CHALLENGES AND STEPS FORWARD FOR PUBLIC SERVICES REFORMS IN LIBYA

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Contents

Introduction

Over the past ten years, Libya has endured one of the most difficult periods in its modern history. The overthrow of Muammar Gaddafi in 2011, subsequent intra-societal domestic conflicts, a series of unstable governments, and lack of institutional development have created complex and challenging issues for the country when it comes to effective governance. The country saw a glimmer of hope last year when the United Nations-brokered process established the Government of National Unity (GNU), ended the parallel and competing dual governance situation, and promised national elections in December 2021. However, the promised elections did not take place, the situation has almost returned back to square one with two competing governments, and the political process is in a limbo.

Whether or not Libya produces a new governing structure and holds national elections, moving forward, the Libyan governments will have to tackle the growing deficit of state legitimacy, which largely stems from the lack of service delivery, among other factors. This was evident in the mass demonstrations that took place in Tripoli and in Benghazi in the summer of 2020, which called for better living conditions. Regardless of which camp they support or under which government's control they fall, people across Libya suffer from poor or inadequate provision of basic services, such as electricity, access to banking services, trash collection, and water supply. The continuous deterioration of these services in Libya threatens to further erode state legitimacy and impede all attempts to end Libya's transitional period.

Improving the provision of basic services in Libya is an extremely challenging task. Governments in Libya face a number of challenges, which range from legal to operational and institutional. Additionally, the toll that the different wars have had on service delivery infrastructure and the lack of in-house technical expertise have made reforming these sectors even more difficult. Furthermore, due to the legacy of 42-years of top-down policy making culture in Libya, public service providers are usually advised by engineers who are adept at providing engineering solutions but lack experience in addressing institutional problems and formulating policy advice. To begin improving the provision of essential services in Libya, a rigorous examination of their institutional set-up and the legal frameworks that govern them is a necessary first step. This series of policy papers is an attempt in this direction.

The three policy papers cover the service provision of solid waste management, electricity, and water in Libya. For each service, the team examined the institutional set-up of the sector, i.e., how the service is institutionally organized at the central and local levels, the decision-making processes, and the underlying causes of the declined functionality of the service. Based on these analyses, the team proposed a set of short- and long-term practical recommendations for national and international policy makers.[1] The short-term recommendations are grounded in realism about the limits of what can be achieved given the current situation in Libya.

[1] Specifically, the international organizations that are currently working on improving these services in Libya such as GIZ, UNDP, and USAID

CHAPTER-1

WASTE MANAGEMENT IN LIBYA

Institutional and legal challenges

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EXECUTIVE SUMMARY

Despite nearly a decade of attempts to delegate solid waste management to local authorities, Libya has been unable to overcome a series of institutional and legal obstacles, resulting in a low-quality and inefficient waste management system. Most Libyan laws on the management of solid waste – passed both before and after 2011 – assign the provision of the service to local authorities across the country. Municipalities are better placed to provide responsive and better-quality service given their proximity to the citizens and their ability to closely monitor the service provision on the ground. Yet despite the existing legislative mandates, solid waste management remains the responsibility of the Ministry of Local Government, with local municipal authorities playing little or no role in the management of the service. In 2019, the Presidential Council attempted to enforce the local administration law (Law 59), which assigns the municipalities jurisdiction over the management of the service, but because of legal loopholes, vague definitions of roles, contradicting regulations, and unwillingness by the current service providers to change the status quo, these efforts effected no change.

This policy paper examines the existing legal and institutional arrangements that are preventing the delegation of Solid Waste Management to the municipalities as outlined in the local administration law. This paper proposes that the Ministry of Local Government should amend Decree 434 (2010) which regulates the work of the Public Service Companies – the current service providers – and should negotiate a new relationship between these companies and municipalities after the delegation of responsibilities. Without these two key changes, the Ministry of Local Government may be unable to delegate the management of the service to the municipalities as mandated in the local administration law.

INTRODUCTION

Solid waste management (SWM) is one of the core basic services that significantly affect citizens' daily lives and a polity's overall governance. SWM refers to the process of collection of waste from streets and public spaces and treatment and disposal of this collected waste. Over the last five decades, the volume of solid waste in Libya has risen significantly due to increased urbanization and population growth, yet the state capacity to manage this increasing waste volume is lagging. Pre-COVID19 pandemic estimates indicate that only 50%-80% of citizens were provided the service.[2] Even fewer would have reported satisfaction with its provision. The deteriorated situation is evidenced by three related phenomena, which represent only the most obvious failures of SWM: the accumulation of trash in public, widespread garbage burning, and open dumping.

These three phenomena are seen and felt by every Libyan citizen, contribute to poor quality of life, and weaken the social fabric of the community. First is the piling and accumulation of trash in streets and public spaces resulting from trash-collection workers' strikes; the lack of equipment, vehicles, and human resources to remove it; insufficient trash collection frequencies; and poor route planning. Limited resource allocation and a management system detached from local needs are the underlying causes of these problems. The second phenomenon is trash burning, which is a byproduct of the first issue. When waste accumulates in the street and no one shows up to collect it, the only alternative residents have is to eliminate it by incineration, even though they are knowingly generating public health and environmental hazards in the surrounding communities. The third situation is open dumping. When residents tire of seeing trash accumulate in front of their homes, they take it to the nearest empty land area. Over time, these areas become a de facto uncontrolled and open landfill and a source for toxic gases.

Citizens resorting to these harmful practices are only the symptoms, not the disease. Besides the heavy toll that the different conflicts have had on the service infrastructure, the root causes stem from poor regulations and inadequate SWM policies and practices that the state has adopted over the last five decades. In other words, the alarming state of solid waste across Libya represents the sum total of the policies and decisions of the country's SWM system. This situation not only produces the immediate results that we now see, but also generates long term effects that can lead to deeper and more disruptive outcomes. If no structural changes are made to the current system, continued ineffective SWM threatens to further exacerbate poor living conditions for Libyans and weaken the already worn-out social contract between the state and the citizens.

Improving solid waste management in Libya is a challenging task, however. The government's current approach to improving the quality of the service is to delegate the responsibility of managing the service from the Ministry of Local Government to the municipalities. The rationale is that municipalities

[2] World Bank, "Proceedings Of the Libya Local Government Forum," January 2021. Available at https://reliefweb.int/sites/reliefweb.int/files/resources/Proceedings-of-the-Libya-Local-Government-Forum_0.pdf.

are better placed to provide responsive and good-quality service given their proximity to the citizens and their ability to closely monitor the service provision on the ground. This approach faces a number of challenges, which range from legal to operational and institutional. These challenges are made worse by the government's lack of inhouse subject-specific policy advisors. In SWM, the government has traditionally been advised by engineers who are adept at providing engineering solutions but lack experience in addressing institutional problems and formulating policy advice.

The Government of National Unity is struggling to rebuild state credibility and citizen trust in the system, which stems from the lack of service delivery and other mismanagement behaviors by previous governments. This was evident in the mass demonstrations that took place in Tripoli on 23 August 2020 and in Benghazi on 12 September 2020, which called for better living conditions and service provision.[3] Regardless of which camp they support, people across Libya suffer from inadequate provision of basic services, such as electricity, access to banking services, trash collection, and water supply. The continuous deterioration of services threatens to further erode state legitimacy and undermine the potential for Libya's transitional period and success of future governments.

