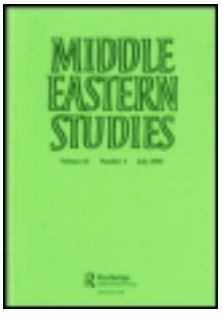

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The Role of Drought and Climate Change in the Syrian Uprising: Untangling the Triggers of the Revolution

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More than two years after the first protests in the rural town of Dara'a in March 2011, what started as a peaceful uprising against the regime of President Bashar al-Assad in Syria has degenerated into a bloody conflict. In July 2013, the United Nations (UN) estimated that more than 100,000 people had died since March 2011, while millions of officially registered and unregistered refugees are scattered from Egypt to Turkey and beyond, and an estimated 4.25 million people are internally displaced.

The uprising in Syria took many, including many Syrians, by surprise. They looked on in admiration as Tunisians, Egyptians, Libyans and Yemenis took to the streets to demand freedom, justice and the fall of their respective regimes, but largely agreed that nothing like that would ever take place in Syria. Yet less than two months after Bashar al-Assad had told the *Wall Street Journal* that Syria was immune to the wave of protests sweeping through the region,[1] inhabitants of Dara'a, Homs, Hama and other provincial towns poured into the streets demanding freedom, dignity and an end to corruption, in what has been described as a 'rural and rurban Intifada'.[2]

As in other Arab countries, the uprising in Syria was triggered by a series of social, economic and political factors, including, in this case, growing poverty caused by rapid economic liberalization and the cancellation of state subsidies after 2005, a growing rural–urban divide, widespread corruption, rising unemployment, the effects of a severe drought between 2006 and 2010 and a lack of political freedom.[3] More recently, media and analysts have also suggested that climate change plays an indirect role in the Arab Spring and the Syrian uprising.[4]

All these elements are connected and have mutually influenced each other, making it difficult to untangle the importance of different 'triggers' or identify any single one as the definitive 'last straw that broke the camel's back'. As a result, there is a tendency to take certain events out of context and misinterpret or overstate their significance in relation to the current events unfolding in Syria.

This article attempts to contextualize the 2006–10 drought and place it in the broader framework of (a) the economic reforms and market liberalization that were initiated in the 2000s as part of Syria's transition to a social market economy, (b) the

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recent history of agricultural development and water management in Syria and the large-scale mismanagement of resources over the last 50 years and (c) the Syrian regime's failure to acknowledge and address the impact of this mismanagement. The article is based on extensive research that was carried out in Syria between 2006 and 2010, including fieldwork in the Jezira region in 2008 and 2009, interviews with Syrian officials and interviews with migrants who left drought-affected areas and settled temporarily in Damascus, Damascus Countryside and Dara'a governorates in Syria and in the suburbs of Beirut and the Mount Lebanon region in Lebanon. This data was complemented by information from the literature, reports from UN agencies and media reports.

I will argue that it was not the drought *per se*, but rather the government's failure to respond to the ensuing humanitarian crisis that formed one of the triggers of the uprising, feeding a discontent that had long been simmering in rural areas. Drought forms an integral part of Syria's (semi-)arid climate and is not an exceptional phenomenon. Countries in the region such as Iraq, Israel, Jordan, Lebanon and Palestine were also affected by drought in 2007/8, but only Syria experienced a humanitarian crisis, with large-scale migration of populations and widespread malnutrition. I will argue that this can be explained by the fact that the humanitarian crisis in fact predated the drought.

Similarly, climate change *per se* – to the extent that its predicted effects would already be visible – did not drive Syrians into the street in protest; it was the Syrian government's failure to adapt to changing environmental, economic and social realities.

While climate change may have contributed to worsening the effects of the drought, overstating its importance is an unhelpful distraction that diverts attention away from the core problem: the long-term mismanagement of natural resources. Furthermore, an exaggerated focus on climate change shifts the burden of responsibility for the devastation of Syria's natural resources away from the successive Syrian governments since the 1950s and allows the Assad regime to blame external factors for its own failures.

