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The Forgotten Crises in the Gulf:

Electricity and Water in Iran and Iraq

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The Gulf is well known for its oil and gas resources, but the lack of water may be its outstanding feature. Between 2000 and 2020, the population of the Gulf states rose by almost 50 percent but the supply of fresh water from sources other than desalination fell. This edition of *Iqtisadi* examines recent developments in the Gulf with an emphasis on the water crisis.

The oil producers in the Gulf are divided into two groups: the Gulf Cooperation Council (GCC) members – Saudi Arabia, the UAE, Kuwait, Qatar, Bahrain, and Oman – and Iran plus Iraq. The GCC states are all monarchies while Iran and Iraq are republics. The differences between the two groups are not only constitutional and political, but also socio-economic.

The GCC is facing challenges with a series of long-term vision programs designed to reduce reliance on hydrocarbons and increase employment for citizens. They have also set environmental targets designed against the background of global warming and severe water supply problems. There are numerous difficulties in implementing these reforms, the most significant being the system of rule that discourages private initiative. Cooperation between GCC members is limited as they are in competition with each other. While Qatar has returned to the fold, tensions between Saudi Arabia and the UAE have increased.

Iran and Iraq face far more severe problems. Iran suffers misrule by an ever-increasingly authoritarian regime, corruption, unemployment, poverty, and allocates huge sums for intervention and subversion abroad. With the election of Ebrahim Raisi to the presidency, the

regime is becoming even more oppressive. Iraq is mired in corruption, internal conflict, poverty, mismanagement and suffers from foreign intervention, mainly from Iran. Both Iran and Iraq face chronic shortages of water and electricity, despite their huge hydrocarbon reserves.

Table 1 illustrates the basic differences between the two groups of states. National income per capita is much lower in Iran and Iraq than in the GCC. Their oil income has been constrained by sanctions in the case of Iran and problems of maintaining supply in Iraq. As a group, the GCC has a much smaller population and larger oil reserves and revenues. As a result, national income on a per capita basis is much higher.

Table 1: Main Indicators, 2019

	Population (million)	GDP ($billion)	GDP/capita ($)	Oil reserves (billion barrels)	Oil income ($billion)	Water**
Iran	82.9	454 (2018)	5,537 (2018)	155.6	19.2	1,593
Iraq	39.3	234	5,954	145.0	80.0	793
Saudi	34.3	793	23,120	297.6	202.4	73
UAE	9.8	421	42,959	97.6	49.6	16
Kuwait	4.2	135	32,143	101.5	52.4	0
Qatar	2.8	176	62,857	25.2	15.4	21
Bahrain	1.6	39	24,375	0.0	5.5*	3
Oman	5.0	76	15,200	5.4	17.9	300

Source: World Bank, British Petroleum, OEC.

*Bahrain imports and refines crude oil

**Renewable internal freshwater resources per capita, cubic meters

On 2 July, Iraq's electricity system collapsed. In the early hours of the day, power generation fell to an unprecedented low of 0.4 gigawatts (GW), compared with plans to supply up to 22GW this summer. Even this plan was inadequate: power needs were estimated were 29 GW. The collapse in supply came as the ministry was trying to cope widespread blackouts. This happened after Iran stopped supplying electricity and reduced the flow of gas drastically. Iranian supplies have in recent years accounted for over 30 percent of Iraq's electricity supply and without them the system could not cope with temperatures reaching 50°C. In addition, Iraq is suffering the effects of a growing spate of attacks on power lines in the north of the country.