[3] Libya Desk, Weekly Report 3920-, September 24, 2020

INSTITUTIONAL CHALLENGES

The institutional arrangement governing SWM in Libya creates incentives for the current SWM providers to oppose and resist any structural reform, such as delegation to the municipalities, that could threaten their financial or political interests.

The management and provision of solid waste have experienced continuous structural and operational changes over the past five decades in Libya, motivated by political considerations and characterized by shortsighted solutions. Before 1970, the service was primarily provided by private companies, but starting from that year, the entire service provision process was nationalized and assigned to the public sector, as was the case with all services.[4] The service repeatedly swung between local and national management modalities. Since 2010, however, it has been administered by national ministries, which continues to be the status quo.[5] The frequent changes in the sector's management modalities have weakened the government's institutional capacity and hollowed it of any experiential expertise and managerial knowledge, which has contributed to the government's inability to design the new institutional set-up to facilitate the delegation of responsibilities.

Currently, the Public Services Companies (PSCs) provide the service. PSCs are state-owned enterprises and there are 23 PSCs covering all of Libya. In most Libyan cities, these PSCs manage the entire waste cycle from trash collection to final disposal and landfill management. In big cities, private cleaning companies play a supporting role to the PSCs, but are limited to the narrow task of street trash collection.[6] The reintroduction of the private companies to the SWM sector took place in the early 1990s, when it became evident that the public sector was unable to meet the expanding urbanization of the big cities.[7] Except in Benghazi and a few other cities, PSCs directly subcontract these private companies to support the trash collection process.[8] No governmental agency has any oversight over how, with which, and under what criteria these private companies are being contracted.[9] In Benghazi, the municipality directly contracts private companies to collect trash from the street, which it was only able to do after the central government lifted the municipal budget ceiling to pay for services.[10] In this way, the municipality of Benghazi is one of few Libyan cities that provides SWM in accordance with law No. 59 on Local Administration, which grants administrative and financial control over the service to the municipalities.

The Public Service Companies have every incentive to keep the status quo as it is. The Ministry of Local Government (MoLG) pays the PSCs a lump-sum amount each year for the provision of the service, but there is no formal contracting process.[11] This lump-sum amount is

[4] Etriki, Jalal. "Municipal Solid Waste Management and Institutions in Tripoli, Libya." Department of Geography, Environment and Earth Sciences, The University of Hull, 1 Jan. 1970, https://hydra.hull.ac.uk/assets/hull:8239a/content.

[5] Cabinet Decree No. 434 (2010)

[6] Government official, authors' interview, March 2021.

[7] Cabinet Decree No. 1225 (1990).

[8] Government official, authors' interview, March 2021.

[9] Ministry of Local Government, Libya. "Sector strategy/ medium-term strategic plan: solid waste management". (Unpublished). May 27, 2019

[10] Government official, authors' interview, March 2021.

[11] SWM expert, authors' interview, April 2021.

calculated based on a formula that uses a World Bank estimated average for waste generation per person for middle-income countries multiplied by a unit cost of each collected ton of waste, rather than the actual weight of trash per location in Libya, because almost all weighing equipment at the landfills have been damaged.[12] Therefore, these payments are not conditioned by any performance indicators or targets. Not only does the MoLG not hold the PSCs accountable against any agreed-upon performance indicators or targets, but it also exercises little oversight over how PSCs fulfill their self-appointed duties since there is no contract in place.

The MoLG paid around 410 million LYD in 2019 to PSCs.[13] This budget is spent mostly on solid waste collection, transfer, and final disposal, but also provides for other services such as parks and cemeteries maintenance, public sanitary protection, and street decorations. Accounting for inflation and the fact that the unit cost per ton of collected waste was last updated in 2013, the PSCs are significantly underfunded in comparison to previous years.[14] In 2012, for instance, the MoLG paid 500 million LYD for solid waste management. However, given that the PSCs do not submit any financial reports to the MoLG, it is difficult for the MoLG to know exactly how the money is spent.[15] Estimates indicate that at least two thirds of this amount go into staff salaries.[16] These PSCs are considerably overstaffed, which, among other issues, diverts funds that should be going to maintenance of equipment and landfills to salaries of staff who do not work. The MoLG pays this amount from the fourth chapter of the government budget, which deals with subsidies and is not subject to any auditing process.[17] Such an arrangement is a recipe for corruption and poor delivery of the service.

Fearing that the municipalities will not have the financial resources to cover their costs nor be able to continue the current no-contract status with the ministry — valid concerns — the PSCs have every incentive to block any attempt to transfer the SWM responsibilities from the MoLG to the municipalities. In fact, the PSC in Tripoli has twice appealed in court against government decisions to delegate SWM responsibilities to municipalities. The PSC won both appeals by leveraging old yet still in-place legislation against the incomplete local administration legal framework; the two cases are explained below.

Libyan citizens are negatively impacted by poor service delivery, but the current institutional arrangement provides no channel for citizen participation or feedback. Citizens lack awareness about the depth and extent of the issue of solid waste. Trash could continue to accumulate; citizens would just burn it as a quick 'solution'. Furthermore, since only the PSCs conduct trash collection in most Libyan cities, there is no competition and thus no incentive for the PSCs to improve the delivery of the service. Also, given that the service is provided by the PSCs and directly financed by the MoLG, there is little incentive for citizens to engage with their elected municipal officials about a service that these officials have no control over.

[12] GMinistry of Local Government, Libya. "Sector strategy/ medium-term strategic plan: solid waste management". (Unpublished). May 27, 2019.

[13] Libyan Audit Bureau, Annual Auditing Report, 2019.

[14] Ministry of Local Government, Libya. "Sector strategy/ medium-term strategic plan: solid waste management". (Unpublished). May 27, 2019.

[15] Ibid.

[16] Libyan Audit Bureau, Annual Auditing Report, 2017.

[17] Ministry of Local Government, Libya. "Sector strategy/ medium-term strategic plan: solid waste management". (Unpublished). May 27, 2019.

However, if SWM were provided and funded by municipalities across the country, citizens would be able to gauge the relative quality of their city's SWM and hold municipal officials accountable for substandard service provision. Additionally, SWM in Libya could be improved if municipalities managed it directly as it would help clarify the division of SWM responsibilities and roles between the different institutions, give attention to other neglected aspects such as waste treatment, and allow the municipalities to collect service fees from citizens to recover the waste collection and disposal services costs and alleviate municipal budget constraints.

LEGAL CHALLENGES

The legal framework for SWM in Libya is confusing, self-contradictory, and in conflict with recent government decrees, resulting in the reversal of several reform attempts.

Libya was among the first countries in the MENA region to regulate SWM in 1973.[18] The Health Law No. 106 (1973) was the first Libyan law that placed municipalities in charge of waste management. Ten years later, Libya passed its first and only law specifically for SWM, Law No. 13 (1984) of Public Cleaning, which also assigns the management of solid waste to municipalities.[19] Another relevant law is the Environmental Protection Law No. 15 (2003), which focuses on environmental issues in general. It reconfirms that SWM is the responsibility of the local authority, referred to as Shaabiyat in the law.[20] Last is the Local Administration Law of 2012, Law 59, which also tasks the municipalities with SWM. All of these laws are vague about the role of municipalities in SWM. They do not clarify the varying roles and relationships of the different institutions involved in this sector. Moreover, they are outdated and in many instances refer to institutions that no longer exist; for instance, the Public Cleaning Law (1984) has not been updated for 37 years. Additionally, these laws use the term "cleaning" for SWM, which is an outdated administrative term as it makes the ultimate objective for SWM in Libya primarily the prevention of waste accumulation in streets, neglecting other aspects that affect the quality of SWM services such as waste treatment and recycling as well as the broader environmental impact of solid waste.

