

MAY 2021

# SUSTAINABLE STATES *on the Ground*

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A Report of the  
CSIS Middle East Program

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# CLOUDING JORDAN'S RENEWABLES FUTURE

In early 2012, the Jordanian government and NEPCO increased the electricity rates on banks and telecom companies by 150 percent overnight in an attempt to keep costs low for individual consumers. The move dramatically increased costs for Jordan's three major telecom companies, Orange Jordan, Zain, and Umniah. By 2018, one of the companies was operating in the red, prompting executives to search for a way to cut energy costs. They found their solution in solar energy.

Orange Jordan partnered with Kawar Energy, a renewables company, to install a 37-megawatt photovoltaic (PV) farm, covering over 70 percent of the company's energy consumption. Zain and Umniah planned their own. The arrangement was good for the telecoms, but it created a crisis for NEPCO, which was relying on some of its largest customers to pay steep rates in order to subsidize individual consumers. NEPCO had gone deeply into debt to finance generation capacity, and it suddenly had both an income problem and a looming demand problem.

On January 9, 2019, the Jordanian government capped all new renewable projects at one megawatt, citing the need to assess grid capacity. Two years later, that cap on new development remains.

The cap on new, large-scale solar projects has decimated what was once a market for solar energy. Most solar companies have shrunk by 50 percent after the cap. Kawar Energy has half the employees it had in 2018, and a slew of projects have been put on hold.

With investor confidence shaken by the government's sudden move, it might be a long time until PV advocates in Jordan see the light at the end of this tunnel.

# PATCHING JORDAN'S WATER LEAKS

The Jordan Valley is the country's "vegetable basket," but one farmer's frustration captured the water challenge there succinctly: "Those banana plantations are owned by the big guys; there is water for them. . . . The water problem is for the small guys and the weak guys." The history of water management in the Jordan Valley is one of maximizing political stability, not water conservation. In this arid country, influential tribal members and landowners have steady access to water, while individual consumers and small farmers struggle.

In 2001, the German development agency Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) developed a set of Water User Associations (WUAs) in partnership with the Jordan Valley Authority (JVA), the government agency responsible for water distribution to the valley's farmers. The scheme sought to create a "sustainable participatory approach" to water management to address both inequities in access and the JVA's own resource constraints. In exchange for a yearly fee to the WUA, farmers were able to lobby the JVA collectively, get access to assistance that the under-resourced JVA was unable to provide, and win the right to repair their own leaks.

The presidents of WUAs were typically powerful tribal leaders. As a consequence, they hired workers to monitor pipes and open taps more often for the workers' connections than their technical skills. Many small farmers accepted the trade-off. They had joined WUAs mainly for entrée to powerful farmers who could lobby for water on their behalf.

The WUAs have increased solidarity among farmers. For example, many are now persuaded that stealing water from farmers' shared pumping stations is wrong. The goodwill does not flow to the Jordanian state or those outside the WUA, though. One farmer said he had no problem with farmers stealing water directly from the King Abdullah Canal. That is like stealing from the government, he explained, and that seems to be fine.



