

Climate Change in Syria – trends, projections and implications

Background document for Sida's development of a results strategy for Syria 2015

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Table of Contents

1. Introduction.....	3
2. Climate trends, environmental management and its impacts	4
2.1. Observed trends in rainfall and temperature	4
2.2. Increased pressure on unsustainably managed natural resources.....	4
2.3. Social implications	5
2.4. Climate and conflicts.....	5
3. Climate projections as risks driver over the coming decades	6
3.1. Climate projections for the Middle East region	6
3.2. Potential implications	6
4. Governance voids – implications for sustainable development in a changing climate	7
4.1. The rise and fall of Syrian planning economy.....	7
4.2. Possibilities for Syria to handle the challenges.....	8
4.3. Addressing climate change through supporting the water sector	9
4.4. Transboundary water management	10
4.5. Addressing climate change through a resilience approach	11
5. Conclusions	11
6. References	13

1. Introduction

This background document has been developed as an input to the Swedish results strategy process for Syria at the request of Alex Nyström, Syria Strategy Group, Sida, Stockholm. Based on “entry points” (“ingångsvärden” 2015-02-26) provided by the Ministry for Foreign Affairs, Sida is to present proposals on expected results within the areas of; “Protected human security and freedom from violence” and “Strengthening of democracy and equality and greater respect for human rights”. Sida can also suggest other areas where Sweden has an added value. Furthermore it explicitly says that an environmental and climate perspective should be taken into account, not least in the light of the effect by climate change on the resilience of the Syrian population. Environmental challenges in Syria are many. Major environmental issues include deforestation, overgrazing, soil erosion, desertification¹, water pollution from the dumping of raw sewage and wastes from petroleum refining, and inadequate supplies of potable water.² Furthermore the on-going conflict in Syria has caused enormous damage to the country’s essential water and sewage systems, putting millions of people at risk of waterborne diseases, and creating huge challenges for the sector.³

Environmental challenges are numerous, as described above, and all of them will not be addressed in this report. Sida’s Helpdesk for Environment and Climate Change has been assigned to provide a brief desk analysis to mainly answer the following three questions:

1. Is there evidence that climate change is behind the dry periods and food uncertainty in Syria in the 2000s? These are considered to have contributed to social tensions and to the popular uprising which broke out in 2011.
2. What are the major known risks/vulnerabilities linked to climate change in Syria and its neighbouring countries?
3. What does the administration decay in Syria mean for the country and the region's ability to plan/manage these risks/challenges? What capacity existed before the civil war broke out, and what capacity is most important to save in Syria, not to lose too much ground? What are the consequences for the neighbouring countries?

In the analysis below, the most recent scientific information on past climate trends and future projections is reviewed and subsequently the socioeconomic implications are summarised based on a wider set of published sources (see References at end of this note). Based on recommendations from Sida, contact has also been taken with some selected persons at the United Nations Social and Economic Commission for Western Asia (UNESCWA)⁴ for further input to the background document.

The three questions above will be answered in the three following sections (2-4) and finally in section 5 we will present some conclusions.

¹ According to the UN in 2010, 80 percent of Syria is susceptible to desertification, defined by FAO as “the sum of the geological, climatic and human factors which lead to the degradation of the physical, chemical and biological potential of lands in arid and semi-arid zones, and endanger biodiversity and the survival of human communities”.

² http://en.wikipedia.org/wiki/Environmental_issues_in_Syria

³ UNICEF, Under Siege, March 2014

⁴ <http://www.escwa.un.org/>

2. Climate trends, environmental management and its impacts

2.1. Observed trends in rainfall and temperature

Several sources verify that changes in rainfall patterns over the Middle East have declined over the past four decades with a gradually declining *average* rainfall since around 1940 (see Annex with supporting graphics). Nearly all rainfall in the region occurs during winter (November – April) and exhibits large natural year-to-year variability, but the observation data show *new record lows* in the past three decades.^{5,6}

Average temperature has been steadily increasing for most of the past century with a sharp rise since the 1980s – and most extreme increase in the summer months.^{7,8} In addition to higher average temperatures, the number, intensity and length of heat waves in the eastern Mediterranean has increased.⁹

Higher temperature means higher evaporation, so the combination of increased average temperatures and declining rainfall increases the water stress and can result in droughts. Droughts are recurring climatic events which often hit Syria, however, the multi-year (>3 years) droughts that are especially devastating have only occurred four times since 1930; one around 1960 and then three in rapid succession since 1990 with the latest (2007-2010) the worst ever.¹⁰

The magnitude and frequency of the drying that has occurred is too great to be explained by natural variability alone¹¹ so anthropogenic drivers are also playing a role.

