

# 7 Competing translations of environmental knowledge

## The case of Viinivaara groundwater extraction plans

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### **Introduction**

Water is a central element when it comes to environmental management, governance and natural resource utilisation. For this reason, water is also a seminal topic in political ecology literature (Swyngedouw 2009). Questions that situate water in the context of social and cultural meanings and different knowledge practices make it interesting from an anthropological point of view as well. In the anthropology of water, it is often depicted as an inherently multifaceted element that escapes reductionist approaches to knowing about its flows and its relation to the environment and to society. Instead of being just a mute object in nature, water also has a political and social dimension through which it participates in the formation of societal relations (Ballesterero 2019; Krause & Strang 2016). Thus, many researchers tend to turn to more relational conceptualisations of water. By replacing a purely hydrological understanding of water with a more nuanced hydro-social one, the research focus shifts to the societal circumstances in which particular instances of water are defined. It is now widely recognised that water has multiple meanings, and to understand its flows, it needs to be approached as a simultaneously sociocultural, physical and technological assemblage (Usón et al. 2016; Linton & Budds 2014).

From different understandings, knowledges and relations concerning waters follow different ways of managing them. Defining water purely as a natural resource to be harnessed and controlled is closely connected to a technocratic management of waters (i.e. operating under the notion that water is best understood by experts of hydrology and best governed by an overarching authority such as the state; de Rijke et al. 2016; Linton 2014). On the other hand, when water management becomes problematic or is debated for one reason or another, the messy multiplicity of social and ecological relations in which the water is situated is revealed. Water can prove difficult to control and manage through knowledge, especially in the context of large social-ecological systems under constant change and reformation (Waylen et al. 2023; Carroll 2012). In situations of many sources of uncertainty, environmental knowledge easily becomes contested and politicised (Turnhout 2018).

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In this chapter, I focus on a particular nature-political dispute regarding the utilisation of groundwater to supplement the public water supply of the City of Oulu in northern Finland. Currently, the dispute is centred around plans by the city waterworks, a public utility in Oulu, to extract groundwater from Viinivaara, which is a virtually unpopulated wilderness-like forested esker area approximately 70 km from Oulu on the territory of two neighbouring rural municipalities, Utajärvi and Pudasjärvi (Oulun Vesi 2017). The dispute has become a highly complicated political issue that reflects the contested and contradictory meanings of the water in the region. The main bone of contention involves the groundwater's significance for the ecosystems in and around Viinivaara, including parts of the Kiiminkijoki River system and Olvassuo aapa mire complex, which are both protected in the EU's Natura 2000 network (FCG Suunnittelu ja Palvelu Oy 2017; Pöyry Finland Oy 2017). Most importantly, there are significant differences in the interpretations of key environmental indicators that point to the potential impacts of the water extraction. The competing parties in the issue have quite contradicting conceptions of the integrity and reliability of the water-related knowledge, which brings forth many uncertainties when it comes to governing the waters. Therefore, it all comes down to what can be said with certainty about the water, whose knowledge counts, and which kinds of understandings eventually come to be influential in the decision-making (cf. Linton 2021).

I investigate how different knowledges about the waters of Viinivaara form and how the circulation of the different conceptions among the wider network of actors relates to governing the waters. I especially focus on how the binary distinctions involving environmental knowledge production dissolve while contradictory understandings of the water issue are produced and circulated. Primarily, the clear-cut distinction of objective expert knowledge as the opposite of vernacular experience-based knowledge becomes questionable when the facts prove to be only pieces of the puzzle of doing knowledge-based environmental governance (cf. Fischer 2000; Negev & Teschner 2013).

To rethink the local-expert knowledge binary in a new way, I lean on concepts from actor-network theory (ANT). I analyse the Viinivaara dispute as a competition of *translations* of environmental knowledge, as different actors struggle to stabilise their contested viewpoints within the wider actor network of regional environmental governance (cf. Callon 1986). Commonly, local and expert knowledge practices are contrasted by comparing the different ways of knowing, whereby experts are expected to rely on scientific or technical methods while laymen are expected to rely on practical observations and experience. Yet, all knowledge is performative and is based on the contexts and conditions of the knowledge production (Turnhout 2018). Thus, I will argue that, while the differences in methods and knowledge practices are influential, the competing versions of actor-network-building through translation resemble each other, which further blurs the local-expert binary.

