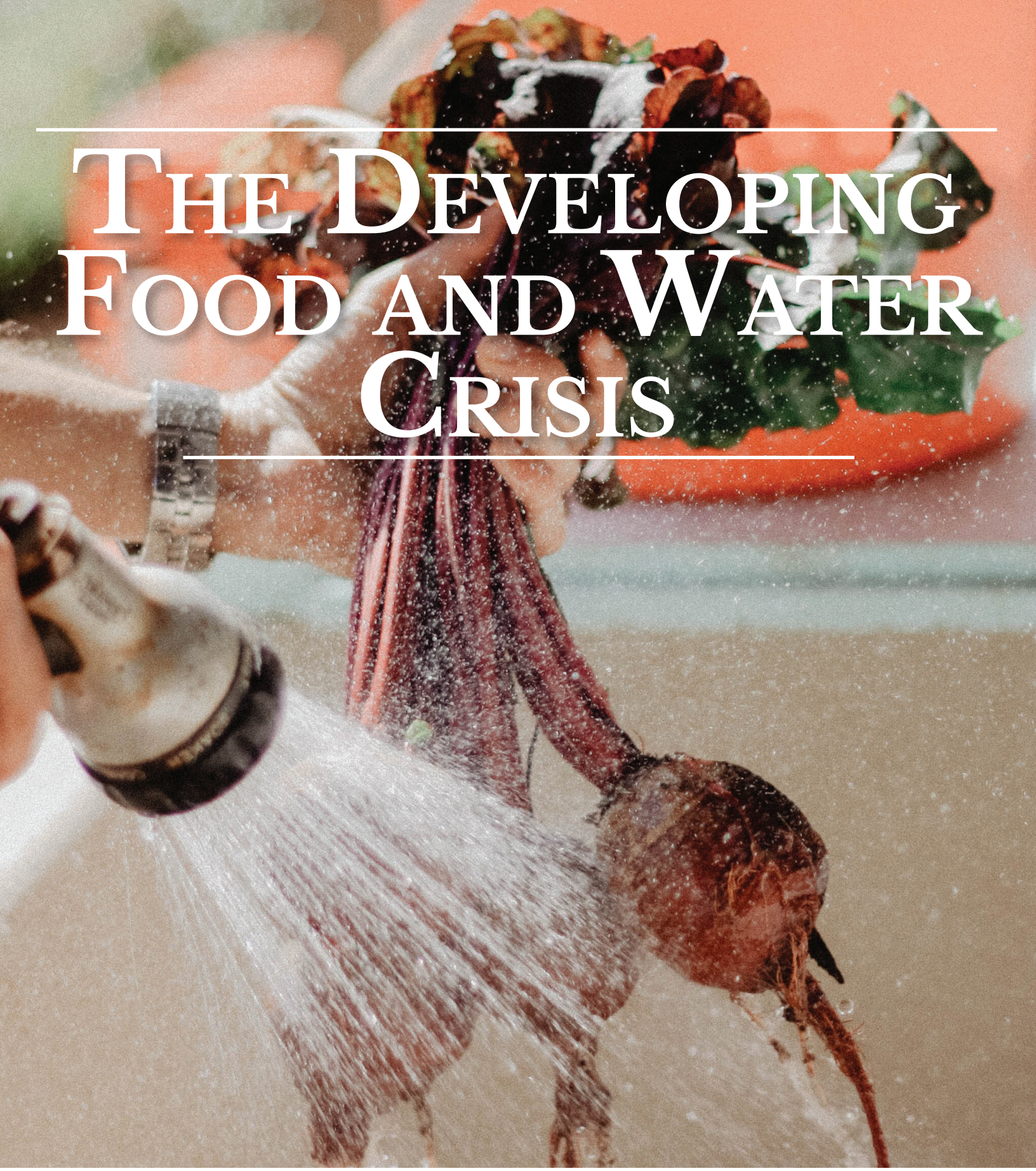
The Developing Food and Water Crisis



GPF | GEOPOLITICAL FUTURES

INTRODUCTION

There are many issues facing the world today with potential to cause major conflicts in the future. Chief among them are food and water, which have been sources of conflict between and within nations throughout human history.

Most of our readers don't worry about whether they can get access to basic food and water supplies. But they've likely noticed their grocery bills growing. The world today is seeing the rise of a food and water crisis. As we've witnessed throughout history, these sorts of crises evolve gradually, over the course of years or even decades. It's possible to mitigate the problems that result from shortages, but such measures require many years of planning, funding and implementation before yielding the desired results.

At Geopolitical Futures, we aim to connect current issues with long-term trends that will shape the world for years to come. This report was compiled with that goal in mind. Each entry addresses an important component in the emerging crisis. There will be more to come, as this is only the beginning of a global food and water crunch. If you would like to continue receiving the latest updates on this pivotal issue, please consider subscribing.

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TABLE OF CONTENTS

daily memo.

| *items from* | Daily Memos

| March 2023 | Food Security

Russian President Vladimir Putin spoke on Thursday with Egyptian President Abdel Fattah el-Sissi. Top of the agenda was food security. Putin outlined Russia's approach to the deals to allow Ukrainian grain shipments through the Black Sea and the export of fertilizer from Russia to international markets. Countries dependent on Ukrainian supplies are concerned about the future of the grain deal, which expires on March 18. Egypt's Ministry of Internal Trade recently estimated that current wheat stocks could meet domestic demand for four and a half months.

| February 2023 | Worsening Drought

The Horn of Africa is facing its sixth consecutive year of below-average rainfall, which could severely worsen the ongoing drought there, according to the IGAD Climate Prediction and Applications Center. The drought covers areas of Ethiopia, Kenya and Somalia, and its effects have been exacerbated by political instability in the region. Militant groups including al-Shabaab have taken advantage, disrupting relief efforts and recruiting fighters from local populations with promises of food.

| January 2023 | Ramp Up

The Indian government ordered the ramping up of construction on planned projects, including four dams, on the Brahmaputra River. The move is in response to China's building of its own dam farther up the same river. Meanwhile, India's chief of the army staff on Monday visited the Line of Actual Control in the northeastern state of Arunachal Pradesh. He inspected units and was briefed on the security situation. The Indian Air Force will hold drills in the entire eastern sector on Feb. 1-5.

| January 2023 | Grain Corridor

Relatedly, officials in the Chinese city of Fuyuan plan to open a grain corridor to Khabarovsk, Russia, that will increase external trade by 20 percent in 2023, expand cargo turnover, and put into operation a number of projects that had been tabled because of the pandemic. China also expects to modernize the deep-water port of Manjita with the construction of a container terminal and increase its throughput to more than 1.7 million tons. China and Russia are eager to ramp up trade in light of Western sanctions.

| January 2023 | Energy in Central Asia

Kyrgyzstan signed a memorandum of understanding with the China National Heavy Machinery Corp. on the construction of a 21-megawatt hydropower plant in Kyrgyzstan. Less than a year ago, the country signed another agreement with a Chinese state-owned company for the construction of a 500-megawatt hydropower plant. Water supplies remain a concern for such projects in Central Asia, but countries outside the region have shown interest in investing, to the irritation of Moscow, which considers Central Asia part of its sphere of influence.

| January 2023 | Grain for Africa?

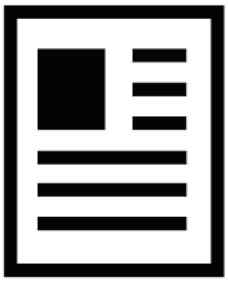
Turkish President Recep Tayyip Erdogan said Russian President Vladimir Putin offered to send grain for free to Turkey via the Black Sea corridor for delivery to poor African countries. Erdogan said he agreed to turn the grain into flour in Turkish factories before shipping it to Africa, noting that 44 percent of the agricultural products exported from Ukrainian ports from the corridor are actually destined for European countries.

| December 2022 | The U.S. and Egypt

U.S. Secretary of State Antony Blinken and Egyptian President Abdel Fattah el-Sissi discussed a number of regional issues, including the Grand Ethiopian Renaissance Dam on the Nile River, at a meeting on the sidelines of the U.S.-Africa Leaders' Summit. Blinken expressed support for efforts to resolve disputes over the dam, including its water usage and schedule for filling the dam's reservoir.

| September 2022 | Rising Coal Costs

Coal prices have surged following a severe drought in China over the past few weeks. Traders fear the lack of hydroelectricity production will force China to burn more coal to meet energy demands this winter. Rising coal consumption in the country could worsen a global coal shortage later this year.



ARTICLES

| January 2023 |

Don't Forget About Water in 2023

by Antonia Colibasanu

On Jan. 16, the Chinese Ministry of Water Resources announced that Beijing invested more than 1 trillion yuan ($148 billion) on water resource management in 2022, a whopping 44 percent increase from the previous year. Elsewhere, Pakistan suggested that water resource management projects need to become a priority for the China-Pakistan Economic Corridor because by 2025 Pakistan is expected to be a water-scarce country. Weeks earlier, an Iranian official confirmed that 270 cities and towns were suffering from acute water shortage as water levels at dams dropped to critically low levels.

Factories in southwest China had to suspend their work last summer after a record-breaking drought caused some rivers in the country – including parts of the Yangtze – to dry up. Hydropower and shipping were also affected; Sichuan province was deemed to be in a "grave situation" because it generates more than 80 percent of its energy from hydropower.

Pakistan is in a similar situation. The Indus River is a source of more than 17 gigawatts of hydropower, and it provides water to the Indus basin irrigation system, which supports more than 90 percent of the country's agricultural output. Poor water management, rapid population growth, and drought and floods have created a truly dire situation.

In Iran, a semi-arid climate and declining precipitation over the

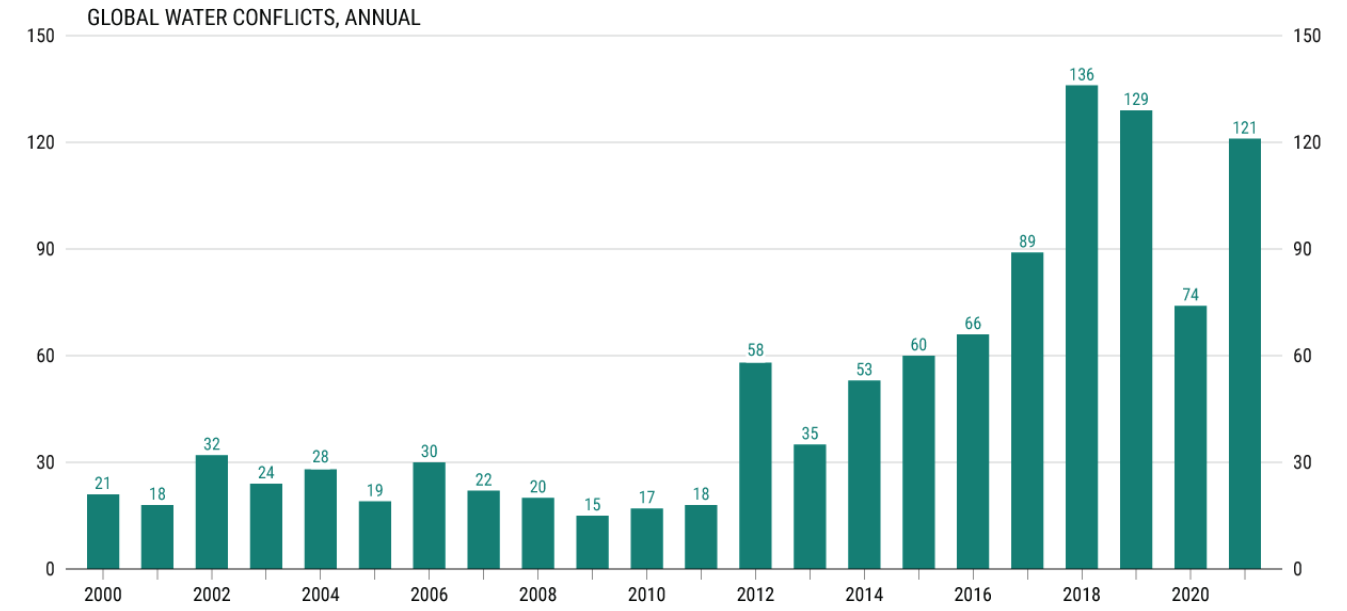
past decade have played their part in the crisis, but perennial inefficient water management since the 1990s is perhaps the larger problem. After the 1979 revolution, the new regime advanced a policy of national food self-sufficiency, which involved producing enough staple crops to meet the country's own needs instead of relying on imports. To that end, agricultural production became reliant on groundwater extraction, and slow-filling aquifers have not been able to keep up with the growing number of water users and withdrawals.

These issues may not be new, but they are all getting worse. And the fact that these three countries are geographically interconnected has been a wake-up call for other nations around the world that have dealt with, or are soon to deal with, similar water shortages and their associated consequences.