Despite the fact that all laws that regulate SWM in Libya assign the management of solid waste to municipalities, or the local level in general, the service is currently under the financial and executive control of the MoLG. This is mainly because in 2010 the Libyan government issued Decree No. 434, which mandated that the PSCs deliver the service and assigned the management of the service to the Ministry of Public Facilities.[21] Since 2012, the MoLG has taken over the management of the service.[22]

The government has tried to facilitate the delegation of responsibilities, but, due to legal challenges, most of these efforts have made no tangible progress. The 2016 court case by the PSC in Tripoli well illustrates some of the legal challenges for the delegation of responsibilities from the central level to the local level. In 2016, the PSC of Tripoli appealed the government's Decree No. 52 (2016) which mandated that PSCs work with the Public Facilities Office at each municipality, a de facto delegation of responsibilities. The court found in favor of the PSC and reversed the government's decision based on the following legal ground: per Law 59, the municipalities can only manage public facilities established by governorates, an intermediate government tier that was never established, and have no authority over the PSCs, which are products of the central government.

[18] Etriki, Jalal. "Municipal Solid Waste Management and Institutions in Tripoli, Libya" Department of Geography, Environment and Earth Sciences, The University of Hull, 1 Jan. 1970, https://hydra.hull.ac.uk/assets/hull:8239a/content.

[19] They used to be called Municipal People›s Committees.

[20] Shaabiyat is a subnational unit equivalent to a province in Libya.

[21] Decrees refer to regulations that were issued by the government cabinet, a ministry, or a minister, not by the parliament. Laws refer to regulations that were issued by the parliament not the government.

[22] Cabinet Decree No. 55 (2012).

Furthermore, as per Decree 434 (2010), which regulates the work of the PSCs, the PSCs shall be managed by a ministry, not a local authority. The ruling adds that for solid waste management, as per Law 59, municipalities shall only play a supervisory role and cannot directly manage the delivery of the service.

In an attempt to pave the legal pathway for the delegation of responsibilities, the Presidential Council (PC) of the Government of National Accord and the MoLG passed a number of decrees in 2018 and 2019, Decree No. 28 (2019) being the cornerstone of these decrees. Decree No. 28 provides general guidelines for SWM and defines the role of municipalities in SWM. The decree states that the municipalities shall be in charge of public cleaning work and shall contract any licensed company for trash collection services. To complement this decree, the MoLG created a template for contracting solid waste collection and transportation services to public and private sector companies.[23] Seizing on the waste accumulation crisis in Tripoli in 2019, the PC issued Decree No. 1011 (2019) authorizing six municipalities inside Tripoli to undertake cleaning work with a budget transferred from the budget allocations for Tripoli's PSC. In response, the PSC in Tripoli challenged all of these decrees in court and won the case again. The court in its decision argued that the government decrees are in violation of Law 59 (2012) and Law 13 (1984). Therefore, these decrees have changed nothing on the ground so far and have only resulted in deepening the rift between the PSCs and the government. It is also important to note that some municipalities rejected the decision as well, fearing that the government would only delegate the responsibilities but not the funds.

The only Libyan legislation in place for local administration (Law 59 of 2012) also provides a distorted path for the delegation of responsibilities. Law 59 states that municipalities shall establish and manage public facilities that are in charge of public cleaning.[24] It has been almost a decade since the adoption of Law 59, but its provisions on the municipalities' role in SWM remain unenforced. Among other factors, this is due to its executive regulation, Cabinet Decree No. 130 (2013). While Law 59 tasks municipalities to manage SWM, its executive regulation only grants them a supervisory role.[25] The fundamental contradiction between Law 59 and its executive regulation regarding what role municipalities shall play creates confusion and legal disputes.

In summary, Libyan laws for SWM are incompatible with each other and fail to form a comprehensive legal framework for SWM in Libya. The roles of the different institutions and service providers are at best vague and at worst contradictory because Libya has issued several laws and decrees that address SWM without a comprehensive strategy for the sector. As long as these laws are active and unchanged, the legal framework for SWM will present a challenge to any attempt to improve service delivery.

[23] Minister of Local Government Decree No. 150 (2019).

[24] Article 25, Law 59 (2012).

[25] Article 11, Cabinet Decree No. 130 (2013).

RECOMMENDATIONS

This policy paper proposes a set of short- and long-term practical recommendations for national and international policy makers. The short-term recommendations, which represent what should be done in the next year or so, are grounded in realism about the limits of what can be achieved given the current situation in Libya.

Short-term recommendations:

- **Start negotiations and dialogue with the 23 PSCs to ensure that they do not block the process again.** Given that they have the most to lose from this process, the government will need to address their fears and find middle ground with them. One approach could be to assign them to do cleaning work for public spaces or governmental buildings, in addition to allowing them to bid on all other tenders. Further, the government should design a special program to address overstaffing and to limit PSCs' political weight, which partly stems from their large number of employees.

- **Revoke Decree 434 (2010) and issue an updated version that takes into account Law 59 (2012).** Decree 434 is the regulating document for all PSCs, and it states that PSCs are in charge of public cleaning work and report to the Ministry of Public Facilities. If the government does not update this decree to indicate that PSCs should bid alongside private companies on municipal tenders as well as change the fact that PSCs only report to a ministry, all efforts to transfer responsibilities can be challenged in court.

- **Update the Executive Regulation of Law 59 to reflect the role of municipalities in SWM as provided by Law 59.** While Law 59 tasks municipalities with the direct management of SWM, its executive regulation only grants them a supervisory role. If this is not corrected, it will always remain a loophole in the legal framework that can prevent local control.

Long-term recommendations:

- **Engage civil society organizations (CSOs) to fight bad practices and exert pressure on trash collection companies.** There is little to no collaboration between public authorities and CSOs in SWM. CSOs have a vital role to play to combat harmful practices, such as trash burning, through public campaigns to raise the awareness of citizens. CSOs can also serve as monitors on the ground and can help the municipalities evaluate companies' performance.

- **Update Law No. 13 (1984) and Law No. 15 (2003) to clearly define the role of municipalities in SWM.** These laws are vague and outdated. They refer to old local administrative units that no longer exist in Libya and fail to clarify the different roles of the different entities in SWM. Also, these laws should formally recognize the role that CSOs can play with municipalities in this sector. Without updating these laws, municipalities cannot obtain full responsibility of SWM.

- **Equip and train enforcement and accountability institutions such as the Municipal Guard and the Environmental Sanitation Offices at each municipality, which currently exist but play no role in the process.** Especially in big cities, the roles of these two entities in enforcing sustainable environmental practices and monitoring trash collection and treatment are essential to improve service delivery.

- **Develop technical expertise at the ministry level.** The SWM sector in Libya suffers from lack of technical expertise: experts who are experienced and equipped to address institutional and management issues for SWM. Without having inhouse technical capacity to develop long-term sectoral goals and strategies and design best-fit solutions, the SWM sector in Libya will remain unable to meet the needs and demands of citizens.