2.2. Increased pressure on unsustainably managed natural resources

Major population changes and agricultural reforms have increased the pressure on natural resources, increased water demand and - as a consequence - increased vulnerability of people and ecosystems:

- Syria's population has increased from around 3 million in 1950 to over 22 million in 2012, decreasing the country's total per capita renewable water availability by a factor 7 (>5500m³ per person per year in 1950, <760m³ by 2012) to a level categorized as "scarce".¹²
- Of total renewable water available nearly 60% originates from outside of its borders. All of the country's major rivers are shared with neighbouring countries and there have been tensions between Jordan and Syria since the early 1990s over the construction and operation of Syrian dams on the Yarmouk River. Turkey and Syria have a longstanding dispute over the management of the Euphrates River.¹³
- Agriculture accounts for almost 90 percent of the country's water consumption.¹⁴
- For several decades conditions have worsened due to poor water management decisions, planning, and policy errors. Despite growing water scarcity and frequent droughts, the government in 1970s onwards initiated policies to further increase agricultural production, including land redistribution and irrigation projects and provided large subsidies for the

⁵ IRI MapRoom

⁶ Kelley *et al.* (2015)

⁷ IRI MapRoom

⁸ Kelley *et al.* (2015)

⁹ Kuglitsch *et al.* (2010)

¹⁰ Kelley *et al.* (2015)

¹¹ NOAA (2013)

¹² Gleick (2014)

¹³ Gleick (2014)

¹⁴ <http://www.irinnews.org/report/88554/syria-why-the-water-shortages>

production of water-intensive crops, such as wheat and cotton. Most of Syrian irrigated agriculture is in need of modernization, still relying on highly inefficient flood irrigation.¹⁵

- Two thirds of the cultivated land in Syria is rain fed, and the remainder relies upon irrigation and groundwater which has become increasingly limited as extraction has been greatly over-exploited. Half of all irrigation comes from groundwater systems. It is estimated that 78% of all groundwater withdrawals in Syria are unsustainable - pumped at a rate exceeding recharge, which is the third-highest figure among 39 water stressed nations across the globe analysed.¹⁶

2.3. Social implications

- With the severe drought starting 2006/07, between 2006 and 2009, around 1.3 million inhabitants of eastern Syria were affected by agricultural failures. An estimated 800 000 people lost their livelihoods and basic food supports.¹⁷ During this period, yields of wheat and barley dropped 47% and 67%, respectively, and livestock populations plummeted.¹⁸
- The reduced supply of groundwater dramatically increased Syria's vulnerability to drought. When a severe drought began in 2006/2007, the agricultural system in the north-eastern "breadbasket" region, which typically produced over two-thirds of the country's crop yields, collapsed. Between 2007 and 2008 wheat, rice, and feed prices more than doubled.¹⁹
- The combination of very severe drought, persistent multi-year crop failures, and the related economic deterioration led to very significant dislocation and migration of rural communities to the cities. The migration added to the challenges already posed by the huge number of people displaced from Iraq after the 2003 war. These factors further contributed to urban unemployment and economic dislocations and social unrest (The timeline of policies, droughts and internal displacement is summarised in Annex: supporting graphics).

