

# Water Scarcity and Water Trade: Turkish Attempts to Supply a Drying Region

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## Abstract

Water scarcity is already causing serious challenges nowadays and devastating water-related processes will certainly continue for decades to come. The emerging water crisis requires new political arrangements, new technological solutions and the development of new water supply chains. Among the possible political-diplomatic answers, water trade may be a viable option, as water abundant countries could distribute resources by commercializing their water surplus. Water trade, however, faces serious obstacles. Dependence of different countries on states that have water surplus, political leverage and the possible opportunity when external powers could control the essentially important human needs are all examples of potential risks. These threats hinder the development of interstate water trade cooperation and orient countries struggling with water shortages towards domestic solutions. This study attempts to examine the practice of water scarcity and water diplomacy, while also applies the Turkish experience as a case study for demonstrating constraints of water trade. The paper will hopefully shed light on the threats posed by global and regional water scarcity and draw attention to the opportunities and limitations of water commercialization. The aim of our study is to outline the issues related to the distribution and trade of water, furthermore to present the problems of water as a product. Our research focuses primarily on Turkey, which has also become involved in water trade, but the story still ended in failure.

## Keywords

water scarcity, water trade, water diplomacy, Turkey



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## Introduction

This paper has a dual aim. Primarily it seeks to present the characteristics of water scarcity in relation to both the global and the Eastern Mediterranean region. Presuming that the provision of fresh water is one of the most important tasks of Turkey, it may even try to enforce this goal against other countries, which could lead to conflicts in which water diplomacy is playing an increasingly important role (Gleick 2000; Dassonville, d'Ostiani 2005; Reigeluth 2018). The conflict vs. cooperation duality clearly defines the international relations of the Eastern Mediterranean region. Over the past decade, the authors have conducted research in Turkey, Greece, Cyprus

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and Israel and found that water use and supply, water management systems are particularly variable, complex processes that require ongoing dialogue with neighbours and solutions to increasingly burning water-related problems (Bornstein 2018; Tziarras 2019). The structure of this paper is also determined by this duality. While many books and studies have been published on the hydrological conditions of the region (Ghiotti 2012; Burak, Margat 2016; Strategic Foresight Group 2018), water policy defines relatively new research directions that attempt to find answers in the challenge-conflict-cooperation triangle (Wolf 1997; Mason 2003). We believe that political cooperation is almost necessary on water issues – frontier rivers and lakes, transboundary surface and groundwater resources – but at the same time the ways in which conflicts are resolved are very varied. The study addresses the issue of water trade, which can play an important role in ensuring the water supply in the region, emphasising that this topic includes many stakeholders, making it impossible to clearly use the same scheme in all cases (Muller, Bellmann 2016). That is also a question that how water can be identified as a product and what can be the real price of water. Furthermore, the paper is focusing on the dilemma that without political will, interstate water trade cannot be successful even in a region that faces many challenges in water supply.

## Water Scarcity

One of the major challenges of the 21st century is the drastic depletion of potable freshwater. The related crisis poses an enormous challenge to the entire humanity, because in its various forms, water scarcity, the lack of sanitation and water pollution issues affect basically all regions of the world. The impacts of wastefulness, agricultural over-irrigation, the energy crisis and global climate change increase the depletion of freshwater, and securing water supplies has therefore become vital in the 21<sup>st</sup> century. It is obvious to everyone that potable freshwater is the most essential and key condition of life on Earth, and therefore its protection, preservation and supply is in the priority interest of each country. The volume of freshwater available on the globe is constantly decreasing, our surface waters are becoming more and more polluted, our rivers and lakes are drying up and slowly disappearing (Erdős 2019). The problem is exacerbated by the fact that the amount of groundwater used for public supply purposes is gradually declining, reservoirs are depleting, the soil is drying up due to the huge volume of extraction, entire cities, such as Bangkok, Jakarta or Mexico City, are constantly sinking and becoming endangered (Morris et al. 2003).

Since 1950, the population of the world has tripled, and considering all demands, water usage has increased sevenfold. Considering renewable water supply, annually less than 1700 m<sup>3</sup> of potable water is available per person. This is the amount that is usually sufficient to supply the population, however, there are regions where this proportion is less than 700 or even 500 m<sup>3</sup>. Presently, around 1.8 billion people all over the world do not have access to clean water, and 600–800 million people lack even access to basic drinking water, and 120–140 million people – most of them in Sub-Saharan Africa – still collect water directly from surface water sources and consume it without proper cleaning (Glied 2020).

The depletion of the Earth's freshwater resources is dramatic, with unfavourable processes threatening a global water crisis, posing an extraordinary challenge to the bodies responsible for water management. In order to understand why this is so important, it is worth knowing the data on the distribution of water. Since 97 percent of the water on Earth is saltwater, only 3 percent of the global water assets resources is freshwater. Most of this is located on the poles, i.e. it is very hard to access. Surface waters comprise 1.2 percent of the total freshwater volume, while underground waters comprise 30.1 percent. The total volume of water resources on Earth comprises 1386 million km<sup>3</sup>, but the distribution is extremely uneven, since there are regions with

an abundance of freshwater and there are – to an increasing degree – regions with water scarcity or regions vulnerable from the perspective of freshwater supply (Shiklomanov, Rodda 2003; Datta 2007). Also, we should really be focusing on renewable water resources instead of the existing supply, when we are discussing the security of supply and the volume of future reserves. So, if we consider the interrelation between volumes and consumption, we are getting a constant volume that is unevenly distributed among the different regions. In addition to this, the world faces a constant population growth which will result in having 9 billion people on Earth by 2050 and 11 billion by 2100, thus the volume of consumption is also constantly growing, affecting the public utility, industrial and agricultural sectors, as well as energy production (Postel 2010). The importance of freshwater is rising constantly: we need water to stay alive, to manufacture products, to water plants and feed animals, water is needed to cool nuclear power plants, for transportation, and a specific volume of water is necessary to operate hydroelectric power plants, etc. Considering the current level of water consumption, the freshwater resources would be sufficient for almost 20 billion people (presuming that water sources are used much more efficiently than today), but if we also take into account the volume required for food production, this figure would be somewhere between 14 and 16 billion (Sheikh, Zahurul 2019).

