Growing Cities and Subnational Hydropolitics

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Abstract

Although academia doesn't expect water wars in the 21st Century, we should be ready to prevent the water conflicts between provinces at the subnational level. This is not only because %60 of the world population will live in urban and metropolitan areas when we reach the year 2050 but also because of a lack of visionary approach and adequate governance arrangements to prevent and resolve conflicts over water use. In addition to these two effects when we count on climate change effects on water resources it means that we are moving towards stronger water conflicts at different levels compared with the 20th Century.

Increasing sub-national water conflict between cities and federal states is mainly driven by decentralization policies and climate change effects on shared water resources.The role of growing metropolitans in water management is increased worldwide as a result of decentralization. Our past experiences in Turkey and ongoing low-level conflicts are also pointing out that this issue will need more attention from now on.

In this article, we aim to focus on growing water conflicts between sub-national actors, including municipalities, states, and provinces. We also aim to define some existing conflicts that need innovative sub-national hydropolitics while potential growing conflict needs to preventive measures.

Keywords: Growing cities, Water shortage, Subnational Hydropolitics, Hydro Diplomacy

1.INTRODUCTION

Population growth, economic expansion, and climate change are increasing the pressures on water resources around the cities. In his book(Moore S. 2018), Scoot Moore stated that "subnational hydro politics are an important feature of several large countries, including the United States, India, and China. Moreover, disputes between water users in shared river basins have often persisted despite repeated attempts by central governments to resolve them through both persuasion and coercion. Yet despite the growing threat of water scarcity around the world, little research exists on subnational politics of shared or reallocated water resources"

According to the Zhanga et al study (Xiang Zhanga at al, 2019) in the first two decades of the 21st century, 79 global big cities have suffered extensively mainly climate change-driven drought disaster putting tremendous pressure on a city's water supply. In addition to this

although they are not located in naturally arid areas, several cities in the world are subject to droughts and water scarcity of severe proportions; For example; Beijing has reached a 3,6 billion cubic meters water consumption yearly, far more than the 2,1 billion cubic meters locally available. Istanbul has reached a 1.2 billion m^3 yearly consumption,35 percent of this amount comes 165 km away from Istanbul city. Nearly one in 10 watersheds in the United States is 'stressed,' with demand for water exceeding natural supply.(Capodaglio G.A.at al, 2016). Several growing cities, which are dependent on water reallocation from out of their provincial borders have a high potential for conflict between municipalities. Growing cities and growing challenge over water call for preventive subnational hydropolitics

2.GROWING CITIES

Over half of the world's population live in urban areas that occupy only a small percentage of the Earth's surface. Urban water demand is projected to increase by 50– 80% by 2050 (Florke , Schneider, Mc Donald 2018). Their growing water demand has been supplied from increasingly distant places by long-distance pipelines.For instance; Istanbul depends on additional water transfer[1] from 165 km. away while Ankara does from 60 km. away. These can be impressive feats of engineering, but both of them are long-distance, a large amount of inter-basin water reallocation[2] to growing urban economies and populations.

