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Wastewater Reuse in Lebanon: Shedding Light on Hydro-Social Politics at Multiple Scales

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ABSTRACT: Through an analysis of wastewater reuse in Lebanon, this paper investigates the socio-spatial politics of wastewater management. I analyse (some) of the complexities and contradictions at play in the scalar politics of water reuse. Drawing on empirical work in Lebanon, I aim to add a perspective from the Global South to this line of analysis, reading scalar politics through the wider framework of imperialism. The history of water and wastewater resource management in Lebanon is marked by a governance process that has been in permanent crisis, shaped by contestation in various ways and at multiple scales. This governance process is characterised by a structural lack of coherence unfolding in a context of political competition, class conflict, and englobing imperial domination. These pressures have manifested in radically neoliberal policies and recurring war. The scales through which wastewater, and eventually treated wastewater, reuse are managed emerge from the contradictory interventions of international development actors interacting with Lebanese administrations and the concomitant undermining of Lebanese state sovereignty. Two case studies of treated wastewater reuse in the Bekaa Valley will further illustrate these processes.

KEYWORDS: Imperialism, scale, potential, treated wastewater reuse, Lebanon

INTRODUCTION

Lebanon, which is well endowed with water resources compared to the wider Middle East, has nevertheless experienced water stress for the last two decades and is said to suffer from water scarcity (World Bank, n.d¹). International development organisations increasingly promote treated wastewater reuse (TWWR) as a way to alleviate shortage. Yet, three decades after the end of the Lebanese Civil War (1975-1990) and the initiation of reconstruction, the promise of reuse has not been realised. Only one TWWR project has been implemented, meant to serve some 20 ha of agricultural land in the Bekaa Valley, but it operated only for about two years. Lebanon's rate of wastewater treatment in general is also very low, notwithstanding around US\$ one billion of investment for wastewater treatment over the past 30 years (WB 2010, CDR 2018). A recent study on behalf of the International Water Management Institute (IWMI) in the context of its ReWater Mena project, estimated that Lebanon produces about 300 Mm³ of wastewater per year (Eid-Sabbagh et al., 2022). Prior to the financial collapse of the Lebanese state (2019-present), 20-30% of this volume was treated, but only 8-12% received more than primary treatment and could reasonably be considered for safe direct reuse. While little is reused directly, the IWMI study states that most inland rivers receiving raw sewage or treated wastewater are drawn upon for irrigation. The study conservatively estimates that reuse potential currently exists for the irrigation of 2000 ha (less than 3% of the actual total irrigated area in the country), given the state of wastewater treatment facilities (Eid-Sabbagh et al., 2022). The study further highlights some of the "governance obstacles and barriers" – stated in the depoliticised parlance of international development – that affect TWWR in Lebanon but

¹ The World Bank. n.d. Lebanon Water Supply Augmentation Project (Bisri Dam).
<https://www.worldbank.org/en/programs/bisri-dam>

does not explain the political and historical dynamics leading to the present state of wastewater management and reuse. The study therefor overlooks a central aspect of understanding water resource politics more generally and reuse specifically.

Why is reuse not practiced in Lebanon and why is so little wastewater treated? Which forces shape the resource production process from wastewater management to reuse? This paper aims to answer these questions by investigating the politics of wastewater treatment and reuse in the post-war era, running up until the current financial and political crisis. A considerable amount has been written on the intersection of class, clientelist-sectarian politics, and water resource management (see Kugnik, 1999; Ghiotti, 2006; Ghiotti and Riachi, 2013; Allès, 2010, 2012, 2019; Riachi, 2013; Eid-Sabbagh, 2015; Nassif, 2019). Much less work, however, has been done to analyse how global structural forces and actors have influenced water politics. In this article, I trace how imperialism shapes this process in Lebanon with specific regard to TWWR. I aim to contribute both to the existing body of literature on Lebanon and the literature on the socio-scalar politics of reuse.

The problem with wastewater treatment and reuse is structural and lies in the contradictory institutional and infrastructural arrangements emerging from the interplay of powerful international and national actors and reinforcing a drastic imbalance in class power. The scales through which wastewater and eventually TWWR are managed emerge from the contradictory interventions of international development actors interacting with Lebanese administrations and the concomitant undermining of Lebanese state sovereignty. The following section lays out the theoretical framework for this argument.

THEORETICAL FRAMEWORK

The socio-spatial politics of water reuse, scale, and territory

Beveridge et al. (2017) provide a useful entry point into the politics of wastewater reuse. The authors consider reused water "a thoroughly disorderly element in water governance, challenging existing power structures, spatial relations and institutions" (Beveridge et al., 2017: 26). They provide a conceptualisation of socio-spatial water politics for the study of reuse by combining Mollinga's articulation of the political sociology of water (2008) and the Territory Place Scale Network (TPSN) framework put forward by Jessop et al. (2008). The first identifies three spheres in which social interaction takes place, namely technical/physical, organisational/managerial, and regulatory/socio-economic. The second, emerging from critical rethinking of scale in urban studies and geography, aims to provide approaches that seriously consider the multidimensionality of contested processes of social (re)production, particularly the social production of space and scale. As the cross product of these two approaches, Beveridge et al. (2017) produce a heuristic matrix (see Table 1) for systematic analysis of social water management processes, avoiding "the confines of conventional spatial scales and administrative structures" (Budds and Hinojosa, 2012: 125).

This approach, adopting the above theoretical frameworks, aims to address the difficulties of water's scalar unruliness, whereby its geographical bounds and flows do not (necessarily) causally overlap with scales of resource management and social organization. In this sense, it de-essentialises scale, positing it as relational and constructed in a contested process.

Table 1. The socio-spatial dimensions focused on in the paper.

Interventions to control water Adapted from Mollinga, 2008	Sociospatial dimensions of water reuse politics			
	Territory	Place	Scale	Networks
	<i>Bordering, bounding, enclosure</i>	<i>Proximity, identity, local differentiation</i>	<i>Hierarchisation, vertical differentiation, inter-scalar action</i>	<i>Interconnectivity, interdependence, inclusion/exclusion</i>
Technical / physical <i>"the manipulation of the physical flow and quality of water"</i>	How do technical/physical aspects of water reuse shape territorialisation?	In what ways do technical/physical aspects of water reuse influence processes of place-making?	How do technical/physical aspects of water reuse shape scalar relations and differentiation (and vice versa)?	How do technical/physical aspects of water reuse enable or hinder particular sociospatial linkages?
Organisational / managerial <i>"the guiding of the human behaviour that is part of water use"</i>	In what ways do organisational structures and managerial practices enable or limit attempts to define water reuse projects territorially?	How do organisational / managerial aspects influence in generating or obstructing place-based solutions for water reuse and relations between places?	To what extent do organisational procedures and managerial practices shape inter-scalar relations around water reuse (and vice versa)?	How are organisational/managerial aspects enrolled in devising new sociospatial networks around water reuse and how are they contested?
Regulatory/ socioeconomic <i>"structures in which water management is embedded"</i>	How do regulatory and socioeconomic interventions shape the territorial reach of water reuse projects and how far are such inside-outside divides contested?	How do institutional arrangements and socioeconomic conditions influence the prospects for, and impacts of, water reuse projects in particular locales and their relation to other places?	In what ways do legal frameworks and socioeconomic conditions structure the scalar configuration and relations of water reuse?	How do regulatory and socioeconomic structures enable or hinder sociospatial relations (and conflicts) around water reuse?

Source: Adapted from Beveridge et al. (2017).