For the global water crisis to worsen, the reduction of the total volume of precipitation on Earth is not even necessary, it is already enough if its distribution changes and less gets to drier regions and more to the regions already having abundant waters supplies (including seas and oceans). And this is exactly what is happening, climate change gradually transforms our weather systems in a way that the distribution of precipitation changes from a state of balance toward extremities. For this reason, significant parts of Africa, some regions of Central America, some parts of the Middle East and Asia, as well as Southern Europe face permanent water scarcity, water shortage. The regions most affected by water shortage are located in North Africa (the Sahara and the Sahel), in the Middle East, Central and South Asia. The supply of clean potable water faces many obstacles in these areas, considering e.g. the rapid population growth in Egypt, Jordan and the Gulf states, but Turkey, Cyprus, Syria, Iraq and Israel also experience serious water supply challenges as well as the MENA region (Middle East and North Africa).

When discussing the method and types of freshwater usage, it is important to note that it is not only the residential consumption that uses up available stocks to a growing extent (doubling every twenty years), but the enormous water demand of the agriculture and industry, as well as the long-term supply of energy production. In order to satisfy the constantly growing demand for energy, such systems need to be created which albeit require expensive investments, can provide energy security for the next decades. Such projects include hydroelectric power plants and dams installed on rivers, which in addition to years of preparation, precise engineering and vast financial resources also require the availability of technology, human resources and – last but not least – a strong government that is able to implement the constructions even if the affected population opposes them, evicting tens or hundreds of thousands of people living in the vicinity. It should be emphasised, however, that aforementioned major water-related investments have in many cases met the expectations of the population and raised the public perception of a strong government, because the state has been able to provide the necessary water flow (Zwarteveen 2017). When the required resources and technical skills are available, construction and commissioning of such facilities is only a matter of time.

Water also plays an increasingly significant role in political-diplomatic conflicts and regional crisis zones: international conflicts related to water supply, rivers and lakes across the borders are increasingly more common (Gleick, Iceland 2018). There are 263 international water supply bases all over the world, and the conflicts around them are mostly caused by upstream countries around the source applying their own water extraction or some regulation activity (power plants,

dams, reservoirs) to limit the volume and quality of water transferred to downstream countries. There are however some important factors that have major impact on a country's "use" of a river or lake crossing its borders. The country's economic, military and political potential in the affected region is a key factor. It also matters where the country is geographically located on the river section, i.e. whether it is closer to the source and therefore a so-called upstream country, or a *downstream country* further away. A more powerful and influential *upstream country* can obviously dominate the use of the river and influence water supply at its own discretion (Yousef 2019). It is also no uncommon for a downstream country with significant military might to enforce its claimed water supply and use threats or extortion to ensure that it gets the required amount (e.g., disputes over the Nile, the Euphrates, the Tiger, or the Mekong). In such cases, countries weaker in the economic or military sense have to share the lower section of the river, and their vulnerability can only be resolved by diplomatic means. This all requires significant insight, reasonableness and fairness on behalf of each party exercising authority over a specific river, which in many cases matures and develops over years, even decades. Additionally, the significance of protecting cross-border *drainage basins* and *aquifers* shall also be mentioned, because this means a common effort of many countries (even a dozen countries in some cases) to cooperate and ensure water supply security (Raisz 2012). According to the optimistic approach, water as a "common treasure" generates cooperation between the affected countries with regard to cross-border waterways, presumes openness on their behalf to ensure and use the water flow of the rivers, the use of drainage basins, as well as the criteria for constructing waterway structures (on the banks and the rivers themselves) (Wolf, Yoffe, Giordano 2003: 39). The nature and form of cooperation may change due to changes in hydrological conditions or political-economic systems, sometimes it may become deeper and more widespread, but it may also cease or simply stagnate. In the most fortunate cases like Danube, Tisza, Senegal, Jordan, or Russian-Finnish agreements on the frontier waters this is indeed what is observed, but in the recent decades there have been a number of conflicts between two or more states that have involved many forms of confrontation. If any such disputes on the international politics level are coupled with food scarcity or rapid demographic growth in regions already burdened by historical, ethnic, religious antagonisms (North Africa, Sub-Saharan Africa, Middle East, Central Asia, Central America), conflict is practically inevitable.

Acquiring, securing, alienating water resources, of taking efforts to do so can lead to international disputes and conflicts, and can also cause violent incidents between countries in hostile relationships. Pollution can also affect the water resources of other countries, while governments in a more favourable water strategy position can reduce the allowed flow or impact the quality thereof. Also, countries with more military potential can use their water policy superiority to threaten, influence and coerce other people, dependent on them. States upstream of a river can also use or pollute a significant part of the water, putting downstream countries in a vulnerable position (Gehrig, Rodgers 2009). This makes cooperation unavoidable in water-related affairs, thus water can both be a source of conflicts and a factor contributing to cooperation. Experience shows that international intervention (if a major power has interest to that) does not primarily aim to change the reasons of the scarcity, but strives for a political arrangement, and in many cases provides aid in exchange for the liberalisation of local strategic sectors (energy, public utilities, processing/manufacturing, construction, telecommunication).

## Water Diplomacy and Water Trade

Water diplomacy (hydro-diplomacy) covers the intergovernmental negotiations, concluded conventions and international regulations for the prevention and control of transboundary water

pollution, flood protection, the provision of the water flows and the resolution of conflicts arising therefrom. All this to ensure that the stakeholders sharing underground and surface waters maintain peace and stability in a specific region. More recently, the increasingly widely used mechanisms of water trade have also been included in the range of “soft” tools of water diplomacy. This includes the sale of water as an actual commodity, but virtual water is also included in this scope, referring to the volume of water that is linked to the manufacturing of products and energy production as a sort of “hidden factor” (Allan 1997; Turton 2001).

When examining the increasing role of water diplomacy and water trade, the following four key factors should be taken into consideration (Hefny 2011).

1. Population growth;
2. Availability, condition of water utility systems;
3. Water quality;
4. Negative impacts of climate change.

As a combined result of these factors, water trade is a growing business, estimated to reach 1 trillion USD by 2025. Its means also include international regulations and “know how” type experience sharing, because these both play a major role in rationalising water management and promoting the technological development of developing countries (Tóth 2012: 139). Nor should we forget regional cooperation projects that affect the cross-border water bodies, rivers and lakes of a specific region. Such cooperations are present with regard to almost every major river and lake, including the Nile, the Ganges, the Mekong, the Danube or the Rhine.

