Why Water Issues Are Crucial to Stability in the New Syria[1]

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SUMMARY

When one looks at the last situation of the Syrian map, it can be seen that the Islamic State is squeezed out of its strongholds in Mosul and Raqqa and witnesses a steady decline in the influx of foreign fighters. As of 2017 July IS has lost 60% of the territory, 80% of revenue This brings any other important question: what is next for ISIS?

Will it continue to retain control of several urban centers in the region—or will it disband and devote its complete attention to external operations and attacking Europe and the West?

Balanche pointed out a very crucial issue in his article *(2)* while it has been out of mind during this chaotic civil war situation. After a six-year civil war, regardless of who controls the Euphrates Valley agricultural zone next, they will need to address the legacy of failed regime irrigation policies that are once again creating tension among local tribes

Major offensive military movements in eastern Syria have taken place to eradicate the Islamic State (IS) presence in the area. The Syrian army is advancing toward Deir al-Zour and Tabqa with the help of Russian aviation, while U.S.-supported Kurdish and Arab fighters under the flag of the Syrian Democratic Forces (SDF) are closing in from the North. (2).

Ousting ISIS from its de facto capital of Raqqa may not be too far behind. Last month, Lieutenant General Stephen Townsend, commander of Operation Inherent Resolve, said that he hoped the assault on Raqqa would be “underway by this summer” and would be surprised if it continued into next year. In many ways, while the battles against ISIS in Mosul and Raqqa may soon reach their conclusions
Military expert explanations indicate that time has come to prepare for "the day after IS" in the Euphrates area. After IS, it is clear that various economic issues will play a very key role in

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local political stabilization. Regardless of who controls the area next -- whether the Assad regime, the SDF, or other players -- they will face the problem of water scarcity, which has long driven the area's political and economic dynamics.

It seems that change is inevitable and the region must prepare for it. In this article, we explained the current situation and threats to draw attention to crucial water issues.

Keywords: Middle East, Syria, Divided Syria, New Syria, Euphrates River

1. INTRODUCTION

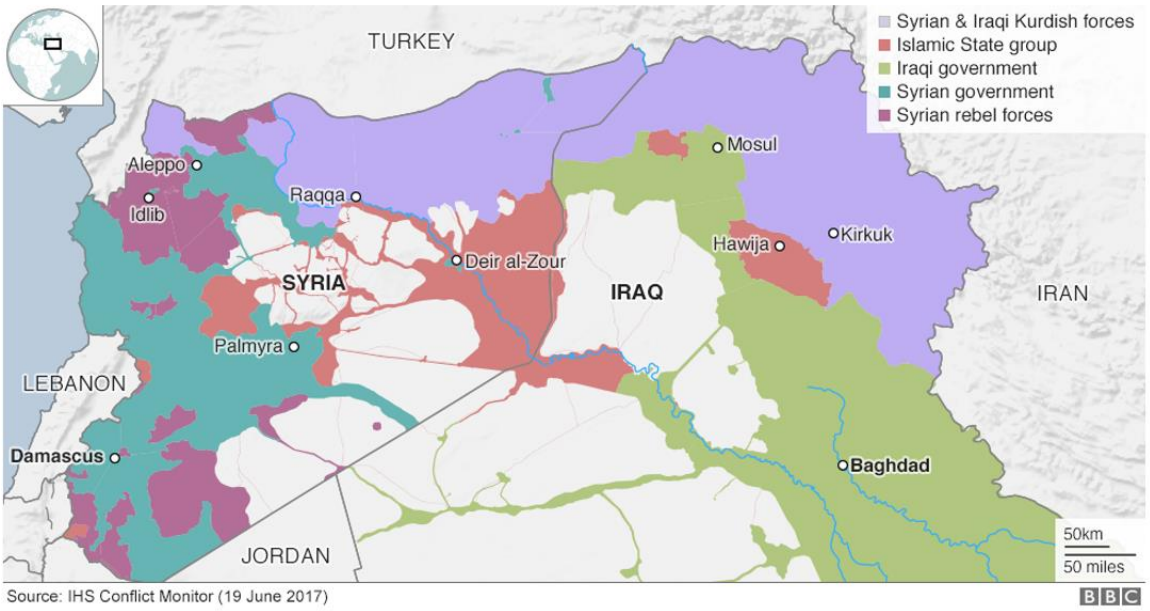

Figure 1. The controlled areas in Syria as of July 3, 2017.

As shown in Figure 1, the Islamic State group has lost more than 60 percent of its territory and 80 percent of its revenue, an analysis firm said, as the jihadist "caliphate" turns three. The group declared its self-styled "caliphate" across swathes of Iraq and Syria on June 29, 2014, prompting the formation of a US-led coalition in a bid to halt its advance. In January 2015, IS jihadists controlled about 90,800 square kilometers, but by June 2017, that number dropped to 36,200, said IHS Markit.

This brings the question that what next after IS. The answer is directly related to the future of the agricultural and livelihoods sector in Syria. Despite six years of crisis in Syria, agriculture remains a key part of the economy. The sector still accounts for an estimated 26 percent of gross domestic product (GDP) and represents a critical safety net for the 6.7 million Syrians – including those internally displaced - who remain in rural areas.