2.4. Climate and conflicts

So, "*is there evidence that climate change is behind the dry periods and food uncertainty in Syria in the 2000s?*"

The data summarised above indicate strong evidence of changing climate conditions in the region, and the recent severe droughts. But although, at a global scale, statistical relationships have been established between climatic conditions and outbreak of conflict,²⁰ conflicts are rarely, if ever, attributable to a single cause. The relationship between climate and conflict is complex, but in general there is broad agreement on one matter: social, economic and institutional factors are at least as important for driving civil conflict across the globe as climate change.²¹

Climate change have caused more frequent and harsher drought in the region, and Syria in particular, but the decades of "failure to rationalize water use and enforce environmental and water use laws certainly constitutes a much greater threat to the country's natural resources". Although the 2006–10 drought in Syria may be partly reinforced by a changing climate, the effect on people should be considered on the backdrop of years of mismanagement, unsustainable policy making

¹⁵ Gleick (2014)

¹⁶ Wada *et al.* (2012)

¹⁷ Châtel (2014)

¹⁸ Gleick (2014)

¹⁹ Kelley *et al.* (2015)

²⁰ Hsiang *et al.* (2013)

²¹ Solow (2013)

and rising rural poverty, which fuelled pre-existing discontent and sparked the first protests.²²

3. Climate projections as risks driver over the coming decades

To answer the second question – *what are the major known risks/vulnerabilities linked to climate change in Syria and its neighbouring countries?* – the scientific forecasts for the coming decades are reviewed, mainly based on the recent IPCC 5th Assessment Report but supplemented with more regional analyses.

3.1. Climate projections for the Middle East region

The Mediterranean, Middle East and northernmost North Africa are among the areas of the globe where all scientific projections agree that the rainfall will continue to diminish over the coming decades – and average temperatures will continue to increase.²³

Analyses^{24 25} of the implications of IPCC's intermediate climate scenarios for the eastern Mediterranean, including Turkey, Syria and Israel, indicate:

- Average summer temperatures will gradually increase 0.5–0.9° C per decade over much of the region.
- The number of warm days will increase by 50–60 additional days/year by the end of the 21st century
- Rainfall may decrease – the number of rainy days may decrease by 5–15 days at mid-century (see supporting graphics in Annex)
- It is expected that the annual rainfall will typically decline by 5–25% in 2040–2069 (although rainfall reduction is less certain in period up to 2040²⁶)
- The annual number of heat wave days may increase, and drastically so by the end of 21st century.

3.2. Potential implications

Increased temperatures and continued decreases in annual precipitation induce worsening water scarcity in Turkey and Syria in particular.²⁷

The projected lower rainfall in the Eastern Mediterranean, Turkey, Syria, and Northern Iraq is likely to further damage rain fed agriculture in vast areas, and longer dry seasons will reduce the length of time that the rangelands can be grazed.²⁸

Hence, with an already struggling agricultural sector dependent on irrigation from unsustainable and dwindling water sources the future outlook for production of water-demanding crops is bleak and the population still engaged in the agricultural sector may be even more vulnerable.

With the significant increasing risk of heat waves follows health risks including marked heat stroke mortality risks, and the region would become conducive for “smog” health risk.²⁹

²² Châtel (2014)

²³ IPCC (2013)

²⁴ Lelieveld (2012)

²⁵ Kostopoulou *et al.* (2014)

²⁶ IPCC (2013)

²⁷ Gleick (2014)

²⁸ Evans (2009)

²⁹ Lelieveld (2012)

The Arab region is particularly sensitive to climate change and variability as it already suffers from water scarcity: small changes can thus result in dramatic impacts on the ground. Some climate scenarios also anticipate increased climate variability and more frequent extreme weather, such as floods and droughts. Evidence that climate change is affecting freshwater quantity and quality in the region is becoming stronger, although the expected intensity of these changes remain uncertain.³⁰

So although climate change may have played a minor role compared to the influences of policies and natural resource mismanagement, it is important to consider the current and future changes in climatic conditions in the (post-conflict) recovery phase: water challenges will only increase further the coming decades with the projected higher temperatures and reduced rainfall.