CHAPTER-2

WITHOUT ELECTRICITY REFORMS, LIBYANS WILL REMAIN IN THE DARK

February 2022

INTRODUCTION

For more than five years, power cuts and total electricity blackouts have been a prevailing feature of Libyans' daily life. Depending on the time of the year, power cuts range from four hours to over fifteen hours a day. The peak is the summer season as most houses in Libya have air conditioners because of the hot weather, which subsequently overburdens the half-functioning power system in the country. To a greater extent than other public services, the continual disruption of the electricity service in Libya has devastating consequences for the Libyan economy. In a survey by the World Bank in 2020, almost 70% of the companies surveyed reported power cuts as either a major or severe constraint to their company's growth, surpassed only by macroeconomic instability as the most frequently reported constraint to businesses in Libya.[1] Reliance on an obvious substitute for grid electricity - diesel generators - is hindered by two factors. First, diesel is in short supply across Libya, only available in the black market at a much higher price. Second, many small companies cannot afford sufficiently large generators or the cost of regularly buying diesel from the black market, which makes such an impact disproportionate, affecting poorer people and businesses significantly more. Beyond the economy, the power cuts disrupt other essential public services such as water supply and healthcare.

[26] Rahman, A. & Di Maio, M. "The Private Sector amid Conflict: The Case of Libya, World Bank Group. 2020 https://openknowledge.worldbank.org/bitstream/handle/10986978146481644 4/34818/.pdf?sequence=1&isAllowed=y

Libya's capacity to generate and transmit electricity has deteriorated considerably over the last decade. Libya has 15 power plants with a combined power generation capacity of 10,400 megawatts (MW). However, for a multitude of reasons, this full capacity is never reached. For instance, in summer 2020, the peak load was 7,500 MW while the available power generation was only 3,800 MW, resulting in 18 hours of power cuts per day.[27] In non-peak times, these power plants generate 4,351 megawatts of electricity, around 43% of its full capacity.[28] In addition, among the 63 power stations spread across the country, 23 are not functional.[29] This is met with an extremely high consumption of electricity by Libyans. On average, Libyans consume three times more than their neighbors in Tunisia and Egypt: 4.8 MWh per year per capita, as opposed to 1.3 and 1.7 for Tunisians and Egyptians, respectively.[30] Such a high consumption rate is partly a result of the highly subsidized electricity tariffs and the government's inability to bill and collect these tariffs from users and institute a progressive tariff framework. These policy and infrastructural failures have resulted in a power grid that fails to meet demand at the best of times and occasionally shuts down entirely.

According to Libya's nationwide service provider, Libya will need 11,134 MW by 2025, more than twice its current de facto power generation. When considered with the political and security environment in Libya, a total collapse to the electricity system in the country is not impossible. This situation is the outcome of several intertwined factors. First, the continuous state of conflict in the country has resulted in substantial damage to the sector's infrastructure, shutting down several power plants and stations completely. For instance, the Southern Tripoli power plant, which has a power generation capacity of 659 MW, generated zero megawatts during 2020 due to the war in Tripoli.[31] Furthermore, the lack of security led to the departure of many foreign experts on whom Libya is heavily reliant, given the lack of local expertise, which undermined the maintenance of the power plants and stations. Due to the absence of security, the electricity network has suffered from an increasing number of acts of vandalism and theft, especially of conductors, wires, and other electrical equipment.

Second, beyond the impact of the conflict and the general security situation, the electricity sector suffers from deeper issues that stem from how the sector is institutionally organized and regulated. Despite significant funds allocated by all post-2011 governments, institutional and legal bottlenecks have stalled necessary reforms and strategic investments in the sector, perpetuating or intensifying existing challenges. This policy paper unpacks these institutional and legal challenges and proposes practical policy recommendations for the sector.

[27] GECOL Board Member, presentation at the Libyan British Business Council. 21 October 2021.

[28] US Embassy to Libya Facebook page. 29 September 2020. Available at https://www.facebook.com/236838689712543/photos/pb.100066897574503.-2207520000../3566611663401879/?type=3

[29] US Embassy to Libya Facebook page. 29 September 2020. Available at https://www.facebook.com/236838689712543/photos/pb.100066897574503.-2207520000../3566611663401879/?type=3

[30] World Bank Group. "Task A: Sector performance and structural sector reform", September 2017. Available at https://documents1.worldbank.org/curated/zh/647381527074345716/pdf/task-A-sector-performance-and-structural-sector-reform-deliverable-41--options-study-for-GECOL-restructuring-report.pdf

[31] US Embassy to Libya Facebook page. 29 September 2020. Available at https://www.facebook.com/236838689712543/photos/pb.100066897574503.-2207520000../3566611663401879/?type=3

INSTITUTIONAL AND OPERATIONAL CHALLENGES

The electricity sector is run by a single, nationwide service provider: the General Electricity Company of Libya (GECOL). GECOL is a state-owned enterprise that was established in 1984.[32] With a total of more than 45,000 employees across the country, it is in charge of the entire electricity system, from power generation, transmission, and distribution to maintenance of grids and power plants, as well as operational and policy planning and development.[33] In other words, GECOL has a total monopoly over the electricity industry in Libya. GECOL is governed by a government-appointed Board of Directors and a General Assembly that is chaired by the Prime Minister.

Despite appointing 35 ministers covering almost all affairs that can be possibly managed by a government in Libya today, the Government of National Unity did not designate a ministry for the electricity sector. For the past two decades, the sector had only two short-lived ministries in spite of the successive governments in Libya that continually expanded the number of ministers in each cabinet. The first was the Ministry of Electricity, Water, and Gas, which was established in 2007 but abolished shortly after in 2009, and then the Ministry of Electricity and Energy, which was established in 2012 and dissolved in 2016. Since then, the sector has had no designated administrative body, which has left the sector with no direct supervision from a sector-specific governmental entity. GECOL currently reports directly to the government cabinet, which has neither the technical knowledge nor the organizational structure to provide adequate oversight.

Given the growing political salience of the power cuts issue, recent governments have allocated a considerable amount of money to the electricity sector. The fact that the sector has neither a designated ministry nor an independent technical agency leaves the government exposed to the political pressure of a few people in positions of influence. This has led to ill-informed decisions and policies and the obstruction of necessary reform efforts. For instance, in 2009, when the Ministry of Electricity, Water, and Gas was dissolved, the process of unbundling GECOL - breaking it into smaller companies to improve service delivery and accountability - was suspended shortly after. GECOL, and by extension the entire sector, is controlled by GECOL's CEO, GECOL's Board of Directors, and to a much lesser extent, GECOL's General Assembly, which rarely meets.

Despite the government's huge spending in the sector, the electricity situation in Libya has only deteriorated over time. Over the past ten years, GECOL has reportedly received approximately twenty billion Libyan dinars (4.39 billion USD).[40] Nevertheless, the electricity supply in the country was almost halved between 2017

[32] Law 17 (1984)

[33] World Bank Group. "A Compilation of Existing Analysis on Challenges and Needs". Available at https://documents1.worldbank.org/curated/en/832481591363718980/pdf/Supporting-Peace-and-Stability-in-Libya-A-Compilation-of-Existing-Analysis-on-Challenges-and-Needs.pdf

[40] Authors' interview with an electricity sector expert (October 2021).

and 2020 alone.[41] This drastic drop is due to a number of reasons, some external to the electricity sector and others caused by institutional arrangements and failures. External reasons refer to the general political instability and security situation. The political divide and the subsequent legitimacy crisis of who controls what between the different rival governments undermined these governments' ability to exert any pressure on GECOL or perform any kind of oversight on its operations and paralyzed any potential for reform in the sector.