Indeed, water is so fundamental to geopolitics that it is often overlooked. Water supplies play critical roles in sustaining life, agriculture and industry. The supply levels themselves can fluctuate dramatically for reasons outside of a government's control. However, given the increasing threat of water shortages and the consequences arising from them, governments are increasingly more aggressive in taking what action they can to ensure supply.

Disputes over control of water resources historically end in violence. The historical dispute between Ethiopia and Egypt over water from the Nile River is probably the one that has garnered the most attention. Even today, the water supply in Donbas is carefully managed on both sides, and in Kherson, understanding the way water supplies to Crimea could be cut was key to understanding the fighting on the ground. More, the Russian attack on the Dnipro hydropower plant was meant to sever electricity to the region as part of the Russian strategy to down Ukraine's critical infrastructure. In war, water is at once a weapon and a casualty.

Global Water Conflicts | 2000-2021



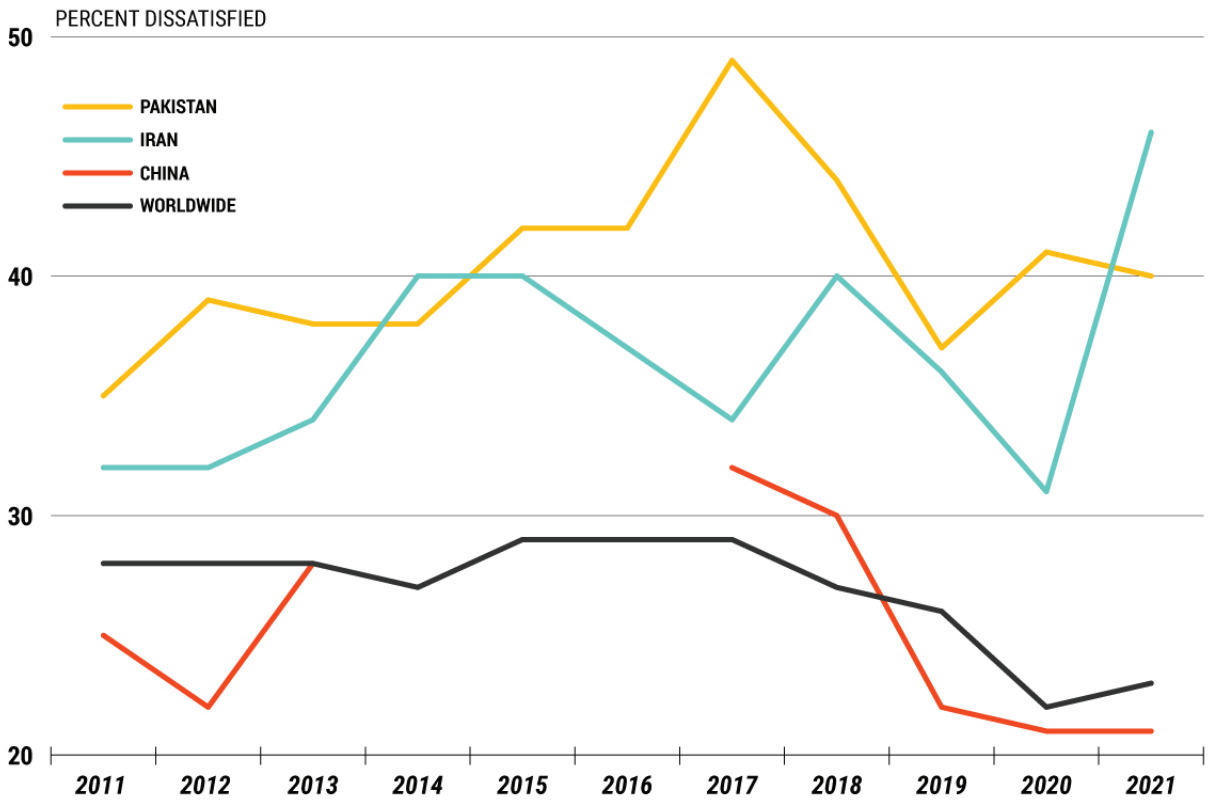
Note: Multiyear conflicts counted each in each year of conflict
Source: WorldWater.org - Water Conflict Chronology

But water is only part of the equation. The droughts of 2022, followed by the warmest winter in years in the Northern Hemisphere, have many governments on edge this year as the downstream effects of water shortage take shape. The potential food crisis, initially the result of last year's energy crisis, may only get worse. The impact will be felt the most in places like Africa and the Middle East, where water scarcity is a constant concern. Refugee flows from places like Iraq, Syria and Yemen may well increase. Food insecurity will likely grow in countries like Algeria, Morocco and Tunisia. And because it's unclear how much food will be available for export from otherwise large producers such as Russia and Ukraine in 2023, countries with limited domestic production have even more reason for concern, especially as their citizens grow more restive.

But even for major powers like China, Pakistan and Iran, things will likely get worse before they get better. All three are already dealing with socio-economic distress. It's unknown how much

the COVID-19 pandemic hurt the Chinese economy, but it isn't good, with reports painting a particularly bleak picture for youth unemployment. (That is to say nothing of the economic problems China faces independent of the pandemic.) Pakistan is seeing its worst socio-political crisis in years. Iran has been embroiled in high-profile protests for some time. Inflation is high in all three countries, as is economic unrest from class

Water Quality Perception Over 10 Years



Source: GALLUP Analytics

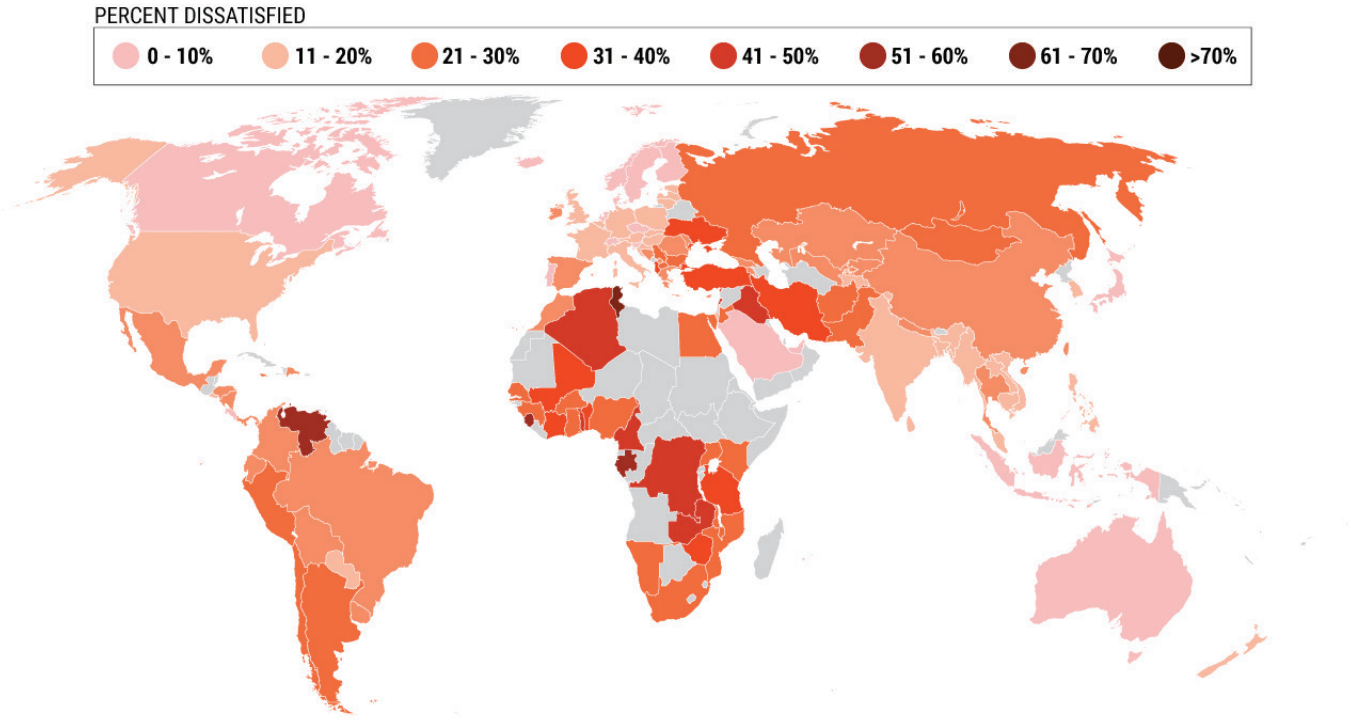
Graphic redesign by Geopolitical Futures

inequality. Adding water stress could make things even more explosive.

Further instability in any of the three major players will likely have a spillover effect in the Middle East and beyond. A troubled Pakistan and Iran at the same time will certainly make Turkey and Saudi Arabia nervous. And what happens in China – one of the world's largest consumers of resources and one

of its biggest economic engines – matters to the rest of the world. Factory shutdowns due to water shortages in post-pandemic China would trigger new supply chain shocks affecting

Water Quality Perception, *2021*



Source: GALLUP Analytics

Graphic redesign by Geopolitical Futures

both Europe and the U.S. Neither is decoupled enough from the Chinese powerhouse to ignore such shocks.

Both have their own water issues to deal with. Lower levels in the Rhine triggered alarms for European inland shipping last year; further reductions will likely hamper economic activity in Western Europe. Last year, water scarcity compelled the U.S. government to limit water releases in western states. If things get worse, U.S. policymakers will be forced to choose between water releases, electricity generation and industrial and food production on the one hand and water conservation on the other.

Water is finite, so it's clear that concerns over its use and distribution will increase as reserves dwindle. Under higher pres-

sure from citizens, governments will search for quick fixes. If a fix for one country comes at the expense of another, tensions will inevitably arise – perhaps violently. Each government will manage, or try to manage, the situation differently. In poorer countries, militias may continue to fight over water, while in wealthier nations, new policies over water usage and likely new technologies for keeping and improving water infrastructure will be debated. All in all, water stress highlights another socio-economic challenge that the world needs to tackle before it gets worse.

| January 2023 |

Water Scarcity in the Arab World

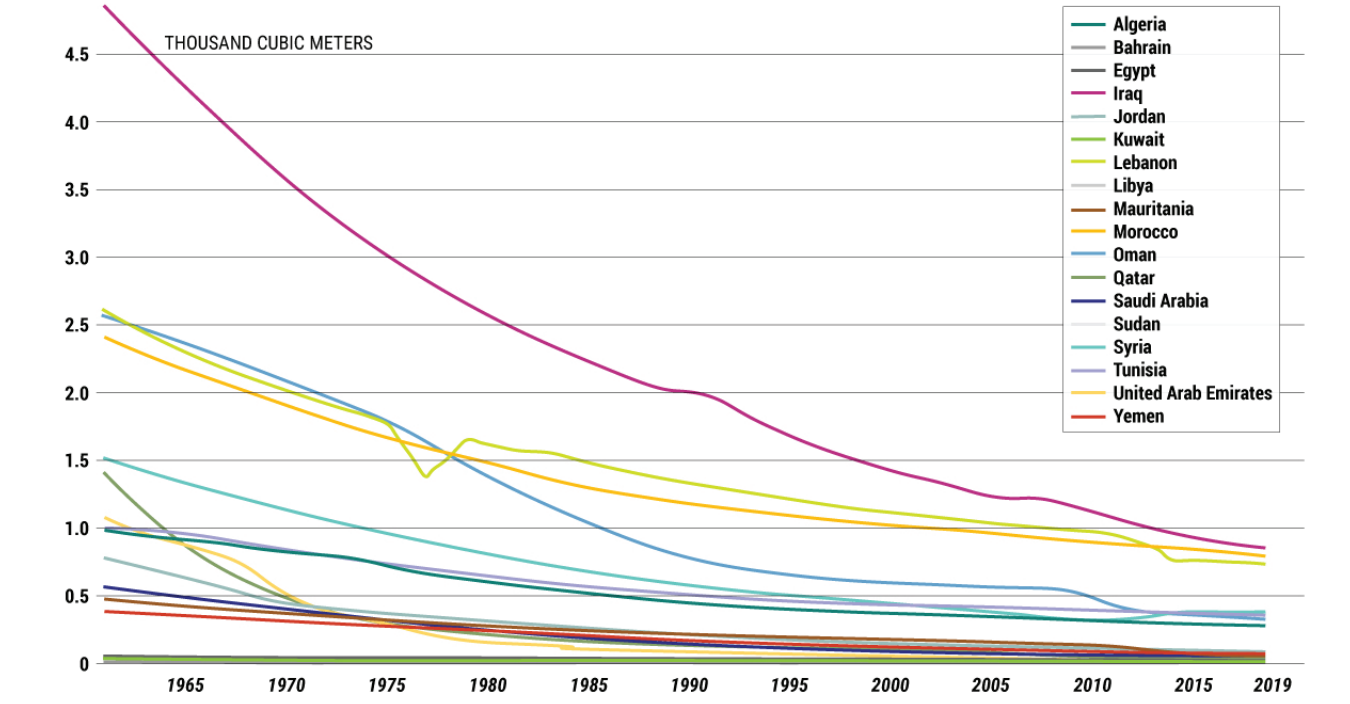
by Hilal Khashan

Many prosperous ancient civilizations in the Arab world had at least one thing in common: an abundance of water. Today, however, the Arab region in West Asia and North Africa could become the most water-scarce area in the world. Demand is rising, driven by the region's rapidly growing population, which totaled 400 million in 2016 and is projected to reach 670 million by 2050. Its many political crises are fueled by the region's unresolved water disputes, including over the Grand Ethiopian Renaissance Dam, Israel's diversion of the tributaries of the Jordan River, and Turkey's siphoning off of the Tigris and Euphrates rivers. For Arab countries, it's a problem with no solution in sight.