The drought hit hardest in the north-east, a region that was on the one hand the most impoverished and neglected part of the country, but which was also the country's breadbasket and source of oil. Since 2000, this region has been rapidly sinking further into poverty as groundwater reserves were depleted and a series of overambitious agricultural development projects overstretched both land and water resources. The drought that struck in 2006 merely formed a final *coup de grâce*. It was not a sudden, catastrophic event; it merely exacerbated an already disastrous situation. It did not trigger a humanitarian crisis; it merely highlighted the rising poverty levels and accentuated a series of trends that had been taking shape for decades. The humanitarian crisis that followed the 2006–10 drought can thus be seen as the culmination of 50 years of sustained mismanagement of water and land resources, and the dead end of the Syrian government's water and agricultural policies. The extent to which climate change exacerbated the situation is debatable, but in any case should not reduce the burden of responsibility on the Syrian government.

The Syrian climate is characterized as arid to semi-arid, with broad variations in precipitation levels between the Mediterranean coast in the west ($\leq$1,400 millimetres per year) and the eastern desert areas (<200 millimetres per year). Fifty-five per cent of

the country is covered in desert and steppe land; annual precipitation in more than 90 per cent of the country lies below 350 millimetres.

Drought forms a structural part of this (semi-)arid climate, with cycles of wet and dry years. Over the last 50 years, from 1961 to 2009, Syria experienced nearly 25 years of drought, which represents over 40 per cent of the period. On average, the droughts lasted around four and a half years each, though a drought in the 1970s lasted ten consecutive years.[5] A number of droughts of two or more years had a significant impact on agricultural production and livestock in the country's north-east: a drought in 1961 resulted in the loss of 80 per cent of the camel population and 50 per cent of sheep. In the 1998–2001 drought, 329,000 people (47,000 nomadic households) had to liquidate their livestock assets, suffered food shortages and required urgent food assistance, which was 'not an exceptional occurrence'.[6]

The link between climate change and drought in the Eastern Mediterranean region and in Syria has been highlighted in a number of studies based on climate models, which predict that the effects of climate change will lead to more frequent and harsher droughts, higher temperatures and lower and more unpredictable precipitation levels.[7] However, other analysts point out that there is very little solid evidence to date of such changes. 'The only available evidence that global warming will lead to more extreme weather events relies on modeling. Data do not really sustain this hypothesis so far.'[8]

Data collected in Syria shows that the overall frequency of droughts had not increased over the last 20 years, except in one of Syria's five agricultural zones. Yet farmers and Bedouins in affected areas perceived an increase in droughts. 'One possible explanation is that the impacts of droughts may have become more severe due to higher population densities and groundwater depletion. [. . .] Therefore, even for the same severity of drought, the socioeconomic consequences can be much greater than that in the past.'[9] Farmers in the Jezira region interviewed in 2009 complained about the increase in hot sand storms, which 'burnt' their crops. They explained this new phenomenon by the desertification of steppe land in Syria's eastern governorates. Far from being a result of diminishing rainfall and climate change, this rapid desertification can be explained by the massive overgrazing of Syria's steppe lands following the nationalization of the steppe and the abolishment of tribes in 1958.[10]

According to conservationist and ecologist Gianluca Serra, who worked on various conservation projects in the Syrian steppe from 2000 to 2010, 'the vegetation in the desert naturally adapts to droughts and wet periods. If the ecosystem is healthy, the vegetation can deal with prolonged droughts'.[11] Experiments carried out over a period of ten years in Al Talila Reserve, Syria's first nature reserve, in the eastern desert conclusively showed that the mismanagement and overexploitation of resources lay at the root of desertification, not drought or climate change. Between 2000 and 2010, researchers created protected enclosures where grazing was forbidden or controlled (grazing of antelope rather than sheep) as opposed to all the surrounding areas where intensive grazing of sheep was allowed as elsewhere in the steppe. The vegetation in the enclosures fully recovered, creating green pastures, while outside the reserve the desert continued to spread.[12]

> This refutes the claim that it is climate change or drought. [. . . Decision makers] can't hide behind external causes like climate change and droughts. Mismanagement and unsustainable regulations have allowed for the over-exploitation of

> natural resources. [. . .] These ecosystems have a major economic value so combating desertification is important for the national economy. Not to mention that desertification in many parts of the world has fuelled socioeconomic conflict and wars because when people start to starve, tension rises. It should be taken very seriously.[13]