Internal reasons stem from how GECOL is set up and operates. Many power plants and stations regularly go offline because of a lack of periodic maintenance, constituting a major reason for the decline in the power supply. Among several other factors, GECOL does not have a tracking system to periodically repair equipment, which means that maintenance is only performed when equipment breaks down. This practice causes regular disruptions to the network, further damaging the power system. GECOL also has no automated system in place to turn off street lights during the day and turn them on during the night, resulting in considerable electricity waste. Additionally, GECOL is hugely overstaffed. While it currently has more than 45,000 employees, it only needs 14,000 employees, indicating a workforce that is more than three times as large as necessary.[42] As such, a significant amount of government funding goes to salaries rather than essential investment in rebuilding the power infrastructure or improving GECOL's overall effectiveness.

Although Libya has a specific governmental agency tasked to promote and implement renewable energy projects in the country, Libya currently gets none of its electricity from renewable energy sources. In its 14 years of existence, the Renewable Energy Authority of Libya (REAOL) has failed to exploit Libya's considerable solar energy potential.[43] This is because REAOL has neither the regulatory power to instruct or enforce policy, nor sufficient funds to roll out any solar power program. Furthermore, despite its expertise-intensive role, REAOL has mostly administrative staff and lacks technical experts.[44] It has so far only provided off-the-shelf recommendations. Without political will and proper understanding of institutional and legal hurdles for solar energy in the country, these recommendations remain ink on paper. Looking at both private and public sectors, Libya in general lacks the technical knowledge and expertise to be able to introduce renewable alternatives to the current system.[45]

[41] The official installed capacity by the GECOL until 2017 was 10.238 GW. However, until 2020, the energy available to consumers is only 5.53 GW, which represents 52% of the total capacity of the GECOL

[42] Authors' interview with an electricity sector expert (October 2021).

[43] Government Decree No. 426 (2007)

[44] Author's interview with a renewable company representative (January 2022)

[45] Ibid

LEGAL CHALLENGES

The electricity sector suffers from weak legal foundations and loopholes, as there is no law specific to the sector. The legal framework for the sector consists of a few laws that regulate the work of specific institutions, not the sector as a whole. For instance, GECOL's operations are regulated only by the commercial law, which is not specific to electricity.[46] Moreover, the sector is in desperate need of policy reforms and restructuring such as the unbundling of GECOL, which, among other benefits, will improve external monitoring and accountability and help separate planning from operational tasks. The government Cabinet Decree No. 33 (2012), which established a ministry for electricity and energy, tasked this ministry to execute reforms, policies, and strategies for the sector. But because the ministry was abolished in 2016, the sector was left to operate in vacuum and the process of GECOL unbundling and sector reform programs were put on hold.

In the absence of an electricity-specific law and clear monitoring processes, the sector continues to be characterized by corruption and mismanagement. TSuch a law should establish an independent regulatory body to provide oversight on all sector activities, propose electricity tariffs, study the issues that the sector faces, and develop policy solutions. The law should also clarify the essential institutions in the sector and establish a clear division of roles and mandates. Although there is one single service provider in the sector, there are reportedly 11 other state-owned and semi state-owned companies that operate in the sector as well.[47] The extent to which these companies currently play any role in the sector should be examined. Without a regulatory framework for the sector and an independent regulatory body, Libya's electricity service will continue to suffer from corruption, overlapping mandates, little to no government oversight, and inefficiency.

[46] Law 23 (2010)

[47] The team was unable to find up to date information about the status of these companies

RECOMMENDATIONS

Short-term recommendations:

- **Adopt an electricity-specific law.** The absence of a strong and clear legal framework for the whole sector will continue to be one of the main underlying factors undermining reform efforts. The law should define the structure and the institutional framework of the sector and the roles and responsibilities of all actors as well as lay the groundwork for a conducive legal environment for renewable energy and public private partnership models.

- **Set up a ministry for the sector.** The government should build on Cabinet Decree No. 33 (2012), which established the latest electricity ministry in Libya. Among other responsibilities, the ministry should have the mandate to execute the necessary measures to restructure GECOL and other state-owned enterprises in the sector. Furthermore, the ministry should be tasked to design an institutional framework for the development of renewable energy projects in Libya.

- **Empower Renewable Energy Authority of Libya (REAOL) and invest in the country's solar energy.** The Libyan government, in partnership with the private sector, should empower REAOL to support the process of solving the electricity dilemma in a sustainable manner.

- **Assign regulatory, advisory, and service provision roles in the renewable energy sector.** To ensure efficiency, the government should empower REAOL to assume a regulatory role and establish two new agencies. The first would be in charge of assessing and studying renewable energy alternatives for Libya and proposing operational guidelines and standards. The other would be tasked with implementing renewable energy projects and have the mandate to partner with private sector and international companies to fill the expertise gaps in the sector.

Long-term recommendations:

- **Restructure the sector both at the government level and at the service level.** The government should consider this as a starting point for long-term reforms in the electricity sector. Specifically, it should institutionally separate policy making, key functions such as monitoring and oversight, and service delivery. At the service level, the suspended unbundling process, which includes the separation of power generation, distribution and transmission tasks, should be resumed as soon as possible.

- **Develop local technical expertise.** Libya's reliance on foreign companies and weak inhouse expertise resulted in limited human capacities in the sector. Designing a strategy for building the capacities of the staff and developing the inhouse engineering expertise with assistance from foreign companies would considerably benefit the sector.

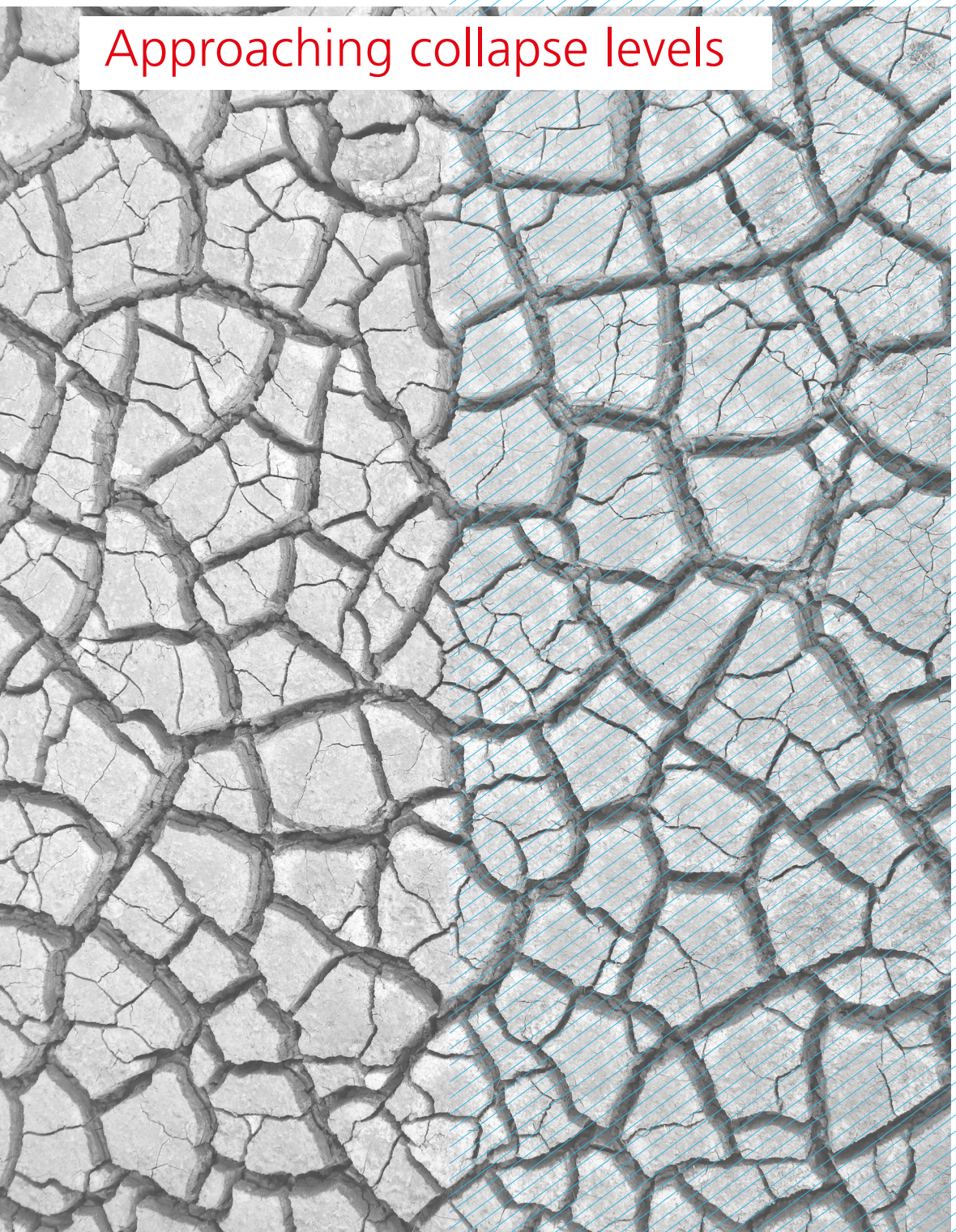
- **Introduce private companies to the sector.** With the unbundling of GECOL and venturing toward renewable energy sources, the government should outsource some of the tasks that GECOL and other companies have performed thus far to the private sector through competitive processes to increase efficiency and reduce cost.