However, agriculture and the livelihoods that depend on it have suffered massive losses. Today, food production is at a record low and around half the population remaining in Syria are unable to meet their daily food needs. Against this background, the Food and Agriculture Organization of the United Nations (FAO) has conducted the first comprehensive nationwide assessment on the cost of the war to the agriculture sector. The assessment interviewed more than 3 500

households and conducted focus groups in over 380 communities to establish the impact and get a clearer understanding of the type of support required to kick-start the recovery.

The findings revealed that USD 16 billion has been lost in terms of production, along with damaged and destroyed assets and infrastructure within the agriculture sector. The assessment also estimates that, depending on the scenario, between USD 11 to 17 billion would be required to kick-start the recovery of the agriculture sector.

Even though the crisis is not over, the conditions for investing in the recovery of the sector are present in many areas of the country. Such investment will not only reduce the need for humanitarian assistance but also stem migration and encourage the return of migrants. If productive farming areas are neglected, more people will be forced to leave already depopulated rural areas making eventual recovery harder, longer, and more costly to achieve(6).

The international community must start addressing new ways of rebuilding livelihoods during a crisis. Despite the potential of agriculture to address mounting food availability and access constraints, very little has been invested to support the recovery of the sector. Failure to provide adequate support will continue to exacerbate food insecurity and irreversibly compromise agriculture-based livelihoods.

2. AGRICULTURAL PRODUCTION IN SYRIA

The most recent Syrian agricultural census (2004) showed that 46 percent of the population in Raqqa province and 43 percent in Deir al-Zour province worked in agriculture -- more than twice the nationwide average of 20 percent. And the actual share of the local population who derive their main income from agriculture is even higher (2). These figures are more understandable when one considers that oil production has created very few jobs in the Euphrates Valley. Given this economic isolation and other factors, many Euphrates Valley residents considered themselves an internal colony of Syria well before the current war.

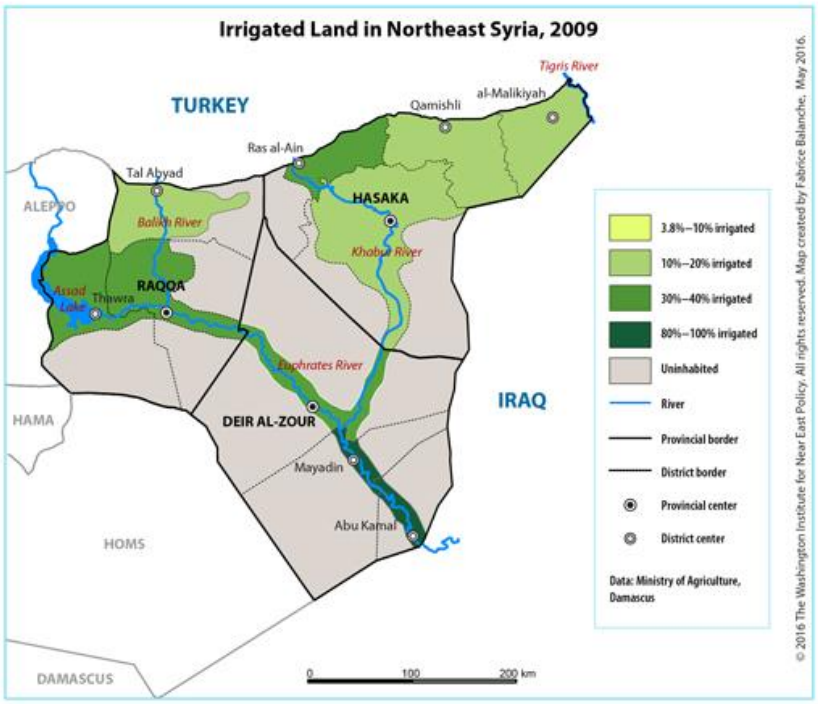

Figure2. Irrigated Land in Northeast Syria (2).

In the provinces of Raqqa, Deir al-Zour, and Hasaka (Figure 2), the ministries that supervise irrigation and agriculture have long forced farmers to enroll in programs obligating them to produce only cotton, cereals, and sugar beet. The state also supervised every aspect of the market through bureaucratic public companies, from seed distribution to commercialization. In fields irrigated by the Euphrates Valley (Figure 3) dams, farmers enjoyed almost free water, but it was delivered according to a government schedule that was only suitable for the crops that the regime mandated be grown, making agricultural diversification impossible(2). When water was plentiful and fields sufficient for every family, social peace reigned, but the situation deteriorated rapidly in the past decade, contributing to the 2011 uprising.