Socio-natural metabolism and the socio-ecological fix

Ekers and Prudham's (2017a) notion of the socio-ecological fix provides an entry point complementary to the above heuristic device given its theorisation of the political economy of nature and space, which includes a value relational perspective. Ekers and Prudham build on the notion of socio-natural metabolism and David Harvey's theory of the spatial fix to conceptualise the process of reproduction of the "material and symbolic conditions of capitalist accumulation through investments in landscapes" (p.2) as a process of production of nature and space often in response to crises of over-accumulation. Ekers and Prudham highlight the combined material and ideological processes wedding "capital accumulation, socio-environmental change and the conditions and experiences of everyday life" (2017b: 3). The idea that TWWR is deployed both in an ideological and a material attempt to shore up accumulation, as well as to address ecological breakdown as a 'fix' more generally (and at all scales),

offers insight into the context of Lebanon. But while Ekers and Prudham acknowledge the importance of primitive accumulation historically, as well as other forms of appropriation (p.14) and their ecological imprints, the authors' omission of the notion of imperialism and how it shapes value relations in the periphery makes their model less useful in the case of Lebanon.² In an analysis of development in the global south, as Yeros and Jah (2020) write, "colonialism and monopoly capitalism remain the proverbial 'elephants in the room', recognition of which is essential to understanding the permanent crisis of the capitalist system and the nature of its contradictions" (2020: 81).

Imperialism, accumulation, and value flows

As argued by Ness and Cope (2021), analytic engagement with imperialism remains an important practice. Recent works have rethought imperialism through the labour theory of value (see Smith, 2016; Kadri, 2015, 2018; Patnaik and Patnaik 2016, 2021) to show how it reproduces value flows to the core capitalist countries through the 'superexploitation' of labour in the Global South. Most relevant for this paper are the theorisations of imperialism as depression of the cost of social reproduction and the value of labour through war (Kadri 2015, 2018) and neoliberal policy prescription (Kadri 2015, 2018; Patnaik and Patnaik, 2021), as well as the resulting denial of sovereignty in the form of neo-colonialism (Nkrumah, 1966; Yeros and Jah, 2020). By imperialism, I mean the US-led imperialism of the Triad (US, EU, and Japan) as identified by Samir Amin (Amin 2013), which is enacted by the "imperialist class constituted of central industrial/financial circles and comprador capitalists" (Kadri, 2021: 2474). Analysing the mechanisms involved in the coercive reproduction of these historically-structured unequal value relations adds qualitatively different dimensions of appropriation and layers of scalar, spatial, and ecological dynamics and social contestation distinct from the conceptualisation of capital's operation by Ekers and Prudham. Neoliberal ideology and policy recipes play a central role in these valorisation processes via the restructuring of states and economies that US-led imperialism entails, selectively including and excluding populations along class lines and political alignment (Yeros and Jah, 2020). These processes must be central in an analysis of development in the Global South generally, and thus of wastewater and reuse specifically.

Drawing from the theoretical building blocks sketched above and focusing on interconnected and inter-scalar organisation of power across the administrative /organisational and socio-economic spheres, this paper traces how wastewater management and TWWR policies and interventions are shaped by different levels of interconnected hierarchic power structures, starting from Lebanon's articulation in the world imperialist system (Foster, 2007) down to the local scale with two case studies.

WASTEWATER AND WATER MANAGEMENT IN THE POLITICAL ECONOMY OF DE-DEVELOPMENT

This section sets the structural context in which wastewater treatment and TWWR take place. Ali Kadri (2015, 2018) shows US-led imperialism to be the determinant force shaping the developmental path of Arab states. According to his analysis, US-led imperialism integrates the Arab World into global dynamics of capital accumulation through war, "as feeder for capital accumulation through militarism" (p.8) – the direct profits from war related contracting -, and by denying Arab peoples (read working classes) control over their natural resources through neoliberal assault and the destruction from war (material,

² Their omission of historical and present US-led imperialism seems to be related to the (dominant) understandings of Marx's theorisation of capital as abstracted from a national economy (see Pradella, 2013 for an elaboration of Marx's understanding of imperialism), as well as Harvey's spatial theory and the (related) reduction of imperialism as an outdated or subsidiary concern to the operation of capital on a global scale (Harvey 2005). For related critiques of Harvey see (Patnaik and Patnaik, 2016; John Smith, 2018a, 2018b; Capasso and Kadri, 2023). Ajl (2023), in his critique of some of the most prominent theories of political ecology, points to the problematic theoretical and political implication that an omission of imperialism entails for peripheral development.

institutional, social, etc). From this perspective, de-development of Arab states serves to reproduce global value relations. It maintains the oil-dollar nexus central to US hegemony.

Three dynamics structuring development in Lebanon are relevant for this discussion of TWWR: 1) the existence, or threat, of conflict and war; 2) the resulting primacy of conflictual/rivalrous politics; and 3) the structuring of accumulation process in line with neoliberal orthodoxy.

War and the primacy of conflictual politics in an ungovernable system

Lebanon is a site of existential and bloody political contestation in the context of wider wars and conflicts in the region. Israeli attacks (1993, 1996, 2006),³ major internal conflagrations with thousands of casualties (for example in 2005, 2007, 2008, 2011-2016) (Balanche and Verdeil, 2016), and recurring political assassinations have marked Lebanon's politics since the end of the civil war and acted as a weight on development more generally. Such episodes interrupt law making and related government and policy implementation processes.

The spectrum of political parties encompasses two largely irreconcilable blocs. One, composed of six to seven political parties and independent parliamentarians, is strongly aligned with Gulf/Saudi and US interests, forming a comprador bourgeoisie. The other, which is associated with regional powers (Syria, Iran), comprising more nationally-oriented and largely-bourgeois parties, along with the armed resistance movement Hezbollah, is opposed to Israel and unwilling to submit to US-led hegemony over the region. Both blocs and all parties have their own internal contradictions and conflicts, entailing complex coalition politics that vary according to geography and political issues, but at the highest level they are divided over their alignment with, or opposition to, US-led imperialism and collaboration with Israel (see for example El-Husseini, 2010; Salloukh, 2017).

The post-civil-war Taef agreement (1990) reconfigured Lebanon's political structure by rebalancing sectarian power and representation inherited from the French mandate (Traboulsi, 2012). This endowed the three positions at the head of the state – the presidency (Maronite Christian), the speaker of the parliament (Shia' Muslim), and the prime minister (Sunni Muslim) – with effective veto power over the legislative and political process (see Picard, 2002; Leenders, 2012). As a result, political crisis and gridlock became a perpetual phenomenon at all levels of decision making.⁴ This increased the influence of regional and international actors who are called upon to mediate, or approve of, political agreements at the government level.

The politics of distribution of public office and resources – which served, and still serves, to secure the buy-in of politically opposed factions, political parties, and sectarian leaders – is rooted in the need to overcome political gridlock. This entails the distribution of state resources; political and administrative positions and employment; control of the different security services; and access to the state's financial resources through the distribution of state contracts. This process strengthens and reproduces patronage relationships on which the political elites rely in order to reproduce their control over sections of the working class according to sectarian logics (see Leenders, 2012; Salloukh et al., 2015). This competition over, and division of, control over ministries and administrative institutions is at the root of the fragmentation of water management and related scalar politics (see Table 2).

³ The destruction of two power plants in 1999 reverberates in the lack of power production capacity until today. In the 2006 war the water supply infrastructure alone estimated to have suffered some 80 million USD of damages in the South and the Bekaa, excluding Beirut. It set the development of water infrastructure there back by years.

⁴ Political crisis has been a recurring concern. Before 2005, Syria was the ultimate arbiter when consensus broke down. After its withdrawal in 2005, political crisis became the norm. For example, Lebanon was without a functioning government for a combined 2.5 years in the period between 2009 and 2014. Since the election of May 2022, the government still operates with a caretaker government, it has now been in a months-long dispute over the next president, meaning two of the highest offices of the country remain vacant.

Table 2. Sketching the water administration according to political alignment.