This study pertains to the 'Co-planning of land use sector climate change mitigation in the Kiiminkijoki river catchment' (MATKI) research and

development project, funded through the Finnish Ministry of Agriculture and Forestry's Catch the Carbon Research and Innovation Programme (Luonnonvarakeskus 2024). The Viinivaara issue relates very closely to the project due to the influence of groundwater in the Kiiminkijoki River system. The extent to which altering the groundwater flows in Viinivaara affects the Kiiminkijoki and especially adjacent mires, streams and lakes, as well as the restoration efforts in the river basin area, is still under debate. The Kiiminkijoki River basin also features in Chapter 8 of this book, in which Heikkinen et al. discuss how the contemporary types of environmental restoration measures, characterised by technological fixes instead of addressing societal root causes of environmental degradation, lead to a further blurring of the nature–culture binary. The case area in that chapter – a restored wetland on a historically drained lake – is situated relatively close to the Viinivaara esker, and the context of both cases is related to the overall restoration aims around the Kiiminkijoki. Consequently, a few of the informants are the same, although for the most part these two cases are not directly related to each other.

### **Networks of environmental knowledge**

The networked, politicised process of knowing about and deciding on the utilisation of the waters of Viinivaara can be described – in terms of actor-network theory – as a competition of translations (cf. Callon 1986; Latour 1999). Obviously, when environmental management is planned and the facts of the matter are defined, people cannot be directly in contact with all the related elements and actors in question. Instead, we rely on mediators such as statistics, maps, documents and other types of representations that quite literally translate all the relevant entities and dynamics so that they can be understood as part of a coherent actor network. By controlling how this translation happens (i.e. becoming the *obligatory passage point* of the actor network), it is possible to stabilise certain understandings in order to garner support from other relevant actors as subsequent decisions are made (Boerboom & Ferretti 2014). The translation can of course fail if the participants in the actor network do not play their part according to the plan. The political process might not work in the favour of the water extraction project, or the water itself can act in unexpected ways, and suddenly all the uncertainties become difficult to manage (Callon 1986; Chou 2012).

Following the ideas of relational and distributed agency developed in ANT, the actor roles can be assigned to various other-than-human entities as well. By their own materiality and through the process of translation, technological artifacts and even various natural objects also actively participate in the formation of social reality (Latour 2005). Thus, the relevant actors in the Viinivaara case are spread out far and wide, including everything from the political representatives and various institutionalised experts to conservation legislation and previous court decisions, and even from the different measurement technologies to rare moss species, and to the water itself. In practice,

much of the dispute about the Viinivaara waters centres around questions such as how the different methods of knowledge production influence the factual basis of understanding the waters, what kinds of roles the various institutional elements (like the Natura 2000 status of the Kiiminkijoki River system) play, and how the water ‘behaves’ in the environment. Indeed, amid all the different knowledge practices, produced facts, network-building and endless piles of legal documents is the water, which sometimes behaves in unpredictable ways. Water becomes an active participant as its actions are followed by investigating, on the one hand, ‘where it goes’, ‘how it absorbs into the ground’ and ‘what it is providing to the ecosystems and species’. On the other hand, the waters of Viinivaara are deeply meaningful in a social and cultural sense, which gives the water a particular kind of political agency. Through its contested social and political meanings, water itself becomes an active participant in the dispute involving water governance (cf. de Rijke et al. 2016; Chapter 5, this volume, on land as a participant in political organisation). Therefore, the contest over defining the waters of Viinivaara has become a complicated collection of hydrological knowledge, technical details, cultural meanings, contradicting values and different relationships between society and nature.

In the Viinivaara case, an especially highlighted feature of the forementioned translation process and the involved representations of nature is their transformative reality-building capacity. Representations of nature are formed in an active process depending on the concrete social and material conditions in which knowledge is produced, which makes environmental knowledge also inherently performative and political (Turnhout 2018). For this reason, controlling how the facts of the matter are formed, presented and eventually circulated among the stakeholders is highly influential in terms of constructing the shared understandings and decision-making regarding environmental management (Carroll 2012). Building networks and gaining allies to support certain conceptions can be seen as an essential part of the knowledge production itself. The more and the stronger the connections are – be they social or material – the more convincing the knowledge claims become. It can even be said that the very realness of the knowledge depends on its connectedness (Kullman & Pyyhtinen 2015).

In the next sections, I will look at the contested nature–cultural network-building process concerning the Viinivaara waters, leaning on empirical material gathered during ethnographic fieldwork between 2022 and 2023. The research field can be described as multi-sited as the relevant social groups, locations and events are scattered both geographically and temporally (Campbell & Lassiter 2015). I collected the research material through participatory observation in contextually relevant locations, through thematic interviews of experts and other stakeholders, and from publicly available sources such as recordings of city council meetings, public statements by various institutions, and legal documents. Although the Viinivaara area itself is very sparsely populated, the most fruitful events of this research process

have been my visits to the springs of Viinivaara and other places alongside the Kiiminkijoki which the research participants have considered significant. In this study I am not able to go through all the historical developments of the Viinivaara water extraction plans in detail, as the discussions have been going on since the 1980s. Instead, I focus on the recent developments that are relevant, considering the current groundwater dispute. A better understanding of how a dispute like the one involving the Viinivaara groundwater develops might help alleviate such disputes in the future.