# REEDING BETWEEN THE LINES

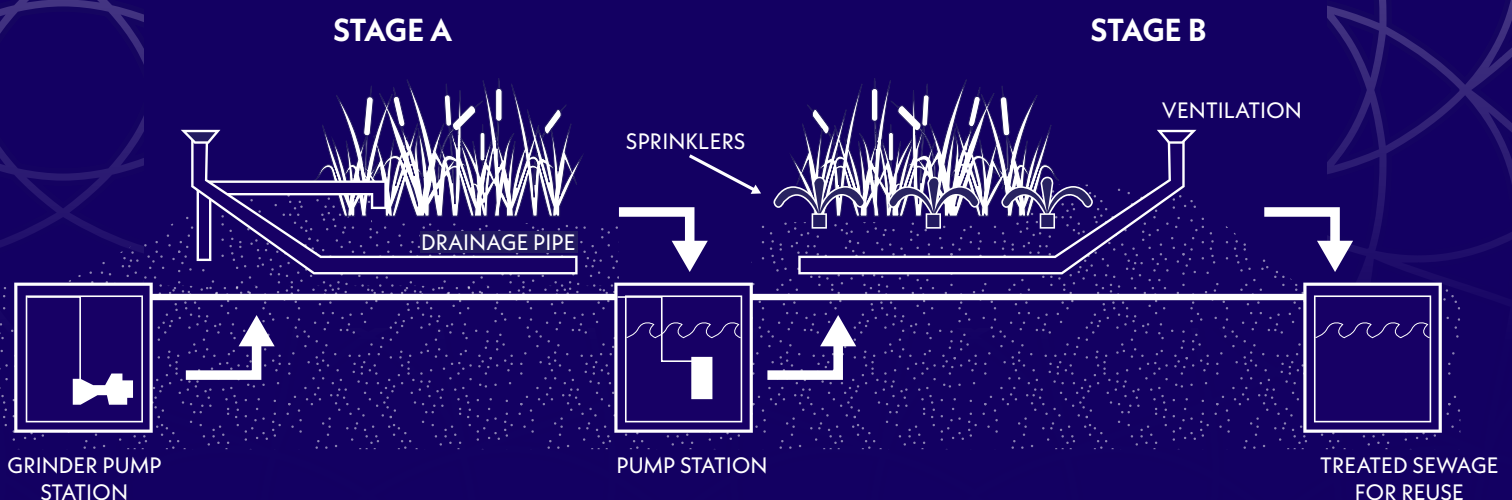
Azraq's oasis—wetlands in the middle of Jordan's arid desert landscape—has been famous for centuries. In recent decades, too much water has been pumped and too much untreated wastewater has been dumped, threatening the Azraq Wetland Reserve, groundwater wells, and local biodiversity. The answer to the threats is as simple as it is elegant: reeds.

When engineers plant reeds for the Innovative Sanitation Solutions and Reuse in Arid Regions (ISSRAR) project, they will be doing more than merely revitalizing the environment. The reeds will form the backbone of an innovative wastewater management system that helps a town near the Azraq oasis turn its sewage from refuse to resource. The "constructed wetlands" can filter and treat over 500 m<sup>3</sup> of raw sewage per day—more than enough for 12,000 residents.

Compared to a traditional wastewater treatment facility, the constructed wetlands require minimal electricity and few highly technical skills to maintain. As a bonus, the treated wastewater can irrigate crops, lessening the burden on dwindling groundwater resources.

The original concept was a hard sell to locals, though. Residents feared that the system would smell and devalue their land. They also did not want to become a dumping ground for other villages' waste. A six-month campaign sought the support of key stakeholders, while young volunteers went door-to-door to build grassroots support and answer residents' concerns.

The technology deployed in Azraq has been used in other places in the Middle East and around the world. In these projects, the reeds do most of the dirty work, and the people reap the benefits. For those in rural communities who often find themselves doing dirty work while others benefit, the project is a welcome change.



# TAKING THE POWER BACK

When residents in the small village of Qabrikha in southern Lebanon pay their electric bill, they pay twice—once for energy supplied by Lebanon’s energy monopoly, *Electricité du Liban* (EDL), and once to fuel diesel generators during the EDL blackouts that are a daily occurrence in southern Lebanon. Recently, they started paying a third bill: for energy from a photovoltaic solar farm that the municipality built. With the third bill, overall costs have plummeted.

According to one resident, connecting to the solar system cut electricity costs by 30 percent and ended daytime blackouts. Villagers like the system so much that when it went down due to a technical glitch last February, villagers and the municipality implored the UN Development Program (UNDP)—which launched the Qabrikha project—to get it back online as soon as possible. The savings have allowed the village to invest in grid improvements and offer power to residents for longer periods for less cost.

Still, the project has had challenges. While UNDP and EDL reached an agreement more than two years ago for the solar farm to sell excess electricity to the utility, EDL has yet to sign the contract or attach the necessary bidirectional meter. For now, customers have to pay multiple electric bills.

Despite the challenges, Qabrikha demonstrates that there is a demand for sustainable electricity in areas of Lebanon that have been historically cut off from electrical resources, for both economic and environmental reasons. Renewables keep the lights on in Qabrikha, even if residents still have to pay twice.

# IT TAKES A VILLAGE TO PROTECT A RIVER

In 2018, the Lebanese Transparency Association released a dramatic video taking viewers on an aerial journey of the Litani River. The Litani is Lebanon's longest river, and its basin covers a fifth of the country. But this was no tourism video. It showed a waterway choked with waste from municipalities, farms, and industry, along with proof that farms use the contaminated water for irrigation. The video and subsequent reports cite rising cancer rates as evidence for the health consequences of the pollution.