Magnitude of the Crisis

Although the Arab region comprises 10 percent of the world's area, it contains less than 1 percent of the world's surface runoff and about 2 percent of total rainfall. According to the United Nations, water scarcity exists where annual supplies drop below 1,000 cubic meters per capita. Some 16 of 22 Arab countries have a per capita average below 500 cubic meters, considered to be the mark at which a population faces "absolute scarcity." Part of the problem is the region's location in arid and semi-arid areas. Thirty percent of its arable lands could face desertification due to acute water scarcity. Climate change has also complicated the issue: According to one report, Arab countries could see economic losses of up to 14 percent of gross domestic product from water scarcity related to climate change.

Renewable Freshwater Per Capita in Arab Countries



Source: The World Bank

Water shortages are particularly concerning in Egypt, whose growing population, which will exceed 175 million by 2050, depends almost entirely on the Nile for its water needs. The country is already feeling the effects of the Grand Ethiopian Renaissance Dam, which will shrink Egypt's share of Nile water by at least 20 billion cubic meters annually. Rising temperatures will exacerbate the situation, causing water supplies to evaporate and reducing precipitation along the northern coast.

The growing difficulties in producing food staples (wheat, cooking oil, legumes and meat) have forced Arab countries to rely more on imports. But rising prices for foodstuffs, driven in part by the use of some grains for fuel production, puts these imports out of reach for many Arab consumers. Agricultural expansion is the only way out, but this places an even heavier burden on water supplies.

In many countries, the shortages are related to deficiencies in fuel. In Lebanon, more than four million people face severe water shortages due to the country's ongoing fuel crisis. Neighboring Syria is suffering similar effects from its own energy shortfall. And like Lebanon, the problem in water-rich Sudan is distribution, especially for household use, due to a serious shortage of diesel to operate pumping stations.

Algeria, meanwhile, is suffering from a three-year drought. The Ministry of Water Resources has admitted to a crisis in the supply of potable water in several states in the central and northern regions of the country. The government established an emergency plan to address the crisis by building new seawater desalination plants, fixing broken ones and digging wells. In Morocco, where annual water supplies dropped below 600 cubic meters per capita, the government decided to stop providing financial support to farmers of watermelon, avocado and citrus fruits – crops that consume a lot of water. Facing the most severe drought in four decades, the government also plans to address water waste and indiscriminate exploitation. These measures are unlikely to solve the problem, however. A long-term solution would involve constructing water desalination plants, but the country lacks the funds.

Over-irrigation is the most important cause of water waste in the Arab region, where the agricultural sector accounts for 84 percent of water consumption. Because of waste and mismanagement, just 50 percent of the region's water resources, amounting to about 340 billion cubic meters, are being exploited. Thus, policies that promote water use efficiency and explore new sources will become increasingly important in solving the region's water scarcity problem.

Transboundary Resources

A third of the renewable water available to Arab countries comes through rivers from outside the region. Perhaps the

most notable is the Nile, which originates from Lake Victoria in Uganda and Lake Tana in the Ethiopian plateau. Located on the Nile, the Grand Ethiopian Renaissance Dam has been a source of tension here for years. The project reduced Egypt's share of water from the Nile River from 55.5 billion cubic meters annually to less than 40 billion cubic meters. Ethiopia insists that the Nile Water Sharing Agreements of 1929 and 1959 need to be updated and are no longer a basis for negotiation, since they were signed during the colonial era and failed to allot a fair share of the supply to the upstream state.

Two other sources that originate outside the Arab region are the Tigris and Euphrates rivers. Both rivers flow down through the Anatolian plateau and have become a growing source of friction between Turkey and its two neighbors Syria and Iraq, both of which accuse Ankara of ignoring their access rights. The rivers feature prominently in Turkey's massive development scheme called the Southeastern Anatolia Project, which aims to construct 22 dams and 19 hydroelectric power plants and irrigate 1.7 million hectares of land for agricultural use.

In Iraq, the Tigris and Euphrates supply most of the country's water stations and agricultural production, which has been declining over the past three decades due to water shortages and Iran's flooding of the Iraqi market with cheap produce. The flow of water from Turkey through the two rivers into Iraq declined in 2021 by 50 percent, while Iran diverted its Tigris tributaries to build dams. Ankara officially acknowledged reducing the Euphrates' water flow into Iraq and Syria from 500 cubic meters per second to 200 cubic meters per second – though officials from the Autonomous Administration in North and East Syria say the real amount is 125 cubic meters per second. The drastic reduction put hydroelectric turbines out of commission, creating problems for crop irrigation.

Water Management

One of the most water-scarce countries in the world is Jordan, which faces an annual water deficit of about 15 million cubic meters. Jordan's dams currently contain 80 million cubic meters of water in reserves less than in 2020. The Jordan River and the Yarmouk Basin are the country's most critical water sources, but their flows have fluctuated due to the effects of climate change. Estimates suggest that the Jordan River loses 85 percent of its water through evaporation due to high temperatures. In 2021, Jordan saw a 60 percent decline in rainfall compared to the previous year. It also suffers from receding groundwater and surface water levels. Renewable supplies meet only half of the kingdom's needs.

In 2013, Jordan signed a preliminary agreement with Israel and the Palestinian Authority to connect the Red Sea with the Dead Sea through a water canal and to establish a desalination complex north of the Jordanian city of Aqaba. The three signatories will desalinate and share water from the Red Sea. The deal is part of Jordan's plan to transport 150 million cubic meters of desalinated water from Aqaba to Amman and increase the water capacity of its dams to 400 million cubic meters. Israel also agreed to provide Jordan with an additional 50 million cubic meters of water from the Sea of Galilee, but a feasibility study is ongoing so the future of this part of the deal is still unclear.

Most Arab countries use groundwater to alleviate severe shortages. As a non-renewable resource, groundwater can't be a long-term solution to the problem, but it can play an important role in a broader strategy to meet the growing demand. The Arab world has three groundwater basins, including the world's largest, the Nubian Sandstone Aquifer System, covering a large swathe of Egyptian, Sudanese, and Libyan territory. This system contains 150,000 cubic kilometers of fossil water. Libya extracts 2.3 cubic kilometers annually via the Great Man-Made River project for drinking and irrigation. There's also the

Northern Sahara Aquifer system in Algeria and southern Tunisia – which, in addition to the coastal aquifers, is the primary source of water for domestic use and agriculture. Saudi Arabia actively exploits the al-Disi Aquifer, spanning from the country's north to southern Jordan, making it a potential future source of conflict between the two countries. Notably, in 2019, Arab countries also imported about 344 billion cubic meters of virtual water as agricultural commodities.

In the Gulf region, Arab countries rely on desalinated seawater, which represents more than 75 percent of their water consumption. About 35 percent of the world's desalination plants are in the Arab region, especially in the Arabian Peninsula. Last year, Saudi Arabia alone desalinated 2.2 billion cubic meters of water, representing 20 percent of global desalinated water. Oman, a country with extreme water shortages, treats 100 percent of its wastewater and reuses 78 percent of it. Other Gulf Cooperation Council countries treat about 80 percent of their wastewater and reuse roughly 45 percent of it.

Uncertain Future

For non-oil-producing Arab countries, the search for solutions is hampered by a lack of funds. The six GCC countries are the only Arab states that have achieved water self-sufficiency by building desalination plants on the shores of the Persian Gulf and the Sea of Oman. But they too are facing an uncertain future, as their populations grow and their capacity for spending declines.

Water flowing through the region's many valleys could be part of the solution. The quantity of water located in these valleys is unclear but likely in the tens of millions of cubic meters, thanks to torrential rains that often pass through the area. However, the cost of building the infrastructure needed to store the water is beyond the financial means of non-oil-producing countries.

Meanwhile, the GERD will continue to be a major cause for concern for the Nile's downstream countries, particularly Egypt. Even without the dam, the country is likely to see an acute water shortage, primarily due to its rapidly expanding population. It has been trying in vain since the 1960s to control population growth in order to stabilize the economy and improve living standards. Other countries in the region, with the exception of the wealthy GCC states, will experience a similar fate. For most Arab regimes, staying in power is more important than finding a solution to a problem as consequential as this one.

| March 2023 |

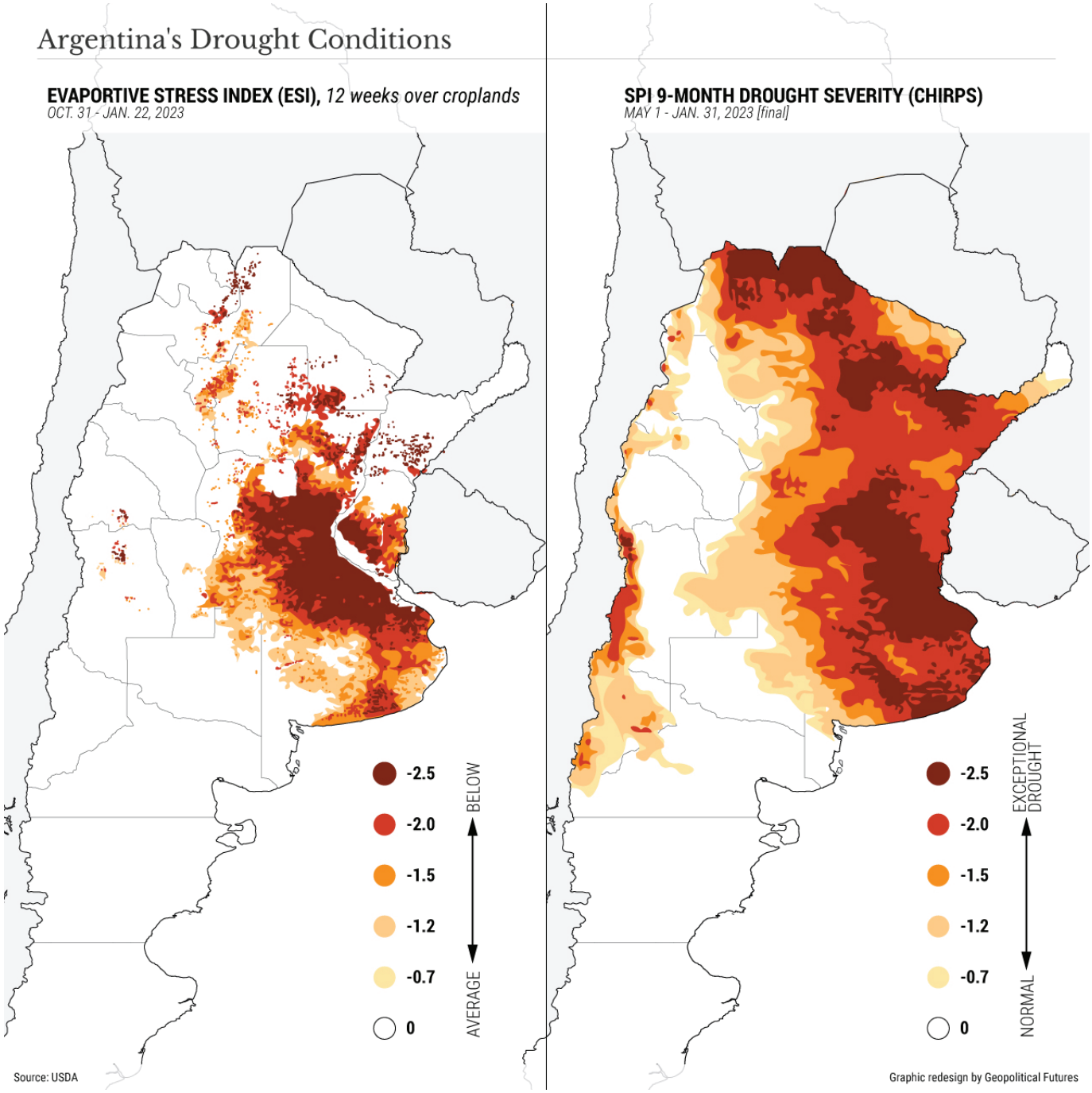
Argentina's Farmers Can't Afford a Drought

by Allison Fedirka

Argentina is infamous for its economic malaise, but once a year, from March through May, it gets a reprieve. This is when agricultural exports bring in foreign exchange that Buenos Aires badly needs to carry the economy through the rest of the year. In 2023, however, Argentina's poor crop performance means the country can expect minimal relief for the time being. The government is trying to adjust, but the knock-on effects will linger for months or longer.