### **Weaving the nature-political webs around Viinivaara**

Contemporary discussion about the groundwater utilisation began due to a need to improve the City of Oulu's public water supply. The household water quality in Oulu is currently considered good, but the problem is its source. The inner-city area and its population of over 100,000 relies solely on cleansed surface water from the Oulujoki River, which has been deemed too precarious a situation in terms of preparedness for sudden disturbances. To achieve the required 'risk assessment level' issued by Finland's Ministry of Agriculture and Forestry, the City needs to find an alternative water source (Oulun Vesi 2017). In 2014, the ELY Centre of Northern Ostrobothnia,<sup>1</sup> which is responsible for the regional implementation of governmental policies, issued a notice to the City stating that the decision regarding the water supply had dragged on too long and needed to be made as soon as possible (ELY Centre 2014). By that point, the water supply question had become a constantly resurfacing topic of political dispute in the city council.

The city waterworks has regarded the potential of harnessing the groundwater in the Viinivaara area as the perfect solution to the water supply problem mostly for technical reasons, even though this is controversial due to the conservation values in the region. The groundwater in the Viinivaara esker is pure enough to be used as household water nearly untreated and, according to the waterworks, the amount of forming groundwater is sufficient to be used as the city's sole alternative water source (Oulun Vesi 2017). Therefore, most of the pre-existing investigations concerning the various options for ensuring the water supply have been done in regard to Viinivaara, although other plausible options are constantly referred to in the debate. The most notable alternative that has been suggested is the distributed model, which would entail increasing the water extraction from the several smaller groundwater reservoirs closer to the city (Rantala et al. 2017).

In the debate, the organisational actor network consisting of various public agencies, consultant companies and politicians emphasising the security of public services and city centre-focused urban development was formed around the idea of implementing the existing plans of the city waterworks within a relatively short time frame. One of the most common arguments for commencing with the Viinivaara plan was indeed the understanding that the decision-makers have enough facts, the current knowledge was sufficient, and

more investigations would just cost more resources and time. From this perspective, the water came to be defined as mostly a security and preparedness, public services and urban development issue, while gathering more knowledge about the other plausible options was presented as an unnecessary hinderance to solving the pressing water supply problem. The existing body of knowledge made the Viinivaara option the most established one, which arguably shows the power of network-building alongside the technical knowledge production. One of the city council members who opposed the Viinivaara option even commented that:

It would have been wise to also investigate the other options earlier. It is not an acceptable rationale for decision-making that some option has just been investigated more. So, if you smashed your head against the wall yesterday, it might not be wise to continue tomorrow but rather think about alternative behaviour patterns.

According to Rantala et al. (2017), the political process involving the final decision regarding the water supply development issue was quite nuanced, with various kinds of strategies for manipulating the decision-making from both sides. In any case, after a very tight vote the city council decided that the Viinivaara groundwater would be the alternative water source for Oulu. The waterworks proceeded with preparing the official permit application alongside the new environmental impact assessments, which were finally submitted in 2017 for proceedings of the Regional State Administrative Agency (AVI), the state organisation responsible for legal permits.

To secure the licence to extract, the city waterworks' aim has been to reduce the uncertainties regarding the impacts of water extraction by representing the environmental dynamics as controllable in the form of clear and quantifiable data. The first test pumping of the Viinivaara groundwater was already conducted many decades ago and since then the knowledge base has been piling up, consisting of a plethora of hydrological, geological and biological surveys and analyses. This accumulated knowledge is presented in an impressive package of statistical representations, figures, graphs and maps buried inside a daunting quantity of highly detailed assessment documents. A good example of this are the groundwater flow simulations, that are represented in a map form showing the estimated reduction in the aquifer's water level due to potential water extraction at certain locations. The simulations are based on a 3D hydrological model of the whole project area, that spans over 30 square kilometres. The model has been constructed and calibrated with the data produced by measuring the groundwater level and water flow amounts from the springs during several years (Oulun Vesi 2017; Pöyry Finland Oy 2017). The translation of the related natural processes into more easily transferrable numerical and graphical information represents the water and the related environmental entities as participants of the actor network in a particular way, making a convincing case for supporting the water extraction project (cf. Lien & Law 2011; Callon 1986).

Thus, from the waterworks' point of view, the assessments have resulted in an undeniable body of knowledge that clearly supports the groundwater extraction from the Viinivaara region. A representative of the waterworks commented on the process of assessing the environmental impacts around Viinivaara as follows:

Vastly nuanced and precise work has been done. ... There's modelling of the groundwater, water system assessments and the multicriteria evaluation of the Nuorittajoki and Kiiminkijoki Rivers that was done in 2014. ... Also, the assessments of the springs – there are dozens in the area – impacts on them are assessed very carefully. The assessment has received praise from the experts: that it's done on a very high level. It's almost like science, what's been done in the classification of the springs.