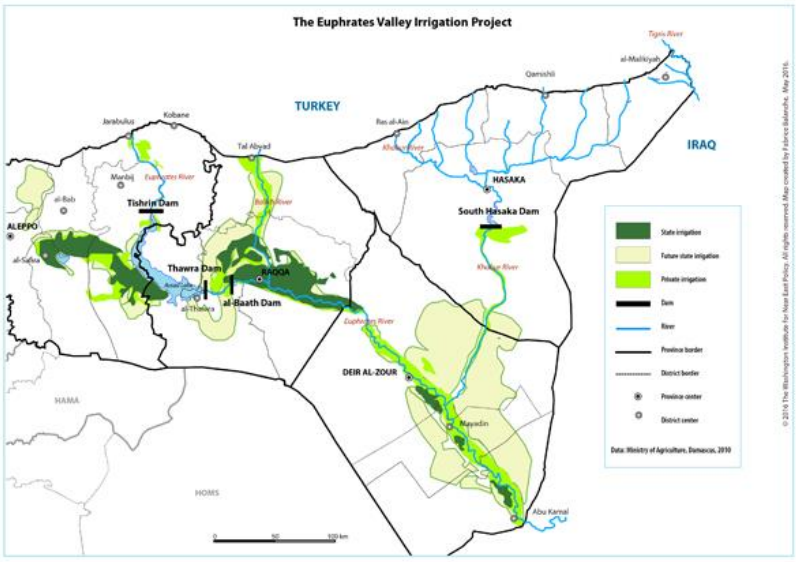

Figure3. The Euphrates Valley Irrigation Project (2).

The population of Deir al-Zour and Raqqa was 400 000 in 1960. It increased from 400,000 to 2,000,000 in 2010 and farm size naturally decreased (2). At the same time, the regime's ambitious plans to extend irrigated land outside the Euphrates Valley were never carried out due to lack of funds and water shortages. Therefore irrigated areas were reduced considerably due to a lack of state investment and a failure to modernize irrigation techniques.

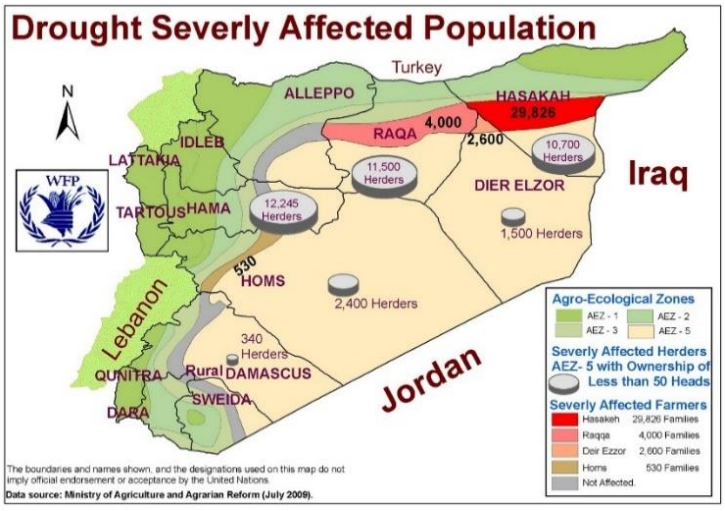

Figure 4. Drought Severely Affected Population

The Drought of 2005-2010

Syria faced three drought periods since 1988. The first one was between 1988-1993. The second drought period was 1998-2000 (Figure 4, 5). After these two drought periods, the drought of 2005-2010 accelerated these problems, especially because it occurred at a time when the state was reducing its subsidies, tripling the price of fuel, making individual irrigation extremely costly, and imposing water savings through a restrictive irrigation modernization plan. These measures were largely ineffective because they were formulated under emergency circumstances and implemented within a very corrupt environment. For example, subsidies were often hijacked by rich farmers with the complicity of officials, while small farmers were threatened with penalties because they continued to irrigate traditionally.

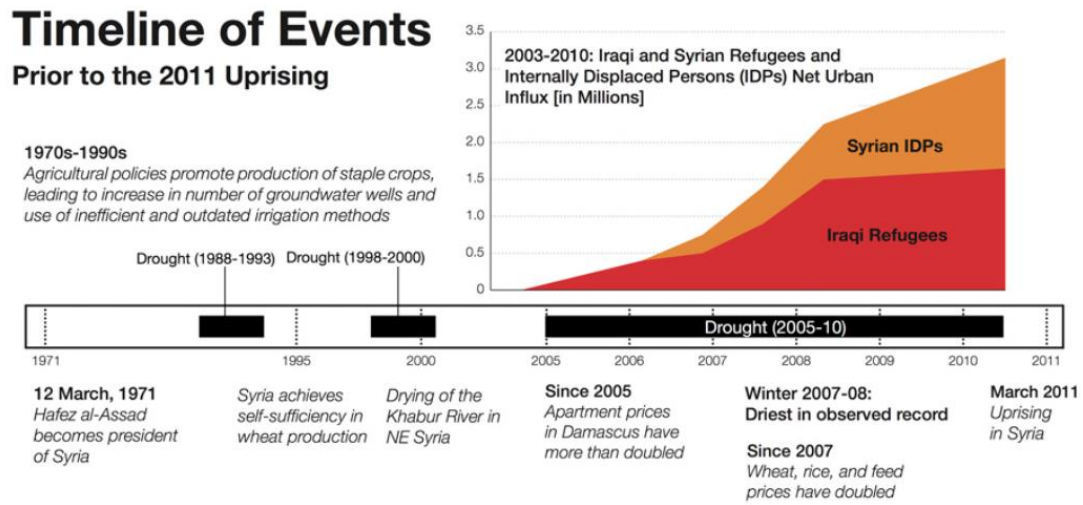

Figure 5. Timeline of Events before the 2011 uprising.