Main water authorities	Administrative scope and territory	Political patronage
Ministry of Energy and Water (MEW)	Plans, manages, and regulates the use of water and wastewater resources at the national level. Oversees the work of the Regional Water Establishments (RWEs) and the Litani River Authority (LRA).	Since the mid-1990s, the MEW has been in the hand of political leaders and parties associated with either Syria or the more nationalist camp. Since 2009, ministers were affiliated with the Free Patriotic Movement led by former President Aoun and his son-in-law.
Council for Development and Reconstruction (CDR)	Manages external funds for the development of infrastructure in the country. Directly accountable to the Office of the Prime Minister.	Its president was traditionally a confidant to the Hariri family and its party, the Future Movement. Vice presidents with less influence represent other political interests.
Four Regional Water Establishments (RWEs)	Plan, implement, and manage water, wastewater, and irrigation infrastructure at the regional level. Merged from 22 water offices in reform law of 2000.	The appointment of General Directors is negotiated between political parties and leaders. (Different political parties, confessional associations)
Litani River Authority	Plans and manages an irrigation project in the Litani River Basin. Responsible for water flow monitoring at the national level.	Since the mid-1990s, the Director General is appointed by the Amal Party led by the Leader and Speaker of Parliament Nabih Berri.
Municipalities	Build and manage WWTPs, although Law 2000 gave priority to the MEW and RWEs over planning and management. Their legal responsibilities remain subject to diverging interpretations.	Municipal councils are elected by registered voters. Family politics are the dominant factor, often aligned with party affiliation.

Neoliberalism, debt, class war, and collapse

The antagonistic contradiction that dominates the political sphere all but disappears with regard to development. Both blocs embrace neoliberal orthodoxy, even if not uniformly. Accordingly, the configuration of state activity has produced an accumulation mechanism centred on public debt at exorbitant interest rates (see Gaspar, 2003; Makdisi, 2004; Chaker, 2020a, 2020b)⁵ and so focused economic activity on the financial and real estate sector against productive activities such as industry and agriculture (see Eid-Sabbagh 2015, Krijnen, 2016; Hamade, 2019). Concomitant US-dollar dependency

⁵ Initially, reconstruction was financed by borrowing from Lebanese banks in Lebanese Lira (LL) at very high interest rates (above 40%, tapering off towards 10-15 % after the 2000s), while a policy of exchange-rate stabilisation was set in place, which in turn required growing US-dollar reserves attracted with high interest rates on US-dollar deposits and Eurobonds.

and a negative trade balance quickly left the state dependent on donor support from Saudi Arabia, Gulf countries, and EU delegation and member countries (Eid-Sabbagh 2015; Baumann 2016). When the internal balance of forces shifted towards a political alliance including Hezbollah with the election of General Aoun as president in 2016, the US, Gulf states, and other donors deployed dependency on US-dollar inflows as a political weapon through a series of sanctions and punitive measures⁶ that further eroded an already fragile and deteriorating balance of payments. Notwithstanding their different and sometimes diverging interests, donors and development agencies have long been united in the promotion of neoliberal policy recipes. They remained so and withheld US\$ 11 billion pledged during a 2018 donor conference and conditioned on reforms that did not materialise.⁶ As predicted by commentators (see IMF, 2016; Economist, 2018; Khair Nahhas, 2020) and unsurprisingly given the United States' extensive experience with sanctions and their effects (see Davis and Ness, 2022), the financial house of cards collapsed (Triangle 2019). By early 2020, hyper-inflation set in. By April 2023, the value of the Lebanese pound to the US dollar reached highs of LL 150,000, far above its LL 1507/dollar peg, which held until late 2019.⁷

This crisis is the apex of a history of what can only be called class warfare. Poverty rates kept rising over the last decades and exploded with the onset of the inflationary downturn of 2019, while wealth was concentrated amongst a very narrow elite,⁷ as has occurred in much of the region (Bush, 2007; Jouili, 2023).

The class coalition driving the neoliberalisation of Lebanon is well represented in the ownership structure of the country's largest banks and their political networks. A 2015 (Chaaban, 2019) study showed that 18 out of the 20 largest banks in Lebanon had large shareholders linked to political decision makers. A 2023 investigation (Badil, 2023) into bank ownership showed that major shareholders include international financial capital, Gulf capital directly linked to ruling families, and Lebanese owners. The study further illustrates the interconnectedness of financial monopoly capital, the Lebanese comprador class, and development institutions by showing the participation of donor agencies and related financing entities in bank ownership structures.⁸

THE SCALAR POLITICS OF THE WASTEWATER SECTOR: INFRASTRUCTURE AND ADMINISTRATIVE REFORM

Emerging from the civil war, Lebanon did not treat wastewater. Many areas of the country did not have sewer networks, and those sanitation networks that did exist were in dire need of upgrades (LDED, 1994). The first post-war reconstruction plan produced by the CDR scheduled US\$ six billion worth of investments in the wastewater sector for the end of the 1990s. In the utopian spirit of neoliberal planning (Harvey, 2006; Achterhuis, 2010), the plan projected to connect 50% of the population to sanitation networks by 1997, with 98% of urban populations and 70% of rural populations projected for connection by 2002 (CDR, 1993: 56-57). Rapidly rising public debt thwarted these ambitions, and as with later plans, the objectives were not met.

A 2017 progress report shows that about US\$ 1 billion of infrastructure investment was spent through the CDR in the sector since the end of the civil war (CDR, 2018). Notwithstanding the considerable

⁶ That the failure to generate these reforms had not been an obstacle for prior donor conferences suggests that a more important reason for withholding the funds seems to have been the ascendancy of the political forces opposed to the US/Saudi-led vision for the region.

⁷ According to Assouad (2023), "the top 1 and 10 percent of the adult population receive almost 25 and 55 percent of total national income, which places Lebanon among the countries with the highest levels of income inequality in the world, alongside Brazil, Russia, South Africa and the United States".

⁸ For example, the International Finance Institution (IFI) owns 8.4% of shares in Bank Byblos (Lebanon's 4th ranked bank), and the international Financial Corporation owns 1.7% of Bank AUDI shares (1st ranked bank); both form part of the World Bank group. Other institutions with shares in top-rated banks are the German development Bank KfW, French development agency AFD, and the European Bank for Development and Reconstruction (Badil, 2023).

investment in the sector by 2019, only 8-12% of wastewater received secondary treatment before the crisis.

The absence of suitably treated wastewater was not the only factor preventing reuse from emerging in the first two decades of the post-war era. Planning for wastewater reuse had indeed been a substantial component of the first national wastewater management plan published in 1982 (CDM, 1982), mirroring developments in rest of the region (Nassif, 2022a). This plan was shelved with the Israeli invasion in 1982 and the return to hostilities in the civil war. The integrated manner in which TWWR was treated in the plan disappeared. In the post-war years, TWWR was treated as an appendage in different government plans (CDR, 1993; MEW, 1999 described in Comair, 2009: 156-169; MEW, 2001) and World Bank documents (1994, 1998). Only in the early 2000s did interest in TWWR re-emerge (World Bank 2003a, 2003b). Thus, in 2010, reuse was finally (re)integrated into the National Water Sector Strategy (MEW 2012), marking the first time TWWR was mentioned as a national policy objective in the post-war era. The strategy promised to implement "secondary treatment and reuse of all inland wastewater by 2020, and secondary treatment by 2020 of coastal wastewater" (MEW, 2012). Beyond this declaration, few details were given, and nothing came of the plans to generate up to 101 Mm³/year by 2020 for reuse.

One reason TWWR was so long neglected was the perception of Lebanese water abundance (see for example Kugnik, 1999) and the orientation of the economy that discouraged rural and agricultural development. As a result, irrigation, and so TWWR, did not appear important to policy makers.

