinger and Taylor 1982a,b). It is also a research field with an extensive literature on its theory and application that considers the variability and seasonality of the stream flow and incorporates these characteristics into the model. The stochastic models work with the ranges of the mean and the variance while accounting for the uncertainty or possible errors in their estimation. These studies reflect the dynamic character of the rivers by representing them with a probability function. However their model, called the drainage-area ratio, which is the most basic and simple one, is constituted on a bold deterministic relationship between the stream flow and the drainage area as follows:

$$Q = K \times A$$

where Q is the average stream flow in m^3/s, A is the drainage area in km^2 and K is a constant. The method first, calculates K at a location on the river, where both variables are known, such as at a stream gauging station, and then carries it over to another particular point on the river and by multiplying with the drainage area of that location, finding a flow estimate at the specified point. This deterministic model conceptualizes

[19] DSİ completed the *İkizdere HES tevsii planlama raporu* in 1989 to evaluate the technical and economic feasibility of alternative extension plans. The DSİ technical personnel were in charge of the study.
[20] Page 18 of the document dated January 20, 2007.
[21] Translated by the author.

the river as a water source with constant flow, but the true characteristics of the river regime of the İkizdere River completely disappear in this model.

In the EIA report of the Cevizlik HES, this method was used to estimate the stream flows of the creeks that join the İkizdere River in the reduced flow section, extending from the water intake facility to the power station. The issue of how well the drainage-area ratio method represents the stream flow dynamics of the İkizdere River, particularly its creeks, was not addressed in the report, and locals therefore objected to the method in their legal battle. The experts included these debated estimates of small creeks in their scientific methods as reliable data and even made their own estimates for the Gürdere stream, undermining the accountability of their scientific expertise. Regardless, the courts continued to rely on the unjustified statements and conclusions of the experts.

Sustainability of aquatic life in the river

The existing fish species, particularly the Karadeniz Alası, singled out among numerous environmental elements to define the river ecosystem as the scope of the court case, and was then used to determine the MWR. Karadeniz Alası first appeared as a species under the protection of the state in February 20, 1984 in the EIA report of the Cevizlik HES. The locals in their opening petition used this fact as an argument to cancel the project, saying that the Cevizlik HES will impact this migrating endemic species, which is under the protection of the Bern Convention [22] to which the Turkish state is signatory. They emphasized two consequences of the Cevizlik HES that put pressure on fish species, the low water level in the riverbed and deteriorating water characteristics, particularly a rise in water temperature.

The first experts, a group of environmental engineers, suggested using the water level required by the fish species as a criteria in determining the MWR, and claimed without scientific evidence that the water level must be at least 15-20 cm to allow the movement of the fish species and fish migrations in the river. Although they mentioned the criticality of water temperature and the amount of dissolved oxygen in the water, they concluded that water depth was the single parameter for the MWR. They claimed that the amount they suggested would assure at least 15 cm water depth in the middle section of the riverbed. Their reductionist perspective was accepted by the court and both defendants, the ministry and the private company, and set the tone for the MWR discussions. The second and third groups of experts used a simple formula that has the water depth as a parameter. The other factors of the river flow such as velocity, temperature, pH, dissolved oxygen, and other elements that affect aquatic life became invisible.

The experts, with their "tunnel vision" (Scott 1998: 11), have cast the river as a pool with fixed dimensions and a constant flow and abstracted the Karadeniz Alası from its natural habitat, the river ecosystem, and considered it as an aquaculture product. They presented it as an object, functioning merely as an indicator of the sustainability of aquatic life in the river. The courts have based their MWR decisions on this impartial and oversimplified view of the sustainability of aquatic life, leading to the overexploitation of the river.

5. Conclusion

By analyzing juridical knowledge-making practices, this article has illustrated that they have a political dimension that can lead to the overexploitation of rivers subject to run-of-the-river hydropower development. As the Cevizlik HES court case demonstrates, there is a significant gap between the initial and final values of MWR in EIA reports that were determined by the hydroelectricity companies and approved by the ministry, which indicates that the institutional knowledge-making process was structured in favor of the hydroelectricity companies. On the other hand, the administrative courts have pushed back attempts to overexploit the river flow for electricity production to a certain level by raising the MWR. However, juridical knowledge-making practices, which seemed to be a mechanism to correct "the partisan knowledge" of the EIA reports by following an objective process and scientific evidence based rational decision-making, have also produced several different MWR, falling across a wide range.

[22] Bern Convention on the Conservation of European Wildlife and Natural Habitats. For more information please refer to http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV%3Al28050.

The central argument of this article is that these different MWRs, suggested by scientific experts and approved by the courts, have a political context. Two discussions in political ecology are relevant: about the role of power in knowledge-making and about the social construction of knowledge. Foucault (1980) emphasizes the dichotomy of the role of power in knowledge-making and addresses politics not only in preventing knowledge but also in producing it. The courts have narrowed down the scope of juridical knowledge-making practice in two ways that have political implications. First, they have commissioned experts from the fields of environmental engineering and aquaculture. Second, they have not just administered the inquiry process, but dominated it. Gradually, the scope was reduced from the knowledge presented as 'truth' in the EIA report, to the sustainability of aquatic life, and then further to the water flow required by a single species of fish, the Salma Trutta Labrax Natio Maria.

On the other hand, uncertainty allows a politically productive space in which the experts produce ecological knowledge (Barnes 2016; Hansford and Mertz 2011; Ives and Messerli 1989; Mathews 2014; Thompson *et al.* 1986). The analysis of the proposed MWRs has underlined the ways in which scientific experts engaged with natural uncertainties intrinsic to stream flows - and to the water required for the sustainability of aquatic life. In constructing the models for MWR, the experts have privileged certain forms of environmental knowledge over others, such as the average width of the riverbed, and stream velocity. Although they are relatively measurable, giving them the appearance of objectivity, the estimates were actually highly fluid, flexible, and partial. In this way, they show the limits of assuming a straightforward application of science and they demonstrate how power can penetrate into the process of the construction of environmental knowledge, making it political (Dove 2005; Forsyth 2003; Haenn 1999; Haraway 1992).

The analysis of the Cevizlik HES court case has indicated that the ministry and the courts have accepted different methods in determining the MWR for different hydroelectricity plants. This uneven element of MWR points to another political dimension of the construction of knowledge, since alternative forms of expertise can produce different knowledge, and it raises concerns in relation to social justice. Further research should seek to address these concerns, and to compare the environmental implications of legitimized alternative methods of MWR.

The political struggle between the locals and the state over the issue of MWR led to another political struggle between the locals and the courts involving concepts, methodologies, assumptions and environmental data (Braun 2002). The contest over MWR is still the soft spot in the hydropower development program, undermining the accountability and credibility not only of state institutions, but also the administrative courts. This article contributes to debates about MWR and dams that are vital in reforming the knowledge-making practices that result in overexploitation of rivers, and to initiate discussion of how to improve the juridical knowledge-making practice for environmental cases involving uncertainty. There is no doubt that these debates can illuminate the future of the İkizdere and other rivers in Turkey, and elsewhere, that are under the pressure of the run-of-the-river hydroelectricity plants.

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