- **Reduce electricity overconsumption across the country.** The excessive per-capita electricity consumption in Libya causes an inflated demand for electricity that will be unmet even if power generation capacity is greatly increased. Such an issue can only be addressed through adopting new policies for pricing and incentives that will lead to a behavior change and ultimately the reduction of electricity overuse, as well as structural reforms that reduce large-scale systemic power overconsumption. Besides these policies, engaging various civil society organizations and media outlets to raise the overall awareness of citizens of the extent of the issue could help reduce overconsumption.

CHAPTER-3

WATER SUPPLY IN LIBYA

Approaching collapse levels



March 2022

INTRODUCTION

Libya, one of the driest countries in the world, faces an alarming and worsening water crisis.[48] In Libya, the narrow coastal region (less than 5% of the country) receives the majority of rainfall. Coupled with increasing water needs as a result of a growing population and overconsumption, Libya is facing an increasingly severe water crisis. Libya's water demand was nearly double water supply in 2020 (3,820 million cubic meters supplied versus 7,236 million demanded).[49] Out of the currently supplied water, only 1.8% comes from a relatively renewable source of water: water desalination and wastewater treatment. In other terms, Libya's per-capita water production from renewable sources is less than one tenth of the global average.[50]

[48] Adegbenro A., "8 Most Driest Countries in the World››. The Explorion. 18 October 2021. Available at https://thexplorion.com/driest-countries/

[49] Emhamed, S. & Idris, A. "Libyan Water Security: Challenges, Surrounding Threats and Proposed Solutions". Arab Democratic Center, Berlin, Germany. (September 2021).

[50] Ibid

With unfavorable geographic and environmental conditions, Libya relies primarily on water supplies from groundwater sources, representing approximately 97% of the water supply in Libya.[51] Surface water contributes to less than 3% of the current water supply in the country.[52] This is because the country has very few rivers, lakes, and natural springs that have fresh and good water quality and an adequate discharge rate. Most of the groundwater comes from water aquifers in the south of the country that are accessed via the Great Man-Made River Project (GMMR). Established in 1983, the GMMR aimed to transfer groundwater from the south to the coastal strip of the country, where the vast majority of the population lives, with around 3,500 KM of pipes.[53] With its current development stage, the GMMR reaches two-thirds of Libya's cities.[45] Despite its magnificence from an engineering standpoint, the GMMR carries its own set of challenges and limitations, and is currently functioning at 40% of its full potential.[55] Some areas rely on water wells that extract water from shallow aquifers, called municipal water wells, in addition to water from the GMMR and desalination stations.

Libya has long suffered from water scarcity, recently exacerbated by population growth and infrastructure challenges. It will nearly be impossible to meet all needs for longer periods of time under the current conditions and the production from all water projects in dams, wastewater recycling, and water desalination does not cover the deficit of water in Libya.[56] Libya's severe water shortage is also being intensified by climate change, which has increased the number of drought days and the rate of evaporation.

Water supply in Libya is mainly managed by five institutions: General Water Authority, the GMMR project management, the General Company for Water Desalination (GCWD), and the General Water Supply and Sewerage Company (GWSSC) and the Ministry of Environment. There should be a mapping of roles, capacities, and coordination gaps for these institutions in order to allow the government to identify and address issues in the water sector that stem from its institutional framework. The lack of clarity and a unified strategic plan among these institutions has hampered the sector's ability to adapt to the growing crisis.

The water supply sector in Libya urgently needs to purchase spare parts and chemicals to operate the desalination plants, which will increase water supply. Additionally, the sector would benefit from a comprehensive assessment of its existing institutional and physical infrastructure and potential alternatives for water supply. The government should then develop its strategy on the basis of this assessment.

[51] Salem, O., Country case study - "National water policy review, and management of water scarcity in the Libyan Arab Jamahiriya". Proceedings of the second national expert consultations on national water policy reform in the near East. FAO. (November 1997)

[52] CEDARE , "Libya Water Sector M&E Rapid Assessment Report", Monitoring & Evaluation for Water In North Africa Project, Water Resources Management Program, CEDARE. (2014).

[53] Great Man-Made River Project website. Available at https://gmra.com.ly/index.php/ar/

[45] Emhamed, S. & Idris, A. "Libyan Water Security: Challenges, Surrounding Threats and Proposed Solutions". Arab Democratic Center, Berlin, Germany. (September 2021)

[55] Abdudayem, A. & Scott, A. "Water infrastructure in Libya and the water situation in agriculture in the Jefara region of Libya", African J. Economic and Sustainable Development, Vol. 3, No. 1, 2014.

[56] Abdudayem, A. & Scott, A. "Water infrastructure in Libya and the water situation in agriculture in the Jefara region of Libya", African J. Economic and Sustainable Development, Vol. 3, No. 1, 2014.

WARNING SIGNS

In February last year, UNICEF rang an alarm bell by stating that "over 4 million people, including 1.5 million children will face imminent water problems if immediate solutions are not found and implemented".[57] According to experts, water resources and infrastructures status in Libya are nearing collapse levels.[58] UNICEF's warnings were made even more worrisome when a survey covering 45 cities across Libya later the same year found that in Tarhouna, for instance, 73% of the respondents reported having insufficient water to meet their needs in the 30 days prior to the data collection.[59] [60] This is in line with the fact that in western Libya, the water supply dropped from 1.2 million cubic meters per day to around 800,000 cubic meters because of vandalism and lack of maintenance.[61] With Libya's exponentially growing population, estimates indicate that Libya will need about 8 billion cubic meters by 2025, twice what it is theoretically supplying today.[62]

The water scarcity issue that the country is experiencing stems largely from man-made causes, including rising water demand from population growth and the effects of armed conflict since 2011.[63] The GMMR's pipeline network has been exposed to several attacks and vandalism that caused it to become unable to function at its full capacity due to pipeline cuts or shutdowns, which can last for days or weeks. Salah Alsaadi, the spokesperson for the GMMR in July 2021, said that "continued attacks on the project's assets might halt operations and flow of consumption water, a situation that could be disastrous to the country's water security."[64] According to Libyans, a large part of the population has already suffered from these frequent water cuts, which is the main reason many more residents had to drill their own wells and not rely completely on the GMMR project. In fact, water was one of the three main services demanded in the protests against deteriorating living conditions in Libya 2020.[65] The continuous water cuts due to poor security conditions of the GMMR makes water as a service as one of the triggers that could potentially ignite social unrest.