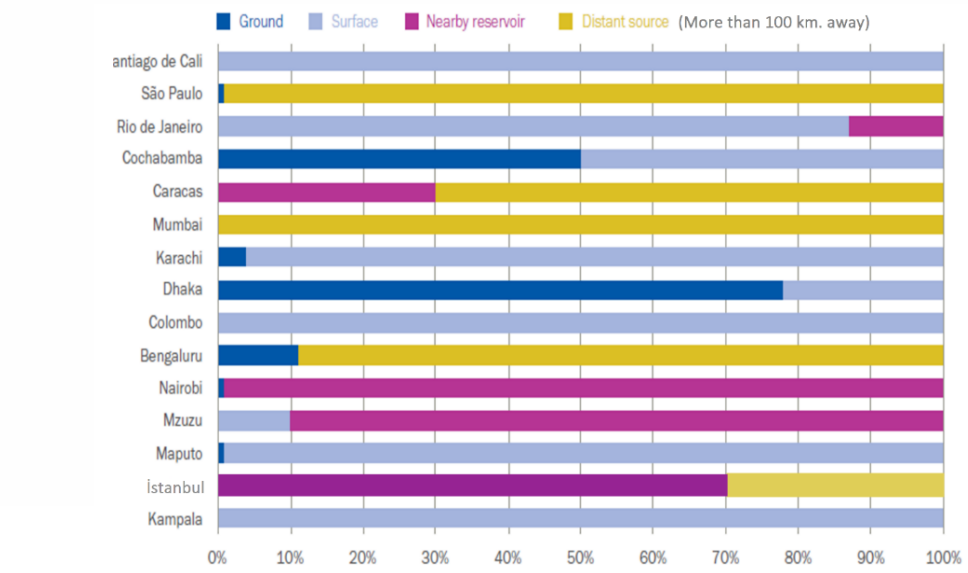

Figure 1. Urban water utilities rely on nearby or distance water resources (After Mitlin, Beard, Satterthwaite, and Du. 2019).

[1] **Transfer:** A transfer refers to the physical movement of water. It differs from 'reallocation' in that the water is not necessarily formally allocated and used.

[2] **Water reallocation:** Transfer of water between users who are committed formally or informally to a certain amount of water when the existing allocation is physically impossible, economically inefficient, or socially unacceptable.

When they grow, they need to allocate water from out of their boundaries and neighboring water basins. As shown in Figure 1,Sao Paulo, Mumbai,Caracas, Bengalure , İstanbul rely on water sources more than 100 km.away from the cities.

2.1 City Development and Water

It is a traditional and commonly accepted rule that the lack of available freshwater can hamper the development of a city and can result in a true 'human suffering disaster' conditions. Therefore additional drinking and domestic water supply to growing cities have been a priority for water management authorities. But during the second half of the 20th century, most growing cities have prioritized securing their economic and financial viability without considering sustainability. In addition to this during the decentralization period, states, provinces, and municipalities have become increasingly important players in natural and water resource management across the globe.

From the beginning of the 21st Century, especially in developing countries, metropolitan city mayors have taken more responsibility for city development to raise the living standards of the city residents. The resulting development plans firstly required more water or innovative water management, a water-smart city approach. Unfortunately, most of the developing word's cities don't have enough institutional capacity as well as efficient water infrastructure. Most of the city managers have chosen the shorter way to extract more water than applying efficient water use policies that may take longer than his/her elected period. Municipalities are less willing to invest in long-term and largescale programs that require substantial investments and continuity over time or that do not demonstrate immediate results. This situation is generally led to more water allocation from local and neighboring basins.

Therefore subnational hydropolitics in practice are going to face to cope with the emerging trends of water demand between neighboring cities as well as federal states. To put water diplomacy into action, we need a strategy with new language to share, new approaches, methods, new mechanisms and innovative tools to apply.

2.2 Emerging Water Transfer From Rural Area to Growing Cities

Water security of the growing cities has been a priority issue and water reallocation from rural to urban regions has become a common strategy to meet their demand. Due to this strategy and rapid urbanization, particularly in the Global South, it is estimated that competition for water between cities and agriculture will grow.

In their remarkable study, Flörke et al (Florke , Schneider, Mc Donald 2018) examined 482 of the world's largest cities with estimates of future water demand and predictions of future water availability. In the study, urban surface-water deficit is projected as of 1,386–6,764 million m^3.It is also obtained that more than 27% of cities studied and 233 million residents, will have water demands that exceed surface-water availability. Results obtained showed that 19% of cities, which are dependent on surface-water reallocation, have a high potential for conflict between the urban and agricultural sectors since both sectors cannot obtain their estimated future water demands. In many countries, this situation can rise tension between cities, local government, federal states that call for innovative sub-national hydro diplomacy.

The new research complements updates to WRI's Aqueduct tool, which recently found that by 2030, 45 cities with populations over 3 million could experience high water stress.

Growing cities have always been dominant to secure their fast-growing water demand asking more water from even out of their boundaries. internal displacement from rural area to the cities will not be easy to stop in a short period. Therefore limiting water allocation can be a starting point to the cities in case they don't use current water potential as efficiently as possible in a circular water management concept. Improvements in agricultural water-use efficiency also could free up enough water for urban use.