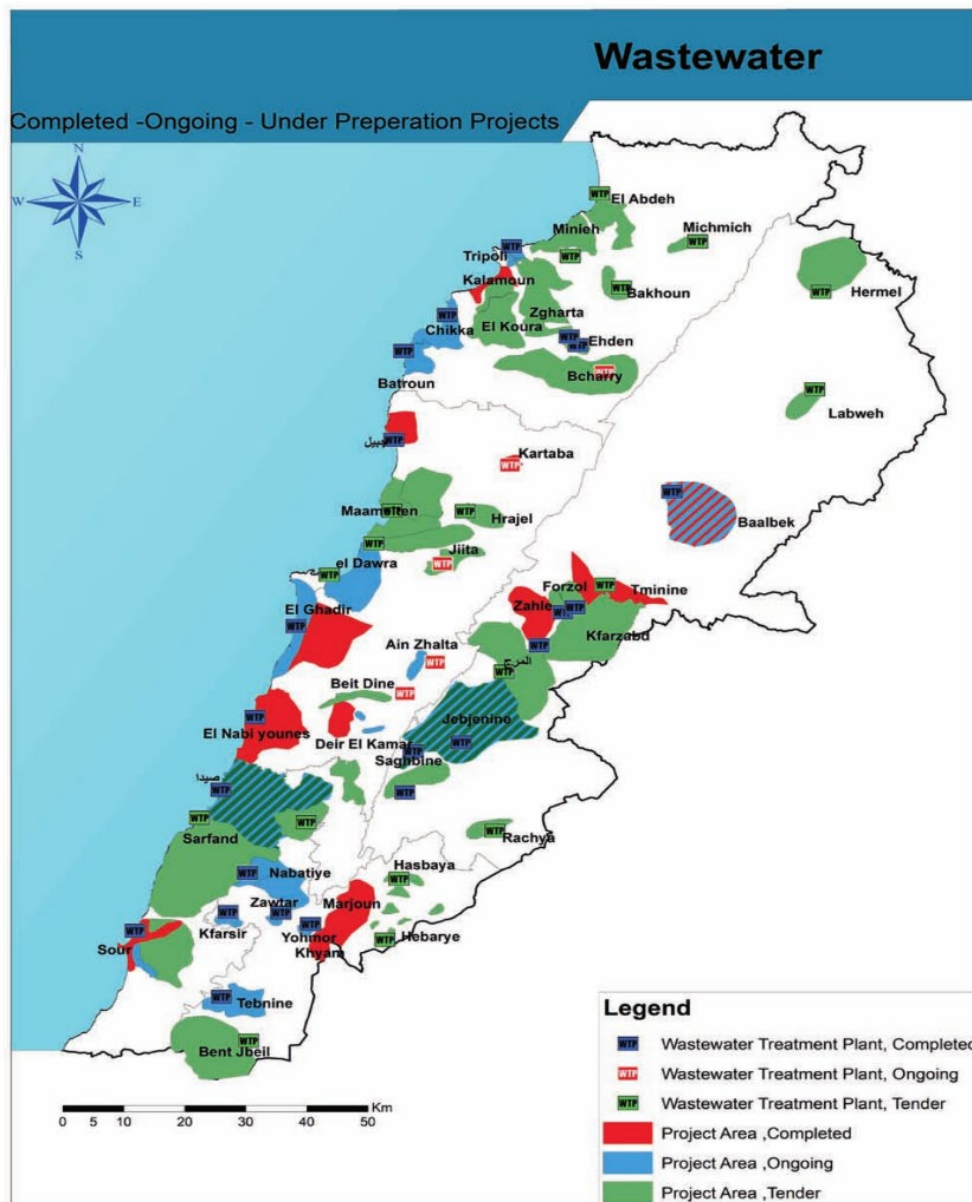
More specific to wastewater sector development, the root of this failure to produce treated wastewater as a resource for TWWR can be found in the contradictory process of neo-colonial and neoliberal restructuring and rescaling of state water resource management. The process embodied a tension between international donor interests and influence on one side, and the needs of class/political leadership to reproduce their political power on the other, all within a contested juxtaposition of emergent scales between the Regional Water Establishments and the Municipalities.

Donor dominance, infrastructure, and the failure to produce treated wastewater

Water sector and wastewater project implementation came to be driven increasingly by the availability of donor funding. Just over 50% of the US\$ 1 billion past investment in the sector (CDR, 2018: 5) originated from foreign donors (57% EU and US and 43% Gulf and Saudi) (CDR, 2018: 100-103), while that share was set to rise to about 90% of the US\$ 800 million in planned future investment until 2025 (57% EU and US and 43% Gulf and Saudi) (CDR, 2018: 100-103).

The interests of international donors have shaped investment patterns since the mid-1990s. Coastal wastewater treatment plants (WWTPs) were favoured over inland WWTPs because reducing the pollution of the Mediterranean Sea, as enshrined in the Barcelona convention of 1976, was a priority for European donors. Coastal treatment plants were planned for implementation in the mid- or late 1990s. But when parliament rejected the 2000 water sector reform law, a core piece of the market environmentalist sector's restructuring, the World Bank made true on early threats and withdrew its contribution to the *Coastal Pollution Control and Water Supply Project* so as to pressure the Lebanese state (World Bank, 1997). The project collapsed, setting back wastewater sector development by years. For most coastal WWTPs, implementation began a decade later. The larger plants (Batroun, Chekka, Jbeil, Tyre, Saida, and Tripoli) were funded by international donors (see Riachi, 2013, Eid-Sabbagh, 2015), but most, if not all, went without the complementary funding to implement sewage networks for collecting wastewater. With increasing public debt, the Lebanese government reduced spending on infrastructure. As a result, numerous plants remained idle, some for more than a decade, because incomplete networks did not convey sufficient wastewater. Figure 1 illustrates that even in 2017, this mismatch between built WWTPs and insufficient network extension influenced treatment rates. WWTPs inland and on the slopes of Mount Lebanon were planned and executed only much later.

Figure 1. Wastewater treatment plants.



Note: Green depicts the network projects that are in the planning/tender stage, blue networks those under construction. WWTPs in blue are complete and operable where the volumes of wastewater would be adequate. The Nabi Younis plant has not been in operation because of insufficient volume reaching the plant in the absence of a pumping station for coastal collectors. The Ghadir plant provides only primary- or pre-treatment. Even the plants in the Nabatiye Region suffer from problems of operation.

Even the World Bank had to concede that the CDR could "not fully control its expenditure patterns" (World Bank, 2010d: 38) and was forced to start projects according to donor funding availability and donor interest, even when funding was only secured for treatment, and not for network extension. As a result, implementation was ad hoc, rather than following the phasing proposed in official plans and reports (DAR IAURIF, 2005). Donors imposed development priorities and deprioritised inland plants where TWWR would have been easier, and most useful, to implement (see Eid-Sabbagh et al., 2022). In this sense, neo-colonial intervention must also be attributed some responsibility for the ecological catastrophe apparent in the pollution of the Litani River.

Early French donor support was geared towards the wastewater sector and helped to establish French infrastructure corporations in Lebanon. Corporations included SUEZ Environment (its predecessor Lyonnaise des Eaux) and subsidiaries (Degrémont), as well as Veolia (formerly Vivendi). Most of the larger WWTPs were implemented and run by these two companies through Build, Operate, and Transfer (BOT) contracts. Foreign funding for infrastructure thus served two functions. It freed Lebanese government funds to service growing public debt interest obligations while simultaneously increasing that debt and producing profits for French infrastructure corporations and (politically-connected) Lebanese subcontractors. Infrastructural investment therefore acted to shore up the Lebanese accumulation regime and reproduce value flows to the imperialist core. In this sense, it acted as a double fix for capital but failed on the socio-ecological delivery.

Water sector reform: RWEs as the scale of dominance

From the onset, the water sector reform process was driven by the World Bank and international donors. Twenty-two water offices, crippled by the consequences of the civil war, were merged into four Regional Water Establishments. The principal goal was administrative decentralisation – the 22 water offices were unable to operate outside the tutelage of the MEW – and commercialisation in preparation for privatisation and private sector participation. The RWEs, in neoliberal theory, were to become independent entities, relying on revenues from full-cost recovery for operation, and the MEW would interact with them only as an oversight body and strategic reference (World Bank, 1994, 1998; Eid-Sabbagh, 2015; Riachi, 2014; Ghiotti and Riachi, 2013; Alles, 2019; Kugnik, 1999). It was a scalar project par excellence. Under pressure of the World Bank, the new reform law was passed in May of 2000 (Law 221/2000).