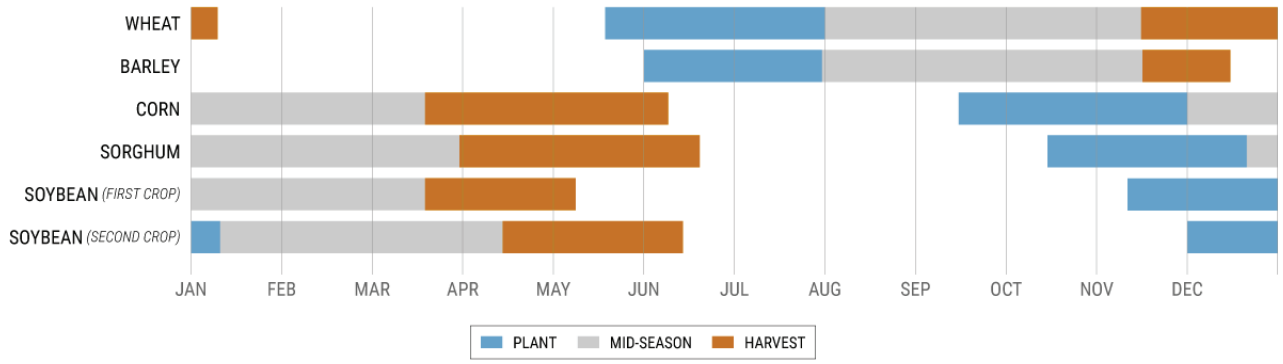
Prolonged drought has taken its toll on Argentine farming. In fact, 2020-22 was the driest period for the country in more than 60 years. The wheat harvest yielded 12.4 million tons, roughly half the previous season's total, and projections for the remaining crops have been repeatedly downgraded. For example, expectations for the soy harvest were cut by 12 percent (33.5 million tons), while corn estimates were slashed by 15 percent (41 million tons).

The global impact should be muted, but the effect on Argentina's economy is already apparent. In the first two months of 2023, the government brought in a mere $1.3 billion from agriculture exports, down 46 percent from the same period a year ago. For the full season, analysts expect these exports to bring in between $7 billion and $10 billion less than a year ago, which would shave 1.5 to 2 percent off gross domestic product. The government's initial fiscal plan anticipated receipt of



$7.6 billion in revenue from agriculture exports, but this has been cut to between $3 billion and $3.5 billion. This comes amid a global realignment in commodities due to the war in Ukraine. Argentina's struggles put it at a disadvantage when it comes to securing market share and longer-term contracts for its exports.

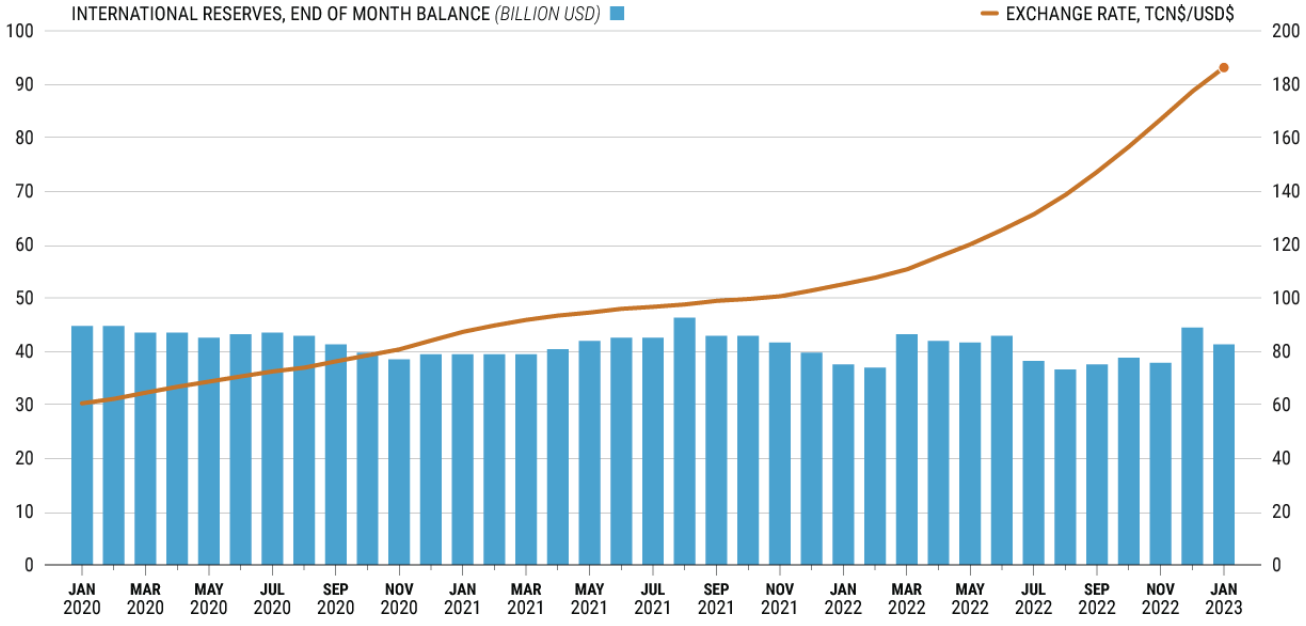
Argentina | Crop Calendar



Source: Foreign Agricultural Service - USDA

Argentina's poor agriculture prospects have also strained its relationship with the International Monetary Fund. Last week, Economy Minister Sergio Massa met with IMF Managing Director Kristalina Georgieva to discuss the monitoring and conditions of the country's IMF loan. Buenos Aires is expected to fall well short of its required net international reserves, which were supposed to reach $7.8 billion by the end of March but are currently $4 billion. As a result, the IMF agreed that it would no longer do quarterly reviews of Argentina's reserves.

Argentina | International Reserves and Official Exchange Rate

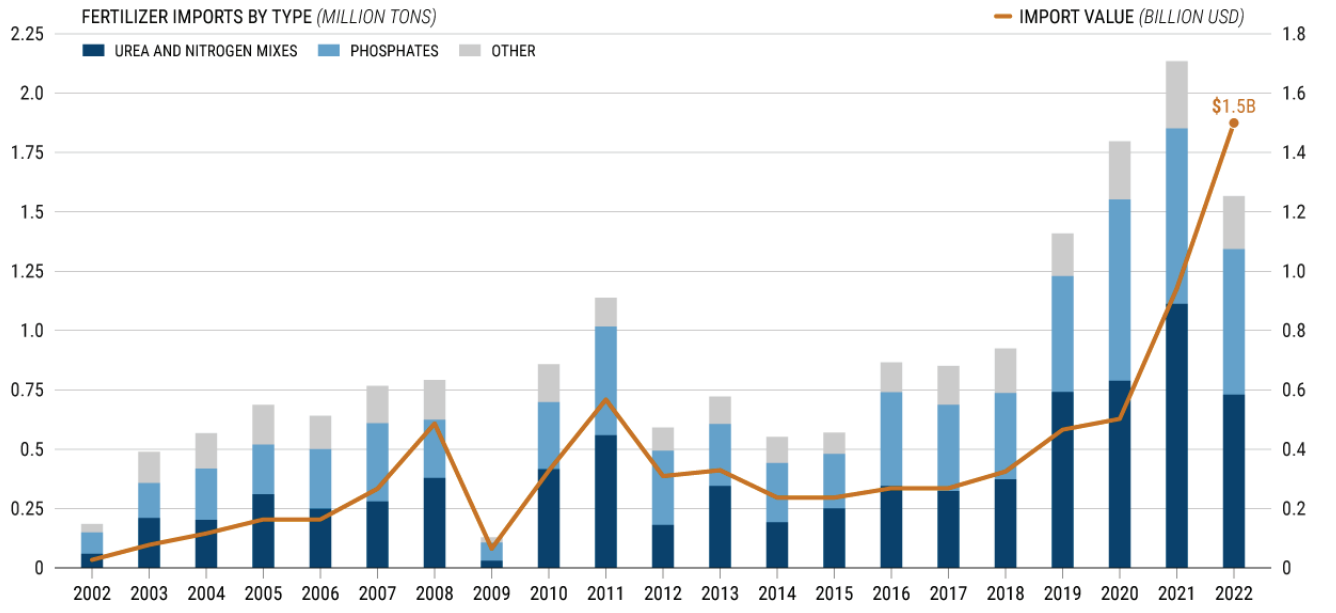


Source: Central Bank of Argentina

(Other guidelines pertaining to the fiscal deficit and monetary issuance remain in place.) According to Massa, the IMF adjustment will provide stability and predictability for the loan program because Buenos Aires will not need to seek frequent waivers from the fund. It also puts the IMF in an awkward spot, because other debtor states will try to use Argentina as a precedent.

For Argentina's farmers, the crisis is far from over. Despite public support programs, small farmers are barely scraping by. Those who stay afloat are under pressure to switch crops and reduce planting area to cope with the drought and high input costs. The price of fertilizer has soared since 2020. From January to July 2022, Argentina imported 26 percent less fertilizer by volume year over year but paid 61 percent more for it. And the damage is still matriculating through the production chain. For instance, because of the country's soybean crop shortfall, Argentine soybean crushers and meal factories will need to import up to 10 million tons of soy this year to keep the industry running. Finally, the difficulties have fueled an uptick in tax avoidance that is already evident in cattle exports.

Argentina | Fertilizer Imports*



* Data covers the first seven months of each year
Source: Bolsa de Comercio de Rosario

For the broader national economy, with fewer dollars, the government will struggle to pay its debt. Failure to do so will endanger its access to capital markets. The dollar crunch also limits the Argentine central bank's ability to stabilize the peso, which will drive up the cost of imports, including all-important energy imports. Last year, Argentina spent $12 billion on energy imports and, in spite of a dramatic rise in energy exports, ended the year with an energy trade deficit of $4.4 billion. In the past, Buenos Aires has prioritized households over industry in the event of energy shortages. Other import-dependent industries are also struggling. For example, the Chamber of Airlines warned of difficulties importing computer equipment, aircraft spare parts and security equipment.

Last but not least is the question of government subsidies. Despite government efforts, subsidies for electricity, water and transportation still consume a chunk of the budget. The government already announced price hikes for later this year, and the shortfall in export revenue means additional hikes cannot be ruled out. This will not sit well with the public, and it comes ahead of a general election in October. Suffice it to say Argentina will be dealing with the fallout of this year's poor agriculture performance for quite some time.