4. Governance voids – implications for sustainable development in a changing climate

To narrow down possible answers to the third question the focus has been put on *What does the administration decay in Syria mean for the country and the region's ability to plan/manage these risks/challenges?* The background is given through describing the rise and fall of Syrian planning economy (4.1) and possibilities for Syria to handle the challenges (4.2). Then in 4.3 there are some concrete suggestions for next steps needed to be taken for a sustainable development to happen in a changing climate. In 4.4 we are addressing the aspect of neighbouring countries and the regional perspective and finally in 4.5, suggesting briefly how a resilience approach can be taken.

4.1. The rise and fall of Syrian planning economy

The humanitarian crisis that followed the 2006-10 drought can 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.³¹ Despite growing water scarcity and frequent droughts, the government 1971-2000 initiated policies to further increase agricultural production, including land redistribution and irrigation projects, quota systems, and subsidies for diesel fuel. These policies endangered Syria's water security by exploiting limited land and water resources without regard for sustainability with a decline of groundwater. The government attempted to stem the rate of groundwater depletion by enacting a law in 2005 requiring license to dig wells but the legislation was never enforced.³² When Bashar al-Assad took over as president in year 2000 he was convinced to open the Syrian economy to the world market through a progressive transition from centrally planned economy to a "social market economy". These political shifts produced growing inequality, increasing poverty rates, stagnant employment, and deepening or persistent regional inequalities that were exacerbated by changes to agricultural policy. Seen from a purely environment point of view, the move to abolish subsidies was entirely justified given the alarming state of the country's groundwater reserves that had been depleted since the introduction of the diesel motor pumps in the 60's but the lack of social safety nets left many in the agriculture sector unable to cope. With the abolishment of subsidies, price hikes, liberalization of prices for e.g. chemical fertilizers etc. many farmers, especially in the north-east, abandoned their lands. In general the government was keen to uphold the image of Syria as self-sufficient producer of wheat

³⁰ United Nations World Water Development Report 4 (2012)

³¹ Chatel (2014)

³² Kelley et al. (2015)

and other key staples and to avoid any closer examination of deeper causes of the humanitarian and environmental crisis that was spreading from the north-east to the southern Governorates.³³

In July 2008 the Syrian Minister of Agriculture stated publicly to United Nations (UN) officials that the economic and social fallout from the drought was beyond their capacity as a country to deal with.³⁴

4.2. Possibilities for Syria to handle the challenges

In Syria key options for policy makers are more sustainable groundwater management (through economic, regulatory and management policies), improvements in water-use efficiency and productivity in agriculture (like modern irrigation technologies and review of crop types and planting patterns) as well as comprehensive agreements on managing and sharing the rivers that cross borders.³⁵ Anti-corruption efforts are also needed notably in the domain of well licensing and groundwater use.³⁶ Furthermore, water is managed by districts in Syria and not basins which means that governors should talk and develop the management of water jointly.³⁷

There is a lack of capacity in Syria, as in other countries in the region, to manage multi-dimensional risks and vulnerabilities, such as drought monitoring, early warning systems, assessment of socio-economic impacts, adaptation to climate change in a multi-disciplinary and integrated approach etc. There is a great need for investing in human and institutional capacity to cope with all these accelerating risks and challenges along with the rebuilding and reconstruction plans in the coming years.³⁸

There are some positive things from the past in terms of infrastructure and capacity which is important to consider and hold on to in the future, such as part of the previous irrigation infrastructure, water information centres with water relevant production data and the more broad view on water resources management since 2011 with the shift from a Ministry of Irrigation to a Ministry of Water Resources with a more holistic approach. Furthermore it will be important to keep skilled technicians and engineers, now part of the government structure, not to lose capacity and competence.³⁹

In light of the crisis in Syria, and as part of its mandate to promote democracy and development in the region, UNESCWA has initiated a programme named "The National Agenda for the Future of Syria" (NAFS). The Programme will work in partnership with Syrian national institutions, civil society and the private sector. It will also collaborate with international organizations, the UN country team in Syria, existing UN coordination mechanisms and international partners. The aim is to develop pragmatic solutions and alternatives to be used by Syrian stakeholders to tackle issues of reconstruction and reconciliation in the transitional post-conflict phase.⁴⁰