In practice, the number and layout – that is the scale – of the Regional Water Establishments was as much a product of the need to reproduce the clientelist and sectarian matrix of power, topography, and geography as it was related to the faint potential of creating profitable units (Eid-Sabbagh, 2015: 140-160). The primacy of the existing political conflicts forced an adaptation of neoliberal policy prescriptions to the needs of competing factions for control over administrative bodies.

RWEs remained underfunded and understaffed as little was invested by the state to develop their administrative capacity. The organisational capacity to manage wastewater and irrigation was not developed (MEW, 2020; Vol I). Collection rates were uneven; three of four RWEs never came close to recovering operation costs (MEW, 2020: V II-D 11), user fees being seen as having a political cost (World Bank, 2012: 6). Clientelist practices meant higher-than-necessary expenses on outsourcing of services and infrastructure investments. These practices burdened RWEs with a relatively unproductive workforce, while the whole technical and administrative hierarchy lacked essential skills due to an austerity-inspired government-employment freeze. In turn, the continued failure of the reform and BWE development led to increasing coordination and cooperation of donors and agencies. This was accompanied by a flurry of technical assistance and support programmes aimed at reinforcing the commercialisation process, though with only limited impact on the structural deficiencies of the RWEs (Eid-Sabbagh, 2015; MEW, 2020: Vol I). Cost recovery would have been difficult to achieve even had operational efficiency been raised further. The financial crisis finally laid bare the fallacy of the full-cost recovery mantra as the already low collection rates collapsed and increasing poverty rates rendered recovery prospects illusory in coming years, devastating the RWE's ability to operate even at a minimal level (Eid-Sabbagh et al., 2022).

The RWEs never gained autonomy; decentralisation remained elusive, with most control retained at the MEW. The weakness of the RWEs left them dependent on funding from donors, development agencies, the CDR, and the MEW, with little room to establish independent planning and implementation processes. The RWEs therefore became the scale through which political dominance could, and would, be mediated in the water sector. The RWEs' chronic inability to manage WWTPs, especially given the

plants' high energy cost, meant that once BOT contracts between the CDR and contractors ended, the RWEs were not in a position to take over operations, nor to supervise new local contractors (Eid-Sabbagh et al., 2022). This meant that many plants remained under the authority of the CDR for up to a decade or longer and contracts were managed through the CDR. In other cases, it meant that the quality of treatment declined because of the lack of RWE supervision.

Conflicting scales: Regional water establishments and municipalities

The administrative level at which wastewater should be managed was an issue of contention since the late 1990s and would remain so. The government that took over in 1998 excised the provisions that transferred responsibilities for wastewater management from municipalities to RWEs in the earlier 1998 draft law. This represented an attempt to strengthen municipalities – part of a more statist vision for the country – in the hope of democratizing the political process by rendering it more accountable at the local level. With his return to power in 2000, Rafik Hariri 'redressed' this situation, and Law 377 transferred wastewater management to the RWEs and the MEW in 2001 (see Eid-Sabbagh, 2015).

Notwithstanding these legal changes, municipalities' responsibility regarding the management of wastewater has a legal basis, even if disputed. According to a 2003 consultation with the Ministry of Justice, municipalities retain ownership of existing sanitation networks, although they are operated by the RWEs (see Eid-Sabbagh, 2015: 145). Law 377/2001 specifically points out that Law 221/2000 does not affect municipal competencies enshrined in the municipal law 118 of 1977, according to which they are responsible for the management of wastewater networks. Furthermore, the argument has been made that their responsibility concerning public health may include wastewater treatment (Machayekhi et al., 2014).

Why were these provisions retained? One interpretation points to the politics of distribution of state resources and the interest of Michel el-Murr, Minister of the Interior in successive governments, in maintaining access to the promised international funds for sanitation infrastructure (see Allès, 2019: 302). The intra-elite contest over influence and access to funds through administrative bodies itself represents a struggle over scales of domination. The result was to subvert and contest the purpose of reform, i.e. to create functioning commercialised administrative bodies as advocated by donors and the World Bank.

Until today, these scalar politics remain central as municipalities struggle to hold on to, or transfer, their municipal-level water and wastewater operations (See Ghanem et al., 2017; Eid-Sabbagh et al., 2022). For example, the Union of Municipalities of Qaraoun Lake has repeatedly attempted to hand over the operation of Aitanit WWTP to the Bekaa Water Establishment because the associated operation costs represent a considerable burden, while the BWE refused to take on its operation for the same reason. The case studies will show further examples.

A bias towards large-scale WWTPs

The scalar tensions are also expressed in the techno-scalar choices of the CDR and MEW; since the civil war, these bodies have favoured a strategy of fewer, centralised larger-scale WWTPs and corresponding sanitation networks over numerous small-scale systems. Most of the projects were designed to service a population well above 100,000, all with energy-intensive activated-sludge technologies. The 2020 NWSS update reproduced this tendency (MEW, 2020). The majority of the National Water Sector Strategy Update (NWSSU)-prioritised projects still represent larger-scale assemblages with population equivalents above 100,000 (flows above 15,000 m³/day). Of the US\$ 1.4 billion to be spent on 'Priority I' projects, about US\$ 900 million are allocated to WWTPs, of which US\$ 607 million are allocated to 16 large WWTPs (NWSSU, 2020: V B 43-63). All existing large plants were implemented through the CDR with donor loans. But in 2020, only 6 out of 17 CDR-managed WWTPs were considered operational (see Table 3).

Table 3. Operational status and distribution of WWTPs according to water authorities.

Managing authority	Larger-scale WWTPs (above 2000 m ³ /day)		Small-scale WWTPs (up to 2000 m ³ /day)		Total		Grand total
	Not or partially operational	Operational	Not or partially operational	Operational	Not or partially operational	Operational	
CDR	10	4	1	2	11	6	17
BMLWE		1		9		10	10
SLWE	1	1		2	1	3	4
BWE	1	1	1		2	1	3
NLWE	None						
Municipalities	5	2	44	21	49	23	62
Total	17	9	46	34	63	43	96

Source: Eid-Sabbagh et al., 2022.

The strategy is defended by its proponents using the economies of scale and the smaller land footprint of complex activated-sludge and biofiltration processes (see Comair, 2009: 164-165). The latter are necessary because of massively inflated land prices, which in turn are a direct result of the finance- and real estate-focused economy. However, measuring investment (including expropriation cost and interest on debt) versus the level of treatment and actual volume treated since construction started on these large projects is likely to play in favour of smaller plants.

The arguments in favour of centralizing systems were reinforced by the failure of a USAID project to build 42 municipal-scale WWTPs in the early 2000s.⁹ Water sector practitioners and administrators cite this project, the perceived inability of municipalities to manage wastewater treatment plants, and municipalities' financial weakness as reasons for granting them a marginal role in water and wastewater management (see Eid-Sabbagh et al., 2022: 40-41). According to the consultant on the latest water sector strategy (MEW 2020), "Centralised WW treatment is the right model, the reason for their (WWTPs) failure being that the state is weak, as we all know" (Majdelani, 2019). Notably, the consultant points out the weakness of the state and not the operational model. This separation of the technical from the political is typical of Lebanese administrators' discourse in the water sector and beyond.

A 2004 Ministry of Environment study on the USAID project emphatically states that the project was badly designed and executed from the start as it failed to provide funds for operation and maintenance to guarantee the longevity of WWTPs. The report goes on to observe that "the use of treated wastewater for irrigation is at present impossible, again due to the poor quality of the effluent. The failure of this project is found not in municipalities but rather in incoherent project planning by donor and NGOs" (MoE, 2004: IV-V, cited in Eid-Sabbagh et al., 2022: 41). The argument against municipal involvement is flawed, reflecting an ideological bias and obfuscating the political and economic realities whereby administrative choices and arrangements serve to maintain clientelist networks. The failure of the USAID project highlights the diverging imperial interest. The project served to reinforce the approach favoured by the CDR, French corporations, and Lebanese contractors, but worked against reuse.