The extent to which climate change played a role in triggering the Syrian uprising is the topic of growing debate. Writing about the Arab Spring in general, one analysis argues that while climate change did not cause conflict or unrest on its own, it played a significant role as a 'threat multiplier'.[14] However, it also underlines the complexity of predicting the future impact of climate change, not only on the environment but also on social and political unrest or conflict. 'The very complexity and multiplicity of the possible paths of which climate change is but a small part makes prediction impossible. Any role that climate change plays in certain events can only be discerned after the fact, and its increased contribution to threats cannot be quantified'.[15]

In the case of Syria, where there are so many other evident causes of the current conflict, it seems unproductive to focus on the possible role of climate change in the uprising, or indeed in possible future conflict. Climate change may cause more frequent and harsher drought in Syria, but the ongoing failure to rationalize water use and enforce environmental and water use laws certainly constitutes a much greater threat to the country's natural resources. Rather than seeing the 2006–10 drought in north-eastern Syria as a harbinger of catastrophic climate change and conflict scenarios, it should be considered on the backdrop of years of mismanagement, unsustainable policy making and rising rural poverty, which fuelled pre-existing discontent and sparked the first protests.

While the 2007/8 season registered as the worst regional drought in 40 years, the overall impact of the 2006–10 drought in north-eastern Syria was undoubtedly exacerbated by a long legacy of resource mismanagement.

During the 2007/8 season, average rainfall across Syria dropped to 66 per cent of the long-term average, with some regions receiving no rain at all. The drought also affected Iraq, Israel, Jordan, Lebanon and Palestine.[16] Syria's north-east received less than half of the long-term average in rainfall, with the governorates of Hassakeh, Deir ez-Zor and Raqqa registering shortfalls of 66 per cent, 60 per cent and 45 per cent respectively.[17] As a result, average yield of basic crops dropped by 32 per cent in irrigated areas and as much as 79 per cent in rain-fed areas. Wheat and barley yields dropped by 47 per cent and 67 per cent respectively compared to the previous year. The consequences for national agricultural production were devastating: the 2007/8 wheat harvest came in at 2.1 million tonnes, compared to the long-term average of 4.7 million tonnes (of which 3.8 million tonnes was consumed internally), forcing Syria to import wheat for the first time in 15 years.[18]

The pattern of poor rainfall continued in parts of the country in 2008/9, particularly in the north-eastern governorates of Deir ez-Zor, Hassakeh and Raqqa. It is important to note, however, that rainfall in other regions largely recovered by 2008/9. Specifically, many media reports after 2011 erroneously stated that the governorate of Dara'a, where the first protests started, had been severely affected by the four-year drought.[19] However, precipitation levels in this governorate recovered to average levels

in 2008/9 and exceeded the average in the 2009/10 season.[20] This also explains why farmers from the north-east migrated to this region to find work after 2008. The population of Dara'a initially took to the streets to protest against the arrest of 15 children in March 2011 and later demonstrated against corruption,[21] notably in the domain of well licensing and groundwater use.

In 2009/10, rainfall levels recovered across the country, though the north-east was plagued by irregular rainfall patterns, with 55 consecutive days without rain during the crucial months of February and March, after good rainfall at the beginning of the rainy season. In addition, farmers producing soft wheat on irrigated land suffered widespread losses in their crop due to an outbreak of yellow wheat rust, a fungal disease, which spread rapidly owing to the previous years of drought.[22] As a result, the 2009/10 wheat crop came in at 3.2 million tonnes, well short of the 4–5 million tonnes predicted by the government.[23]

The consecutive years of drought had a heavy impact on rural populations throughout the country, but particularly affected farming communities in the north-eastern governorates. Broadly known as the Jezira,[24] this region has long been among the country's least developed. Documentary films such as Omar Amiralay's *Everyday Life in a Syrian Village*, *A Flood in Baath Country* and Reem Al-Ghazzi's *Lights* paint a vivid picture of the extreme poverty that existed among rural communities in this region before 2006 and the impact of large-scale dam construction on the Euphrates River since the 1970s. Despite the fact that the Jezira harboured the country's oil supplies and provided staple agricultural crops such as wheat and barley, it had a high poverty rate, low level of healthcare, high illiteracy and few economic alternatives to agriculture.