Although the environmental impact assessments have been extensive and detailed, the actual environmental impacts remain debatable. Even the waterworks assumes that there will be some negative impacts on the water system due to the extraction, and thus the water extraction permit application includes appeals to alter some of the protected springs (Oulun Vesi 2017). The main contested point, therefore, isn't whether or not there are impacts but rather how *significant* they are. Significance is the keyword, because avoiding the need to consider the potential significant harm to Natura 2000 habitats saves the waterworks the trouble of appealing for an alteration of the conservation status of the wider Natura 2000 areas, after which receiving the water extraction permit might be unlikely. To appease the worries related to potential harmful environmental impacts, the water extraction plan includes methods of monitoring and reacting to changes in the conditions due to the water extraction. For example, during low current periods the waterworks is prepared to lead water directly from the pumping facilities to the nearby natural streams, which would make it possible to maintain the affected environment close to the project area (Oulun Vesi 2017). This way, the waterworks can be seen as planning to create a particular type of artificial TechnoGarden structure to govern the groundwater in Viinivaara as a hybrid technical-natural system, which would require constant monitoring and managing (see Chapter 8, this volume, in regard to TechnoGarden scenarios in environmental management). In any case, the waterworks is presenting the potential impacts of the water extraction as well understood and contained, and the figures produced in the environmental impact assessment are allowed to speak for themselves.

For now, the attempts to secure the permit for extracting groundwater from Viinivaara have failed, even after extensive rounds of expert hearings, field studies and investigations that have been going on at varying intensities for more than two decades. The previous plan to replace Oulu's entire supply with groundwater was denied in 2012 by the Administrative Court of Vaasa, following complaints by several stakeholders representing multiple different state and non-state organisations as well as private citizens (Päätös/Decision

no. 12/0363/1). The current plan to secure an alternative water source for exceptional times requires significantly less water, although due to technical reasons the extraction would need to be continued to some degree at all times (Oulun Vesi 2017). In December 2023 the AVI finally accepted the latest water extraction permit application, six years after the waterworks filed it. Since then, all the involved parties have been engaged in interpreting this almost 800-page legal document while preparing for the lengthy process of handling the matter at various court levels before any kind of solution can be achieved.

Thus, the waterworks has been trying in several ways to secure the position of obligatory passage point regarding management of the Viinivaara waters. The water, springs, natural sites, and local flora and fauna have been translated into numbers, statistics, maps and percentages in order to paint a picture of vastly nuanced and detailed work on the environmental impact assessment based on technical expert knowledge. To gain support among other stakeholders such as the political representatives and certain public institutions, the waterworks has stressed the official risk assessment level and the sense of responsibility regarding public services, and the claim that it is possible to achieve a simple, controlled implementation of the plan supported by the detailed investigations. During the process of securing the waterworks' viewpoint, the constructed actor network of environmental knowledge and management is expanded to the policy level, namely in reference to the Natura 2000 status, the EU Water Framework Directive, and national nature conservation and water legislation. In sum, the city waterworks' long-lasting project of building the heterogenous actor network to support the water extraction project in Viinivaara has been based on the claims that the environmental impacts are insignificant or can be contained on the one hand, and that the project is necessary and urgent on the other.

### **Competing translations of the Viinivaara waters**

The opposing side in the Viinivaara issue is more decentralised than the city waterworks and includes, for example, members of the fishermen's association of the Kiiminkijoki, other environmental NGOs and local landowners, who have been observing the development of the river area for decades. Many politicians and some public institutions, especially a few individual officials working in them, have also expressed their strong opposition to the water extraction plan. While these opponents are working together to some degree, the reasons they oppose the water extraction are relatively diverse.

Most of the opposition boils down to the conception that the significance of the Viinivaara waters is far too great to be endangered by the city centre-focused development of the public services. The waters of Viinivaara are an essential part of maintaining the good state of the surrounding protected areas and water systems, which depend on the fresh, oxygen-rich groundwater surfacing from the esker. The balance that the year-round flowing spring water creates in the adjacent streams, lakes and mires is considered far more

fragile than the promoters of the water extraction project claim. In addition to the ecological significance, the waters of Viinivaara are also culturally important and meaningful. The wilderness-like Viinivaara area is a rare collection of 26 natural springs that form a regionally unique natural site, revered by many local people. The springs, some of which are considered exceptionally beautiful, are important places to visit in order to enjoy the unusual natural environment that surrounds them. It is not uncommon to hear people refer to the springs as even ‘magical’ or ‘holy’. Thus, for many people, the idea of extracting the waters of Viinivaara and mixing them with purified Oulujoki River water to be used for washing cars or flushing toilets appears as an abomination.