| November 2022 |

Russia's Long Game on Grain Exports

by Ekaterina Zolotova

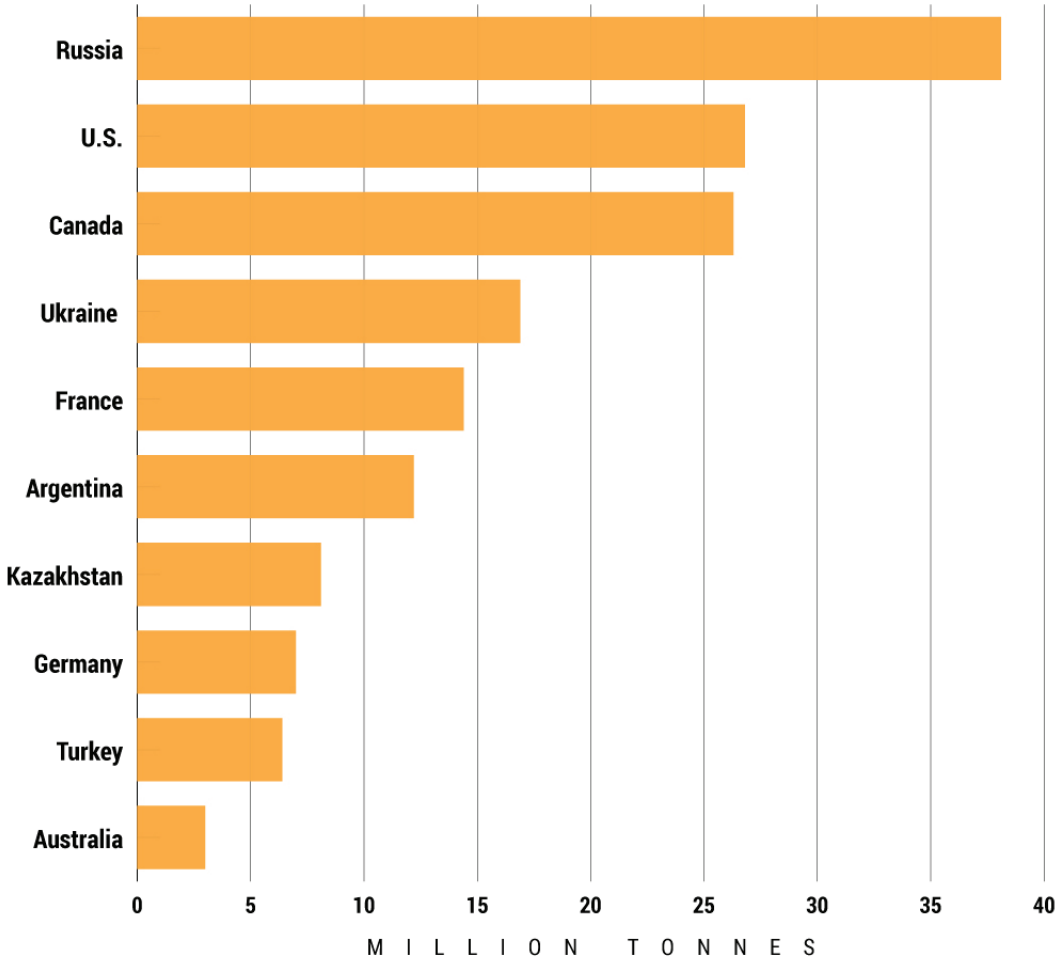
The Black Sea grain corridor, which enabled Ukrainian food to sail from three ports, was extended for another 120 days last week, according to the presidents of Ukraine and Turkey. Russia has not said whether it will participate but did not object to the extension. Having earlier failed in a highly publicized effort to terminate the grain initiative, Moscow prefers to keep its distance from the deal so that Russian participation doesn't seem like a result of Ankara's growing influence over Moscow. Russia's focus now is to continue criticizing the deal while seeking opportunities to use it to advance Russian interests.

Importance of Russia's Exports

Grain exports are an important source of power and influence for Russia. First, Russia is a prolific wheat producer, so sales abroad support the Russian economy and foreign policy goals. For years the Kremlin has been trying to boost its grain harvest and set up sustainable trade relations with wheat importers in countries in the Middle East, Africa and elsewhere. Moscow hopes these partners, craving Russian food and indifferent or hostile to Western sanctions, might support Russian strategy. Poor harvests this year in some regions due to drought or difficulty accessing energy and fertilizers may further these goals.

Second, grain provides about a third of Russia's revenues from food exports, which is important for supporting the national budget and securing foreign currency, access to which has

Top 10 World Wheat* Exporters *(June 2020-June 2021)*

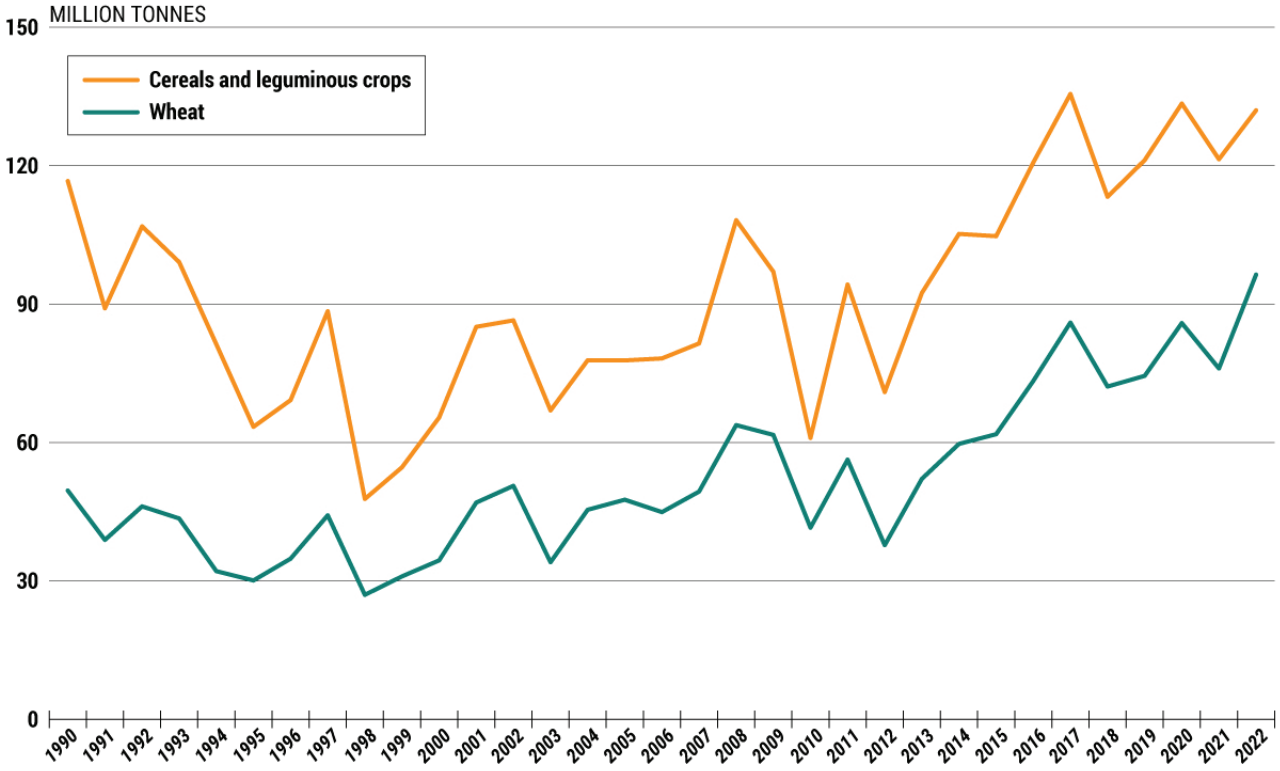


* Wheat: Including spelt and meslin, unmilled
Source: CIS

been limited by sanctions.

Finally, Russian farmers need to offload record-breaking production. The country's wheat harvest reached 105 million tons this year (compared with 77.8 million tons last year), and the government expects a record total grain harvest of more than 150 million tons for the year. However, this blessing will become a curse if Russian farmers cannot get the goods to market. Shipping costs remain elevated, and Russian grain exporters have recorded difficulties chartering ships, insuring cargoes and receiving payments because of sanctions.

Gross Harvest of Agricultural Crops in Russia



Source: Rosstat

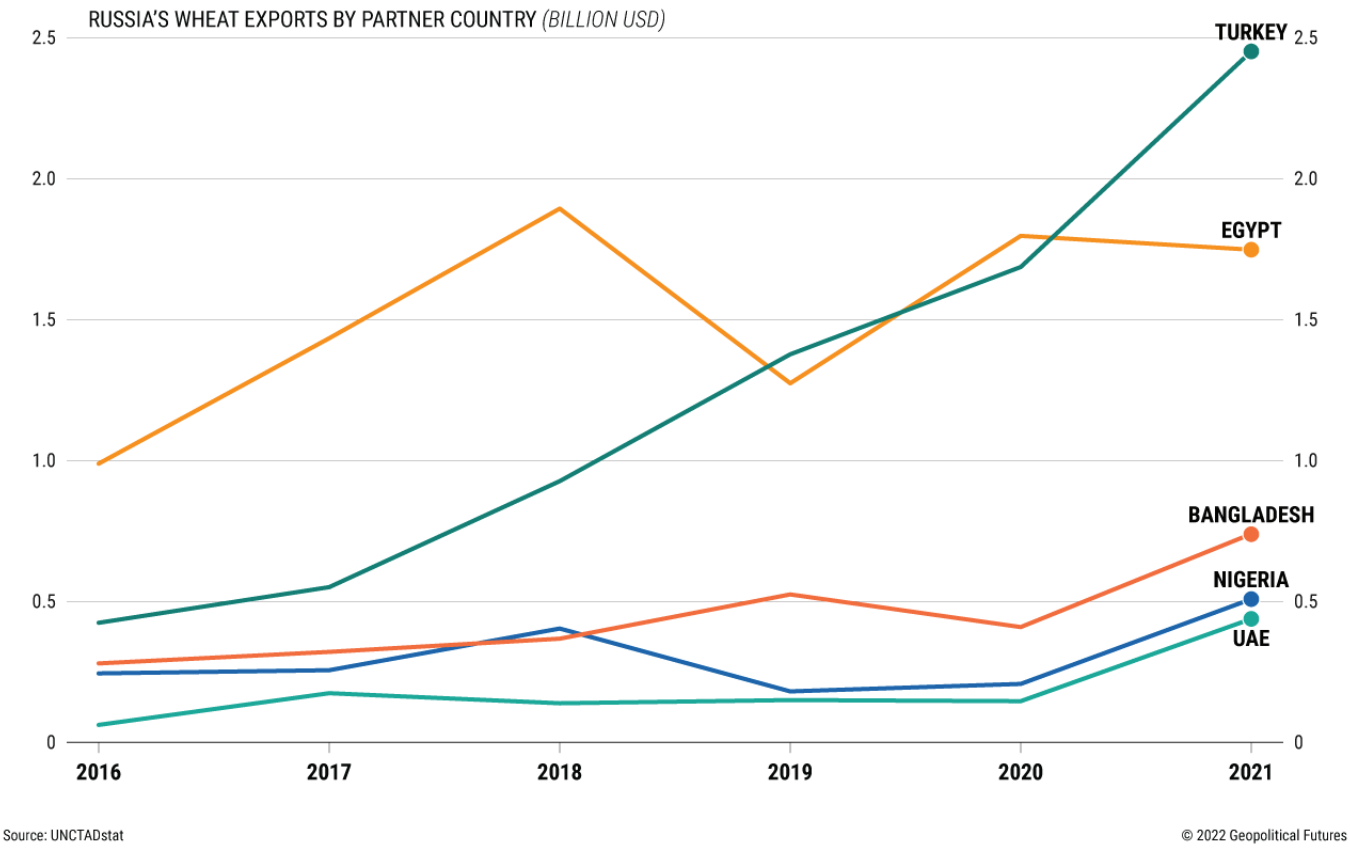
The Kremlin's Game

The grain deal has been extended, but not without Russia receiving some concessions and signaling that its continued participation will always be in doubt. The Kremlin expects its leverage will only grow in the near future, citing several trends. First is Russia's massive harvest and stocks of grain and wheat, which it can release at any time. Second is expectations of growing demand for Russian wheat as Ukraine's exports decline next year because of the war. Third is instability in the energy and fertilizer markets, which may harm output in other countries and further boost demand for Russian wheat.

Finally, although demand is high right now, market sentiment

is gloomier over the next several months. Major buyers like Egypt and Pakistan are experiencing financial trouble. Moreover, Russia's temporary exit from the grain initiative sowed doubts about the arrangement's future, leading major importers like Egypt, Algeria and Saudi Arabia to stock up before the deal expired. The market situation may be very different

Top Destinations for Russian Wheat



Source: UNCTADstat

when the grain deal's extension is up for renewal again in four months.

In other words, with patience and luck, the Kremlin may be in a much stronger position for the next round of Black Sea grain negotiations. Russia still faces barriers to the export of grain and fertilizers, the Kremlin often notes, despite earlier agreements in Istanbul. After this latest round of talks, however, the West is discussing guarantees to restart Russian exports via the Togliatti-Odesa ammonia pipeline, which was halted when

the war began (in September, Ukrainian President Volodymyr Zelenskyy expressed his opposition to restarting the pipeline), and the U.S. is rumored to be willing to ease sanctions on Russia's state-owned Rosselkhozbank agricultural bank. France also said a corridor for the supply of Russian fertilizers to Africa via Europe had been established and could start deliveries within weeks. Moscow expects it can hold out for more such breakthroughs as market conditions develop early next year.

Strategic Patience

Russia can afford strategic patience for as long as it can satisfy its farmers. Eastern markets are too well-protected to be profitable. Farmers have almost stopped delivering grain to Uzbekistan, Kyrgyzstan, Turkmenistan and China, traditional importers, because transit tariffs on Kazakhstan's railways are too high. According to Russian Railways, transit through Kazakhstan costs carriers as much as 3,300 rubles ($54) per ton, while a similar Russian route costs no more than 630 rubles. Russian Railways is in talks with Kazakhstan to reduce the transit tariff on agricultural products. Moscow is optimistic; stronger cooperation with Central Asia is in Russia's interest, and some Central Asian states want access to cheaper Russian grain.