Complex challenges of the 21<sup>st</sup> century, such as population growth in the developing world, climate change, chronic water scarcity and vulnerability, water pollution, increasing water demand in agriculture, deforestation, land degradation, desertification, urbanisation-related issues and increasing energy demand are gradually increasing the role of water diplomacy. Water diplomacy that has been creating and shaping the concept of political water, furthermore redefines the interstate relations on water-related disagreements, conflicts, environmental issues and so on. Water diplomacy is responsible for using diplomatic instruments – negotiations, conflict-resolution mechanisms, the establishment of platform of consultation – instead of showing off force and the language of the threat. Water diplomacy’s final goal is to ensure a long-lasting cooperation, stability and peaceful political settlement. The acquisition, possession and use of natural resources can generate conflicts of varying intensity between the states involved, many of which can be resolved cordially. From the second half of the 20<sup>th</sup> century, conventions were concluded under the aegis of the United Nations, as well as bilateral and multilateral intergovernmental agreements, treaties, which primarily sought cooperation. The transformation of the international community after the First and then the Second World War, arrangements that ignored the preservation of geographical/ecological units, artificially crafted borders and large-scale economic development made necessary the establishment of a system of environmental treaties. These conventions, in most cases concerned the exploitation of water, and almost without exception related to international rivers or lakes. The problem of transboundary environmental impacts (externalities) first appeared in international water relations, and today the issue simply cannot be circumvented when we talk about interstate relations.

It is also important to point out that there are few countries that have exclusively national rivers (originating in their own territory and also flowing into seas, oceans, lakes or other rivers in their own territory), so disputes over *international rivers* are also included in the scope of international law in order to have such disputes settled. By the 20<sup>th</sup> century, two defining trends have emerged regarding the issue of the *right to use rivers*. According to the *principle of absolute*

*territorial sovereignty* (Harmon Doctrine) the State is free to dispose of the water resources of an international watercourse in its territory, regardless of how this affects the quality and quantity of the river when it enters the territory of a neighbouring State, and this clearly favours the upstream state (McCaffrey 1996). The *principle of absolute territorial integration* also takes into consideration the interests of the downstream state, because it partially limits the room for manoeuvre of the upstream state in relation to the activities related to the river and its water flow in its own territory (Csatlós 2018). Basically, these two approaches – and their modifications – are prevalent in interstate political-diplomatic processes related to water nowadays.

Developing – and mostly upstream – countries are generally not active parties to these conventions, saying they have the right to use their waters without restrictions. Thus, international provisions either do not apply to them or apply only to the extent that they are willing to accept and abide by them in their sole discretion. If we look at the existing realist theories, a stronger upstream country would not need to consult with downstream countries, as it could act on its own without the approval of the stakeholders. This model prevails with the dominance of Turkey for the Tigris and Euphrates rivers, for China the Mekong and Brahmaputra, for India the Ganges, Brahmaputra and Meghna rivers, or for the United States with regard to the Rio Grande and Colorado rivers (Rahaman 2012: 5). As a result of the world becoming more interdependent and complex, the sophisticated use of diplomatic and economic instruments is increasingly helping the negotiation procedures, favouring a (more) consensual interstate cooperation and action mechanism over pure force. This can be based on concrete pressure, the promise of compensation mechanisms, the prospect of future economic benefits, or humanitarian arguments involving international NGOs and intermediaries. It works as a game theory where the feasible *win-win* situation sometimes can be considered really progressive, sometimes very disputed – because the stronger country is willing to make compromise, which can be regarded as a success for the politically weaker states (Dinar, Hogarth 2015).

Issues of water share and water allocation already arose in the late 19<sup>th</sup> century in connection with various dams and sluice systems designed for common rivers, and they have become real challenges from the 1970s onwards, in the form of investments that drastically changed water flow. Dam systems, water channel systems, hydropower plants, groundwater distribution pipelines, water utilities and sewage plants all affect the water supply of a specific country as well as the downstream countries concerned. International coordination of these policies is also necessary because water is not an unlimited natural source. Access to water is measured by the Water Exploitation Index (WEI), taking into account the rate of consumption as well as the amount of renewable water. Based on this index, Cyprus is in the most desperate situation in Europe, but Bulgaria, Spain, Belgium, Macedonia, Italy, England, Malta, Germany, Turkey and Poland may also face water supply problems in the near future. As urbanisation increases in parallel with population growth, by 2030, 60 % of the world's population will live in urbanised areas. Water supply will be concentrated in these areas, partly due to household consumption, partly due to food production and manufacturing, and partly due to industrial activities. According to FAO reports, in the coming decades the volume of food demand is going to increase by 60 %, and therefore the water consumption of the agricultural sector will also rise (FAO 2007).

By the second half of the 20<sup>th</sup> century, from a natural resource, water has turned into a product and a commodity (Thompson 2011). A commodity that is constantly needed in large quantities and whose value can be expressed in money. Water prices can be influenced by a number of factors, such as the place and mode of use, the infrastructure used for transport, other economic factors such as the quality of interstate relationships, or secondary goals that are political and hope for benefits in return, in other areas. Water needs to be delivered to consumers from the point of extraction and purification (piping systems, pump systems), it can be portioned (bottled

water), transported, stored (reservoirs). According to Hoekstra (2010) water trade reduces global water use in agriculture by an estimated 5% because the “pricing” of water rationalises the use. In light of all this, it is no coincidence that water supply remained a strategic sector with an increasing significance. The goal of modernising economies is to meet the consumption needs of increasingly populous societies with the least possible expenditure. Water was an underestimated factor in this process, since it could be used almost without restriction for irrigation, energy production, consumption, and (the often polluted) water that became redundant after use could be “returned” to nature without any limits. Water utility systems which require continuous infrastructural improvements, have demanded an increasing need for regulation, task performance and coordination during their administrative “evolution”. By the middle of the 20<sup>th</sup> century, simultaneously with development of welfare societies, the increase in the number of consumers and consumption volumes, the public management operating the infrastructure became an integral part of water supply services. Satisfying basic needs, as well as providing access to water as a condition of life, is not in itself a guarantee that the growing consumption needs of our communities will be able to be met in the long run. Therefore, it is not surprising that the role of clean freshwater has been enhanced by running out of resources and increasingly costly treatment processes. This has also been recognised by economic actors and they became involved in the process of water supply and treatment in more and more countries, in many cases putting governments in a dependent position and raising the price of water. The infrastructure necessary for water management results in a particularly dominant position. When regulations are poor, monopolistic economic actors can make government bodies vulnerable and therefore they generally insist that the majority of water utilities and water infrastructure remain in state control. But in the case of water trade, the same can happen with countries that purchase water, so it is in their fundamental interest, as in the case of energy supply, to diversify their sources, where possible.