At the end of June, as a result of the supply crisis, the Iraqi minister of electricity resigned. The prolonged power breakdowns resulted in mass protests in the southern provinces just three months ahead of parliamentary elections due in early October. As the government cracked down on the protests, the risk of another cycle of violence increases. The current crisis further highlights Iraq's extensive vulnerability and the danger of depending on supplies of electricity from Iran. Efforts are being made to reduce this dependency, but they are unlikely to bear fruit in the short term. Iraq's plans for this summer were based on the assumption that Iranian supplies were secure, following a debt scheduling agreement reached between the two countries in June. The Iranian and Iraqi power grids have been fully synchronized with each other since late 2019 but the Iraqis' assumption that imports were secure was disproved when Iran stopped transmission of up to 1.2GW across the border. Hotter weather is causing consumption to increase earlier each year. The chief of staff to Iran's outgoing president has said that says his country's priority is to supply electricity to its own people and industries. In May, electricity blackouts in Iran forced the government to ban cryptocurrency mining, and now Iraq is feeling the consequences of Iran's need to prioritize its own requirements. In May, the Iranian energy minister apologized for the power shortages and, following further protests in early July soon after presidential elections, President Rohani also apologized.[1]

The halting of electricity to Iraq was coupled with a sharp decline of gas flows through the two gas pipelines from Iran. Iran is contractually obliged to provide Iraq with up to 2.47 billion cubic feet per day (cf/d) in the summer, but flows have been kept at 0.7-1 billion cf/d. Over the course of a year, Iraq imports an average of around 1.5-1.8 billion cf/d from Iran. Added to the 1.2GW of direct cross-border power supplies, this means that Iran effectively supplies up to 7-8GW (over a third) of Iraq's power supply.[2]

Iraq depends on Iran for electricity, and its water supply is also affected by Iran. Iraq depends on the Tigris and Euphrates rivers for nearly all its water. Thirty percent of the Tigris Basin lies in Iran and the country contributes 10-13 percent of its annual water volume through a series of tributary rivers water reaching Iraq. Over the last decade, less water has been reaching the Tigris in Iraq from the Iranian side.[3]

The Tigris - Euphrates Watershed.

Source: Wikipedia Commons [Karl Musser created it based on USGS data].

This is causing alarm and creating major water shortages in Iraq. Some two-thirds the 10.2 billion cubic meters of water that leaves the country flows across its borders into Iraq, which could lead to a major water shortage in Iran. To address the issue, Iran has built dams along its border with Iraq, designed to raise agricultural production. These projects, and the redirection of the extra water collected in dam reservoirs to other drought-prone provinces in Iran, have worsened the water crisis in Iraq. The Kurdistan Regional Government and the Iraqi Ministry of Water Resources have accused Iran of rediverting the Tigris in the north, and violating international law that prohibits such disruptions to natural river flows. In southern Iraq, the Mesopotamian Marshes, bordering Iran, once the largest wet-land ecosystem in western Eurasia, are shrinking despite restoration efforts. The drainage of the marshes, along with dam structures causes severe salinization in rivers. Iran extracts water from the Karun River and discharges harmful water through it into the Shatt al-Arab, a process that further increases salinity.[4]

Iraq has also been affected by draught and water policies in Syria and Turkey. The Euphrates and Tigris Basin (ETB) are the source of the longest rivers in southwest Asia. The main users of the water of these rivers and tributaries are Turkey, Syria, Iran and Iraq. The rivers rise in Turkey, the upper riparian. Some of the tributaries of the Tigris and Shat al-Arab Rivers rise in Iran, the second upper riparian for these rivers. The annual precipitation in the upstream of ETB typically exceeds 1,000 millimeters (ml) whereas in the south of Iraq and Syria it is less than 100 mm. Most of this precipitation occurs as snow in winter and the water resources are mostly available in the form of snowmelt water during spring and winter. There are various dry periods, which affect these countries, especially during the past 15 years. Among these four countries, Turkey has less severity and frequency of drought than the other three countries, and Syria has the most. Over the past 30 years, flows in the Euphrates-Tigris River system declined by almost 50 percent of the average annual flow in drought years. In 2013, the Intergovernmental Panel on Climate Change forecast a 29 percent decline in Tigris flows and a 73 percent decline in Euphrates flows in the future as a result of declining rainfall in the main catchments in Turkey's highlands.[5] Turkey is now suffering draught: More than half of its land is suffering from a shortage of water supply and the next decade could bring about severe drought in the country.[6]