In the meantime, Moscow will distance itself from the grain deal and seek concessions, such as the easing of restrictions on fertilizer exports and payments. The near-term market outlook for Russia is positive. Over the longer term, however, eastern buyers cannot replace other markets choked off by Western- and self-imposed sanctions. With that in mind, Moscow announced an increase in the quota on grain exports to non-Eurasian Economic Union members from Feb. 15 to June 30, 2023. Until then, the Kremlin seems content to passively participate in the grain deal.

| May 2022 |

Arab Food Insecurity and Political Failure

by Hilal Khashan

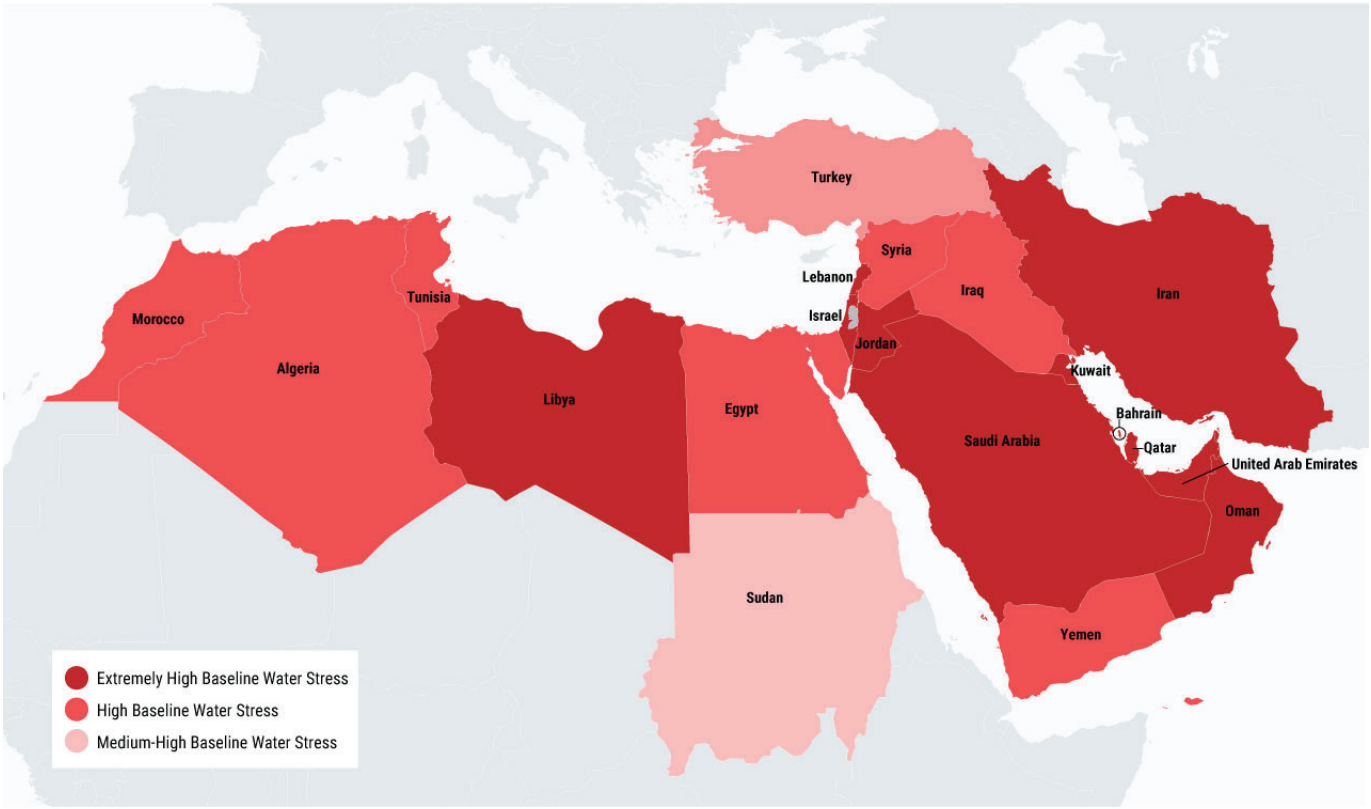
The Arab region, extending from the Persian Gulf in the east to the Atlantic Ocean in the west, faces severe shortages of several staple foods. Given that at least 65 percent of people in most Arab countries are poor or vulnerable to poverty, it's little surprise that hunger and malnutrition are prevalent in the region. Even in oil-rich Saudi Arabia, conservative figures place at least 20 percent of the population below the poverty line. Poor government planning, demographic changes, water scarcity, climate change, the COVID-19 pandemic and unresolved conflicts all contribute to the problem. And today, the war in Ukraine is revealing the extent of these vulnerabilities, which will continue to plague the region long after the war's conclusion.

Water Scarcity

Of the world's 17 most water-stressed countries, 12 are in the Middle East and North Africa. Even though the Arab region includes 5 percent of the world's population, its share of the world's freshwater is less than 1 percent. Arab countries import more than half of their food supplies, spending 5 percent of their gross domestic product on these imports.

These problems have affected countries in different ways. In Iraq, drought, sandstorms, high temperatures and external restrictions on water flows have led to 60 percent water loss. Turkey's and Iran's aggressive dam construction policies have

Water Stress in the Middle East and North Africa



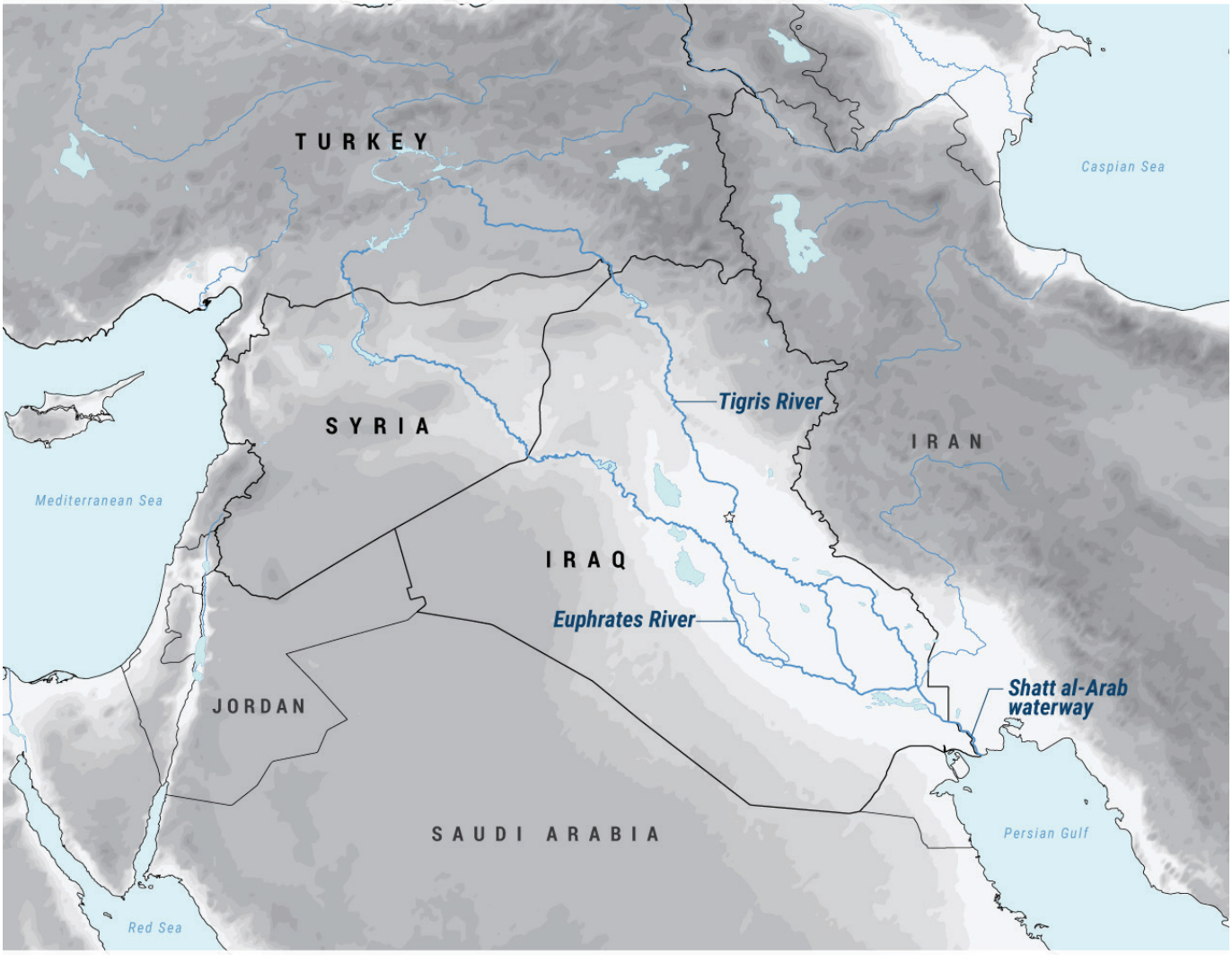
Source: World Resources Institute

hugely aggravated water supply problems in both Iraq and Syria. In Egypt, Addis Ababa's Grand Ethiopian Renaissance Dam has deprived the country of 25 percent of its Nile water supply. Israel's virtual monopoly of the Jordan River system has further worsened Jordan's severe water scarcity.

In Syria and Iraq, where 12 million people have lost access to water, wheat production is collapsing. Land under cultivation shrank by half last year in Iraq, where the population will double by 2050 but potable water will decrease by 20 percent because of declining precipitation, which constitutes 30 percent of the country's water supply. The Iraqi Ministry of Water Resources says that unless Turkey releases more water into the Euphrates and Tigris rivers – which flow into the Shatt al-Arab waterway south of Baghdad – they will dry up in 20 years. In Syria, around 60 percent of the water flow comes into the

country from Turkey, which has used the resource as a political weapon to increase its influence in Syria. It typically releases more water into Syria in the winter, when dams reach maximum capacity, threatening their structural integrity. During the

The Tigris and Euphrates River Systems



dry summer season, reduced water flows can cause immense economic losses in agriculture and fisheries.

Saudi Arabia has already depleted its underground aquifers, having used annually 5 square miles of its nonrenewable fossil water on farming. Even though Saudi Arabia and other Gulf Cooperation Council countries have nearly 900 water desali-

nation plants, farming remains unviable, with more than half of the plants' output going toward household use. In Algeria and Morocco, where water shortages are rising, agriculture depends heavily on rainfall, which is unpredictable.

Outdated Technology

Water scarcity isn't the only problem, however. The lack of agricultural productivity is also a result of outdated technology and cultivation techniques, as well as poor planning and management. Inefficient irrigation systems such as flood irrigation consume 40 percent more water than sprinkler or drip irrigation. Agricultural cooperatives are scarce, and Arab governments do not provide incentives for expansion, resulting in the perpetuation of small, family-owned lots that are not suitable for modern irrigation and mechanized cultivation. Agriculture also lacks sufficient fertilizers and pesticides. These issues lead to low yields, averaging 1.3 tons per hectare, compared to the world average of 3.6 tons per hectare. High birth rates – around 2 percent compared to the world average of 1 percent – complicates the situation.

The region's arable land totaling 70 million hectares, 30 percent of which are in Sudan, would be sufficient to meet its agricultural needs. What Arabs lack is a workable irrigation system and the ability to work together. But corruption and personal politics often stand in the way. In Iraq, the government doesn't seem to take the water situation seriously. In 2018, it allocated $15 million, about 0.2 percent of its budget, to address water issues. Iraq needs to invest at least $180 billion in dam construction and irrigation projects to tackle its acute water scarcity over the next two decades. Syria's water issues predate the 2011 uprising. Metropolitan Damascus, with a population of more than 4 million inhabitants, frequently experiences water cuts that last several weeks. Half of Syria's water treatment facilities are inoperable because of the war, reducing available drinking water by 40 percent over the past decade and causing

sewage water to contaminate supplies.

Government Failures

Arab countries are the world's leading grain importers, but Russia's war on Ukraine has revealed the vulnerability of the region's lack of self-sufficiency. Even though Russia and Ukraine export only 12 percent of the world's food, their proximity to the region makes their products substantially cheaper and more competitive than those of other food exporters. The conflict has been especially disruptive to Arab countries because of the importance of bread in Arab diets. Around 35 percent of caloric intake in Arab nations comes from bread alone. Some countries, such as Iraq, Yemen and Lebanon, import more than 70 percent of their wheat.

Shortages of food staples, including bread, cooking oil and legumes, are common, notably in Egypt, Algeria and Morocco, and have forced the ruling elite to take steps to avoid possible revolts. For years, Algerians have complained about food scarcity and inflated prices, as their purchasing power dropped by 40 percent over the past six years. The cash-strapped government's detachment from the crisis and decision to reduce imports have increased the level of public frustration. In Egypt, the country's 20th century irrigation policy, which culminated in completion of the Aswan High Dam in 1970, did not lead to an agricultural revolution. Instead, the gap between local food production and imports has increased, reaching an alarming rate in recent years. Domestic grain yields totaled 69 percent in 2000, but local production decreased to 45 percent in 2018. During the same period, its locally grown legumes declined from 56 percent to 37 percent, and the downward trend has continued.