Figures from 2004 show that the north-eastern region (governorates of Aleppo, Deir ez-Zor, Hassakeh, Idleb and Raqqa) had the greatest incidence, depth and severity of rural and urban poverty, with 58.1 per cent of Syria's poor concentrated in the region. This region also had the highest percentage of people living under two dollars per day in Syria (8.53 per cent and 21.59 per cent for the urban and rural areas, respectively). And while poverty rates decreased in other parts of Syria between 1996/97 and 2003/4, they rose in rural parts of the north-eastern governorates.[25]

The 2006/10 drought exacerbated this trend. According to several UN assessments between 2008 and 2011,[26] 1.3 million people were affected by the drought, with 800,000 people 'severely affected'.[27] As the drought extended into a second and third year, the population was less and less able to cope: with no crops for two consecutive years, farmers no longer had seeds, while herders were forced to sell or slaughter their flocks due to a lack of pasture and fodder.[28]

Malnutrition, which was already widespread in the impoverished north-east, rapidly increased, with up to 80 per cent of those severely affected surviving on a diet of bread and sugared tea.[29] Data from the three worst-affected governorates indicated a drastic increase in nutrition-related diseases between 2006 and 2010, with 42 per cent of six- to 12-month-old children suffering from anaemia in Raqqa governorate. In 2010, the UN estimated that 3.7 million people, or 17 per cent of the Syrian population, were food insecure, which included more than 2 million people who were living in extreme poverty in 2003/4.[30]

As the drought continued into its second and third year and the affected populations became increasingly vulnerable, the Syrian government cancelled a number of

state subsidies in 2008 and 2009, which multiplied the price of diesel fuel and fertilizer overnight. For many farmers in the Jezira and elsewhere in the country, this formed a greater burden than the successive years of drought and spurred their decision to abandon their land.

Hinnebusch gives a clear explanation of why Bashar al-Assad's attempt to open the Syrian economy to the world market through a progressive transition from a centrally planned economy to a 'social market economy' failed and, ultimately, led to the 2011 uprising.[31] In the agricultural sector, deregulation measures since 1986 had led to the phasing out of certain subsidies and other forms of support for farmers. This movement was accelerated under the 10th Five-Year Plan (2006–10) in a bid to integrate the Syrian economy into the global system and prepare the country for accession to the World Trade Organization. The move to cut Syrian dependency on subsidies was necessary from an economic point of view given the growing budget deficit. However, the lack of social safety nets left many in the agricultural sector unable to cope.

According to official figures, agriculture employed 19.5 per cent of the country's workforce in 2005/6.[32] However, others estimate the figure at 40–50 per cent, particularly given the growing proportion of the workforce employed in the informal sector.[33] The liberalization of the agricultural sector after 2000 led to a significant decrease in agricultural jobs. Estimates based on Syrian labour force surveys showed that 460,000 active people stopped working in the agricultural sector between 2001 and 2007, representing a 33 per cent decrease in jobs in this sector (and 10 per cent of the total labour force), while agricultural GDP rose by 9 per cent. Most jobs were lost in 2003 and 2004, two years not affected by drought.[34]

The cancellation of the subsidy on diesel fuel in May 2008 pushed prices up overnight from SYP7 ($0.14) to SYP25 ($0.53).[35] Farmers in Syria use diesel to extract groundwater for irrigation and pump surface water to their fields, but also to transport their goods to market afterwards. Seen from a purely environmental point of view, the move to abolish subsidies was entirely justified given the alarming state of the country's groundwater reserves that have been largely depleted since the introduction of diesel motor pumps in the 1960s.[36] But the price hike, which came just weeks before the harvest, forced many farmers in the north-east to stop irrigating their already meagre crop. Others were able to continue irrigating until the harvest, but were subsequently unable to transport their produce to market. Younes Berho, a farmer from the Raqqa region, fed his red pepper crop to his sheep in 2008, as he could not afford the price of transport to the market in Aleppo following the subsidy cuts. Many farmers who abandoned their land and left the Jezira in 2008/9 echoed Berho's experience.