The price of commercial water has also been set by the World Trade Organization (WTO) and the OECD, taking into account different criteria. Experts have broken down the volume of imported and exported goods for each country into cubic meters, from which the amount of water used for industrial and agricultural products can be calculated based on various calculations (Chapagain, Hoekstra 2008). Based on this, it can then be deduced whether and for how long a given country has sufficient water for the production of goods, energy production, agricultural irrigation, transportation, and household consumption (Roson, Sartori 2010).

Since the 1990s, a number of studies have addressed the question of how the nature and price of water usage are changing as water trade becomes more widespread. We can basically see a dual process. On the one hand, the drastic depletion of global freshwater sources makes the “product” more and more valuable to both water-rich and vulnerable countries, and on the other hand it requires much more efficient use today, drastic improvements in irresponsible and wasteful water management, and development of water infrastructure. The possible models show a very variable picture, because, as Young (1997) pointed out, water trade can also run partly on a market basis, where governments regulate the market and build/develop infrastructure. In addition to this, current water prices usually do not cover the true value of water. In fact, keeping water prices low has led to further water scarcity and ecological and environmental damages in areas where water was exploited, however the higher prices could put water-scarce areas in a difficult position (Hung, Shaw, Chie 2014). The ideal model of water trading has been defined by researchers (Diao, Roe, Doukkali 2005) based on the “two levels, three characteristics” factor. According to this approach on the first level, the government owns the water infrastructure, regulates access to water and decides on water allocation/reallocation. At the second level, the task of the market (in many cases also together with the concerned government) is to determine the prices and the necessary improvements, i.e. this level is the level of operational decisions itself. The three

characteristics that should always be taken into account when deciding on water are: the issue of water supply (industry, agriculture, communal consumption); players on market and conditions; possible political and economic consequences. As Howitt (1994) and Hearne and Easter (1997) assert, the involvement of the market in water trade has not improved water efficiency, partly due to enormous costs and partly due to the fact that water prices are still primarily a political and not an economic issue as Anderson (1994) has also pointed out. In his research he examined how water prices would change at a constant volume, with a slow increase in consumption, and during periods of water scarcity / drought. He concluded that if water was defined as a free-price product in a liberalised market, countries that abound in freshwater could sell huge amounts of water very cheaply, thus helping to alleviate regional scarcity. However, this would also make importing countries vulnerable, as they would make their water supply dependent on supplies from another country. There is also much debate (Larson 2015) about the case if a water-rich country – such as Canada – would set the international market price of water, it would make the positions of other selling countries disadvantageous, as keeping prices low would make exporting no longer worth. Another profound issue is the construction of artificial infrastructure for water transportation, which would increase the price of water in all its elements and result in hierarchical conditions where the buyer would make other offers to the seller in addition to paying the price of water, e.g. in the fields of infrastructure, transportation, power generation, and other related public services. Several countries – like France and England – have decided to engage the private sector's capabilities in water management and supply. Other countries (Colombia, Romania, China, Czech Republic, Hungary) chose a mixed form to operate their water supply and treatment systems, declaring that a public-private partnership could be the most favourable option for the government as well as the consumers (Alaerts 2019). Beyond doubt, the private sector plays an outstanding role in providing the sufficient technical and managerial sector expertise. The commercial financial sector that traditionally invests in structural developments as well as water facilities and infrastructure obviously seek to create profit. That means on the one hand they strive to realise the highest profit they can achieve; on the other hand, they are interested in improving the infrastructure and their capacities in order to accomplish the more efficient and more economical service. It is also important to note that water is usually traded through intermediary companies, i.e. involving the private sector may further increase prices. In 1997, for example, the Norwegian Nordic Water Supply Company signed a contract with Turkey for an order to supply seven million cubic metres of water to Northern Cyprus in two years, for which Turkey paid 4.1 million USD annually (Rende 2007). However, it is quite obvious that water transported in barrels and tankers does not alleviate water scarcity and can only be a temporary solution.

## **Water Stress and Possible Solutions in the Eastern Mediterranean**

Processes taking place in the Eastern Mediterranean region are textbook examples of the trends outlined above: the region is characterised by severe water shortages, a slowly evolving water strategy, multilateral water diplomacy and attempts to establish water trade. According to data gathered by the Water Risk Atlas, in 2019, 17 states were in the most vulnerable category considering water scarcity, 11 of which were located in the Eastern Mediterranean or Middle Eastern region (WRI Aqueduct 2019). Chronic water scarcity has many regional components including population growth, the consequent increase in consumption, unsustainable residential and industrial water use, negative effects of climate change, and the reduction and deteriorating quality of the existing natural water base. Beside environmental, demographic and industrial challenges, political factors are also undermining regional water security. Asymmetric power relations, un-



balanced financial opportunities and decadelong armed conflicts produce unfavourable conditions for poor and war-torn countries, while (seemingly) benefit political and economic powers of the region (Conker, Hussein 2020: 105–106). The fragile (and in some cases broken) pillars of water nexus generate a number of specific consequences. In the whole MENA region, over 60 % of the population lives in areas of high or very high water stress, about 70 % of the region's economic activities are produced in areas of very high water stress, while more than 50 % of the regional water consumption is unsustainable (Keulertz, Tony 2019; World Bank 2018: 10). Negative outlook of current trends will become even more problematic in the upcoming decades. Expected economic losses from water scarcity are estimated to reach 6–14 % of the GDP by 2050, while the warm spell duration index is expected to reach 200 days, generating extreme heat stress with average peak temperatures at nearly 50°C, by the end of the century (Schaar 2019: 5).