The local stakeholders do not trust that, in the midst of planning the natural resource utilisation for the benefit of the city centre, the environmental impacts and cultural value of the environment in the border regions are being adequately considered. Instead, the water extraction is often regarded as part of the more general dynamics of the centre-focused development of Oulu, which has arguably involved some degree of negligence of the surrounding rural areas in terms of social development and environmental conservation. As also depicted in two other chapters in this book (Chapters 4 and 5), rural or peripheral regions may often be seen as designated areas of primary production for the benefit of regional or even global centres of consumption and development. In the Kiiminkijoki River basin area specifically, the massive-scale drainage of the peatlands for forestry and peat production in previous decades has drastically deteriorated the state of the river. The water quality has worsened due to a diffuse loading of nutrients and suspended solids from drained areas, and the extremes between floods and dry seasons have increased due to the peatlands’ lost capacity to absorb water. From the local perspective, one of the most important outcomes has been the disappearance of the local naturally spawning Baltic salmon population, which has been a culturally significant regional change (Sarkki et al. 2024). In practical terms, much of the environmental management around the Kiiminkijoki water system has become the responsibility of local volunteers, while municipal support has been relatively scarce. Nevertheless, the fishermen’s association of the Kiiminkijoki, among others, has been very active in trying to restore the state of the waters and fisheries. Considering their limited resources, the results have been quite promising. Among the local environmental restoration actors, there are high hopes of returning the river to its earlier state as an important fishing site and turning it into an appreciated travel destination, which in turn would boost the general vitality of the area. Obviously, pumping some of the best water away would not necessarily help the restoration efforts. Thus, local stakeholders are working hard to increase the disapproval of the notion of extracting the Viinivaara groundwater, even among higher legal authorities.

An important aspect of the Viinivaara dispute is the opposition’s attempt to challenge the city waterworks’ abstraction of the waters of Viinivaara, as

depicted in the previous section. The city waterworks presents the project area as mostly empty and unpopulated without significant cultural meaning, and the value-related discussions on the issue have mainly only included considerations of the environmental conservation as required by law. The consequence of reducing the local environment, and especially the groundwater, into abstract and quantifiable objects of knowledge is a detachment of the water extraction issue from the involved local sociocultural, political and historical dimensions that are relevant in the landscapes in question (cf. de Rijke et al. 2016; Linton 2014). Nevertheless, for the people who live and spend time near the Viinivaara area, the local landscape is definitely practised and has inherent value, even though the region is largely unpopulated (cf. Chapter 2, this volume, on the binary between abstracted and practised landscape). The waterworks has thus focused on the technical aspects of environmental management while disregarding the opposition's viewpoint by claiming that they are only objecting in principle, whereas developing the public water supply is an important and urgent task. A representative of the waterworks commented on the issue as follows:

Nowadays it seems that opposition always forms against these projects, local opposition. ... We recognise certain impacts to the water systems, but on the other hand we have the mandate and responsibility to prepare and ensure the water supply for a large residential area. So, we're on the right track with a good reason, and the options have been adequately considered. And considering the lifecycle costs of the project this is a rational, and the best, solution to implement.

Beneath the issue the cultural values of the spring sites play an important role, but on the surface the argumentation focuses mostly on the mathematics of the water and the legal requirements regarding environmental management. The locals' main complaint is that the environmental impact assessments seem to have been conducted with a strong commitment to make the water extraction project feasible in one way or another despite the opposition. Thus, much of the dispute is condensed into technical details, such as the estimated amount of groundwater that forms in the aquifer and the runoff from the natural springs to the surface water systems. For example, according to the opponents, the yearly rainfall and the absorption rate of water into the aquifer used by the waterworks have been systematically overestimated to reach the desired amount of groundwater yield. Disagreement regarding these figures arose in 2016 during a survey visit organised on site in Viinivaara as part of the environmental impact assessment process, as told by a former forest expert and an opponent of the water extraction plan:

That same day, I called the Finnish Meteorological Institute and asked for the area's (interpolated) rainfall data for the whole period of observation. ... I think it costed approximately two hundred euro, and after an

hour the figures were in my e-mail. ... I calculated the mean yearly rainfall, and it was about 50–60mm lower than reported by the City of Oulu waterworks. ... They just took the rainiest season from 2000 to 2012. And they didn't report the evaporation. Still, the application claimed that this was the newest information available.