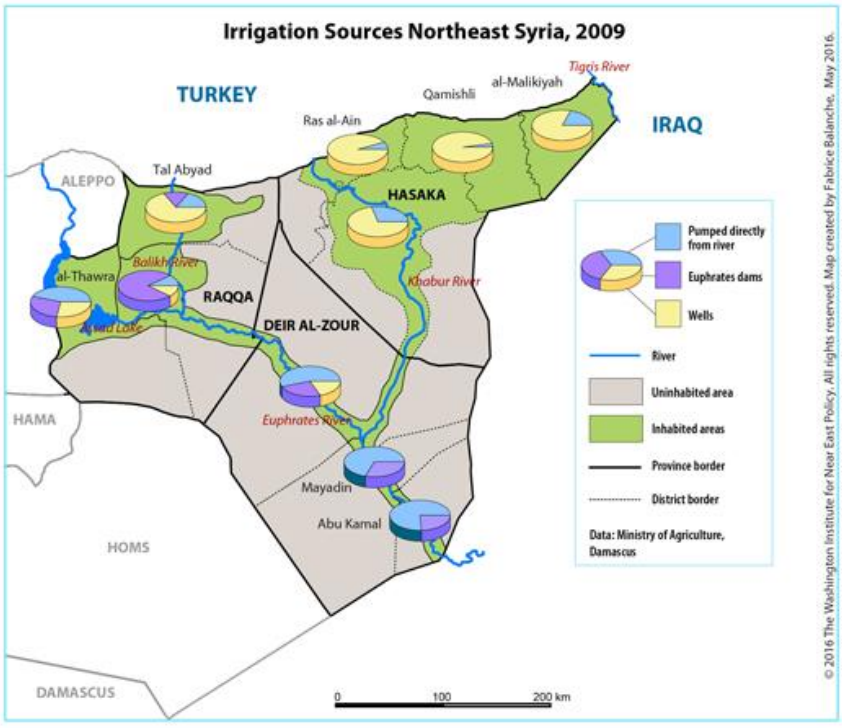

Figure 6.Irrigation Sources Northeast Syria, 2009 *(2).*

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State irrigation has been poorly managed from a technical standpoint as well. Open irrigation canals do not allow the use of sprinklers or drip methods due to lack of pressurization, causing water loss. For instance, if a farmer using this gravity feed method wants to get one cubic meter of water to his crops, he must draw seven times that amount from whatever source he is using. With a sprinkler system, however, he would need to draw just two cubic meters, and with a drip system just one. But what incentive do farmers have to acquire expensive equipment if water is almost free in state-irrigated land? They have more reason to use such water-saving technology in farms that use wells, where low water tables have forced many to abandon cost-prohibitive pumping and leave some fields fallow.

Between 2001 and 2009, agricultural land decreased in areas irrigated by wells(Figure 6, Figure 7) (e.g., Thawra district, Tal Abyad, and Hasaka province) but expanded in the Euphrates Valley, where well use is low. Given this series of mistakes and the ever-looming challenge of scarcity in arid regions, resolving water issues in the Euphrates Valley will be difficult without causing public discontent. Yet the regime's approach to irrigation failed and was an important contributor to the current uprising.