Arab regimes are more concerned about security than food independence. For example, Egypt, Algeria and Morocco spend five times, 12 times and 25 times more on defense than on agriculture, respectively. Some in the Arab region proposed, all

the way back to 1956, establishing a common Arab market in preparation for launching an economic union – but the idea never materialized. The 2005 Arab League summit in Algiers and the 2007 summit in Riyadh presented a strategic vision to achieve Arab food security by developing an economically efficient agricultural sector, properly managing environmental resources and enhancing farmers' quality of life. Arab agriculture ministers approved the summits' recommendations during the 2008 meeting of the Arab Organization for Agricultural Development in Bahrain. The recommendations included developing modern agricultural techniques and encouraging investment in agricultural processing. They also called for improving farming competitiveness and investing in human resource development.

But Arab regimes ruined the prospects for launching a successful agricultural revolution. They rejected possibilities to cooperate, preferring to import food that annually costs the Arab region more than $100 billion and exposes it to price fluctuations and import disruptions due to foreign conflicts. Arab dictators willfully contributed to wasting their countries' meager water resources. In 1992, Iraqi strongman Saddam Hussein ordered the drying up of the Mesopotamian Marshes in southern Iraq, where insurgents sought shelter, destroying its agriculture, fisheries and unique biodiversity. In the early 1990s, Syrian President Hafez Assad diverted sewage water to the Barada River, which crossed through Damascus and provided the capital with water for domestic and agricultural use. He also rerouted its canals away from his palace for security reasons. His son, Bashar, changed the direction of the river mouth to flood rebel areas outside Damascus.

Impact on Public Health

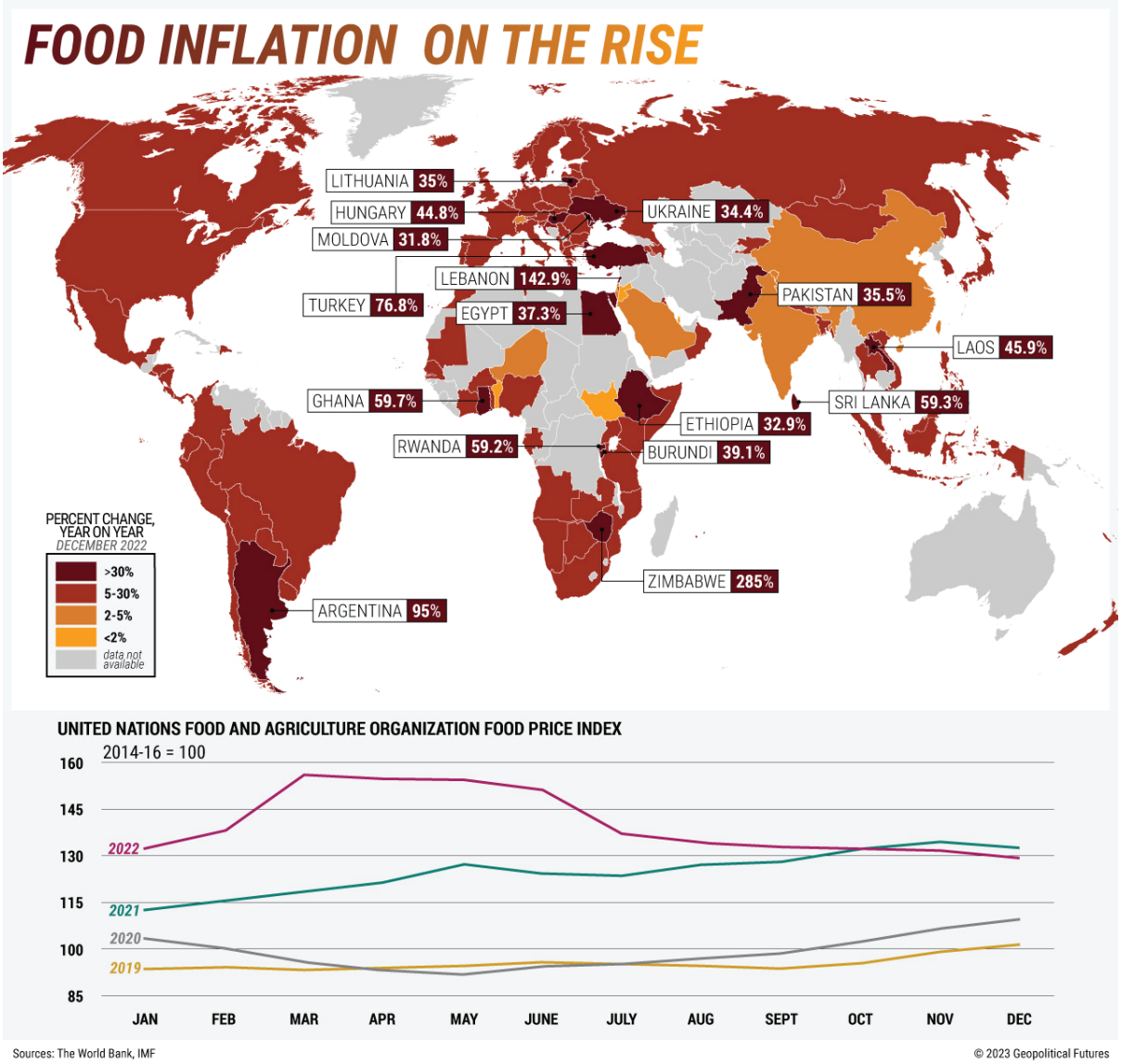
According to the Food and Agriculture Organization, the number of people who go hungry in the Arab region has risen by more than 90 percent over the past two decades, exceeding 69 million in 2020. One-third of the region's 420 million people

suffer from malnourishment. More than 20 percent of children under five suffer from stunted growth. Eight percent are underweight, and 11 percent are overweight, primarily because of poor diets, which exceeds the international average by 5 percent. In Yemen, 45 percent of adults suffer from hunger, and 60 percent of young people are anemic. In Sudan, more than 20 percent of the country's 45 million people suffer from severe hunger, which could double under its military-controlled government. These figures are particularly stark given that Sudan could feed most of the Arab region if it was able to meet its full agricultural potential.

In wealthy GCC countries, however, overnutrition is a big problem. The Arab diet depends heavily on refined flour and rice, and variety in food consumption is either beyond most people's means or is not part of the traditional cuisine. In addition, government subsidies do not cover wholesome foods. Unhealthy eating habits have contributed to high rates of suffering from chronic diseases, especially diabetes. A quarter of adults in GCC countries will become diabetic by 2030. In Saudi Arabia, more than 50 percent of people over 30 are prediabetic. In Egypt, 21 percent of adults have diabetes, and an equal percentage are prediabetic.

The Arab region has failed to tackle the underlying causes of its food issues and thus is unlikely to overcome them in the near future. Achieving sustainable development requires resolving the endemic food crisis and exiting the vicious cycle of poverty. This process involves reprioritizing state objectives from defense to agriculture and reversing internal migration patterns that saw a massive population movement from rural areas to urban centers over the past half-century. These demographic changes weakened the agriculture sector yet failed to promote other productive industries. Arab rulers may be eager to develop their countries, but they are unwilling to abandon their fixation on regime stability and order.

INFOGRAPHICS

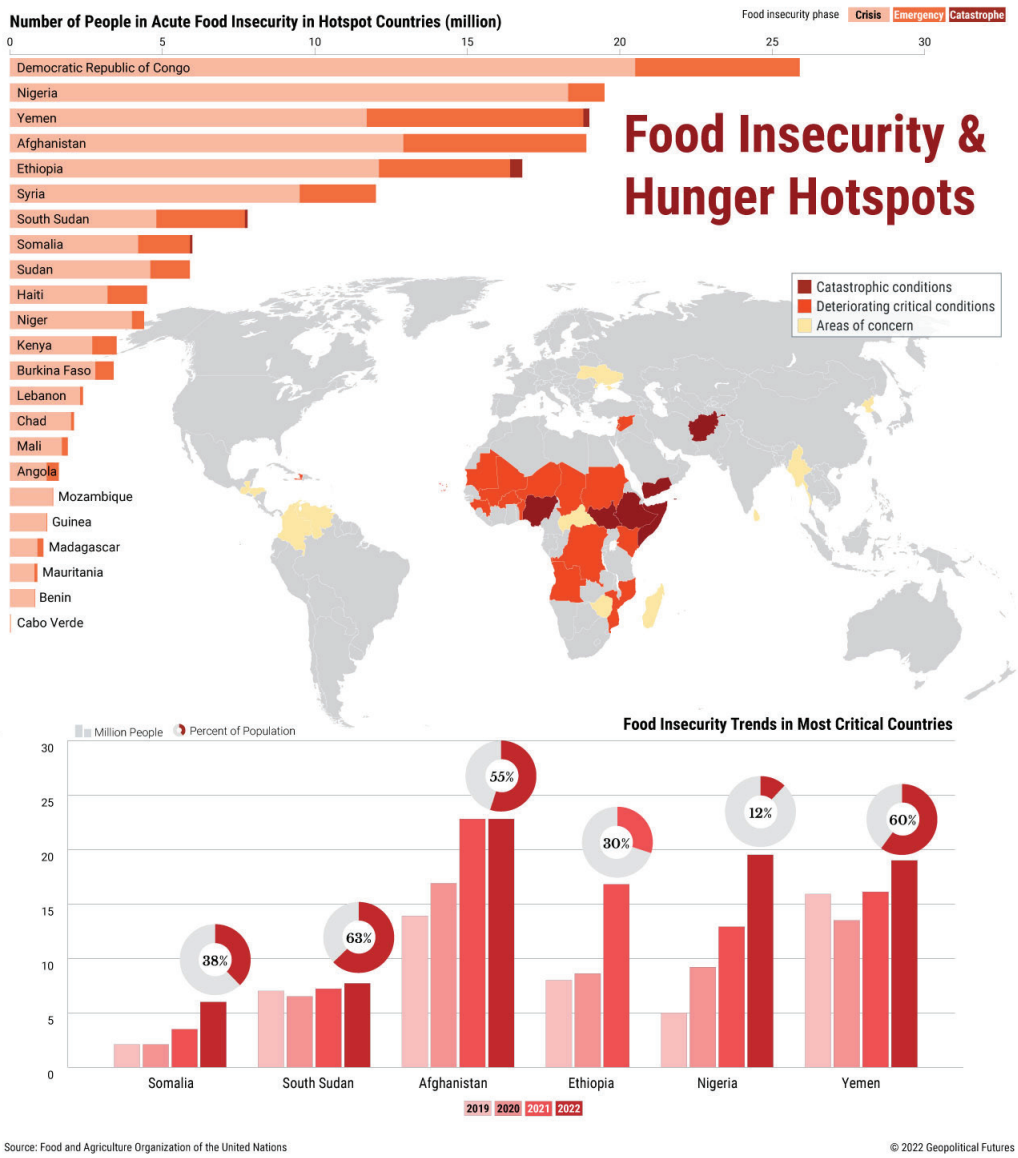


Food Inflation on the Rise | 2023

Most countries have been affected by the problem.

This time last year, world food prices started to rise. It was the beginning of a series of spikes in food costs due largely to rising fertilizer prices, increasing fuel costs, the Ukraine war and logistical backlogs. Inflationary pressures subsided somewhat throughout the course of 2022, but from September to December, nearly all low- and lower-middle-income countries (83.3 percent and 90.5 percent, respectively) experienced food inflation above 5 percent.

It seems prices will start to stabilize this year as many of the drivers behind the spikes have started to weaken. The situation is still uncertain, however. Fertilizer supplies remain tight, and the war in Ukraine continues to disrupt grain markets. There are also concerns over poultry supplies as corn prices continue to creep up and the bird flu hits farms across the globe. So despite some promising signs, it could be another tough year for consumers.



Global Food Insecurity | 2022

There is little cause for short-term optimism.

Widespread food insecurity is back on the table. War and organized violence are the main drivers of acute food insecurity, followed by weather events and post-pandemic economic disruption. For some places this is a near-constant problem, but right now there are several new areas experiencing difficulty. In the Americas, for instance, migration, organized crime and abusive government policies have put food security at risk. Ukraine stands out not only for its own food issues but also its role as a provider of food for the rest of the world. In North Korea and Myanmar (and to a lesser extent Sri Lanka), food insecurity could destabilize regimes and cause regional crises.