These numbers are central, of course, because the groundwater yield can be calculated, and the feasibility of the extraction plan evaluated, based on the estimated amount of water formation. The activists have pointed out many problems in the assessments, questioning the certainty of the numbers used in the calculations, which they claim are often invented at someone's desk without any actual empirical basis. The consultants who were hired to conduct the assessments are considered unreliable and partisan in the issue, despite their expert status. The previously mentioned opponent of the water extraction expressed his distrust in the following way:

They have a pretty weak basis (the figures). ... One can have many opinions about the assessment. Mostly, they're not based on any observations or long-term measurements of, for example, the water levels in the lakes. They're just expert assessments, ... modelling. And the results are also interpreted quite arbitrarily.

Because of this distrust, local stakeholders have been engaging in their own projects of alternative knowledge- and network-building. Quite interestingly, the locals have consciously chosen the strategy of challenging the very basis of the knowledge claims in the assessments in order to directly undermine the certainty, as well as the neutrality and integrity, of the waterworks. The strategy of focusing on knowledge and legal processes has been considered more effective than resorting solely to traditional forms of activism such as political demonstrations and campaigning, which are other aspects of the opponents' repertoire that they use from time to time (Lauhava 2013). This way, they can attempt to position themselves as somewhat equal stakeholders alongside the waterworks and the City of Oulu. Some of the local activists commented on the process as follows:

- R1: They [certain political representatives] said we should organise demonstrations. But for God's sake, it doesn't work like that!  
 R2: I told them I'm not going to start a riot. As long as the law holds, we'll watch how the situation develops.  
 R1: And we're on the right side of the law!

The opponents' project can be regarded as a parallel version of the actor-network-building process as it involves alternative versions of translation (i.e. the environmental knowledge production), appeals to the institutional and political actors, and relating the entire issue to the legal framework of environmental management and natural-resource use. Moreover, pointing out

certain fallacies in the knowledge and partiality of organisations such as the ELY Centre of northern Ostrobothnia, which should officially act as a neutral institution governed by public law, forms a strong argument in questioning the fairness and reasonability of the entire project.

Because the assessments based on questionable initial information and modelling do not convince the local activists, they rely on firsthand experience and observations concerning the changes in the water system between different seasons and conditions. The most concrete way this alternative conception is produced involves directly observing the water flows from the Viinivaara springs. This is done from special measurement dams which are used for monitoring the water runoff to the streams that are adjacent to the sites where the water pumps would be installed if the plans to extract were realised. The water runoff is observed by measuring the height of the water in the middle of the V-shaped hole in the dam and converting this measurement into litres of water per second by referring to a simple graph designed for this purpose.

These measurements are conducted at different times of the year in several places and are then compared to the figures presented in the city waterworks' water extraction plans. In most cases, the conclusion is that the planned amount of water extraction is much higher than the amount of water measured to be flowing out from the springs. Thus, if the extraction were to commence as planned, some of the springs would effectively be destroyed or severely damaged. The empirical observations suggesting a real danger of ruining the springs naturally



*Figure 7.1* Pentti Marttila-Tornio, chairman of the fishermen's association of the Kii-minkijoki, measuring the spring water runoff near Hämyhete spring.  
Photo: Olli Haanpää

cause a great deal of concern among the stakeholders who prioritise conservation of the natural springs and their affected environment. In fact, according to the locals, some deterioration has already occurred merely due to the investigations. For example, Hämyhete, one of the most notable springs, had changed drastically already in the early 2000s due to test pumping. In the summers of 2022 and 2023 when I visited the site of this natural spring, which had previously looked like a pond or an oasis in the middle of a lush forest, only the dry banks of the pond were visible. Furthermore, the idea of securing a reliable alternative water source for the City of Oulu becomes questionable when in practice the amount of water wouldn't suffice for several months of the year.

Through their measurements, the local stakeholders are tying the 'natural actor' – namely the water itself – to their version of the actor network of environmental knowledge in a new way. Building more connections works towards a more convincing argument that challenges the conception of the water's behaviour in the area as depicted in the official environmental impact assessments. As discussed earlier, very often the locals simply claim that despite the extensiveness of the water extraction plan the figures it presents are just plain unrealistic, produced by flawed practices, or based on vague assumptions. By conducting an alternative translation of the environmental knowledge (i.e. going on site to do the measurements and maths themselves), they make the waterworks' version of the actor network more brittle as the locals' version gains rigidity through new connections. Emphasising the uncertainties and fallacies in the official assessments calls into question the waterworks' position as the knowledge authority and thus the obligatory passage point in the issue.