Water demand in growing cities grows much faster than rural water demand. For instance, in every year, İstanbul Municipality subscribe 200 000 new water subscribers while Ankara,İzmir 100 000 and 70 000 respectively.

This rapidly growing demand and climate change effects indicates that we urgently need to shift our paradigm. Priority must be given to use water as efficiently as possible instead of right away water supply to the cities.

Cities water demand under the pressure of internal displacement is likely to grow.Some studies showed that 69 urban agglomerations receiving water through 103 reallocation projects (Garrick at al, 2019). This trend has already shaped a perception that the urban area is a net water receiver while rural is a donor. For example, Florke et al (Florke , Schneider, Mc Donald 2018). estimate that a 10% increase in irrigation water-use efficiency could reduce urban surface- water deficits by 2.7 billion m^3 by 2050, affecting almost 240 million city residents. This is an acceptable but incomplete approach that only points out the necessity of an increase in irrigation water-use efficiency in rural.

The high pressure of the growing population and the priority of drinking water supply made the cities primary water receiver.It should be noted that supplying more water is not a sustainable way to the cities. Therefore we urgently need to paradigm shift. Priority must be given to use water as efficiently as possible instead of right away water supply to the cities. Especially in Developing World, we need an innovative approach to use water as efficiently as possible.

The status and trends of water reallocation from rural to urban regions based on academic literature and policy documents have been examined by Garrick (Garrick at al, 2019). According to their findings "*approximately 16 billion m^3 of water per year moving almost 13 000 kilometers to urban recipient regions with an estimated 2015 population of 383 million. Documented water reallocation shares of watercourse are concentrated in North America and Asia with the latter constituting the majority of watercourse pairs implemented since 2000.*"
Growing cities has put increasing pressure on water resources,in context of emerging water reallocation from rural to urban areas. In arid and semi-arid zones, this reallocation can create a particularly important conflict in terms of the water rights of rural communities.