The Iraqi economy has been badly affected by the COVID-19 epidemic. In 2020, it resulted in a fall in the international demand for oil and prices tumbled. The government, which relies

on oil for more than 90 percent of its revenues and spends 45 percent of its total budget on salaries and pensions, did not have enough money to pay millions of public employees and pensioners. The government borrowed billions of dollars, mostly from local banks, to bridge the shortfall. The fallout of the virus hit the business community hard as their largest consumer group — public employees — reduced spending. The result was, according to the IMF, an 11 percent fall in GDP, and an increase in poverty and unemployment.

According to the IMF, only about a third of the electricity generated capacity by the Ministry of Electricity (MoE) reaches consumers, mainly due to obsolete stations, lack of maintenance and cooling facilities, and the use of a suboptimal fuel mix to make up for a shortage of natural gas, as well as an overloaded transmission and distribution system. Half of Iraq's gas production is being allowed to flare rather than being used as a fuel. The MoE relies on purchases from independent power producers and imports to complement its limited capacity. Furthermore, more than half of the domestically generated electricity does not yield any revenue for the government because of theft and non-collection of charges. In 2019, this deficit exceeded five percent of GDP as tariff revenues were not high enough to cover costs. The deficit has been financed by the budget either directly through transfers—notably to cover wages and imports from Iran—or indirectly, in the form of lower revenues and arrears to state-owned oil companies, which bear the cost of the fuel subsidy to the electricity sector**.** Frequent power outages have been a constant theme in social protests. Electricity has been available for an average of seventeen hours a day with significant regional variation. Demand exceeded supply by 34 percent in 2020, widening marginally from 2019.[7]

Iran has suffered from the COVID-19 crisis more than many other countries, largely because of mismanagement. This has compounded the effects of sanctions. The UN estimates that Iran's GDP may have fallen by 15 percent affecting 50 percent of the workforce, particularly the lowest 40 percent of income-deciles of the population. This has resulted in greater inequality – and a rise of unemployment possibly by two million. Social services and public health systems have suffered and are at risk given tighter financial situation. Some 11.5 million households live below or just above the multi-dimensional poverty line and have been affected by the crisis. Service sector businesses and employees, unskilled, low-skilled, and semi-skilled workers, especially those not covered by social security suffer most.[8]

In May, the Iranian Minister of Energy, stated that this summer will be the "driest in the recent five decades." The minister said he was concerned about increasing demand for drinking water

and cast doubt on the government's ability to ensure an uninterrupted supply of water. Iran is now facing its most severe drought in half a century, with climate change contributing to a huge decline in rainfall compared with to preceding years. The authorities have been unable to remedy the impact of the record dry spell, though they are now speaking up about the existential risks posed by the looming water crisis.

In 2018, the head of the environment department, Isa Kalantari, declared that "Iran is being wiped off" due to the collapse of water resources. He warned that the "water war" was expanding from one province to another, spilling over into villages. This pro-reform politician who, unlike, most senior officials, speaks his mind, said that in line with the consensus at the 1992 Rio de Janeiro Earth Summit, countries were urged to utilize only 40 percent of their renewable water resources. Iran has, however for years been making use of more than 100 percent of its renewable reserves. Kalantari claimed if water consumption rates for agricultural use remain unchanged, the country's populous southern and eastern regions will be entirely vacated in less than 25 years.