When it comes to the water sector input to the NAFS the standpoint is that as water is an essential prerequisite for development of other sectors and water availability varies substantially according to the actual physical location, Integrated Water Resource Management (IWRM) should be applied as a framework for regional planning in basins. Water resources is to be managed more sustainably including the application of existing knowledge and experience. The available

³³ Chatel (2014)

³⁴ Gleick (2014)

³⁵ Gleick (2014)

³⁶ Chatel (2014)

³⁷ Interview with Jos de Sonnevle, Consultant Water Management contracted by the Dutch Government, 150526

³⁸ Written input by e-mail, Roula Majdalani, Director, Sustainable Development Policies Division (SDPD), UNESCWA, 150527

³⁹ Interview with Jos de Sonnevle, Consultant Water Management contracted by the Dutch Government, 150526

⁴⁰ <http://www.escwa.un.org/sites/ESAR/project.asp?ProjectTitle=The%20National%20Agenda%20for%20the%20Future%20of%20Syria>

renewable water resources need to be better shared for domestic, agricultural, and industrial use with a priority for respecting internationally defined minimum standards for domestic use. The objective is to redevelop the economic potential of Syria for the coming decades and beyond for future generations in a three-tier approach:

- a) **Immediate:** local rehabilitation and reconstruction measures, wherever required and possible. The focus should be on urgent issues of functionality to assist people to regain their livelihoods.
- b) **3-5 year-perspective:** initiatives on reconstruction and development of water infrastructure that integrate local and basin-wide concepts by linking the existing situation in communities and cities with the long term vision of resilient water management.
- c) **10-year perspective:** Re-defining and implementing Syria's National Water Strategy. The objective is to create the enabling conditions for implementation of Integrated Water Resources Management.

With this approach UNESCWA hopes for transformation of Syria into a water-saving society. The challenge is to guide decision makers into flexible, adaptable and environmentally sound directions. Water is not only a sector but also essential in other sectors with strong links to regional planning, urban development, agriculture, energy, industry etc. but also crosscutting topics such as gender.⁴¹

But challenges to carry out any of the above is of course tremendous given the current state Syria as a failed, non-functioning state. Like Thomas L Friedman put it in New York Times January 2014 "*Syria couldn't respond to a prolonged drought when there was a Syrian government (in 2008). So imagine what could happen if Syria is faced by another drought after much of its infrastructure has been ravaged by civil war.*"

4.3. Addressing climate change through supporting the water sector

Based on the background documents and interviews, it is clear that the water sector needs to be strengthened to address challenges that it is facing now and in the future. Three donors are active in supporting the water sector today; Japan, the Netherlands and Germany, but many more will be needed with the huge efforts required.⁴²

UNESCWA has in a rather detailed, but very concrete way, developed what they see as needed to move Syria into a water-saving society through the NAFS:⁴³

- a) Developing a vision on sustainable water management for socio-economic development
- b) Developing and implementing a National IWRM programme
- c) Developing and implementing a National Drought Strategy (policies dealing with crisis situations, including drought and water scarcity strategies to improve resilience)
- d) Developing a national policy for the water-food nexus. Increasing agricultural water productivity by investing in the modernisation of irrigation systems and promoting improved crop varieties and sustainable crop selection
- e) Managing groundwater aquifers sustainably. This entails the water quality protection, and planning by means of assessment and sustainable use, conjunctive use, metering and controlling through enforcement of the Water Law

⁴¹ UNESCWA, Framework Water Sector Input to the National Agenda for the Future of Syria, Work Group Water, February 2015

⁴² Interview with Jos de Sonnevill, Consultant Water Management contracted by the Dutch Government, 150526

⁴³ UNESCWA, Framework Water Sector Input to the National Agenda for the Future of Syria, Work Group Water, February 2015

- f) Shifting from supply-side to demand-side management
- g) Re-using of treated waste water for irrigation and landscaping (non-conventional water resources)
- h) Rain water harvesting especially in rural areas for irrigation and in schools for sanitation
- i) Strengthening water users' associations
- j) Conservation of natural resources. Natural resources, which are part of the natural genetic and biodiversity heritage, are highly dependent on water resources. Thus, maintaining of the quantity and the quality of water in rivers, lakes, wet lands, artificial lakes, and marshlands is crucial for the human being in Syria
- k) Optimise the Syrian share of the Euphrates and Tigris water.