In addition to the water's behaviour, drastic differences can also be noted in the different conceptions of its influence in the nearby water systems, which for many local stakeholders is often the main concern regarding the general restoration efforts. The waterworks has claimed that, with groundwater extraction, the reduction of the water in the Nuorittajoki River, the largest tributary of the Kiiminkijoki, would be on average approximately only 0.7%, and during the summertime's low flow would rise to a monthly average of just 7%, which is still considered a mild impact (Oulun Vesi 2017). This calculation does not carry much weight among the people who have observed firsthand the changes in the water's quality and temperature between the different seasons. Local activists living near the potentially affected water systems stated:

- R1: When I went swimming in the summer it was noticeable how the water got colder as the amount of water decreased [in the Nuorittajoki]. If there weren't groundwater in there, then obviously it should get warmer! But it got colder as the amount decreased. That proves that the amount of groundwater in the river is significant!
- R2: We have precise figures about that. They're from the gauges of the Finnish Environment Institute. The water temperature dropped 9 degrees Celsius over only two weeks [in the dry season].

Compared to the centralised, professional waterworks-led project to extract groundwater from Viinivaara, the opposing side is quite scattered and operates with considerably fewer resources. Obviously, the measurements and observations conducted by the activists are also not inherently more accurate than those in the official environmental impact assessment. Furthermore, the opposing side definitely has an agenda, which they do not hide. Mainly, they worry that something might happen to the regions' water systems and the still untouched natural springs, which besides their inherent conservation values are extremely culturally important. On the other hand, the waterworks does not express its possible political reasons for clinging to the Viinivaara option as explicitly as the locals express their reasons for opposing it. When the water is translated into more transferrable form with a great deal of technical detail, any other motives or possible inaccuracies than purely technical or managerialist ones are hidden from sight, at least for readers who are not fully devoted to the matter. Therefore, when it comes to the decision-making, attempts can be made to disregard the opposition as irrational, or to accuse them of downplaying the importance of developing the public services in urban areas and of focusing instead on biased 'regional politics'.

Still, in many cases the activist-produced knowledge about the environment is aligned with some of the statements by different experts, with whom the locals actively try to be in contact with for consultation and to gain support for their knowledge claims. Indeed, various experts believe they are on the right track with their interpretations. Many, for example, question the feasibility of modelling groundwater behaviour so precisely in such a large area with variable soil types. Doubts are cast as to the origin of the data used in the modelling, which could result in an underestimation of the environmental impacts of the groundwater extraction. Metsähallitus, the state forest agency managing the state-owned lands, expressed the following in an official statement:

Metsähallitus notes that there might be a significant risk of possible systematic error in the assumptions regarding the total amount of groundwater formation that are used in the modelling.

(Metsähallitus 2017)

The rate of water absorption to the aquifer used in the application was also commented on in the official statement of the ELY Centre of southwest Finland, which acts as the official point of contact in the issue:

Small changes in the assumptions affect the result, and the figures are subject to uncertainty. The high absorption rates stated in the permit application, especially 65% in Viinivaara, feels oversized because a mean figure this high is generally the absolute maximum in exceptional circumstances.

(ELY Centre 2017)

Regarding the impacts on the adjacent lakes, the environmental impact assessment also provides quite an optimistic conception. The consultant hired by the waterworks determined that, in Olvasjärvi Lake near Viinivaara, the proportion of groundwater is only 27% and the extraction would thus cause no significant harm (Pöyry Finland Oy 2017). In a master's thesis (Wiman 2021) within a larger University of Oulu-led research project studying the eutrophication of the lakes in the Viinivaara region, these estimates were contrasted. According to the thesis, the groundwater proportion in Olvasjärvi is in fact up to 85%, based on empirical measurements and a calculation of the water's G-index.<sup>2</sup> The conclusion in the thesis is that, if groundwater inflow to the lakes were disturbed, their water balance would change critically. Moreover, in my study, an individual expert from Metsähallitus commented on the importance of the groundwater for the lakes around Viinivaara:

It (Marttisjärvi Lake) stays alive in a way thanks to the groundwater from Viinivaara. The oxygenated spring water keeps it alive during the winter. ... Olvasjärvi, Timosenjärvi, Marttisjärvi and Ahvenlampi are the lakes that would suffer if the groundwater were to go. On that basis, we've opposed the Viinivaara project. It would threaten the state of these lakes very strongly.

Of course, it must be noted that the city waterworks has its hands tied due to the official requirements of improving the security of Oulu's water supply, which is gaining ever more urgency in these times characterised by many global crises and general uncertainty. Nevertheless, the direness of the water supply situation is also a debatable issue, and many question the decision to continue the planning of water extraction in Viinivaara when there may be other less politically flammable options available. The situation was adeptly commented on by an official at the ELY Centre of northern Ostrobothnia:

I would be very worried to be a resident of the Oulu inner city and to be dependent on that water (purified river water). If there's one oil truck that falls into the river upstream, then what? ... So, something must be done. But this Viinivaara [issue] has been grinding there for at least 20 years so one would think that somewhere else [the water] might be found too. ... The stubbornness [of the City of Oulu] in the issue is very strange. Still, I have no doubts that the locals aren't yielding. They're definitively not giving up.