For decades, Lebanese governments have lacked either the will or capacity to combat pollution of the Litani. But in 2018, Sami Alawieh became the head of the Litani River Authority (LRA), the governmental institution responsible for the Litani River. A lawyer by training, Alawieh rallied strong political backing to wage a war against pollution. Lacking a mandate either to manage sanitation infrastructure or shut down violators, Alawieh had to think creatively.

The LRA began recruiting a wide range of partners. Experts at the Lebanese University helped to measure pollution levels, and teams from the Faculty of Agricultural and Food Sciences at the American University of Beirut assisted in documenting violations. The LRA website asked citizens to submit evidence of pollution and polluters through LRA social media channels, and Alawieh posted videos of polluters dumping into the river on social media, engaging the community. The Lebanese Bar Association signed a cooperation agreement with the LRA to provide legal support on environmental matters, and after just one year, the LRA had issued more than 200 violation notices over the discharge of waste into the river. Activists then launched campaigns to boycott the companies and factories while enforcement was pending. Alawieh was labeled a hero for his campaign to save the Litani.

The LRA's campaign has caused its share of disturbance. The campaign displaced hundreds of refugees, and it sued 17 local and international NGOs assisting them for failing to properly manage the latrines servicing the settlements. Litigation also shut down more than 70 unlicensed factories, putting people out of work in an already strained economy.

There will be limits to punishing violators without viable options for cost-effective wastewater treatment in the country. However, the LRA's campaign is an example of civil society, academia, and the judiciary joining together to do what the government alone cannot.

# GOLD FROM GARBAGE

When the mayor of Manara, Hassan Ayoub, does his daily lap through the streets of his small municipality in Lebanon's Bekaa, he looks for one thing: small bins outside of residents' homes that indicate they are sorting their waste.

Manara is one of a few Lebanese municipalities that have teamed up with Compost Baladi, a startup promoting low-tech, low-cost composting solutions for municipalities, individuals, and the private sector. The company's founder recognized an opportunity to significantly decrease the amount of organic waste dumped or landfilled—over 50 percent of the total amount of waste produced—through composting. Through the partnership, and the mayor's watchful eye, over 80 percent of Manara households regularly sort their waste. Compost Baladi works with the municipality to gather, dispose, and transform organic material into compost that can be sold to consumers and recover costs.

It was a long road to the Manara model. Past experiences had made municipalities wary of private sector initiatives on waste. To demonstrate that their model worked, Compost Baladi began small, working with groceries and then residences on domestic sorting and composting. After demonstrating their proof-of-concept—and demonstrating that they were not just creating another problem—they were able to scale up.

Local as it is, Compost Baladi's municipal interventions were only made possible because international donors, such as the Dutch VNG International in Manara's case, made significant investments covering the cost of infrastructure.

The economic crisis has limited imported products and opened new opportunities for the locally made compost. But since most of the machinery and equipment used in a composting facility are paid for in dollars and the compost it produces is paid for in Lebanese liras, the sharp drop in the value of the lira has created problems for investors. While Compost Baladi is committed to working in Lebanon, its next expansion may be elsewhere.



# BRIGHT SKIES, BRIGHT FUTURE

Ahmed Ernez was amazed at Germany's success despite its cloudy skies. The Tunisian electrical engineer had moved to Berlin to work in Germany's innovative solar energy industry and was convinced his perpetually sunny homeland held even more potential. But the German technology was too expensive for the Tunisian market. Instead of exporting it to Tunisia, he founded his own company, Biome Solar Industry (BSI), and manufactured affordable solar water heaters in Tunisia for Tunisians.

BSI worked within the government's PROSOL mechanism. Under PROSOL, Tunisia's national electricity utility vets the financial viability of potential clients and then provides them with subsidized credit and a loan that is repayable through their electricity bill, ensuring the manufacturer gets paid and removing customers' upfront investment costs. A combination of PROSOL financing and a growing team of highly trained technicians have allowed BSI to thrive. It now exports its products internationally.