So in summary: Among the key options available to policy makers are improvements in water-use efficiency and productivity in agriculture, better management and monitoring of groundwater resources, and comprehensive international agreements on managing and sharing the rivers that cross political borders.⁴⁴ UNESCWA, through their input to the water sector in the NAFS, seem to cover these aspects in their proposal, which could be valuable for Sweden to look further into.

4.4. Transboundary water management

Most transboundary water agreements around the world are based on the assumption that future water supply and quality will not change and few international water agreements include mechanisms for addressing changing social, economic, or climate conditions. Few such agreements are in place in the MENA region and growing demands for these resources will make it progressively more difficult to reach agreements over time.⁴⁵ There are some important agreements and secretariats in place regionally like the Arab Water Security Strategy, the Arab Countries Water Utilities Association (ACWUA), The Centre for Water Studies and Arab Water Security, affiliated with the League of Arab States, The Arab Ministerial Declaration on Climate Change, The Arab Strategy for Disaster Risk Reduction 2020 etc.

Four major challenges affect water resources management in the Arab region: water scarcity, dependency on shared water resources, climate change and food security. Furthermore, pesticides and fertilizers mixed with agricultural runoff are contaminating surface and groundwater sources, and have become a source of conflict in some shared water systems in the region, such as between Turkey and Syria. A big challenge to water resources management in the Arab region is that the major international river systems in the region are shared by two or more countries with pressure on these shared waters. Syria is part of three major shared surface water systems in the region including: Tigris and the Euphrates river basin, Orontes river and Jordan River. There are also smaller surface water resources that cross into the region and between Arab countries which have sparked localized disputes regarding water resources and fuelled border tension.⁴⁶

We have tried to highlight some of the regional challenges as described above. We were also asked to look into consequences by the Syria crisis for Lebanon specifically, but very little material is available. Though a recent assessment by FAO of the impact of the Syrian crisis on food security and agricultural livelihoods in neighbouring countries found that it has become extremely difficult for Lebanese farmers to sustain their livelihoods. According to Lebanese customs, bilateral agricultural exports from Lebanon to Syria decreased by 37 percent between 2011 and 2012. Before the conflict began, 20 percent of Lebanese products were exported to Syria, according to

⁴⁴ Gleick (2014)

⁴⁵ Gleick (2014)

⁴⁶ United Nations World Water Development Report 4 (2012)

the UN Food and Agriculture Organization (FAO). In addition, Syria is the only land trade route to Iraq, Turkey and the Gulf, by far the largest market in the region.⁴⁷

4.5. Addressing climate change through a resilience approach

Syria is highly vulnerable and seriously affected by environmental threats, water scarcity, and climate change as described earlier in the report. Yet, due to differing institutional structures and resources, there are major regional differences in adaptive capacity. For example, Egypt has reduced river-flow variability through the construction of the Aswan High Dam. To overcome physical water scarcity Gulf states exploit oil rents through heavy investments in seawater desalination⁴⁸, and imports food to save the water used in its production (“virtual water”).⁴⁹ Poorer Middle Eastern states less integrated into the global economy have fewer such policy options available to develop their adaptive capacity in the face of fore-casted climate change. For Syria and many other poor and conflict torn countries in the Middle East the adaptation space is even more restricted. Additionally, the absorptive (for stability) and trans-formative (for change) capacity are also very restricted.⁵⁰ In a workshop held 29th of April 2015 at Sida, suggestions were given by OECD/DAC and others on how to develop this approach further which could be used in the ongoing results strategy process.

5. Conclusions

In this background document we have focused on three questions:

- Is there evidence that climate change is behind the dry periods and food uncertainty in Syria in the 2000s?
- What are the major known risks/vulnerabilities linked to climate change in Syria and its neighbouring countries?
- What does the administration decay in Syria mean for the country and the region's ability to plan/manage these risks/challenges?