## **Conclusion**

I have investigated the dispute over the Viinivaara groundwaters as a contested actor-network-building process through translations of environmental knowledge. Although highly nuanced cultural and political meanings regarding the waters can be traced, the dispute focuses mostly on various technical details used in order to control the epistemological interface between the water, the

environment and politics. Below the surface of the dispute, water itself plays an important part as the centrepiece of the whole issue through its multiple cultural meanings and environmental connections. A detached position whereby the waters' behaviour could be interpreted objectively doesn't exist (cf. de Rijke et al. 2016; Usón et al. 2016). Instead, the constructed facts are given a mediatory role of conveying the various conceptions of the water among different stakeholders, who all have their agendas, be they explicit or not.

Returning to the binary distinction between expert and local knowledge, it can be concluded that in a highly politicised and complicated matter such as the Viinivaara groundwater issue, the forementioned binary dissolves when it comes to the neutrality and integrity of knowledge. Local laypeople become experts through observational and experiential knowledge when the issue focuses on the detailed local environmental and cultural impacts of the water extraction. At the same time, the experts basing their arguments on seemingly neutral knowledge-production practices become partial political players when attempts are made, based on public interest and institutional pressures, to force an environmental management project through the bureaucratic system despite relentless opposition (cf. Negev & Teschner 2013).

As is established in various anthropological accounts of water, it is as much an inherently social, cultural and political element as it is material (Ballestero 2019). Following Bruno Latour's (1993) idea of the proliferation of nature-cultural hybrids, the modernist dualistic distinction between nature and culture, which in this case manifests itself as the detachment of water from its cultural, technological and discursive aspects, only seems to paradoxically increase the complexities of water management. In other words, maintaining an attitude towards water as a purely material object of hydrological knowledge and technocratic governance contributes to an artificial disjunction of natural and human systems (see Chapter 1, this volume), which can cause unexpected complexities in environmental management (Linton 2014). Failing to recognise the multiplicity of water while planning its utilisation poses the risk of ending up in a complete political cul-de-sac.

In terms of developing more reasonable, usable and agreeable environmental governance, it would be beneficial to realise and truly consider the local viewpoints regarding the project areas in question instead of trying to exclude them by hiding behind abstractions produced in the environmental impact assessments, which in fact contain many fallacies. Indeed, one of the main differences in the understandings between the different sides of the Viinivaara dispute is the attitude towards the landscape as either abstracted or practised (cf. Chapter 2, this volume). From the perspective of the City of Oulu waterworks, the area is defined by various objects of knowledge that are measurable and controllable in a more or less straightforward way. For the opponents of the extraction, this kind of instrumentalist viewpoint seems detached from the local practices and cultural meanings, and even from the many local ecological nuances that are lost in translation when attempts are made to model complicated natural processes as a controlled totality.

The strategy of producing more facts can, to an extent, contribute to a more convincing argument supporting implementation. On the other hand, if the objective of the entire project is not seen as right or fair by citizens, as is the case in Viinivaara, simply producing more facts won't necessarily lead to wider acceptance. Furthermore, disregarding many valid points about aspects other than technical ones and values associated with the region in question, and avoiding the considerations of other plausible options that might be more agreeable, seems to only increase distrust and result in unnecessarily complex, daunting political processes. Development might receive broader legitimacy if the goal-setting and planning were more shared and done in a more participatory way (Fischer 2000).

In the end, the local activists striving to conserve the natural springs of Viinivaara will probably not be able to secure a status similar to that of obligatory passage point like the waterworks, even though many experts agree with their knowledge claims. What the opponents instead have achieved is a dismantling of the position of knowledge authority and certainty that the waterworks has tried to construct. As a result, the situation has been complicated to the extent that the focus has shifted to the legal rulings that are in the process once again. As I write in this chapter, results are awaited from the proceedings of the Administrative Court of Vaasa, which is now assessing the issue based on all the available material, including the pleas of the various stakeholders supporting or opposing the water extraction. Thus, the Administrative Court has become the real obligatory passage point in the issue. When the final decision eventually arrives, the actor network around the Viinivaara waters will shift once again to a new formation as the dispute continues through the different levels of the legal system. The discussions about the Viinivaara groundwaters will probably continue in one way or another for years to come, while the water supply issue remains unresolved.

## Notes

- 1 'The Centres for Economic Development, Transport and the Environment (ELY Centres) are responsible for the regional implementation and development tasks of the central government' (ELY Centre 2023). In the Viinivaara groundwater case, the ELY Centre of Southwest Finland has been appointed as the official point of contact. The local ELY Centre of Northern Ostrobothnia has been disqualified from the task due to partiality in the issue.
- 2 The G-index is calculated based on the isotopic composition of the water. It provides information on the groundwater proportion, in percentage, of all the water that ends up in a lake (Wiman 2021).

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