Countries of the region have provided different responses to deal with these negative circumstances. In the previous decade rationalisation of consumption, introduction of agricultural and industrial standards, establishment of desalination and water treatment plants, and allocation of external sources have begun. Responses, however, produced mixed results and limited impacts. While high-income countries successfully introduced non-conventional water resources such as desalination plants and water treatment plants, low-income countries lacked financial, technological, and/or political means to adopt accurate public policies and develop alternative supply technologies. These differences further increase the divide between regional actors and generate extreme examples of disparities. For instance, it is noteworthy that while almost 30 % of the global desalination capacity is located in three MENA countries (Saudi Arabia, UAE, Kuwait), major cities of other regional actors, such as Saana in Yemen, are expected to run dry in the following decade (Jones et al. 2019: 1348; Varisco 2019: 323–326). It is also telling that regional high-income states treat about 70 %, while low-income countries only around 8 % of their wastewater on average (World Bank 2018: 15).

Although these examples seemingly outline a partial victory over water stress, even high-income countries of the region will face severe conditions due to negative effects of climate change. Slowing population growth, normalisation of consumption or the emergence of non-conventional supplies, and generally ideal political, economic and social decisions may decrease unsustainable water consumption, but will not be able to solve environmental conditions such rising temperature and reducing precipitation. These conditions will be particularly significant in the Mediterranean region where forecasts expect a 3–5°C increase in temperature by 2040–2069 and a 10–20 % decrease in average rainfall compared to the data of 1961–1990 (Lange 2019: 5–6).

The rather negative overall picture calls for a rapid response that is sustainable in the long run; solutions that directly and indirectly ensure the maintenance and possible expansion of water resources. As mentioned above, one of the traditional methods of indirect solutions is the so-called “virtual water trade” through which the importing country reduces domestic water consumption by purchasing a particular product, i.e., does not use the water needed to create the commodity (Allan 1997; Turton 2001). However, as critical authors outline, virtual water trade is not always suited for less developed countries. These states should address multiple conditions before benefiting from virtual water trade and put a special emphasis on the cultivation of environmentally and industrially suitable crops (Neubert 2008: 124). Since virtual water trade is not a magical tool for eliminating water scarcity, other direct solutions aim to increase the amount of water intended for domestic use with the goal of ensuring a constant water supply through diversification. One of the pillars of diversification is treating non-conventional water reserves: countries of the region may supplement their own resources by undertaking the often-costly construction of non-conventional water treating facilities. As Pereira, Cordery and Iacovides (2009: 175) explain, non-conventional resources usually include saline water, brackish water, agricultural drainage water, water contain-

ing toxic elements and sediments, as well as treated or untreated wastewater effluents. It can be seen from the list that these treating solutions are not only expensive, but also have their limits and risks, concerning both human health and environment pollution. Thus, the second pillar of diversified sourcing may also apply techniques of fog-capturing, water harvesting, cloud seeding and water transfers (Pereira, Cordery, Iacovides 2009: 215–219).

Among these, water transfer has developed a prominent position in previous decades and has repeatedly raised the possibility of suppling dry regions through transboundary water trade. Although international water trade presented a number of technical, political and economic difficulties – some of which will be outlined later –, the potential results seemed to be promising for both exporters and importers. The utilisation of international resources on the one hand seemed to reduce the load on the domestic water infrastructure, and on the other hand it tried to provide the required amount of water in case of a periodic loss of domestic resources. While these potentials may play a fundamental role in the upcoming decades, there are concerns about their social, environmental and economic impacts (Shumilova et al. 2018: 9). Beyond these, political aspects may also hinder the potentials of water trade and could resemble the unbalanced and dependent relations of energy markets.

Seeing the forecasts for the future of the Eastern Mediterranean region, it is clear that multiple solutions are needed to address water scarcity. Water trade and regional cooperation occupies a prominent position among efficient and sustainable solutions as other examples including introduction of non-conventional resources and less water-intensive crops, development of efficient technologies and distribution, slowing population growth or legal, institutional and educational reforms (Roudi-Fahimi, Creel, De Souza 2002: 2–7). However, in the case of regional cooperation and water trade, it is questionable where the necessary resources can be obtained, and what external actors can be potential suppliers. Options are greatly reduced by the fact that potential exporters have to meet criteria such as sufficient resources in the long run, the technical base and portfolio needed to carry out their trading activities, and the political neutrality that is essential for the buyers.

## Turkey's Water Diplomacy and Attempts to Establish Water Trade

One of the potential (self-)nominated water exporters in the region could be Turkey, as Ankara has been seeking a regional water supply role since the 1980s (Gruen 2015: 157). Turkey's supply strategies are based on relatively abundant water resources. Although Turkey is far beyond the globally significant water hegemony, it enjoys a more comfortable regional position with its 25 hydrological basins (Tigrek, Kibaroglu 2011: 30–31). The country's per capita freshwater volume has recently decreased and accumulated around 1400 m<sup>3</sup> compared to the 91.2 m<sup>3</sup> measured in Israel or the 19.9 m<sup>3</sup> calculated in Egypt (Altinbilek-Hatipoglu 2020: 62). Rivers, lakes, and reservoir capacities contribute to these resources. The two most important river basins are Euphrates and Tigris, together account for 28.5 % of Turkey's national surface flow (Tomanbay 2000: 100). The annual exploitable water potential is calculated around 112 billion m<sup>3</sup>, while annual consumption was about 54 billion m<sup>3</sup> in 2017 (Altinbilek-Hatipoglu 2020: 63).

These decreasing but regionally still abundant water resources provide limited yet crucial potentials to develop a water trading role. According to Kibaroglu (2015: 154–155), Turkey's water diplomacy has been articulated and institutionalised since the 1980s, when the country's largescale development projects related to irrigation and dams produced technical opportunities for international water transfer. As domestic water projects have caused serious tensions between Turkey and some of its neighbours, the Turkish Ministry of Affairs first considered water diplomacy a strategy that supports the international recognition and reputation of domestic water projects, and, at the

same time, attempts to reduce related challenges of lower riparians (Dohrmann, Hatem 2014). Later, the completion of large-scale projects allowed the establishment of more ambitious plans. As Conker and Hussein (2019: 2) argue, water resources were seen by Turkish decision-makers as strategic foreign policy tools to enhance the country's regional influence. However, this regional influence did not necessarily mean the establishment of a regional hegemonic role. Rather, it has attempted to rebalance bilateral commercial relations by creating interdependent ties based on the exchange of Arab oil for Turkish water resources (Shah 2009: 2). A direct consequence of this strategy was the commercialisation of water which became a marketable commodity and a possible source of economic gains and political influence. Since water commercialisation seemed to provide as much political and economic benefits as oil or gas, Ankara has repeatedly pressed its water trade agenda and attempted to find regional markets. Thus, since the late 1980s, Turkey's water diplomacy has sought to establish trade partnerships in several respects and the possibility of water trade with the Gulf States has emerged beyond the countries in the Eastern Mediterranean. Potential partnerships were also aided by international processes changing with the end of the Cold War: Turkey (a NATO member) was already able to forge closer ties with neighbouring countries during the weakening of the communist bloc (Kibaroglu 2015: 154), encouraged by US foreign policy that supported Arab–Israeli reconciliation through various confidence building measure including water stability.