In May 2009, the price of chemical fertilizer was also liberalized and prices doubled from SYP450 to SYP900 ($9.60 to $19.15) per 50 kilo, worsening the plight of farmers.[37] The average monthly salary in Syria in 2009 was $242, but most farmers earned significantly less than this, with 30 per cent of workers in the agricultural sector earning $109 or less.[38]

Following the subsidy cuts in 2009, farmers and herders from the north-east massively abandoned their land and migrated to urban areas and the southern governorates in search of work. While seasonal migration – particularly of men seeking work in the construction industry in Aleppo, Beirut and Damascus – has long been common

in rural areas, migration of whole families was a relatively new phenomenon. For example, families who lost their lands after the construction of the Tishrin Dam on the Euphrates in 1999 migrated to the Damascus suburb of Al-Hammouriyeh and were still living there in tents in 2009. Dozens of drought victims settled in a tent camp in Mzeirieb near Dara'a from 2008 onwards, but inhabitants of the camp and their relatives in the north-east said the camp had existed for more than ten years. The drought just meant it had expanded.

While no exact figures exist, UN agencies estimated that up to 65,000 families or around 300,000 people migrated from the north-east,[39] and that 60–70 per cent of villages in the governorates of Hassakeh and Deir ez-Zor had been deserted in 2009.[40] In reality this figure is likely to have been a lot higher as no comprehensive study was ever carried out on the number of internally displaced people and the figures did not take into account workers and families who crossed to Lebanon. The migrants settled in makeshift illegal tent camps scattered around the Damascus and Aleppo suburbs and southern governorates and sought work in agriculture, construction or small industry, earning SYP200–400 ($4.25–8.50) a day.[41] The tent camps, which had no water, sanitation or electricity, varied in size from one or two tents to up to 80 tents. Tents were patched together from old burlap sacks and pieces of plastic.

After initially ignoring the mounting crisis, officials acknowledged that the drought had pushed up food prices and put pressure on basic food supplies,[42] forcing Syria – a net exporter of wheat since the 1990s – to import wheat for the first time in 15 years in 2008.

Faced with a worsening humanitarian situation in the north-east, the government launched two drought appeals in conjunction with UN agencies in September 2008 and August 2009 to help finance a series of short-, medium- and long-term aid and development projects. However, the 2008 Syria Drought Appeal received just 20 per cent of the $20 million requested, while the 2009 Syria Drought Response Plan[43] received just 33 per cent of the requested $43 million.[44]

The drought appeals primarily targeted populations of the governorates of Deir ez-Zor, Hassakeh, Homs and Raqqa. Migrants to the southern governorates received no aid from the government or international aid agencies. Moreover, the Syrian security forces discouraged private Syrian initiatives to help the migrants. In July 2009, the United Nations Children's Fund (UNICEF) carried out an assessment of 25 tent camps in the Damascus suburbs with a Syrian NGO, but no results of the mission were published, and neither the government nor aid agencies followed up with any concrete aid plan for the displaced populations.[45] Instead, migrants were 'encouraged' to return to their drought-stricken lands in the north-east, in exchange for cash handouts, transport assistance or the promise of food aid upon return to the north-east. Needless to say, few took up this offer. No aid was provided in the tent camps themselves.[46]

The shortfall in funding for the two drought appeals was closely related to the government's efforts to downplay the extent of the crisis. The donor community was largely unaware of the humanitarian crisis unfolding in the country's north-east and donors complained of a lack of clarity regarding the government's long-term strategy to cope with the effects of drought.[47] For instance, some questioned why the Syrian government's national drought strategy, which had been under preparation since

2000 and was officially approved in 2006, was not put to use during the drought period.[48]

There was also disagreement within the government, with the minister of irrigation questioning the severity of the drought in November 2009.[49] In general, the government was keen to uphold the image of Syria as a self-sufficient producer of wheat and other key staples and to avoid any closer examination of the deeper causes of the humanitarian and environmental crisis that was spreading from the north-east to southern governorates. It severely restricted media coverage and sought wherever possible to frame the worsening situation in the broader context of the global food crisis, financial crisis and climate change, portraying Syria as a victim of external factors and natural disasters beyond its control.[50]

Syrian state media outlets largely omitted any coverage of the drought and its economic and social repercussions. Coverage highlighted agricultural production achieved *despite* the lower rainfall and denied local water shortages.[51] The only reference to the drought occurred in articles discussing global or regional climate change, where 'decreased rainfall in Syria' was mentioned as an example of the effects of global climate change.[52]

Syrian private media dedicated more space to coverage of the drought and its victims, but largely failed to place them in the context of years of resource mismanagement.