In 2020, the deputy minister of energy stated that nearly ten million Iranians lack sustainable water access. He noted that there were 6,000 villages across the country which totally lacked efficient water supply facilities and are only able to supply residents with limited quantities using tankers.[9]

The water crisis in Iran has developed over many years. The government has accelerated the depletion of water resources in to expand agricultural and infrastructure projects in pursuit of self-sufficiency and agriculture accounts for more than 90 percent of the country's water use. The huge contracts to build dams have been awarded to companies close to those in power and encouraged farmers to grow crops that are often water intensive. These dams blocked rivers throughout the nation and prevented aquifers from replenishing. This, in turn, forced farmers and others to drill deeper wells into the depleting groundwater resources. Much this is illegal and unsustainable. Drought has become prevalent in Iran. Declining rainfall, higher temperatures, desertification, and extreme weather all place added pressure on Iran's water supply. Further, the intense burning of fossil fuels has contributed to declining biodiversity and increased water pollution, putting remaining water supplies at risk.[10]

This year is expected to be among the driest in the last 50 years. One third of Iran's roughly 28 million people live in water-stressed areas, mostly in the center and south. Water scarcity is

affecting the whole population. Iran's ability to tackle the water crisis is related to foreign-policy challenges. The water crisis is not just a result of drought. It has also coincided the latest round of U.S. sanctions. These have limited Iran's financial power and access to the foreign water technologies.

Restrictions on oil exports have resulted in Iran looking for alternative sources of income. Water-intensive industries such as petrochemicals, mining, and steel continue to operate, because there are customers in Asia, especially China, which plans major investment ambitions in Iran's economy, including mining. As a result, an already water-challenged economy has diversified in a way that increased water use.[11]

Iran is also facing severe shortages of electricity that have resulted in power cuts. At the end of June consumption reached 64 megawatts, nearly 20 percent above the level one year earlier. This was despite a reduction in industrial consumption. Production has been affected by the temporary closure of the Bushehr nuclear plant and reduced hydro-electric production because the shortage of water in dams throughout the country. Demand has been stimulated not only by increasing heat but also by illegal cryptocurrency mining that is based on low electricity prices. As a result of the shortage of power, Iran ceased export of power to Iraq. Iran relies on natural gas for 90 percent of its power generation while renewables, including solar power, account for only seven percent.

While Iran is a late comer to desalination (desalinated water accounts for less than one percent of total supply) the GCC states have long relied on desalination. They obtain between 55 percent to 100 percent of their water supply through desalination. There are about 850 desalination plants operating in the Persian Gulf region, and with eight of the ten largest plants in the world located in Saudi Arabia and the United Arab Emirates, increasing use of desalinated water raises some major environmental questions. Building desalination plants, using seawater, and discharging untreated brine back into the sea adversely affects marine ecosystems. Gulf seawater is becoming saltier, making desalination harder. Furthermore, desalination uses a lot of electricity, generated by burning oil, and this contributes to greenhouse gas emissions.

One estimate suggests that $100 billion worth of desalination projects are currently being planned in the Gulf. This excludes Iran, whose water needs and reliance on desalinated water might rapidly grow. The GCC States have the financial means and the access to the latest

desalination technologies, that are less damaging environmentally. The financial and other limitations that Iran faces mean may restrict it to older desalination and more environmentally damaging technologies. As the Gulf has a common shared ecology, Iran's lack of access to the latest desalination technological know-how will affect the GCC countries on the southern shores of the Persian Gulf.[12]

Despite the water challenges impacting all the littoral states, there is no collective regional agency that can deal with water-related challenges. None of the Gulf countries have the storage capacity for more than a few days' consumption of drinking water and if there a supply crisis, littoral states have no multilateral agency to consult. The agency created to deal with this, the Regional Organization for the Protection of the Marine Environment was established in 1979 but is now defunct.[13]

The GCC states are much better placed than Iran or Iraq to face the challenges ahead for several reasons. The first is that they are much richer. The second is that do not suffer a great deal of internal conflict and are relatively stable. The third factor is that their pro-Western orientation together with their private business sectors enables them to acquire technology from abroad with ease. They have, however, much less water than Iran and Iraq and are exposed to the political, socio-economic, and ecological developments in their northern and eastern neighbors.

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