Besides the direct impact of the armed conflict, due to political instability, the state has made minimal investment in terms of maintenance and repairs for the water supply infrastructure. Because of this, the deteriorating conditions of the water

[57] Reliefweb. "Over 4 million people including 15 children are about to face imminent water shortage in Libya". 1 February 2021. Available at https://reliefweb.int/report/libya/over-4-million-people-including-15-million-children-are-about-face-imminent-water

[58] Alwasat News. (مسؤولون وخبراء يحذرون من أخطار تهدد المياه في ليبيا), (21 September 2019). Available at http://alwasat.ly/news/libya/258159?author=1

[59] Tarhouna represents one of the extreme examples in the study.

[60] REAC. "Multi-sector Needs Assessment", December 2021. Available at https://www.impact-repository.org/document/reach/f615578d/REACH_LBY_factsheets_LBY2105a_December2021.pdf

[61] Elumami, A. "In battle for Libya›s oil, water becomes a casualty:". Reuters. 2 July 2019. Available at https://www.reuters.com/article/us-libya-security-water-insight/in-battle-for-libyas-oil-water-becomes-a-casualty-idUSKCN1TX0KQ

[62] Borgen Magazine, "Libya's Water Crisis Affects Millions Nationwide". 2 June 2020. Available at https://www.borgenmagazine.com/libyas-water-crisis/

[63] Reliefweb. "Over 4 million people including 15 children are about to face imminent water shortage in Libya". 1 February 2021. Available at https://reliefweb.int/report/libya/over-4-million-people-including-15-million-children-are-about-face-imminent-water

[64] https://global.chinadaily.com.cn/a/20210820//WS611f427fa310efa1bd66a1d6.html

[65] France 24. ليبيا: مظاهرات في طرابلس احتجاجا على تدهور الأوضاع المعيشية وانتشار الفساد August 2020

distribution network results in considerable water leakages, which is estimated to often sum to up to 50% of the supplied water.[66] In addition, due to several incomplete expansion projects, the GMMR primarily serves coastal regions and large cities, as service to rural and mountainous areas is cost prohibitive.

The reliance of many Libyan households on the groundwater from the shallow aquifers poses a major water security risk. The excessive exploitation of groundwater in coastal areas reduces groundwater levels and increases its salinity in these shallow aquifers, driving many wells out of service.[67] The consequences of this reduction in groundwater levels heavily affects the quality of vegetation cover and agricultural production as access to fresh water is made more costly and difficult, and additionally drives up the salt precipitation in the soil, making it less arable.. This is because when groundwater drops below a certain level, sea water intrudes into fresh groundwater aquifers, which is largely the reason for the increasing salinity of groundwater in coastal regions.[68] In a study on water pollution on the Zawia city coast in 2018, it was found that sea water had polluted wells nearly 6 kilometers inland.[69] This was caused mainly by heavy agriculture activities in the area and low groundwater recharge. The phenomenon is taking place in several other coastal cities across Libya. With the increasing sea levels due to climate change, sea water intrusion into fresh groundwater is only going to intensify, threatening Libyans' freshwater access and arable land.

Another alarming cause of the water crisis is the increase in drought days and the decrease in the annual average of rainfall, attributable to climate change. Libya's annual rainfall averages between 100-600 mm per year, mostly in areas along its coast. In fact, only 5% of Libya receives more than 100mm per year, while most southern areas are facing drought and increasing desertification due to their dry climate.[70] Although Libya has almost 16 major dams to collect surface water, they do not contribute much to water supply in the country due to low recharge rates and poor surface water management and infrastructure. In summer 2021, Libya faced one of the longest heat waves in the past four decades, with more than 10 days of unusually high temperature; coupled with the long power cuts, it caused tremendous social stress and made living conditions intolerable for many Libyans.[71] Long dry days increased the level of evaporation, creating more loss of surface water. In fact, during this year, one of the biggest dams in Libya called Wadi Kaam became completely dry due to the high levels of evaporation between 2020-2021.[72] This development has strained the farms that are dependent on the dam for irrigation.[73] Such events worry experts as they indicate an

[66] Reliefweb. "Over 4 million people including 15 children are about to face imminent water shortage in Libya". 1 February 2021. Available at https://reliefweb.int/report/libya/over-4-million-people-including-15-million-children-are-about-face-imminent-water

[67] Alwasat News. (مسؤولون وخبراء يحذرون من أخطار تهدد المياه في ليبيا), (21 September 2019). Available at http://alwasat.ly/news/libya/258159?author=1

[68] "تلوث المياه الجوفية بمياه البحر بمنطقة الزاوية". The Journal of Agriculture. Available at https://www.ljagric.uot.edu.ly/lj/index.php/ljagric/article/view/96102/

[69] Ibid

[70] Brika, B. "The water crisis in Libya: causes, consequences and potential solutions", Desalination and Water Treatment 167 (2019) 351–358.

[71] "ليبيا تشهد أطول موجة حر منذ 35 عامًا". Libya Observer. Available at https://ar.libyaobserver.ly/article/14417

[72] 218 TV. جفاف بحيرة سد وادي كعام يثير مخاوف خبراء. August 2021

[73] Mutethya, E. Libya›s water crisis threatens health of millions. China Daily. 20 August 2021. Available at https://global.chinadaily.com.cn/a/20210820//WS611f427fa310efa1bd66a1d6.html

intensifying effect of climate change in the country.[74] Yet more concerning, however, is the fact that Libyan policy makers do not seem to be responding to this serious issue. Although Libya signed the Paris agreement in 2021, there is still no official policy or plan to face the critical effects of climate change on water resources and its management.

Public awareness across Libya about the seriousness of water scarcity in their country is very limited. Libyans are generally unaware of the extent of the issue and the importance of managing water consumption tightly. Compared to its neighbors, Libyans consume considerably more than Tunisians, Egyptians, and Algerians. As per the Worldometer platform, Libya consumes 2,541 liters of water per capita per day, whereas Tunisia consumes 1,168, Algeria consumes 674, and Egypt consumes 2,202 liters.[75] Considering that the Libyan agriculture sector is significantly smaller[76] than its counterparts in Tunisia, Egypt, and Algeria and the fact that agriculture sectors are the largest consumer of water, Libya overconsumes its water resources by a huge margin. In 2012, the total consumption of water in Libya was estimated at 5.8 billion cubic meters, out of which 83% was consumed by the small agriculture sector, which represented less than 3% of the GDP that year.[77] [78]

If Libya does not control its water consumption, the majority of the Libyan population will have serious difficulties accessing fresh water soon.

In addition, there is still a big question mark about water quality, particularly water coming from private wells as there is an intrusion of wastewater from cesspits into these aquifers.[79] Due to the lack of data, the team was unable to understand the severity of the water quality issue.