Thus, the first project to envisage a more serious water trade partnership was not accidentally named Peace Water Pipeline. The project, initiated by the Turkish Prime Minister Turgut Özal, in addition to alleviating regional water problems, expected the establishment of stability in the region based on the construction of pipelines, and considered water cooperation a confidence-building measure (Yıldız 2018: 2). Applied rhetoric has not only highlighted the geographical, hydrological and climatic necessities (Conker, Hussein 2019: 9), but also emphasised shared benefits and mutual utilisation of water resources through regional cooperation (Rende 2007: 168). The planning phase began in 1986 with such ambitious aims and goals. The original idea was that the water provided by the Ceyhan and Seyhan rivers would be delivered to regional partners through two pipelines. The eastern Gulf Route was originally planned to be 3900 km long, with its main branches and side-branches transporting water through Syria and Jordan to the Gulf States, including Kuwait, Bahrain, Qatar and the United Arab Emirates. According to preliminary plans, the eastern line was planned to transport a total of 2.5 million m<sup>3</sup> of water per day, and its construction cost was estimated at approximately 12 billion USD (Yıldız 2018: 3). In addition to Syria and Jordan, the western line also aimed to supply to Saudi Arabia, and its route would have connected major economic and touristic cities such as Aleppo, Homs, Amman, Medina and Jeddah (Rende 2007: 172). The planned 2650 km long western pipeline was design with the transport capacity of 3.5 million m<sup>3</sup> per day, with potential investment costs of 8 billion USD (Yıldız 2018: 3).

The large-scale vision of the Peace Water Pipeline project was hindered by a number of factors. In addition to technical and geographical difficulties, investment costs have proved to be one of the most significant barriers, with a total cost of 20–21 billion USD proving to be extremely costly (Gruen 2007: 157). Already in the early stages of the project it was a problem that Turkey gave a much stronger role to oil-rich Arab countries in terms of cost-sharing. At the end, instead of implementing the costly pipelines, these countries decided to set up similarly expensive, yet domestically controlled, desalination and water treatment plants. Besides technical and financial challenges, political aspects also decreased the enthusiasm of potential partners. While the Turkish rhetoric emphasized regional cooperation, shared benefits and mutual utilization of resources, possible importers considered the potential risks as well. In this regard, Arab states feared the

emergence of water dependence which could establish unbalanced relations with Turkey and have also provided influence for transit countries.

In addition to the Peace Water Project, another significant investment to build water export capacities was the Manavgat Project. The large-scale idea, based on the Manavgat river basin, envisaged the potential export of 180 million cubic metres of water, in this case using tank ships for transportation purposes. Although the transport alternative required the construction of new tankers designed for this purpose, at the same time the versatility of maritime shipping raised the possibility that Turkey could be a water supplier to the Eastern Mediterranean countries. Considering the plans, it is quite telling that in addition to the previously mentioned states, Greece, Libya and Malta have also emerged as potential target countries (Gürer, Ülger 2007: 176). Turkey has embarked on major developments within its means, building between 1992 and 1999 an infrastructure worth approximately 150 million USD in the Manavgat estuary, 80 km east of Antalya. The facilities serve partial needs of Turkish cities in the region,<sup>1</sup> and became available for international use in the early 2000s, when Israel indicated its intention to import water from Turkey. After lengthy negotiations, the agreement outlined in 2002 and detailed in 2004 provided for the delivery of 50 million m<sup>3</sup> of water annually over a twenty-year period (Conker, Hussein 2019: 11). As highlighted earlier, the agreement sought to connect a transport distance of approximately 600 km between Manavgat and Ashkelon with tank ships designed for this purpose. Although this solution was a cheaper and safer alternative to pipelines laid in a deep-sea environment, it also required the construction of pipelines, storage capacities, water treatment facilities, and pumping and filling stations in addition to transport vessels. Turkey spent about 147 million USD on such constructions by 2006 and also expected Israel to carry out the necessary works under the agreement (Gruen 2007: 161–162).

Despite high investment costs, Turkey hoped for significant political and economic gains from Israeli water imports. Political opportunities should be interpreted in the light of regional circumstances in the 1990s. During this period, Turkish foreign policy suffered from various external strains extending from water disputes with Syria and Iraq through deteriorating relations with the Arab countries to separatist movements by the Kurdish PKK (Conker, Hussein 2019). With these problems, Turkey saw a potential ally in Israel that could reduce its regional isolation and rebalance its damaged regional weight. From an economic point of view, the project itself did not promise large income opportunities. However, Turkey considered Israeli exports a pilot project that could later generate significant economic benefits if other international partners were involved (Rende 2007: 170).

The importance of Turkish–Israeli water transfer was also enhanced by the fact that the two parties considered water as an internationally tradeable commodity. However, in practice, this meant that in addition to investment and transport costs, developing market conditions also influenced purchase price perceptions. One of the main obstacles to the project was the fact that the specified lowest possible price of 0.7 USD / m<sup>3</sup> would have reduced Turkish profits to a minimum, and it was more expensive than the purchase price of Israeli domestic water resources (Rende 2007: 163). For the Israeli side, Manavgat was accordingly a cheaper alternative than the price provided by desalination plants, but more expensive than water obtained from domestic sources. In addition to high investment costs, the project was eventually doomed by the relatively high Israeli rainfall in the years after 2004 and rising oil prices (making transportation expensive), in parallel with the gradual alienation of relations with Turkey. These parallel processes first decreased Israeli enthusiasms, then sealed the fate of Manavgat Project (Szwedo 2019: 146–147).