⁹ It is worth noting that the bulk of the completed WWTPs are in the Hasbani River Basin, where they are intended to improve water quality for the upper Jordan River flowing into Israel (see Zeitoun et al., 2012).

According to the IWM study (Eid-Sabbagh et al., 2022), a total of 35 small plants (below 2000 m³/day design capacity) were reported operating compared to nine larger WWTPs (above 2000 m³/day). Of the former, 11 are managed by RWEs, three by the CDR, and the remaining 21 by municipalities. The latter represents 85% of plants categorised as 'operational' (see Table 2). In light of these numbers, it is hard to argue that a strategy of smaller decentralised plants is inoperable. On the contrary, given the failure of so many large-scale projects, the argument could easily be reversed, even if the processed volumes are considerably smaller.

The modelling exercise of the IWM study showed that existing municipal plants tend to be more suitable for the implementation of reuse projects but would cover a smaller area of around 200 ha. This could be increased to around 800 ha with the rehabilitation of all existing plants with a capacity below 2000 m³/day. That rehabilitation is a real possibility, confirmed by the fact that the South Lebanon Water Establishment had already advanced plans and cost estimates for such a project, though these plans had to be shelved due to the financial crisis (Mehzer, 2020). Whereas the potential irrigable area by CDR-managed plants was almost 1700 ha, more than half of this area corresponds to three plants, one completed in Zahleh and two that are under construction or waiting to be connected. The operational difficulties faced by most CDR-managed WWTPs suggest that this potential is unlikely to materialise in the medium-term future in the current inflationary context (Eid-Sabbagh et al., 2022: 27-29 and 40-49).

Reuse and its promises: Reinforcing a techno-managerial vision to fix climate change and failed policy

The National Water Sector Strategy of 2010 served to promote the modernising and professional image of Gibran Basil, the newly appointed Minister of Energy and Water, in his quest to inherit the political leadership role of his father-in-law General Aoun (President of the Republic, 2016-2022). The inclusion of TWWR, like the whole strategy, aimed to show that planning was done more professionally and past failures would not be repeated.

Interest in TWWR had started growing in the early 2000s in the academic sphere and in donor agendas, mirroring regional developments (Nassif et al., 2022a). Early articles on the topic were linked to engineering faculties (see Darwish et al., 1999; Massoud and Fadel, 2002), and TWWR research was increasingly published as part of Mediterranean research projects (Karaa et al., 2005; Karaa et al., 2013) or funded as part of EU (Abi-Saab et al., 2021) or ReWater MENA-financed (Abi-Saab et al., 2022) projects that focused on reuse in the MENA region.

Following academic research presenting reuse as a desirable solution to scarcity (see also Ayoub and Chammass, 2006; Cellamare et al., 2016; Husseiki et al., 2017) came a wealth of donor-driven reports addressing policy frameworks, legal barriers, and regulatory issues (see for example USAID, 2020; FEMIP, 2009) in the depoliticised manner described by Swyngedouw (2013) in his assessment of the 2012 UN Water report.

Narratives root themselves in techno-managerial and economic notions of water management and deploy the standard development terminology of 'stakeholder participation', 'good governance', and 'sustainable development'. The economic logic is illustrated in a report by the Lebanon-based Arab Forum for Environment and Development:

Arabs cannot afford to waste a single drop of water. Governments should urgently implement sustainable water management policies which rationalize demand to ensure more efficient use. This can be achieved by attaching an economic value to water, measured by the value of the product from each drop (...) Because reclaimed wastewater represents a valuable resource in a water-scarce region, it is desirable to treat all generated wastewater and to reuse all treated water (El-Ashry et al., 2010: 9).

The passage illustrates how market environmentalist logics are fused with TWWR. Sustainability juxtaposed with scarcity requires economic valuation, which in turn means that the maximisation of the

resource is a must, requiring full cost recovery. The discourse that is built around reuse serves to reinforce market environmentalist logics (Bakker, 2014). It is in this sense that reuse enters "the ideological terrain of legitimacy and hegemony" (Ekers and Prudham, 2017b) and appears as a potential socio-ecological fix. Failed wastewater sector policy is doubled down on, with the goal of increasing reuse.

The necessity for reuse is reinforced by advocating it as climate change mitigation (see for example UNDP, 2011). In 2015, the EU-funded project, *Adaptation to climate change through improved water demand management in irrigated agriculture by introduction of new technologies and best agricultural practices* (known as ACCBAT), implemented the first reuse scheme in Ablah, in the Bekaa Valley (Abi-Saab et al., 2021). Similar projects played a key role in promoting the benefits of reuse and were the main drivers of major institutional and infrastructural development in the country. The first Lebanese guidelines for wastewater and sludge reuse quality were developed in 2010 under an FAO project (FAO, 2010) "so as to maximise the benefits and minimise the risks of the reuse of treated effluent and sludge" (FAO, 2016; p. 11). While not officially ratified, these guidelines represent a reference in planning new reuse projects today (Eid-Sabbagh, 2022; Nassif et al., 2022a).

In 2016, ambitions for reuse expanded to the national scale when another FAO project, *Coping with Water Scarcity*, produced the first national *Assessment of treated wastewater for agriculture in Lebanon* (FAO, 2016). The report estimates that reuse can provide an "11% increase in the water available for agriculture and forestry for environmental purposes" (ibid: 4). The FAO project also supported experimental field trials to test the impact of Iaat/Baalbeck WWTP's¹⁰ effluent on eggplant and finds a "19% yield increase when compared to yield from crops under freshwater irrigation" (FAO, 2016).

A whole network of actors, donors, multilateral agencies, NGOs, consultants, and academics is mobilised in the reproduction of neoliberal discourse. While adding technical knowledge to the discussion, these efforts present reuse in an overly optimistic manner. They ignore and obfuscate the "deeply uneven political, social and economic power relations and conflicts that ultimately choreograph access to, distribution and management of water" (Swyngedouw, 2013: 826).

THE REALITY OF WASTEWATER TREATMENT AND REUSE

Taking the example of two WWTPs and associated reuse schemes situated in the Bekaa Valley, this section serves to illustrate how the above-described scalar dynamics unfold concretely. They analyse TWWR, wastewater treatment planning, implementation, and management in Lebanon within the larger "structures in which water management is embedded" (Mollinga, 2008: 8).

Zahleh WWTP

The Zahleh WWTP has recently (2020-2022) been the subject of different reuse studies and projects, initiated by international development organisations. Located in the largest agricultural region of the country (the Bekaa Valley) and part of a river basin (the Litani) with alarmingly polluted and over-allocated water resources (Nassif, 2019), it treats around 20,000 m³/day of high-quality water, which is 'lost' in the highly polluted Litani. The IWMI study classified it as one of ten WWTPs with "high reuse potential in Lebanon" (Eid-Sabbagh et al., 2022: 27-29). The IWMI ReWater Mena project, which contracted the TWWR potential study, adopted it as one of the two sites to develop "conceptual designs and associated implementation plans for feasible water reuse solutions" (IWIMI, n.d.). More recently, a UN-Habitat project funded through the UN Adaptation Fund selected Zahleh WWTP for a project to "increase the resilience of displaced persons and host communities in Lebanon & Jordan in addressing

¹⁰ Iaat WWTP was funded by the World Bank to provide wastewater treatment for the Baalbeck area and was designed with the possibility of reuse, though no funds were allocated for a reuse network (World Bank, 2003). The project experienced numerous delays and suffered from chronic technical problems but became one of the wastewater treatment plants around which the idea of reuse was anchored.

climate change-related water challenges" (UNHABITAT, n.d.). The project plans to build an irrigation infrastructure that would pump the treated effluent upstream to complement water that the Berdawni River, an effluent of the Litani, supplies to Zahleh's age-old irrigation system. Zahleh's potential for reuse may be convincing: the treatment facility can produce enough treated water to meet the irrigation requirements of 500 ha of agricultural lands in an area where farmers struggle to meet their irrigation needs in the summer (Eid-Sabbagh et al. 2022; Nassif et al., 2022b). But in light of the WWTP's technical deficiencies, its failed governance model, its complete dependency on aid money, and the multiplicity of existing community arrangements that the UN-Habitat intervention fails to comprehend, success seems much more uncertain.