[74] Alwasat News. (مسؤولون وخبراء يحذرون من أخطار تهدد المياه في ليبيا), (21 September 2019). Available at http://alwasat.ly/news/libya/258159?author=1

[75] Worldometer, "Global water use". Accessed on 25 December 2021. Available at https://www.worldometers.info/water/

[76] As a proportion of its GDP, 9% for Tunisia and 1.3% for Libya in 2017.

[77] World Bank Group. "A Compilation of Existing Analysis on Challenges and Needs". Available at https://documents1.worldbank.org/curated/en/832481591363718980/pdf/Supporting-Peace-and-Stability-in-Libya-A-Compilation-of-Existing-Analysis-on-Challenges-and-Needs.pdf

[78] FAO. "Libya - The impact of the crisis on agriculture". (2019). Available at https://www.fao.org/publications/card/en/c/CA3099EN/

[79] Emhanna, Saleh & & الكاسح, سالم & موسي, عبدالحفيظ & Suliman, Saleh. (2016). دراسة هيدروكيميائية لبعض ابار المياه الجوفية بمدينة اجدابيا ، ليبيا. الكاسح, فتحي & ديدح, أحمد

INSTITUTIONAL FAILURE

Climate change has had a huge impact on natural resources across the world and Libya is one of the most affected areas, making the issue a severe water scarcity case. Yet the government has failed to invest in addressing climate change in general or water scarcity in particular. Enforcement of Libyan water-sector legislation remains weak and in some cases is completely absent.[80] Tariffs levied on water usage do not cover operational costs. Additionally, billing is rarely conducted, which, coupled with the fact that even if fees are collected, water prices in Libya are heavily subsidized, explains the alarming overconsumption of water in the agriculture sector.

Desalination, a potential alternative to groundwater, is underinvested and expensive. Libya has eight desalination plants spread across its coast. One is completely offline, while the other seven run at roughly 28% capacity due to overdue maintenance and lack of chemicals and spare parts.[81] Additionally, although desalination offers the only viable alternative to groundwater as the vast majority of the Libyan population lives along the coast, it is energy-intensive and extremely expensive. Currently, each cubic meter of water from desalination plants costs the Libyan government six times the price of a cubic meter from the GMMR project.[82]

Therefore, before adopting this alternative on a large scale, the government should assess how it can bring the cost down, as this alternative will otherwise impose a huge burden on the already inflated public budget. Among other solutions, shifting from the currently in-use light fuel oil to natural gas or solar energy could significantly reduce the cost of the desalination process.[83] Despite its significance for Libya's water supply in the future, Libya does not have a designated institution or agency to promote and manage desalination resources. The General Company for Water Desalination (GCWD) only operates the desalination plants.[84] It does not perform any policy and strategy development tasks.

Besides desalination plants, Libya has 75 wastewater treatment plants as well. Out of these 75 wastewater treatment plants, only 10 are reportedly functional.[85] These 10 plants process less than 11% of the generated wastewater from urban centers, while the rest is dumped into the sea or in open space without any treatment, causing great damage to the environment in general and contaminating the sea and shallow groundwater aquifers. With almost 55% of the Libyan population reliant on private wells that extract water from shallow aquifers, this dumping practice could expose

[80] Abdudayem, A. & Scott, A. "Water infrastructure in Libya and the water situation in agriculture in the Jefara region of Libya", African J. Economic and Sustainable Development, Vol. 3, No. 1, 2014.

[81] Reliefweb. "Over 4 million people including 15 children are about to face imminent water shortage in Libya". 1 February 2021. Available at https://reliefweb.int/report/libya/over-4-million-people-including-15-million-children-are-about-face-imminent-water

[82] World Bank Group. "A Compilation of Existing Analysis on Challenges and Needs". Available at https://documents1.worldbank.org/curated/en/832481591363718980/pdf/Supporting-Peace-and-Stability-in-Libya-A-Compilation-of-Existing-Analysis-on-Challenges-and-Needs.pdf

[83] UNICEF. "Assessment of national water systems and institutions in Libya" (July 2019). Available at https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/documents/files/assesment_of_national_water_systems-english.pdf

[84] Article 3, Law 924 (2007) for the establishment of the GCWD

[85] World Bank Group. "A Compilation of Existing Analysis on Challenges and Needs". Available at https://documents1.worldbank.org/curated/en/832481591363718980/pdf/Supporting-Peace-and-Stability-in-Libya-A-Compilation-of-Existing-Analysis-on-Challenges-and-Needs.pdf

them to dangerous levels of contamination.[86] Data on the extent of this contamination phenomenon are unavailable in Libya.

All of the aforementioned causes, in addition to poor water resources management, are driving Libya to the brink of a catastrophe. Policy makers need to urgently develop policies and allocate the necessary funds to face the current water crisis and maintain better living conditions as well as meet the increasing water needs and urban growth.

[86] Reliefweb. "Over 4 million people including 15 children are about to face imminent water shortage in Libya". 1 February 2021. Available at https://reliefweb.int/report/libya/over-4-million-people-including-15-million-children-are-about-face-imminent-water

RECOMMENDATIONS

The below recommendations are preliminary recommendations that should be further developed based on rigorous assessment of the current situation.

Short-term recommendations:

- **Purchase spare parts and chemicals to operate the existing desalination plants.** The government should immediately allocate funds to the GCWD to procure the necessary spare parts and chemicals to improve the functionality of these plants. Additionally, the GCWD should assess the technical status of the out-of-service plants and estimate the required maintenance cost to bring back these plants to service.

- **Reduce water consumption in the agriculture sector.** The excessive consumption of water leads to serious environmental and health issues as discussed above; therefore, the government should invest extensive efforts on raising public awareness about the criticality of the water situation as well as develop policies to tax and ration the usage of water. Additionally, the government should introduce irritation techniques that will make irritation more water-effective. The government should also engage civil society organizations, media outlets, and international organizations to raise citizenry awareness in general about the water issue.

- **Conduct a comprehensive study of water resources and infrastructure.** The government should avoid jumping on baseless strategies and plans; rather, it should carry out an in-depth assessment of water resources and organizational and physical infrastructure across the country, which should be the basis of its interventions. The government should restructure the institutional framework for the entire sector to foster effective coordination and responsiveness as well as explore the potential entry of the private sector into the sector.

- **Repair water networks.** The damage to water networks is mostly due to the conflict, which restricts citizens' access to water and affects their quality of life. Therefore, the networks that are already in place should be fixed. This will have a significant impact on poor families who could not afford to build their own private water wells.

Long-term recommendations:

- **Establish a state institution that should develop and manage water desalination and waste-water treatment plants.** Currently, there is only the General Company for Water Desalination serving as the executing company rather than a regulator and a technical agency. The establishment of such an institution will help the government develop its technical expertise on the matter and allocate more resources and attention to it.

- **Review and update water regulations.** In collaboration with the legislative body, the government should appoint a committee to review the existing legislations for the water sector as a whole and propose the necessary amendments in order to design a legal framework that is fit for addressing the crisis.

- **Adapt water desalination and wastewater treatment technologies that reduce operational costs.** For Libya to move away from the complete reliance on groundwater, these two alternatives must become viable options in terms of cost. For instance, changing from light fuel oil to natural gas or solar energy could considerably reduce the cost. Increasing Libya's utility of desalination and wastewater treatment processes will help control damaging phenomena such as the seawater intrusion and dumping wastewater into the sea.

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