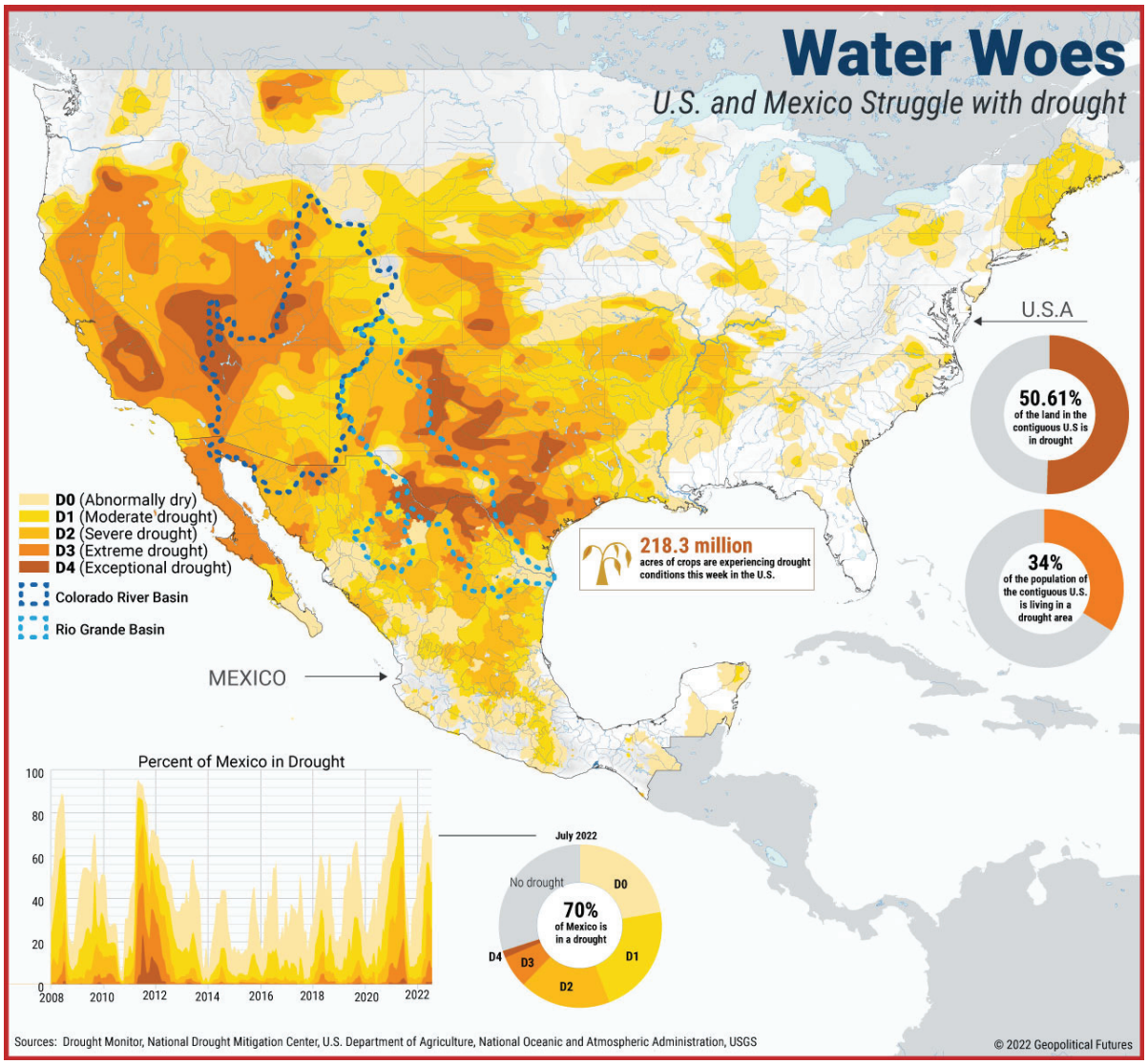
There is little reason to believe the global situation will improve anytime soon. A prolonged Russia-Ukraine war will have lasting effects on local production and grain export infrastructure that will take many months, if not years, to repair. And distortions in the fertilizer market and high prices will also affect crop prices in 2023.

Drought in North America | 2022

U.S.-Mexican cooperation on water sharing works well – most of the time.

Dating back to 1848, water sharing is one of the longest-standing areas of bilateral cooperation between Mexico and the United States. Agreements reached in 1906 and 1944 formalized water cooperation between the two countries, most importantly by regulating water flows and cross-border deliveries of the Colorado and Rio Grande rivers. While this cooperation runs smoothly most of the time, lower water volumes in border rivers, along with periods of intense drought, lead to strained relations. Most recently, disputes broke out in 2020 and 2021. The two countries will revisit the shared water rules next year.

The current droughts in North America have caused concern about economic losses and public water supplies. The U.S. drought area affects states producing wheat, corn and to a lesser extent soy. It also significantly affects cotton production and ranching activities. In Mexico, the government has declared a water emergency in all northern states. At-risk industries include irrigated agriculture, ranching, mining, tourism, bottled beverages and possibly the automobile factories.

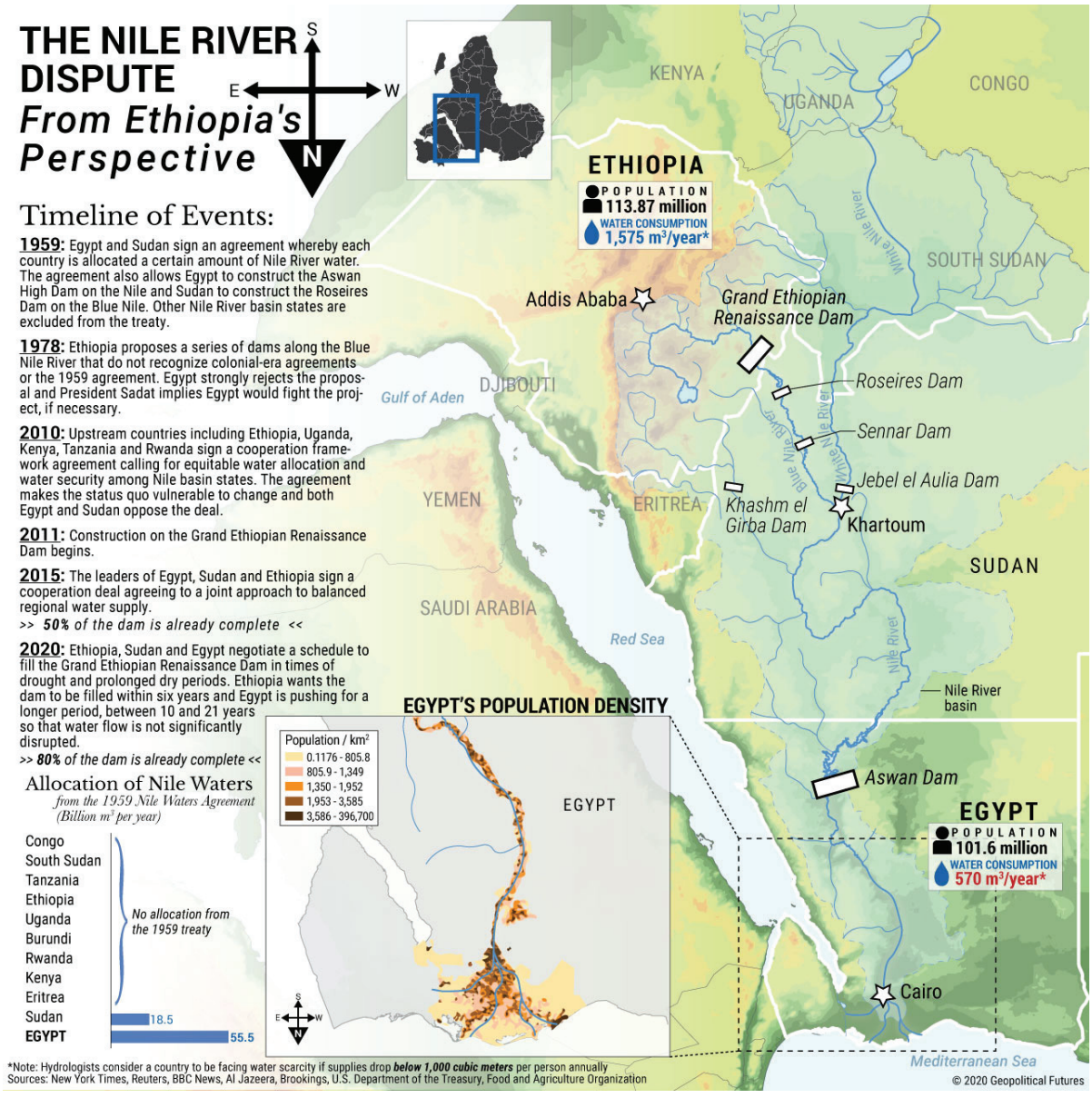


The Nile River Dispute From Ethiopia's Perspective | 2020

The Nile River and its tributaries have served as a lifeline for human civilization in the Nile River basin for centuries. Today, more than 300 million people from Burundi, Congo, Egypt, Ethiopia, Eritrea, Kenya, Rwanda, South Sudan, Sudan, Tanzania and Uganda rely on this river system as their primary source of freshwater. For many of these countries, especially Egypt, ensuring the flow of water through the Nile River is a question of national security.

Cairo is in a very vulnerable position. Ninety-five percent of the freshwater consumed in the country originates beyond its border and is therefore out of its control. Approximately 85 percent of all water that flows through the Nile River in Egypt originates in Ethiopia. This explains why Egypt and Ethiopia – two countries that fought a war over this issue in the 1870s – have historically viewed each other as a threat. Egypt is concerned that Ethiopia may block the flow of water downstream; Ethiopia is concerned that Egypt may compromise its access to freshwater in an effort to secure Egyptian supplies.

Further complicating the issue is the Grand Ethiopian Renaissance Dam, a project that promises to deliver much-needed energy to the region. Talks are currently underway over how to fill the dam and manage water flows in times of drought. The project poses a potential threat to Egypt's water supply and strikes at core security issues for both countries. While talks have been progressing toward a final agreement, the reality of the situation is that the flow of water through the Nile River will remain a point of contention between Egypt and Ethiopia.



Border Disputes in Central Asia | 2021

Resource control is one of the key factors that can lead to conflict in these areas.

After the collapse of the Soviet Union, five independent states were formed in Central Asia, the boundaries of which were artificially established by the Soviet regime without taking into account the ethnic and cultural characteristics of the regions. As the newly independent countries were working to establish their own economies and political institutions, they also had to define and secure their new borders.

One of the most hotly contested areas was the Fergana Valley, which was divided among three states – Uzbekistan, Tajikistan and Kyrgyzstan. In some places, borders have yet to be demarcated, and talks are ongoing. Tensions persist over not just ethnicity but also control over resources. On the latter, one of the biggest areas of contention is water, as states compete for access to supplies from the region's many rivers and canals.

These disputes have often led to armed conflicts. A prime example is the conflict that erupted last week on the Tajik-Kyrgyz border, one of the most difficult boundaries in the region to secure because of its mountainous terrain and multiple nearby enclaves. On April 28, clashes broke out around Vorukh, a Tajik enclave in Kyrgyzstan, between local residents over control of an irrigation canal. The two countries' security forces later got involved.

Conflicts like this – i.e., ones that are confined to a limited area – can threaten the security of a whole country because the territory becomes vulnerable to external threats like terrorism and extremism. They then can become a threat for the whole region including Russia, which is trying to restore its influence in the post-Soviet states while also working to secure its own borders.

PODCAST

Antonia Colibasanu on The John Batchelor Show: The Geopolitics of Water

Water is so fundamental to geopolitics that it is often overlooked. Antonia Colibasanu joins John Batchelor to discuss this finite resource, and how many countries like China, Pakistan, and Iran will need to take measures in the coming year to prevent crises. In the second segment, updates on Russia's invasion of Ukraine as the 101st Airborne is deployed into Constanţa.

Warnings of water crisis across Eurasian World Island

PODCAST+

The Geopolitics of Natural Disasters

What are the geopolitical impacts of natural disasters? Director of Analysis Allison Fedirka and Chief Operating Officer Antonia Colibasanu join host Christian Smith to discuss the recent earthquakes in Turkey and Syria, last year's flooding in Pakistan, and the ongoing drought in Argentina.

Geopolitics of Natural Disasters

MISSION STATEMENT

Geopolitical Futures understands the world through the rigorous application of geopolitics: the political, economic, military and geographic dimensions that are the foundation of nations. The imperatives and constraints contained in these define the nation. We study the past to understand the future. At its core geopolitics assumes, as does economics, that events are governed by these impersonal forces and not by individual whim or ideology.

Geopolitical Futures is rigorously non-ideological. Our staff may have their personal beliefs, but they must check them at the door. Therefore, we strive to be objective and indifferent to the opinions swirling around the world. We believe that liberal democracy can survive only if there is a segment of society, which we call the learned public, who is not caught up in the passions of the moment, but is eager to look at the world as it is. It is this learned public that will influence the political system toward the prudence that flows from understanding, and whom we serve with the methods we have developed.

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