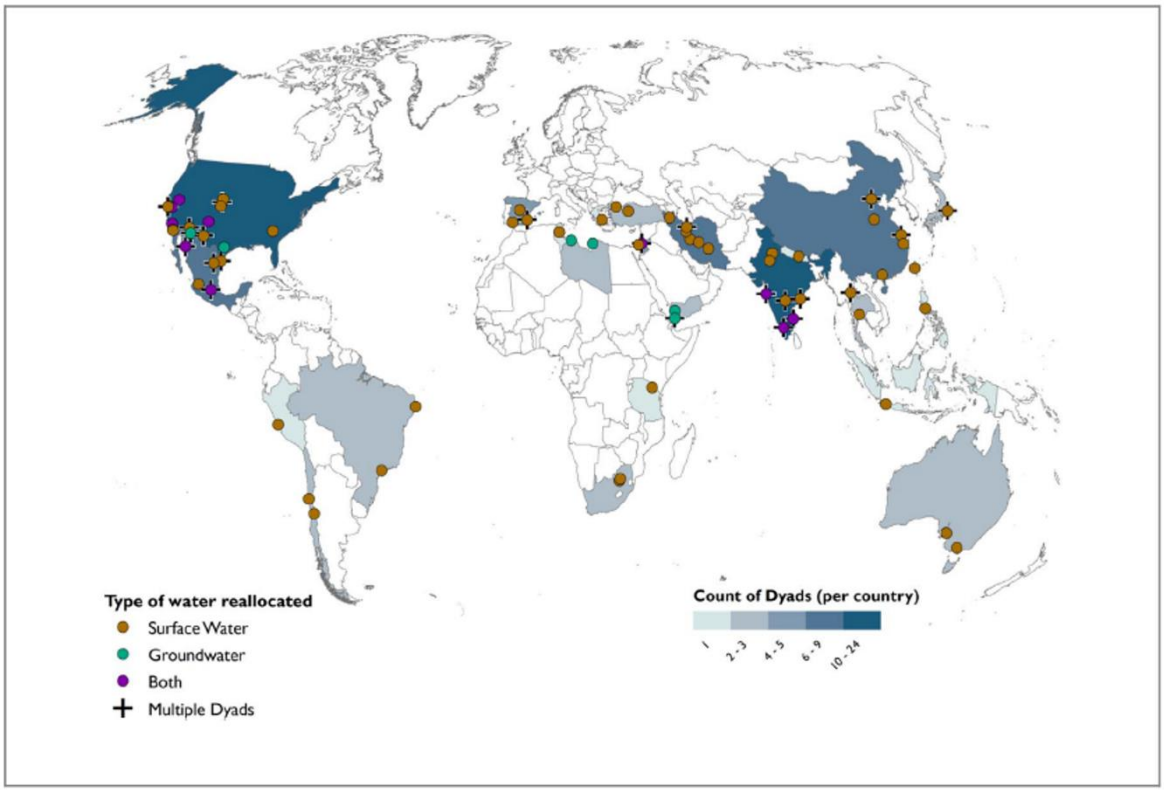

Figure 2.Water reallocation from rural to urban regions: watercourse pairs in the global reallocation database (GRaD) (Garrick at al, 2019).

In their study, Garrick (Garrick at al, 2019). stated that" *Asia and North America account for the vast majority of reallocation region (watercourse pairs) documented by the current literature. Of the 103 watercourse pairs, 49 are in Asia, while 33 watercourse pairs are in North America*" (Figure 2).

In Turkey, the top three cities with the highest population İstanbul, Ankara and İzmir have already reached the limit of their local water potential. Because of internal displacement-based rapid population growth and climate variability, these three cities have depended on large amounts of water transfer from other basins for the last ten years. These three cities can be seen as plotted points in Figure1 given by Garrick at al. continue to grow up and water dependency also grows up. This will certainly increase the pressure on water resources in the donor basin with rainfall variability.

3.METROPOLITAN MUNICIPALITIES DOMINATE WATER MANAGEMENT

Integrated water resources management (IWRM) approaches have most often in the form of river basin management councils. Therefore for instance,the European Water Framework Directive divided the continent into 110 river basin districts (Newig, Schulz and Jager, 2016). Although this approach is a commonly accepted base for sustainable water management, still provision of water infrastructure, service delivery, and related administrative tasks, are typically held by local governments, or municipalities.

In terms of implementing water management activities, municipalities are in a relatively unique position and have maintained their administrative competencies at the local level.

Growing population and climate change effect could bring serious difficulties to carry out their basic administrative competencies Under the growing pressures, municipalities want to expand the scope of their activities to address the basin level that can create conflicts with the other cities on water allocation. Although municipalities do not have direct authority for the basin located outside their municipal borders, especially metropolitan municipalities could be dominant to allocate water originate both within and outside of municipal boundaries. This is because of that decisions involving the distribution and use of water resources are inherently political,

This can create serious emerging and chronic conflicts between municipalities located in the same watersheds. When central government policy fails, a national water policy or water governance institutions are nonexistent to articulate the relationship between municipalities, conflicts can grow up faster creating a high-conflict watersheds. Under these circumstances, this high-conflict watersheds.need to subnational hydropolitics and municipalities need to focus exclusively on more efficient water management within their territories,

4.WATER SHORTAGE -INDUCED WATER DIPLOMACY BETWEEN TWO CITIES

Increase in urban water demand is projected as of 50– 80% by 2050 resulting competition between cities and agriculture for water. This challenges between the city of Los Angeles and the Owens Valley started in the early 20th century (Libecap, 2009). Urban population has rapidly increased since 1960 and created new water sharing conflicts globally since last 20 years (Garrick at al, 2019).