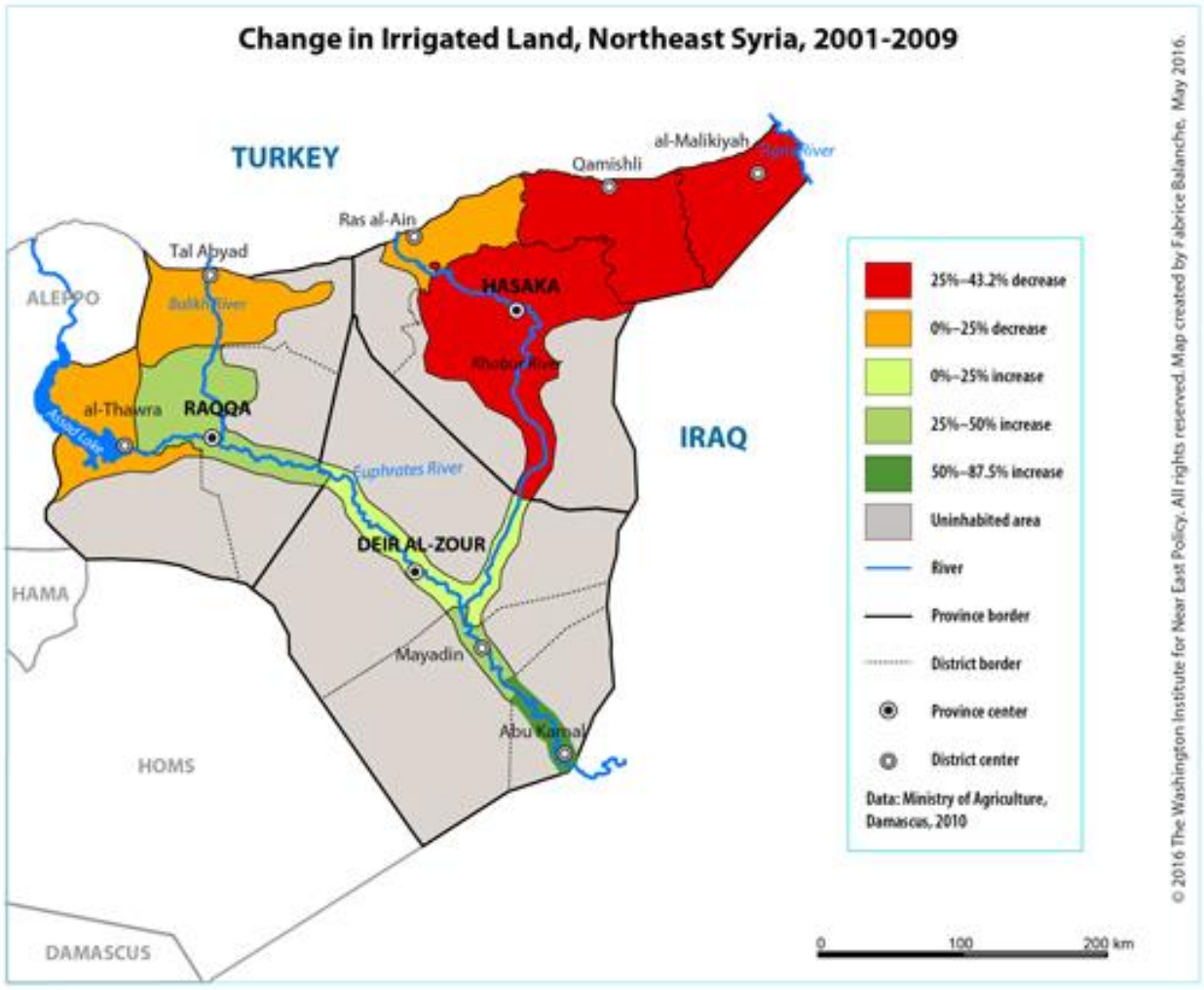

Figure 7. Change in Irrigated Land, Northeast Syria 2001-2009 (2).

Syria's conflict has so severely affected water and agriculture in the region

Fighting for control of water supplies has plagued the civil war, but new research shows the extent of the six-year-long conflict's impact on rivers **in** the region

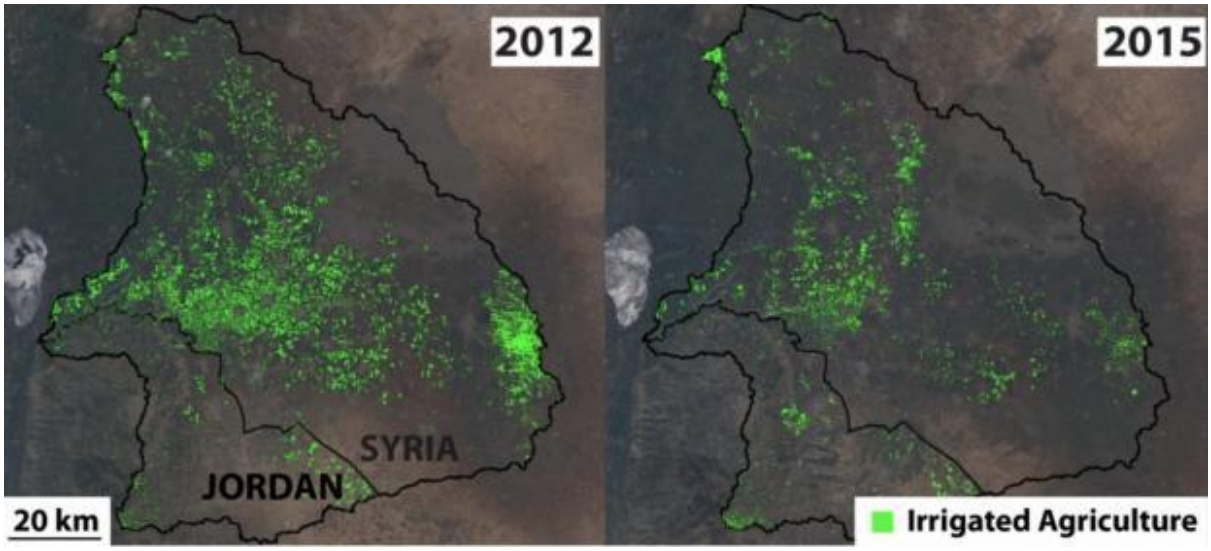

Figure 8. Used composite satellite imagery to compare irrigated agricultural land. (4).