Climate change is influencing recurrences of droughts in Syria through reducing winter rainfall and increasing evaporation. The magnitude of the observed changes leading to more frequent multi-year droughts is too great to be explained by natural variability alone. Although the last drought in Syria was partly reinforced by changing climate, its socio-economic effects can mainly be attributed to other factors: government mismanagement (including unsustainable policies) in relation to agriculture and water use, a rapidly growing population (including an influx of refugees), and rising rural poverty, which all fuelled already existing discontent and sparked protests. Conflicts are rarely, if ever, attributable to one single cause.

The Middle East is particularly sensitive to climate change and variability as it already suffers from water scarcity so even small changes result in dramatic impacts on the ground. Although climate change may have played a minor role compared to the influences of policies and natural resource mismanagement, it is important to consider the current and future changes in climatic conditions in the recovery phase: water challenges will increase further the coming decades with the projected higher temperatures and reduced rainfall.

⁴⁷ <http://www.irinnews.org/report/98218/syria-crisis-puts-lebanese-farmers-at-risk>

⁴⁸ Which should from an environment sustainability perspective be based on renewable energy

⁴⁹ Sida’s Helpdesk for Environment and Climate Change, Environment and Climate Change Policy Brief occupied Palestinian Territory, March 2013

⁵⁰ OECD/DAC, Guidelines for Resilience Systems Analysis, 2014

There is a lack in Syria to manage multi-dimensional risks such as drought monitoring, early warning systems, assessment of socio-economic impacts, adaptation to climate change in a multi-disciplinary and integrated approach, etc. There is a need for investing in human and institutional capacity to cope with all these accelerating risks and challenges and it seems like UNESCWA, through the NAFS, is trying to move in that direction.

From a regional perspective there is a challenge to water resources management with the major international river systems in the region shared by two or more countries with pressure on these shared waters. Few agreements on shared water resources are in place in the MENA region and growing demands for these resources will make it progressively more difficult to reach agreements over time. Sweden is supporting water resources management regionally and there is great potential for cooperation and coordination on these issues bilaterally and regionally.

Sweden could, with a resilience approach and further exploring possibilities to support the water sector and integrate a climate change perspective, address challenges and risks to avoid consequences of future droughts as seen in Syria up to now.

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Ralf Klingbeil, Regional Advisor Environment and Water, UNESCWA, 150521