In October 2014, the Cities of Phoenix and Tucson USA announced an agreement for Phoenix to divert some of its share of Colorado River water to Tucson to be stored underground there for future use. Because Phoenix uses only about 70 percent of the amount of water it subcontracts from the Central Arizona Project, it proposes to send the excess to Tucson for storage as a hedge against likely future shortages on the Colorado River. When shortages occur, it was an effective resource management strategy with mutual benefits for two cities (Zarghami, 2015)

4.1 Strategic Investment in Solutions

Even in more centralized countries, however, the division of powers and responsibilities between central and subnational levels of government creates ambiguity in who is responsible for certain issues, as well as inherent coordination problems between levels of government.

As cities develop, societal expectations grow, and as water resources reach the limits of sustainable exploitation, urban water managers are being faced with increasingly complex and multi-faceted challenges.

One of the main challenges to water resource management in urban areas is the pollution and depletion of shallow and deep aquifers that traditionally supplied the urban area with drinking water. The subject is worth investigation and research by scholars. Several proposals have been provided until now. City Planner Kamal Jalouqa in his lecture on “Stormwater

management in Greater Amman" provided some solutions to these problems through improving filtration to aquifers by good urban design, well-designed drainage systems and transfer to watersheds that are nearby and have less or no urbanization (Jalouqa, 2015)

Foreseeable climate change and population growth challenges facing large cities will need for strategic investment in solutions that will deliver long-term, lasting sustainable outcomes for donor and recipient regions

4.2 Preventive Measures and Hydro Diplomacy

Preventive sub-national hydro diplomacy would firstly require applying a systems approach and a long-term perspective to identify unexpected consequences of water reallocation and distributional implications.

On the base of this identification, it is needed to build capacity that creates a systems perspective that links reallocation with wider discussions regarding development, infrastructure investment and institutional strengthening.In addition to this grassroots level hydro diplomacy can help to identify the common myths and perceptions of reallocation to guide engagement, communication and compensation approaches.

Use of technological advancement in mainstream practice in the water and development industries can take time for developing regions. Therefore increasing investment in human capital with building capacity may be a starting point to facilitate effective hydro diplomacy at the grassroots level.

Instead of relying on traditional, technical, linear management approaches, innovative hydro diplomacy requires an integrated, adaptive, coordinated and participatory approach for both rural and urban sustainable water management.

Preventive Hydro Diplomacy that is based on water use efficiency and the fairness of compensation approaches, including new infrastructure, alternative water supplies, community development, can play an effective role to lessen the resistance of donor region and debates about the ownership of water

5.CONCLUSION AND RECOMMENDATIONS

Although it includes some similarities between international and sub-national water conflicts, resolving subnational water conflicts require deeper attention than that of the international water conflicts. Firstly we should be aware of that the root of subnational conflicts in water management is not seen yet. Conflicts of interest are growing slightly at the local level. When these conflicts are projected beforehand, preventive measures can play an important role to avoid them. Therefore governments, multilateral institutions, and researchers should devote much attention to analyze the potential water conflicts at the subnational level.

Preventive measures can be collected in four main areas

1. Raising awareness on the current trend and analyze continuing low-grade conflicts in the basins
2. Capacity building to facilitate grassroots level effective hydro diplomacy

3. Good water governance and fairness approach to the rural area together with technological assistance and compensation policies
4. Accelerate the transition to the circular water management concept in cities

In general, subnational water conflicts potential can be seen as a matter of local and mainly sectoral interest that can be prevented easier than that of the international one. It is also presumed that national leaders can play a powerful role in bringing parties to the table and brokering consensus. But past experiences showed that this didn't work efficiently. Local actors play a more important role in inbuilt confidence and appropriate implementations. to solve these anticipated conflicts

It should also be noted that being late to prevent it can shape a national security threat with the growing effects of climate change on local water resources. This requires the political sensitivity of local water issues and at the same time would encourage the involvement of NGOs and multilateral institutions to provide actionable perspectives. If NGOs and other players have the right to provide input on water decision-making, grassroots-based water diplomacy may play an important role to avoid potential conflicts in water diplomacy.