The amount of water stored in reservoirs in Syria's Yarmouk basin has dropped by around 50 percent, a new Stanford University study found *Stanford School of Earth, Energy, and Environmental Sciences*

A new study has found that the civil war in Syria has had a drastic effect on rivers and freshwater resources in both Syria and neighboring Jordan.

While drought caused by both climate change and resource mismanagement has been a problem in Syria for decades, fighting and forced displacement has turned the issue into a full-scale crisis. that the effects could be seen in Figure 6.

Principal investigator Professor Steven Gorelick's team found that in the south of the county, there is now so little agricultural activity that the amount of land being irrigated has shrunk by 49 percent (4).

Damaged infrastructure and Mismanagement

The 11 reservoirs in the Syrian-controlled Yarmouk-Jordan River basin, essential for Syria’s agricultural production and all other human activity, have also halved in size over the last three years.

Many of them have been intensely fought over, and reservoirs under rebel control, in particular, have been badly managed, since the opposition lacks the technical expertise or staff to run them properly. More than three times as much water than three years ago from the Yarmouk basin now flows into water-poor Jord.

Irrigation under IS Governance

Since establishing control over most of the Euphrates Valley during the civil war, irrigation services have deteriorated sharply compared to the prewar period, making the collection of taxes by the IS "Zakat Department" unbearable. The lack of water in previously state-irrigated land has spurred many farmers to drill unregulated wells. This in turn means increased pumping, which is costly under normal circumstances but even more so now because coalition bombing of oil facilities has made it difficult to obtain the fuel needed to power the pumps.

Above all, local farmers lack fertilizers and pesticides, which have become rare and expensive because they can only be procured from the government zone through smugglers.

As a result of these problems, agricultural yields are decreasing sharply, and IS has been unable to refill the wheat silos it previously emptied to win the population's support. If the current circumstances persist, the next inevitable drought cycle will be catastrophic.

Cost of Civil War-related to water issues

Strategic Foresight Group (SFG) is a think tank engaged in crafting new policy concepts prepared a comprehensive report in 2016 August to provide the relevant facts and figures on the cost of civil war and non-cooperation about water issues.

During the conflict in the Middle East, water resources have been used as a target and weapon of war and also as a part of the expansion strategy to further political and military aims. However, the water infrastructure and the populations dependent on them suffer a great deal due to the resultant damage.

The decreased water availability in Syria due to the destruction of water infrastructure has severely affected the society still living there.

The cost of civil war has been immense. More than five million people have become internally displaced or refugees. In parts of Jordan and Lebanon, refugees outnumber the local population. Syria, which was most obstinate in refusing cooperation in water and environment, has experienced the largest devastation and the collapse of its institutions.
Out of 500 public and private hospitals in the country, almost 200 are either out of service, destroyed, or inaccessible. The water availability has fallen from 75 liters per person per day in 2011 to 25 liters in 2016.

Crop production has reduced by 60% from 2011 to 2016. Food inflation has been 400-700% depending on the specific commodity. Not only in Syria but also across the region, the share of agriculture in GDP has declined by 50%. Iraq, Lebanon, and Syria have experienced a significant increase in water and food-borne diseases since 2011. Iraq had a cholera outbreak in 2015 and also the return of the polio epidemic for the first time in the 21st century. And away from the front pages, people in Gaza continue to suffer. This report provides the details of costs incurred by common people across the Middle East due to lack of cooperation in water, environment, and other issues critical for human survival. We hope that it will
encourage debate and make people see reason at the end of the tunnel.

3. FAO SURVEY OF SYRIA'S AGRICULTURE SECTOR (6).

Fighting in Syria has caused huge damage and losses to agricultural production, but the sector can and should be kick-started now, dramatically reducing the need for humanitarian aid and migration, according to a new FAO report published in 2017. In addition to the severe human suffering, the conflict has caused more than $16 billion of lost crop and livestock production and destroyed farming assets.

The report, Counting the Cost: Agriculture in Syria after six years of crisis, presents the first comprehensive nationwide assessment of the damage of the war on the agriculture sector. The assessment included surveys of more than 3 500 households across **Syria**, interviews with more than 380 community groups, and analysis of primary and secondary agricultural data.

"The survey shows that amid conflict, agriculture provides a lifeline for the millions of Syrians, including internally displaced people, still living in rural areas," said José Graziano da Silva, FAO Director-General. "Ramping up investment in the recovery of the agriculture sector could dramatically reduce the need for humanitarian aid. It could also have a significant impact on stemming the flow of migrants," he added.

Farming support impacts migration flows

Around 95 percent of communities surveyed felt that if they were assisted with even basic agricultural support such as **seeds**, **fertilizers**, and **fuel** to power irrigation pumps, it would reduce the number of people abandoning rural areas to find opportunities elsewhere, and also encourage the return of migrants and internally displaced people.