After June 2009, foreign media was severely restricted in its coverage of the crisis and journalists who obtained a journalist visa were banned from visiting the governorates of Damascus Countryside, Dara'a or Suweida, where the majority of the tent camps had sprung up. Accompanied by 'guides' and 'translators', foreign journalists were instead taken to Hassakeh and Raqqa governorates where they were allowed to interview villagers under supervision. Few were able to obtain interviews with Syrian government officials.

The government's response to the drought – attempts to downplay it and subsequently deny the humanitarian crisis or blame it on externalities – is part of a mindset that influences all aspects of policy making and implementation in the Syrian water sector. As in many other countries in the water-scarce Middle East–North Africa (MENA) region, water is considered a strategic resource that pertains to national security. As a result, accurate and up-to-date information on water availability and use is not readily available to the general public.

However, in Syria the fixation on water as a 'sensitive' issue has extended far beyond strategic considerations and covers all levels of water management. Water has become a taboo that is reluctantly discussed, not only in the public domain but also at government level. The idea that water is, and should remain, 'sensitive' goes unquestioned. As a result, government officials, water experts and analysts avoid any deeper analysis of the state of the country's water resources. This in turn means that any efforts to reform the sector remain cosmetic.

In the context of the uprising in Syria, political scientist Marwan Kabalan wrote in 2012 that 'Syria has two power structures: the official powerless one and the real one'.[53] He describes how the former comprises all the institutions of a modern state, including a cabinet, parliament, ruling party and bureaucracy, while the latter is made up of just a small group who make key decisions behind closed doors. Similarly, the Syrian water sector operates in two realities. On the one hand there is the

official narrative, a facade, which portrays Syria as a naturally water-scarce country actively working to 'modernize' its water sector,[54] and on the other there is the reality on the ground of an inefficient, corrupt and rigid water management system that has enabled large-scale overexploitation of water and land resources and engendered growing poverty and disenfranchisement among rural communities.

The official narrative portrays Syria as increasingly water stressed due to a range of extraneous environmental and socioeconomic factors such as climate change, desertification (due to climate change), unequal distribution of water resources, seasonal variations in rainfall and population growth. However, it also admits that Syria's water sector faces a series of institutional challenges. In doing so, the government instantly neutralizes any criticism of its land and water use policies, as it can simply counter that it is addressing these issues but that it 'takes time'. By acknowledging that irrigation systems need to be modernized, urban networks need to be renewed and institutional structures simplified, the government creates the impression that it is committed to 'modernization' and that it is both a responsible and a responsive actor.

Thus the Syrian government operates on the surface, going through the motions of managing the country's water resources, with little concrete result or proof of lasting change on the ground. In the long run, water and its management become almost abstract concepts that have little connection to reality and the rapidly worsening state of the country's water resources. The institutional water management framework is a fictional arena where plans are outlined on paper but never followed through, goals are set but never achieved, and the minister of water can boast of 'an excellent water resources management system',[55] while aquifers are depleted and pollution levels soar. This dynamic is reinforced by the culture of secrecy and the 'sensitivity' of water described above, which has engendered widespread self-censorship across the Syrian water sector and among those working with it.

The official narrative does not correspond to the reality of a deeply dysfunctional water sector, which is incapable of reform or change as long as basic issues such as inaccuracy and incompleteness of data, lack of human resources, opaque financial governance and lack of accountability are not comprehensively addressed. The existing structure makes such an overhaul impossible as the 'sensitivity' of water precludes any substantial discussion on the legacy of 50 years of agricultural and water resource mismanagement.

As in many countries in the MENA region, water policy in Syria has since the 1950s been driven by a supply-side approach with a specific focus on dam construction and irrigation projects in the north-east of the country.[56] The relentless drive to increase agricultural output and expand irrigated agriculture blinded policy makers to the natural limits of the country's resources. Unrealistic agricultural targets, corruption, a failure to implement and enforce legislation, and the absence of a long-term strategy have thus devastated a region that was considered a breadbasket for Syria and the region.[57]

Over the past 60 years, Syria's agricultural sector has undergone intensive development, particularly in the north-east of the country. The country's irrigated area has doubled over the past 20 years from 651,000 hectares in 1985 to 1.35 million hectares in 2010.[58] Sixty per cent of this surface area is irrigated with groundwater, which is being extracted at an unsustainable rate. Ninety per cent of the country's

water goes to agriculture, by far the highest percentage in the region, with very low irrigation efficiency. Over 80 per cent of irrigated land is still irrigated through traditional flooding methods and losses in the open concrete government irrigation canals range from 10 to 60 per cent.[59]