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<sup>1</sup>The Manavgat project has established 500,000 m<sup>3</sup> storage capacity with 250,000 m<sup>3</sup> of refined and 250,000 m<sup>3</sup> of raw water. Beyond export opportunities, the project intended to supply coastal towns and tourist investments surrounding the Manavgat region (Gürer, Ülger 2007: 176).

The failure of Peace Water and the Manavgat Projects was influenced not only by rational economic and business interests but also by political problems, as potential buyers feared the dependence on Turkey. These concerns have also been raised with regard to the water partnership with Northern Cyprus and have greatly strengthened the position of critics questioning the neutrality of Turkish water trade. The possibility of establishing a water partnership between Turkey and Cyprus has a long history and since the 1950s there has been a steady discussion of importing Turkish water resources to the island. The first major cooperation was provided by the Manavgat project: under the protocol signed in 1997 between Northern Cyprus and Turkey, Ankara promised to supply the Turkish Cypriots with 7 million m<sup>3</sup> of water annually. As there was no sufficient transport capacity available at this phase of the Manavgat project, the aforementioned Norwegian Nordic Water Supply Company was invited to transport water to Northern Cyprus using floating plastic balloons (towing bags). However, the process proved to be less effective,<sup>2</sup> so the Turkish Cypriot wing of the Manavgat project was extinguished in a few years (Elkiran, Aslanova, Hiziroglu 2019: 3). Nevertheless, water cooperation remained on the agenda for the following years. As previously, Ankara's motivations were influenced by political interests, which in the case of Cyprus sought to increase Turkish strategic role and sustain it in the long run. Intensive water stress and Turkey's historical positions on the island, as well as geographical proximity, provided a perfect opportunity for achieving these aims. Moreover, in this case, Turkey was able to control the receiving end of water trade: while the Arab countries and Israel were free to decide on the possibility of water trade, the dependent relations of Turkish Cypriots did not allow the rejection of Turkish demands.

Consequently, after conducting impact assessments and shifting transport technology from towing bags and tank ships to the construction of a water pipeline, the Turkish government finally decided in 2011 to implement the Cyprus Water Supply Project. The project – originally planned for 450 million USD – was completed in 2015 and exceeded the originally planned costs by about 100 million USD (Gungor 2016: 3). The project scope included constructing a 107 km long line between the Alaköprü Reservoir in Anamur and the Geçitköy Reservoir in Northern Cyprus, of which about 80 km crossed the Mediterranean Sea between Anatolia and Northern Cyprus. The rather complex project posed a difficult technological task for the engineers designing and constructing the pipeline, taking into account not only potential water pressure, weather conditions and maritime traffic, but also ensuring that the otherwise extremely costly investment can still be a rational business investment. The pipeline delivered in 2015 will in principle provide 75 million m<sup>3</sup> of water annually to Northern Cyprus for the next thirty years, of which 37.76 m<sup>3</sup> is suitable for domestic consumption and the rest is untreated irrigation water (Mason, Bryant 2017: 15–16; Gungor 2016: 3).

When assessing the impact of the pipeline connecting Turkey and Northern Cyprus, it is worth distinguishing between the technical and political/financial aspects of the project. Despite the maintenance works required to be completed since the construction, the Cyprus Water Supply project can be considered a major engineering success that has proven Turkey's qualities in terms of both water supply and technical challenges. In this sense, the project is one of the key elements of Turkey's water management portfolio, demonstrating the country's ability to build infrastructure to realise its water trade principles. However, the design, construction and infrastructure operational aspects of the project are more problematic and raise political concerns. In the construction of the Northern Cyprus pipeline for example, it has been a matter of serious resentment that despite Turkey's rhetoric based on fraternity and humanitarian aid, it did not treat Turkish Cypriots as equal partners. Design and construction works were mostly performed

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<sup>2</sup>Instead of the planned 7 million m<sup>3</sup> per year, only a total of 4.1 million m<sup>3</sup> of water was supplied to Northern Cyprus between 1998 and 2002.

by Turkish engineers and companies, and following the handover, operation was not given to the authorities of “Turkish Republic of Northern Cyprus” but a Turkish corporation (Özdemir 2019: 15–26). This kind of attitude on behalf of Turkey is definitely indicative. On the one hand, it indicates that Turkey sees its water investments in Northern Cyprus as political tools, and instead of supporting local water management developments, it is forcing the construction of infrastructures that will maintain and deepen the patron-client relationship. Secondly, it is also striking that Ankara takes into account its economic and business interests despite the patron-client relationship system, i.e. it considers the water supplied to Cyprus a commercial commodity whose price and quantity are not determined by some kind of Pan-Turkic fraternity, but the market conditions and Turkey’s politico-economic interests.

## The Limits of Turkish Water Trade

Despite the successes in Northern Cyprus, the Turkish water diplomacy and water trade face significant barriers. As these limitations have only been partially highlighted, it is necessary to review them briefly below. The factors limiting Turkish water trade can be divided into local and international problems, and basically outlined in four main areas:

- Large-scale domestic water management projects are hindering the international viability of Turkish water trade by negatively affecting neighbouring countries.
- Due to the increase in domestic water consumption and the decrease of water resources, the possibility of water exports is expected to become unreasonable and nearly impossible in the medium term as Turkey’s national consumption will take away the surplus water that can be used for export purposes.
- Decreasing water resources and expensive investment costs reduce the willingness to invest in water trade. This aspect influences both the export and import.
- Turkey’s regional conflicts and diplomatic strains alienates potential buyers and steers them towards domestic water developments or other potential exporters.

When focusing on the domestic problems, it can be ascertained that water development projects in Turkey are of strategic importance, as they play an important role in energy production, in addition to potable water distribution and ensuring the water supply of agricultural production areas. The Southern Anatolia Project is a classic example of such investments, with the 22 reservoirs, 19 hydropower plants, and the vast irrigation water network created by the program, becoming one of the most important manifestation of economic and social development in the south eastern regions of Turkey (Yuksel 2015: 151). However, in addition to their domestic significance, these projects also cause serious international concerns, as the expropriation of the water resources of cross-border rivers adversely affects downstream countries. Although Turkey has paid explicit attention to avoid the use of cross-border rivers in the cases of Peace Water, Manavgat and Cyprus Water Supply projects, domestic mega-projects still adversely affect Turkish water trade. On the one hand, because unilateral development of megaprojects of Turkey has reduced trust among neighbouring countries and decreased their willingness to cooperate. On the other hand, because other, non-water related disputes<sup>3</sup> further reduce the number of potential buyers and make the intentions of the Turkish water trade unreliable in the eyes of many. As Conker and Hussein (2019: 15) put it, the required “approval of the neighbouring states was beyond Turkey’s power grip” and thus, “the Turkish government has been unable to impose its political agenda”.