Other main findings are:

- Over 75 percent of households in rural areas still grow food for their consumption, even if at a very reduced scale.
- About 60 percent of households reported that a lack of fertilizers was a critical production constraint for perennial crops such as wheat, barley, legumes, and pulses. A lack of fuel, outbreaks of pests and diseases, and destruction of irrigation systems and water points for livestock were also listed as important constraints.
- Since 2011, household livestock ownership has plummeted, down by 57 percent for cattle, 52 percent for sheep, 48 percent for goats, and 47 percent for poultry.
- The proportion of income spent on food has soared as incomes and household food production have decreased, while food prices have increased dramatically. Before the crisis about 25 percent of households would spend over half their annual income on food; by the time of the survey in September 2016, 90 percent of households were spending more than half of their annual income on food.
- Less than half of the 2011 rural population still lived in rural areas in 2016.

Crop production and livestock suffer huge losses

Of the $16 billion total bill, the cost of damage to assets - such as tractors, machinery, commercial farms, veterinary clinics, animal sheds, greenhouses, irrigation systems, and processing facilities - is estimated at over $3 billion, though this number is likely to rise significantly when the full extent of damages in the main conflict areas can be better assessed.

About $6.3 billion of the total is made up of damage and loss in crop production. In the livestock sector, damage and loss were calculated at around $5.5 billion, and in the fisheries sector, the estimate is almost $80 million.

Rebooting food production

The initial cost of rebuilding the agriculture sector over three years is estimated at between $10.7 and $17.1 billion in total, depending on whether there is no change in the conflict, a partial return to peace, or a full return to peace. The report outlines a response plan under each of these possible scenarios, including addressing underlying issues such as sustainable water use for irrigation.

Rural households are very clear about what they require to resume or boost their agricultural production. Basic supplies such as fertilizer, seeds, and veterinary medicine for livestock are urgently needed. After those needs have been met, emphasis should shift to credit, processing and marketing support, and repairing critical assets such as irrigation infrastructure.

Despite the potential of agriculture to address mounting food availability and access constraints, very little has been invested to save and protect agriculture-based livelihoods during the six-year conflict and support recovery of the sector. The report states that if productive farming areas continue to be neglected, more people will be forced to leave rural areas and Syria will be in danger of emerging from the conflict as a country with its commercial food production and agricultural base on the verge of collapse.

The assessment took place in August and September 2016. The focus groups and surveyed households were drawn from every district in the country and included men and women. Since 2011, FAO has supported the livelihoods and food and nutrition security of more than 2.4 million Syrians in rural and peri-urban areas of Aleppo, Al-Hasakeh, Dara'a, Deir-Ez-Zor, Hama, Homs, Idleb, Rural Damascus, As-Sweida and Quneitra

Impact of Destruction and Drought on Syrian Agriculture

Strategic Foresight Group (SFG) prepared a comprehensive report on the Water Crisis of Survival in the Middle East. According to a new SFG report published in 2016 “The costs of conflict to the agriculture sector are manifold. The apparent loss in production occurred due to drought and irregular water and electricity supply, mainly in Iraq and Syria. The civil strife in Syria and Gaza has taken its toll on water and irrigation infrastructure directly impacting the production.”

The report presents a comprehensive assessment of the damage of the war on the agriculture sector as well as farmers. Key findings of report(2) are given below.

With decreased agricultural production, food imports are on the rise in the region – a direct impact on food security and food prices. The loss of arable land has caused the farmers to move to the urban centers, which are already under tremendous pressure.

Lack of water, drastic erosion of livelihoods 1.3 million Syrians affected 803,000 people lost all of their livelihoods. The reported Number of Wells was 135 000 in 1999 while increased to 213 000 in 2007. 60 percent of the Syrian territory suffered from drought between 2006 and 2013. The agriculture output fell by 50 percent since 2007.

It has been observed that more than 75 percent of Syria's agriculture sector has suffered,47 percent drop in wheat yields,67 percent drop in barley yields by 2010.

All 420,000 illegal wells in Syria went dry, which halved water resources and led to a drop in grain output. As a result, 250,000 farmers were forced to abandon their land from 2002 to 2008.

45 percent of farmers could fully harvest their land, while 14 percent could not harvest at all due to insecurity and lack of fuel since 2011.

It has also been observed a nearly 60 percent decline in farming GDP between 2010-2015.

The total area of cultivation has been decreased from 6 million hectares to 3.6 million hectares between 2010-2015.
Food Insecurity has been a very crucial issue related to water and agriculture in Syria.
The ongoing conflict and droughts have made 8.7 million Syrians food insecure
It has been observed that 6.3 million Syrians are food insecure and 2.4 million Syrians are at a very high risk of food insecurity.