The sludge problem

The Zahleh WWTP was financed with a €22 million loan from the Italian Agency for Development Cooperation. The Lebanese government contributed €7 million (Keushkerian, 2022). The CDR implemented the funds through a BOT contract awarded to SUEZ Environment, including operation fees of €2 million per year. The contract was supervised by a Lebanese consulting company, Rafiq Khoury, frequently contracted by the CDR and with a reputation for neglecting supervision of civil-works projects in the country (el-Ahed, 2022). The final plant design included a 'sludge digester' that now proves to be inadequate, producing 30 tons of liquid sludge per month with no place to dispose of it safely (Hamieh, 2019). According to this plan, sludge was to be disposed in the neighbouring solid waste management plant operated by the municipality. Shortly after the plant started operating in 2017, it became clear that the amount of sludge was too large for the capacity of the local dumpsite. The Municipality of Zahleh requested that the CDR look for another disposal mechanism. For about a year, hundreds of tons of sludge were secretly dumped throughout the Bekaa Valley, until a newspaper broke the story of Zahleh's "sludge flooding the Bekaa villages" (Hamieh, 2019). The CDR's and its contractors' solution was to bury the untreated sludge inside the WWTP's premises, only a few meters from the Litani River (Khalil, 2019).

The Regional Water Establishment's dependency on aid

The BOT contract covered the first three years of plant operation, excluding energy costs.¹¹ How the Bekaa Water Establishment, the least viable of the four RWEs, was to operate the WWTP in the long term was never clear, even before the country's financial collapse.¹² The BWE, which was not involved in plant conception and design, issued an official announcement in 2020 addressing the "Zahleh and Bekaa residents":

Based on the Law 221 (...) the BWE conducted studies to assess how to operate the WWTPs that were built and equipped (Iaat, Joub Jannine, Zahleh) and those currently under construction. It was found that the Establishment cannot operate these WWTPs according to the standards required nationally and internationally and this is for the following reasons: a) the substantial gap in human resources (...) and the prohibition in employment (...) as per the decision of the Council of Ministries (...); b) the huge and accumulated financial deficit inherited from the water offices (more than 100 billion L.L) in addition to the non-payment of a large fraction of fees from users (...) (around 170 billion L.L) (...) c) the high cost of operation of WWTPs estimated between 100 and 250 USD/residence, for around 1 cubic meter/daily...

"Pushing up the scale" (Crombé, 2017) and blaming the central state, the announcement continues: "While the [BWE] was forbidden to increase the water fees to be able to reach the fiscal balance requested [by the law], how can it now charge users additional fees amidst these difficult circumstances (...)" and closes its statement by situating itself aside other regional actors demanding action from above:

¹¹ The cost of energy for all WWTPs is not included in operators' contracts. It is paid by the BWE, in the form of debts to Electricité du Liban. Interview with a BWE official in November 2022.

¹² Interview with BWE official, November 2022.

This is why the [BWE] joins its voice to the calls of municipalities (...) and those of the Litani River Authority (...) and demands from all officials and especially the concerned Ministries, the Bekaa Member of Parliament and the Council for Development and Reconstruction to work on resolving this issue...

In summer 2022, the deepening financial crisis had worn down BWE's already limited financial capacities, and staff were leaving in droves. Exemplifying the loss of Lebanese sovereignty over policy, an emergency plan was put in place to support large-scale WWTPs. It was led and coordinated by UNICEF in collaboration with other donors (USAID, GIZ and AFD) and given an official approval by the MEW. Due to the limited capacities of RWEs and the refusal of donor organisations to finance the state directly after the 2019 uprising and 2020 port explosion, it was agreed that emergency funds would be directly implemented by donors or through 'trusted' NGOs. The Government of Italy provided a €4 million loan to secure Zahleh's operation for two years (Keushkerian, 2022), and UNDP hired a large Lebanese contracting company to operate it. The role of the BWE was limited to monitoring the operator's work.¹³ It is in this context of financial collapse and weakened state capacity that UN-Habitat planned the reuse project around Zahleh WWTP. The investment and its promise of strengthening the 'resilience' of local communities is at best questionable given the uncertain future of the plant's operation and the failure of the state apparatus more generally, and even more so considering its disinterest in local irrigation arrangements and farmer and peasant social differentiation.

The erasure of local governance

The potentially irrigable area in the vicinity of the WWTP is supplied by several interdependent water sources, around which community infrastructure and customary water rights were historically shaped, constituting a multiplicity of 'places' (Beveridge et al., 2017). Today, these water sources are overallocated and generate individual strategies and contestations, further exacerbated by the introduction of the treated effluent (Nassif, 2022b). The Berdawni River that flows through Zahleh into the Litani River is captured by a 2000-ha open canal irrigation system dating back several centuries and governed by farmers based on water rights linked to land property. At the tail end of the system, groundwater provides an additional source of supply when surface water stops being available, starting in June. Two large networks, implemented by prominent landowners in the region, convey water from high-yielding wells located a few kilometres upstream in karstic rock formations to large agricultural fields (400 ha) neighbouring the WWTP, but wells are also used in other regions of the Berdawni system on smaller plots (Nassif et al., 2022b; see Figure 2). Since the operation of the plant, the two large farmers have been directly pumping part of the treated effluent from the Litani to reduce the use of costly well water (Nassif et al., 2022b).

UN-Habitat ignored these dynamics.¹⁴ The project envisaged pumping the treated wastewater to the Berdawni canals (upstream) to be used by Zahleh farmers and presented that as an alternative and complementary resource to the groundwater and canal water used in the area, but how this would assure a reduction in groundwater abstraction remains unclear (Nassif et al., 2022b). It was also not clear how water would be shared within Zahleh and which Berdawni farmers would benefit from this project. The

¹³ Interview with BWE official, November 2022. He further states that access to participation in this team generated heavy conflicts between engineers around the 'fresh dollars' – dollars entering Lebanon after the crisis and the freezing of all dollar accounts dating from before the crisis – incentives limited to those in the team. Funded by donors, administrations and the political networks in control of them use the granting of access to such supplemental salaries as a way to reinforce the clientelist/sectarian networks that sustain socio-political power.

¹⁴ The project manager pointed to the bureaucratic difficulties a change request to the UN Adaptation Fund would entail and the resulting impossibility to change the project when interrogated on the multiple issues related to the UN-Habitat project in a discussion in September 2022.

[illegible]

UN-Habitat project excluded the downstream village of Barr Elias, even though it would have required less pumping to supply. While farmers there have water rights to the Litani, they had to discontinue pumping because of high pollution levels. In this part of the alluvial plain, groundwater is not available, and farmers have been leaving their lands fallow since before the crisis. In this sense, UN-Habitat's action favoured the already more 'resilient' farmers.

Ablah WWTP

Municipal scale and imperial interests

Ablah WWTP in the Bekaa is one of the numerous examples of WWTPs managed by municipalities and the only one in the country with an established reuse system. It illustrates a local form of governance and different forms of scalar production, appropriation, and contestation, as well as how these intersect with the priorities of imperialism.