<sup>3</sup>E.g. Greek-Turkish disputes, Cyprus conflict, Armenian–Turkish tensions etc.

Although these mega-projects have made it possible to accumulate significant amounts of water, the decline in the water base resulting from population growth, increased consumption and negative effects of climate change is also adversely affecting Turkey. A narrowing gap between the available quantity and water consumption can be well observed in long-term trends: while in 1962 there was 7872 m<sup>3</sup> of renewable internal freshwater resource per capita, by 2014 this volume was reduced to 2939 m<sup>3</sup> per person annually (World Bank 2020). This trend is projected to continue in the future. According to estimation of the World Bank, Turkey's available resource may reduce to 1120 m<sup>3</sup> / capita by 2030 when the country's population is projected to reach 100 million (World Bank 2016: 15). The associated dangers become apparent with regard to the amount of water available: According to calculations by the General Directorate of State Hydraulic Works (DSI), the amount of water that can actually be exploited decreased to 110 billion m<sup>3</sup> by the early 2010s, which is close to the projected water consumption of 112 billion m<sup>3</sup> for 2023 (DSI 2013). Although the latter data are subject to change, it is a warning sign that the DSI's calculations are confirmed by other sources with only slight differences (Düzen, Özler 2013: 3; World Bank 2016: 5). In practice this means that Turkey will have little room for manoeuvre to build an international supply base after domestic demand is met. The fact that Turkish water export strategies ignored these trends shows that the Turkish foreign policy considered ad hoc political benefits more important than the establishment of long-term commercial partnerships.

In addition to the reduction in capacity and the disputes arising from domestic investments, the technical and financial problems of water trade also burden the visions of Turkish water diplomacy. Although Turkey has an ideal geographical location in many respects, it is unable or limited to take advantage of its neighbours' markets due to its tense relations with nearby countries. Disputes with countries such as Greece or Syria greatly increases the cost of Turkish water trading opportunities, as potential partners are in many cases outside or on the peripheries of Turkish geopolitics, requiring the construction of more sophisticated and expensive infrastructure, and increasing transportation and operating costs.

Last but not least, it is worth pointing out that political constraints also hinder the effectivity of Ankara's external water strategy. One of the most important features of Turkish water diplomacy is that its actions must be interpreted along the lines of the country's energy dependence, as Ankara has for decades seen freshwater resources as the means for offsetting the financial and political deficit of energy imports. A direct consequence of this attitude is the commercialisation of water: in this approach, water is a marketable commodity that, like oil or gas, can provide political and economic benefits to exporters (Shah 2009: 2). As presented earlier, the potential political advantages of Turkey have unconvinced potential buyers, who have repeatedly questioned the neutrality of Ankara's intentions and feared the emerging dependencies. Although certain signs of political leverage can only be found in the case of Northern Cyprus, it has been repeatedly suggested by the potential importers that Turkey may use water as political tool for creating dependent ties (Conker, Hussein 2019: 7–14). The general fear among possible partners suggests that Turkish water trade is paradoxically a victim of the country's geopolitical ambitions, as disputes with the states in the region preclude the neutrality required for a water trade partnership.

## Conclusion

Securing water supply is undoubtedly one of the greatest challenges of the 21<sup>st</sup> century. Population growth, water pollution and the overuse of surface and underground waters have presented humanity with issues that need to be addressed in a way that has never been seen before in history, as almost 8 billion people have never lived on our planet. The freshwater volume available

on Earth is constant, but its distribution is uneven and less and less accessible due to various impacts. This means that worrying water shortages have developed in some areas of the Earth by the late 21<sup>st</sup> century, which are going to gradually become more severe due to further unfavourable developments. Such an area is the Mediterranean basin, where the soaring population and the declining amount of renewable water volumes are generating huge problems already. It can also be observed that water sharing and common water bases (cross-border rivers, lakes) have played a major role in the aggravation of political-diplomatic conflicts. As well as the important role played by a country's location and political and military potential in water sharing, which enabled it to provide the necessary water flow, even to the detriment of other states. In addition to conflicts, there are, of course, many examples of states cooperating in water management issues, recognising that the unilateral decisions can have drastic consequences, whether in terms of mass migration or the destabilisation of neighbouring countries. Therefore, it is not surprising that water diplomacy and water trade are an increasingly important – and expected to become increasingly trending – branch of international relations. Water is not a traditional commodity, as it is obviously meaning much more. However, as its value can be expressed in money, it can also function as a product. How this product is sold, in what way, through what channels, and how its trade is regulated is still unclear.

The states in the eastern part of the Mediterranean face ongoing complex challenges of water supply. The difficulty of water diplomacy negotiations and the attitude of the dominant states, in this case Turkey, to the negotiations make it extremely difficult to develop a viable and long-term water management strategy in the region. In addition to providing its own consumption, Ankara has reserves that make the country suitable for exporting water – for the time being. Dominant countries with severe surpluses could also forge a geopolitical advantage from the sale of water, as conditions in the region are expected to worsen rapidly, as seen above. However, the exploitation and transportation of water requires very significant investment, as the suitable infrastructure must be constructed. Projects related to the use and trade of water offer innovative opportunities that we cannot yet appreciate today, as supply must be secured and, if no other resources are available, and a state does not want to be tied to another country's exports (as in the case of energy) there is no other choice but to develop and implement technological improvements while creating rational water consumption – in the fields of desalination, water purification and irrigation. We would like to emphasise that all these steps usually exist as feasible options until the exporting country intends to realise other political and economic gains. Water cooperation and water projects are constantly on the agenda, whether in Israel or Northern Cyprus. We acknowledge the limitations of the programs and see that the countries involved in the water management issues face a number of pitfalls, such as Turkey's dominant political position, lack of infrastructure and the very high cost of improvements, whether it is the construction of reservoirs and pipeline systems or transport capacities. The processes of water use, and water trade can be operated, water can be interpreted as a product, however, the creation of a smooth, well-functioning system is not a realistic solution in the Eastern Mediterranean region yet.

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