Growing demand and the continued drive to expand the irrigated area has created a water deficit. Syria's total available water resources for use were estimated at 15.6 billion cubic metres in 2007. Total average annual water withdrawal in the same year was 19.2 billion cubic metres. The resulting 3.59 billion cubic metres deficit was compensated with water from dam reservoirs and groundwater reserves. Syria's per capita water availability had dropped to 882 cubic metres per year in 2007, classifying it as a water-scarce country.[60] While the official narrative hastens to point to external factors such as population growth, worsening drought conditions and climate change, the absence of a long-term national water management strategy and overambitious agricultural policies should not be overlooked.

Like elsewhere in the region, Syria's population has grown rapidly over the past 60 years, rising from 3.3 million in 1950 to approximately 21.4 million today, with 53 per cent of the population living in urban centres. This explosive growth is the direct result of a strong pro-natalist policy launched in the 1950s, which led to an official ban in the trade and use of contraceptives in the 1970s.[61] Syria's annual average population growth rate remains among the highest in the region at 2.94 per cent, down from around 3.75 per cent in the 1970s. The population is expected to increase to 37 million by 2050.[62]

According to the official narrative, the strong drive to develop irrigated agriculture is linked to the demands of a growing population and the desire to achieve food self-sufficiency. Yet the national wheat production target of 4–5 million tonnes per year exceeds internal demand, while cotton – clearly a non-food crop – accounts for the greatest share of total irrigation water after wheat. 'Hence the scarcity in water resources which Syria faces is far from a "natural" characteristic of the country's limited resources and growing population.'[63] Despite the water deficit, and extensive proof that much of the land in the north-east is in the long term unsuited to intensive irrigation,[64] expansion of the irrigated area through land reclamation remained official government policy, with over 400,000 ha earmarked for reclamation in Deir ez-Zor and Hassakeh governorates in 2011.[65]

The culture of secrecy around water has engendered a chain of mechanisms that weakens the system. First of all, the obsession with the 'sensitive' nature of water has resulted in a lack of transparency. On a governmental level, the perceived 'sensitivity' of all water-related topics means that data sharing between and within ministries and research institutions is limited and fraught with bureaucratic procedure. Different ministries and government research bodies do not freely share data, and data are not shared between governorates. In many cases, different ministries use different methods to assess the state of the country's water resources, resulting in a cacophony of contradictory data sets.[66] This general confusion makes it impossible to articulate, let alone implement, a coherent national water policy.

This situation is not helped by the sector's arcane institutional framework. The system is trapped in a colossal bureaucratic structure with 22 ministries, councils, commissions and directorates directly and indirectly involved in water management.

Often these bodies have overlapping responsibilities but there is little coordination between them.[67] Hinnebusch describes the agricultural management system under Hafez al-Assad (1963–2000), which was narrowly linked to the country's water development strategy, as not only bureaucratic and fragmented, but also fraught with rivalries between the different ministries.[68] This situation has remained largely unchanged since Bashar al-Assad took over in 2000.

The problem of conflicting, outdated and inaccurate data is worsened by a widespread lack of capacity in the water sector. The majority of staff in the ministries of Agriculture and Irrigation has barely finished secondary school and only a small minority has a university degree. Of the multiple bodies administering the water sector, the Ministry of Agriculture and Agricultural Reform is the largest employer, followed by the Ministry of Irrigation and its water establishments. These institutions have very few educated staff, with 40–60 per cent of employees having only completed preparatory school or lower.[69] Moreover, low salaries in senior positions, clientelism and nepotism within the ministries have encouraged corruption.[70]

The lack of transparency, corruption and absence of reliable data leads to a lack of accountability. Ambitious policies are drafted on paper, but never implemented; special committees are formed to 'study' various aspects of sector modernization, but final reports are never produced; studies are carried out, but never followed up on; laws are issued, but inconsistently enforced. This has enabled years of unsustainable management.