The Ablah WWTP is located in the central Bekaa Valley, a few kilometres north of Zahleh, on the right bank of the Litani River. It was built between 2009 and 2012 through USAID's Small Villages Wastewater Treatment Systems Program in partnership with Ablah Municipality, along with two other WWTPs (USAID, 2013). USAID's intervention corresponds to its geo-strategic orientations: its 2002 strategy paper identifies a primary goal as 'Combating Terrorism', which includes "expanding USAID's development programs to provide a counterweight to Hezbollah's social and economic activities in South Lebanon and the Bekaa Valley" (USAID, 2002: 8). The project offers a socio-ecological fix wedding ideological processes not only to capital accumulation as per Ekers and Prudham (2017b), but also imperialist domination to "socio-environmental change and the conditions and experiences of everyday life" (ibid, 2017b: 3). The targeted municipalities were "government institutions that had the means to operate and maintain the constructed facilities to the benefit of their constituents" (USAID 2013), which at that time was also consistent with USAID's funding strategy in the water sector and reflected USAID's ideological commitment to decentralisation at all levels, in line with current donor practices in Lebanon (see Allès, 2019: 304-305).

The scale of intervention was also related to USAID national politics and its choice not to cooperate with the MEW, which at that time was led by a Minister from Hezbollah, thus undermining the ministry's water sector policy. The US company CDM Smith¹⁵ built the project under the supervision of the municipality, and works were reportedly of very good quality (Engineer, 2022). The technology of choice was the 'Trickling Filter' for its lower energy requirements and ease of operation as compared to the 'Aerated Sludge' used in large-scale WWTPs. After the failure of the previous USAID experience with WWTPs, this project took care to choose appropriate technology and management.

The (limited) success of community-based sanitation

In terms of implementation and management, the WWTP proved more successful than in Zahleh. The municipality of Ablah has managed the plant since 2013, covering most of the cost of operation of around US\$ 50,000 yearly, with energy representing 50% of the total costs (USAID, 2013) through the municipal taxes levied on residents (on properties and others). The treatment process has been satisfactorily managed by an engineer from a neighbouring town for around ten years, with water adequately treated and suitable for reuse on fruit trees (Abi-Saab et al., 2021). According to the engineer in charge, "the success of Ablah WWTP is linked to the strong sense of commitment of the mayor for his village". The operator's diligence also stems from his sense of "professional enjoyment and community service" (Operator, 2022) and transcends the strictly financial dimension of personal rewards. His dedication

¹⁵ Camp Dresser and McKee (CDM), the same company that produced the Wastewater master plan. It had a revenue of US\$ 1.3 billion in 2021 (see <https://www.zippia.com/cdm-smith-careers-18460/revenue/>).

persisted after the crisis despite a 95% loss in his salary value, as well as the constraint to work several months without any salary after the dissolution of the Municipality in 2022.

If the plant is more resilient to the crisis because of these commitments, it also became more dependent on external interventions. Since 2021, the WWTP has operated only 12 hours a day, according to the schedule of electricity rationing in the region, after the Lebanese state stopped subsidizing fuel. But the plant's operation will not be supported by the UNICEF programme, which gives priority to large-scale WWTPs (NGO Consultant, 2022). It is supported by smaller funds, such as the implementation of solar panels meant to secure additional hours of electricity. The project is implemented through the Economic and Social Fund for Development (ESFD), a branch of the CDR targeting the 'grass-roots level',¹⁶ and with funding from the EU (LEWAP, 2022). But its project in Ablah appears to be suffering the same fate as Zahleh's in terms of neglect, lack of consultation with the operator, and incoherent design. For example, while solar panels were supposed to be implemented 'on grid' for Ablah Municipality to reduce its electricity bill, consultants "forgot to make a request and now the system might be working off grid", despite the lack of power storage.¹⁷

Fragile local governance, reuse, and the clientelism

The reuse system itself, often presented as a success, testifies to the omnipresence of clientelist dynamics. The project was implemented through the EU-funded ACCBAT programme by the Institute for University Cooperation, an Italian NGO. Hydraulic works were substantial: the project built a reservoir, two pumping stations, and a pressurised collective network to distribute water to 20 ha of grapevine plots using individual wells. The main Lebanese partner was the Ministry of Agriculture (MoA), and the Lebanese Agricultural Research Institute led the scientific field trials with farmers. The municipality's role in the project was limited, while the MoA took the lead on implementation. The works were implemented by a contractor with close ties to the Amal party, profiting from connection in the MoA. "I suspect a lot of money went to the pockets of the contractor and those protecting him" reports an informant from the municipality, who suggests that even the Italian NGO project manager seems to have been in on it. "The cost of the project, US\$ 1.2 million, is almost double the real market cost, and what's worse, the result is of really low quality" (Engineer 2, 2022). These assertions remain anecdotal and cannot be verified, but the assessment made by the IWMI project confirms the many technical problems and low quality of implementation. The filtration station is "not installed as per the engineering standard", and a "low operating pressure of the existing system" and other equipment is "not operationally adequate for the purpose" (Ecosystem, 2021: 56). During the two-year operation of the system, some farmers located at the tail end of the network ended up having to use their wells.

But the reuse system was not accepted by all in the community. Its operation was stopped after only two operating seasons due to a legal complaint filed by a nearby politically-connected property owner according to involved individuals.¹⁸ According to IWMI's assessment, even if the project resumes, its operation costs cannot be recovered through farmer's fees, as what they pay now for groundwater is less than what they must pay to compensate the high cost of pumping (Nassif, 2022c), giving further weight to arguments pointing to the contradictory nature of the full cost recovery mantra.¹⁹

¹⁶ Acting as an 'autonomous governmental institution', the ESFD is a branch of the CDR established in 2000 under the Euro-med partnership and with substantial funding from the EU. It implements small-scale infrastructure funds.

¹⁷ Interview with a person involved in the project, November 2022.

¹⁸ Interview, December 2022.

¹⁹ The cost of operation and maintenance is estimated to be US\$ 53,278/year. The total potentially irrigable area in Ablah is 250 du (25 ha). Farmers would then have to pay around US\$ 2130/ha, which is considerably higher than the range of individual pumping costs which, according to the survey, varies from US\$ 310 to US\$ 830/ha depending on well depth.

CONCLUSIONS

The two case studies show how socio-scalar politics of wastewater management and TWWR come together in specific territories. On one hand, they illustrate the contradictory scalar dynamics emerging from the interplay of local, national, and transnational forces, and on the other, the waning Lebanese sovereignty in matters of water resource management and the strengthening of neo-colonial governance.

At an inter-administrative level, scalar politics appear as a shifting of blame up the scale, such as the BWE in Zahleh's blaming of the CDR, and a passing of the burden associated with costs of operation, specifically post-crisis energy costs, also usually up the scale.

Scalar politics appear also in the neoliberalisation of the Lebanese water sector. The dialectical interplay of neo-colonial forces promoting neoliberal policy recipes, along with the specific requirements of the Lebanese political division of power, produced a scale of dominance in the form of the operationally weak water establishments. This scale is also an important element in the failure to sustainably manage wastewater, while allowing for a vertical (re)production of donor and clientelist dependencies.

The losers in this contest of scales in the wastewater sector were the municipalities, which nevertheless remain resistive. The example of USAID shows how the failure of its earlier intervention at the municipal scale fed into the discourse aiming to strengthen the dominance of scale of the water establishments. The follow-up project discussed in the example of Ablah provides a counter example to the narrative of the inefficacy of municipalities in wastewater management and points to the possibility of alternative models. It also sheds light on how international development actors deploy scalar strategies to undermine state administrations and local political actors in a context of contestation by the state and local actors. The case of Ablah also shows municipalities may mobilise such interventions to their own benefit.

Finally, the depoliticised understanding of water management appears also as a depoliticisation of scale and reinforces the contradictions affecting wastewater resource management. This depoliticization as it is reproduced with regards to TWWR represents an ideological intervention in the sense of Ekers and Prudham. Conceiving this as integral to contemporary imperialism and the related reproduction of neoliberal ideology provides a wider understanding of the reproduction of accumulation regimes and struggle for domination.

Understanding imperialism as the primary contradiction through its structuring effects on politics and accumulation widens the scope of politicization of development more generally. Specifically regarding TWWR, we see how contradictory intervention in the resource management process through a multitude of donors and development actors, in concert and conflict with local actors, has contributed to the de-development of the water sector, the weakening of its administration, and in that sense, domination reproduced.

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