Despite being established in the Tunisian renewables market, a lack of public awareness about solar technology remains an issue. BSI has taken to social media to educate Tunisians on the myriad benefits of solar water heaters. One recent Facebook post says taking a hot shower before bed improves sleep quality, while another states that hot washing machine cycles cost less and conserve water.

Rising gas prices, increasingly affordable technology, and vocational programs mean the Tunisian solar industry is also creating jobs. With help from the German government, BSI opened a training center in 2016 to facilitate installations and services in Tunisia's solar market. Trainees graduate with a nationally recognized "Qualisol" certificate and have gone on to found more than 60 microenterprises which operate across the country. However, entrepreneurs without Ernez's decades of technical experience and international contacts may struggle to replicate his success. Entering Tunisia's solar industry takes more than just a sunny disposition.



# THIRST ALONGSIDE A RESERVOIR

A group of women in the remote village of Erroui in northwestern Tunisia staged a sit-in by a reservoir. "We are dying of thirst!" they shouted, gesticulating at the reservoir full of drinking water two miles from their homes. Despite being in Tunisia's most water-rich region, their homes and the school in Erroui are not connected to the state water utility's network, and the women must walk for more than four hours a day for water.

The Tunisian government delegates responsibility for water provision in rural areas such as Erroui to volunteer-run associations called Agricultural Development Groups (GDAs). GDAs were designed to be democratic and financially sustainable entities, based on a model trialed in Germany. Rural populations elect directors to run their local GDA, and the group funds itself by charging consumers for water.

Until the Tunisian revolution in 2011, the system worked relatively well. A government-assigned representative in each GDA monitored its functioning and ensured consumers paid their bills. These representatives were often feared, so compliance was high.

However, the government has retreated further from water management in rural areas in the decade since the revolution. Corruption has increased, and some consumers extract more than their fair share of water. As service deteriorates, fewer consumers are willing to pay GDAs for their bills. In turn, GDAs have fallen behind on paying for electricity to run the water pumps, and the state electrical utility has cut their electricity.

GDA directors say they are trapped. They lack the authority to enforce payment and regulations, and they lack an independent body to investigate corruption. The GDA in Erroui, like many others, has fallen into debt. Of the estimated 2,500 GDAs across Tunisia, as many as 1,400 have stopped operating entirely.

Parliament's instinct is to get less involved rather than more so. A new water code would add wastewater management to GDA responsibilities. When civil society groups pushed back, the government argued that it is Tunisians' responsibility to elect effective representatives to GDAs. Whether they have effective representatives or weak ones, rural Tunisians may be walking hours a day for water for some time to come.

# VOLUNTEER TRASH COLLECTORS

Tunisia's revolution in 2011 improved many things, but the odors of Tunis was not one of them. Trash collectors went on strike for almost half a year after the revolution to demand better salaries, and waste collection systems broke down. Garbage piled up and rotted in the streets.

The situation motivated some Tunisians to take matters into their own hands. A sound engineer, a software developer, and a French expatriate in the northern suburbs of Tunis founded an initiative "Tunisie Propre" to organize beach clean-ups and public awareness campaigns on littering. The three volunteers realized they could sell some of the waste they collected to recyclers if they sorted it. They saw an opportunity to use the limited revenues to increase the environmental impact of their efforts. They devised a plan to collect garbage directly from homes and businesses.

Tunisie Recyclage was born, a volunteer-run non-profit association that collects and sorts waste from members, who pay a subscription fee. The association attracted the attention of foreign embassies and international organizations in Tunis and secured funding to expand their work. By 2018, more than 1,200 households and 30 companies had subscribed, and they were able to hire three paid permanent staff.

However, the system relied on volunteers and an old truck that kept breaking down. Multiple times, they were forced to cancel their service at the last minute, and many of their members grew frustrated and stopped paying. Although they bought a new truck in 2020 through crowd-funding and resumed reliable service, they are still working to win back members' trust.

Because Tunisie Recyclage continues to rely on volunteers and donations, the initiative may be difficult to replicate elsewhere in Tunisia. Still, the organizers are keen to collaborate with municipalities and other similar organizations to expand their impact and encourage others to copy their model. They recently joined a consortium of 30 stakeholders working on fighting pollution. They believe that such partnerships may enable them to influence government strategies in the long term. However, Tunisia's political turmoil has made establishing relationships with the right authorities a challenge: in the 10 years since the revolution, Tunisia's government has changed seven times.