Good water governance can bring different stakeholders together to achieve the most equal and efficient water use not only at present but also in the future water shortage period. The donor area should have technological assistance as well as need to be convinced equitable and reasonable sharing of local water potentials. The concept of benefit-sharing' may also offer a constructive and practical path forward

Consequently, water reallocation from rural to urban areas as well as from neighboring municipalities watershed will remain a key policy response to the trends of increasing urbanization, changing water supply reliability under climate change, and growing populations in cities.Any reallocation of water from rural to urban areas is often opposed to as a net loss to rural communities.
Win-win outcomes for both donor and recipient regions can only be available if integrated basin-wide development plan is implemented strictly. Otherwise, the city side weighted water allocation can bring significant consequences for donors and recipients, as well as the environment.
In conclusion, we would say that water conflict at each level ,from local to international is in emerging trend ,But this conflict is not inevitable with the right institutions and incentives, the cooperation of stakeholders. Subnational hydropolitics as well as digital water concept (Sarni,Webb,Cross,Glotzbach, 2019) and increasing treated wastewater reuse approach in growing cities will also be helpfull to avoid this raising tension.

References.

Capodaglio G.A.at al (2016) "New paradigms in urban water management for conservation and sustainability. Water Practice & Technology Vol 11 No 1 2016 IWA Publishing 2016

Florke M, Schneider Cand, McDonald R I (2018) Water competition between cities and agriculture driven by climate change and urban growth Nat. Sustainability 1, 51–
58. https://doi.org/10.1038/s41893-017-0006-8

Garrick D. at al (2019)" Rural water for thirsty cities: a systematic review of water reallocation from rural to urban regions" Environ. Res. Lett. 14 (2019) 043003 11.April 2019

Jalouqa, Kamal (2015) "Stormwater Management in Greater Amman" lecture notes, Jordanian Engineers Association, Amman, Jordan.

Kjellén M.(2019) Senior Water Advisor, UNDP" Climate Change Reveals Underlying Threats to Urban Water" available at https://www.undp.org/content/undp/en/home/blog/2019/climate-change-reveals-underlying-threats-to-urban-water.html

Libecap G. D. (2009) Chinatown revisited: Owens Valley and Los Angeles —Bargaining costs and fairness perceptions of the first major water rights exchange J. Law Econ. Organ. 25 311–38.

Moore S. (2018) "Subnational Hydropolitics " Oxford University Press

Moore S. (2018) "The Water Wars Within: Preventing Subnational Water Conflicts".May 30, 2018, *New Security*. Available at: https://www.newsecuritybeat.org/2018/05/water-wars-within-preventing-subnational-water-conflicts/

Mitlin, D., V.A. Beard, D. Satterthwaite, and J. Du. (2019). "Unaffordable and Undrinkable: Rethinking Urban Water Access in the Global South." Working Paper. Washington, DC: World Resources Institute. Available online at www. citiesforall.org.

Mancilla García, M., J. Hileman, Ö. Bodin, A. Nilsson, and P. R. Jacobi. (2019). The unique role of municipalities in integrated watershed governance arrangements: a new research frontier. *Ecology and Society* 24(1):28.https://doi.org/10.5751/ES-10793-240128

Newig, J., D. Schulz, and N. W. Jager. (2016). Disentangling puzzles of spatial scales and participation in environmental governance —the case of governance re-scaling through the European Water Framework Directive. *Environmental Management* 58:998-1014. http://dx.doi.org/10.1007/s00267-016-0753-8

Peter Newborne, (2016) « Water for cities and rural areas in contexts of climate variability: assessing paths to shared prosperity – the example of Burkina Faso », *Field Actions Science Reports* [Online], Special Issue 14 | 2016, Online since 15 April 2016, connection on 30 April 2019. URL : http:// journals.openedition.org/factsreports/4042

Sarni W.,Webb R.,Cross K., Glotzbach R. (2019) "Digital Water. Industry leaders chart the transformation journey" the International Water Association and Xylem Inc.

Xiang Zhanga at al (2019) "Urban drought challenge to 2030 sustainable development goals." Science of The Total Environment Volume 693, 25 November 2019, 133536

Zarghami M. (2015) Water diplomacy between two cities: What about the Colorado River? Available at https://www.linkedin.com/pulse/water-diplomacy-between-two-cities-waht-colorado-river-mahdi-zarghami/