The government's inability to implement water policy and enforce law is perhaps most clearly exemplified in its failure to address the continuing depletion of the country's groundwater reserves, resulting in widespread over-extraction and depletion of aquifers. Traditionally, most farmers living in areas removed from the major rivers relied on seasonal rainfall to water their crops. They used shallow hand-dug wells to draw up groundwater manually, which they used for drinking water and domestic purposes only. As extraction levels were low, the groundwater was naturally replenished during rainy periods.

The large-scale introduction of diesel motor pumps in the 1960s, however, led to a rapid drop in groundwater levels. From the 1970s to the end of the 1990s, farmers across the country drilled hundreds of new wells and massively expanded the areas irrigated by groundwater.[71] The number of wells is estimated to have increased from around 135,089 in 1999 to over 229,881 in 2010.[72] Fifty-seven per cent of wells were unlicensed in 2010. During the 1980s and 1990s withdrawal rates were approximately five times higher each decade than they had been in previous decades. In the worst-affected areas, such as Mhardeh in Hama governorate and Khan Shaykhun in Idleb governorate, the over-pumping led to a drop of up to 100 metres between the 1950s and 2000.[73] The huge increase in groundwater use had similar effects in many other areas. In the period between 1993 and 2000, groundwater levels in the Damascus Ghuta and its surroundings dropped by more than 6 metres per year in certain areas.[74]

Far from acknowledging the limits of the resource during the 1980s and 1990s, the government encouraged the large-scale expansion of groundwater-irrigated areas and supported the digging of new wells for cotton cultivation.[75] Farmers had easy access to advantageous loans to drill wells and install pumps, and fuel prices were heavily subsidized, making it inexpensive to extract water, even from great

depths. In addition, the licensing and monitoring of wells was poorly organized and thousands of new wells were sunk without government licences during the 1980s and 1990s.

In the late 1990s the government issued a decree demanding the licensing of all illegal wells by 2001 – a measure which had little concrete effect. Later, the 2005 Water Law outlined various measures to improve water resource protection, license wells and better regulate drilling procedures, with a commitment to punish violators with fines and prison sentences.[76] The government required well licences to be renewed annually to allow for the monitoring of groundwater levels. However, this engendered widespread corruption as security personnel or local officials forced farmers to pay bribes for new licences, which in turn triggered strong resentment in rural areas.[77] The widespread corruption also meant that the number of wells continued to increase despite the new law.

Poor understanding of sustainable groundwater use coupled with a weak legal framework and failure to enforce laws has led to depletion of aquifers across the country. Aquifers in large parts of Hassakeh governorate, which was heavily settled and cultivated from the 1970s on, are depleted,[78] with large-scale migration from the land since the late 1990s. Massive over-pumping has led to the drying up of many springs, while most wells and shallow aquifers have been depleted. The Khabur River no longer flows in summer since 1999 and one of the largest karst springs in the world, the Ras al Ain Springs on the Syrian–Turkish border, has disappeared completely since 2001 following extensive over-extraction in the spring catchment area over the last 50 years.[79] The area of Nebk north of Damascus, which used to be renowned for its vines and wheat fields, has turned to desert following extensive overexploitation of groundwater. In 2009, farmers there worked as real-estate developers.

It is important to consider the 2006–10 drought and its possible role in triggering the 2011 uprising in the broader context of 50 years of resource mismanagement, rapid economic liberalization, the abrupt cancellation of state subsidies and the government's failure to address a humanitarian and environmental crisis that had been taking shape for more than a decade.

The Syrian uprising that started in March 2011 was sparked by a series of interrelated social, economic and political factors. While it is tempting to include 'drought' and 'climate change' in this list of triggers, it is important to keep a clear view of the correlations between the different causes and effects of events: 50 years of resource mismanagement and overexploitation caused the depletion of resources, which in turn led to growing disenfranchisement and discontent in Syria's rural communities. The 2006–10 drought exacerbated an already existing humanitarian crisis. The government's failure to adequately respond to this crisis was *one* of the triggers of the protests that started in March 2011, along with a host of political, economic and social grievances.

The possible role of climate change in this chain of events is not only irrelevant; it is also an unhelpful distraction. In the context of the future of water management in Syria, it distracts from much more tangible and real problems; in the context of the uprising, it strengthens the narrative of the Assad regime that seizes every opportunity to blame external factors for its own failings and inability to reform.[80]

Notes

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