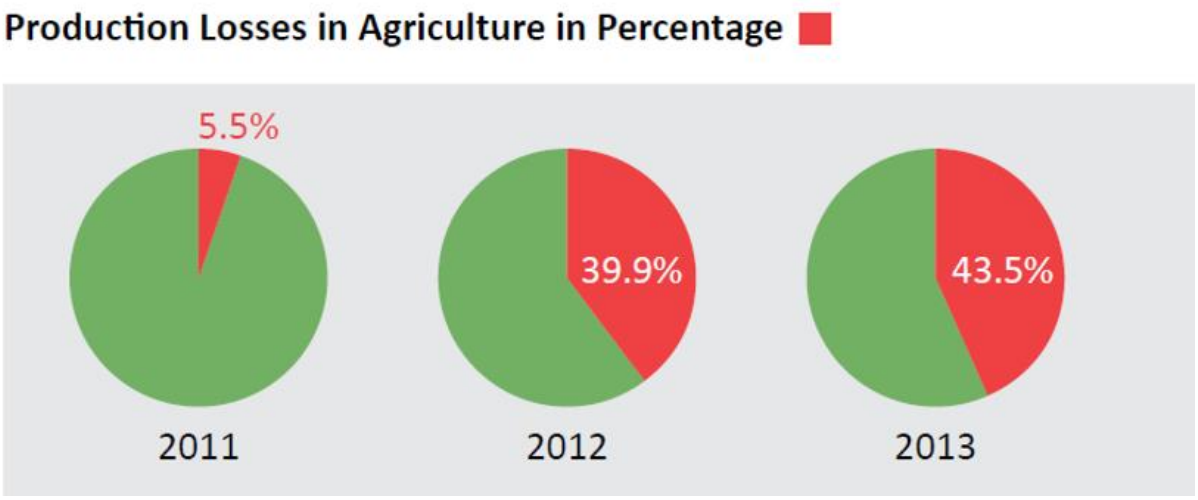

Figure 9. Production loses in Agriculture in percentage (3).

Food prices increased on average by 62.1 percent between November 2014 and November 2015. Regional variations have been 46,5 % in Damascus,978% in Dair Ez Zor. While water

price was USD 5 per month before 2011, 1 liter of water price was between USD 2 to 10, provided by water tankers at the end of 2015.

During the 2007-2008 drought overall 1.3 million people were directly impacted, more than 160 villages were abandoned 65,000 rural families were forced to migrate to urban slums, 1.5 million people were forced to move to overburdened Syrian cities from the rural areas due to declining water availability and prolonged mismanagement of water resources

4.5 million people have fled the country and 6.5 million are internally displaced mainly because of severe damage to the water infrastructure and prolonged droughts combined with the conflict since March 2011,

Water Refugees

The term water-refugees is accorded to people who were displaced as the direct result of droughts, climate change, poor water management, and imbalance of population/resource ratio. Taking into account this explanation, water refugees in the percentage of the displaced population has been 57% in Syria while it has been 12 % in Iraq

4. CONCLUSION

The challenge of fixing irrigation problems in the Euphrates Valley should be anticipated before eradicating IS there. A large modernization plan for irrigation and agriculture is essential to stabilizing the valley, but whoever is responsible for this effort will face the same physical and social constraints. Local water resources are inherently limited and will likely become even scarcer in the coming decades.

Some waste can be reduced by using modern irrigation techniques and abandoning water-intensive crops such as cotton, but such efforts require great discipline and a high level of development that is currently incompatible with the valley's tribal society.

Therefore, the authorities who take the Islamic State's place will face a cruel dilemma, because if nothing concrete is done soon, the scarcity of resources will exacerbate tribal competition for them.

Restoring stability in the valley will also be so difficult under the effects of climate change on water and soil resources in the region.

Divided Syria will force to set up a new water equation and water issue will give new states leverage over whoever controls the Euphrates Valley.

An important consideration for the recovery of the agriculture sector is the question of production incentives and the linked issues of irrigation and climate-smart agriculture. While water use must be revised to avoid the depletion of aquifers, irrigation is still essential for most rural households. Syrian agriculture will need to adapt to reduced use of water for irrigation, while at the same time coping with increased temperatures and more frequent droughts.

To tackle this effectively, the water management approach will need to include the following elements:

• adaptation of crop selection patterns to maintain economic profitability – this could mean a movement away from high water intensity crops to more water-efficient / drought-tolerant crops such as pulses and spices;

• adoption of conservation agriculture methods to reduce needs in water and fertilizers, including landscape-based approaches; and

• improved efficiency of irrigation systems. In addition, consideration should be given to adjustments in the delivery modalities of agricultural services.

One possibility for the future is that some of the services formerly provided by the Government may be provided by the private sector. As such, there will be a need to build the capacity of farmers to sell their products through value chain approaches (post-harvest management, food processing, and preservation and marketing), as well as promoting the development of income-generating activities.

If done sensitively, investments in the agriculture sector will not only revitalize agricultural production but will also foster social cohesion and stability.

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Biography

Dursun Yıldız is a hydropolitics expert and Director of the Hydropolitics Academy Association located in Ankara-Turkey. He is a civil engineer and used to be Deputy Director at State Hydraulic Works in Turkey; completed hydro informatics postgraduate course at the IHE in Delft, Technical training program in USBR-USA, and a master degree in Hydropolitics at the Hacettepe University-Turkey. He has over 5 years of teaching experience in some Turkish Universities and now works as head of his own Hydro Energy & Strategy consulting company located in Ankara. He has published several international articles and 11 Books. He received the Most Succesful Researcher Award on International Water Issues from the Turkish Agricultural Association in 2008 and the Central Union of Irrigatıon Cooperatives in 2016.

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