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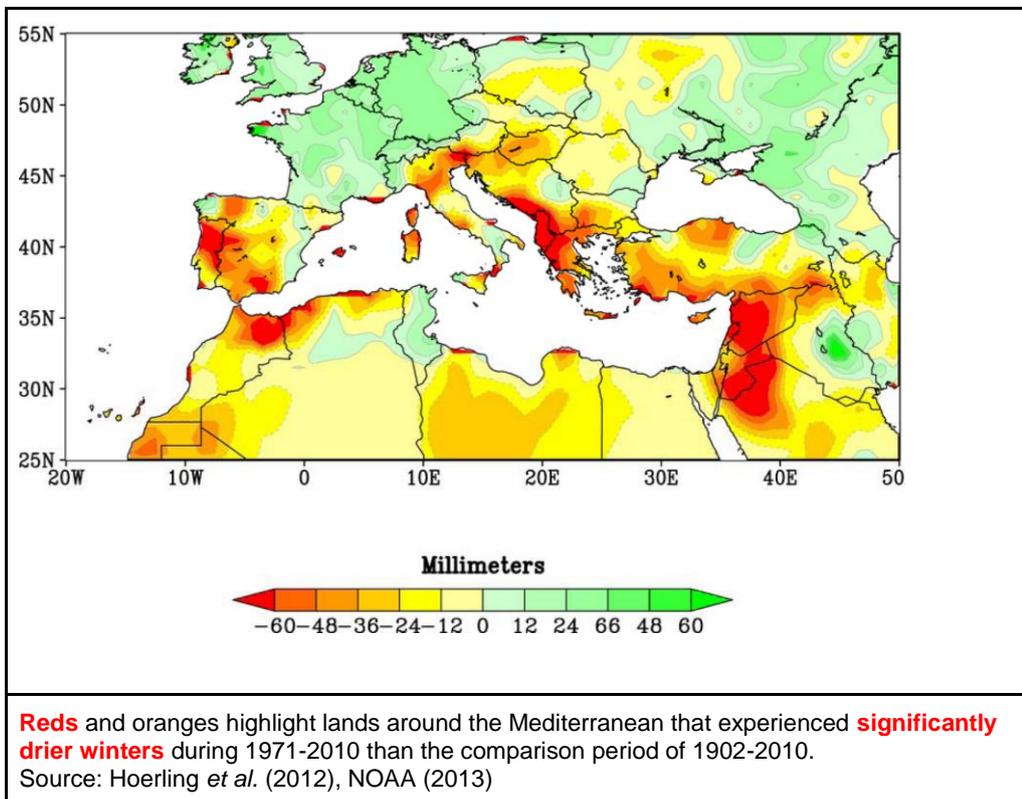
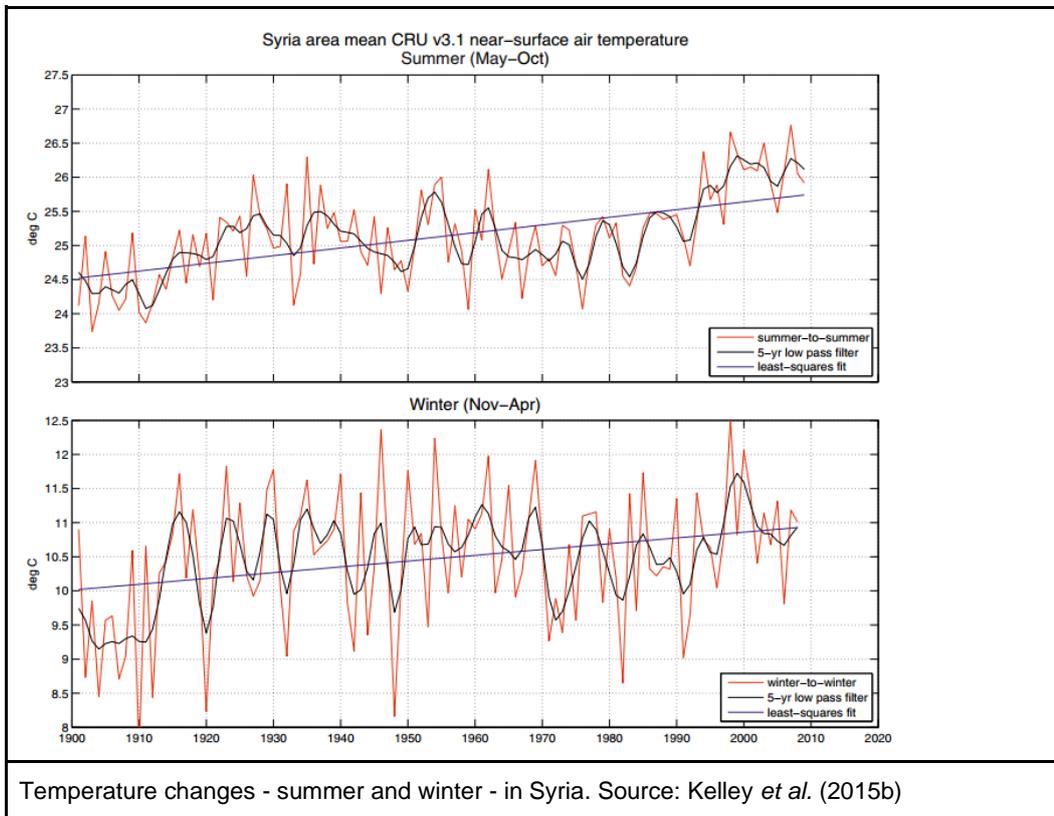
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<http://www.irinnews.org/report/98218/syria-crisis-puts-lebanese-farmers-at-risk>

Annex I. Supporting graphics



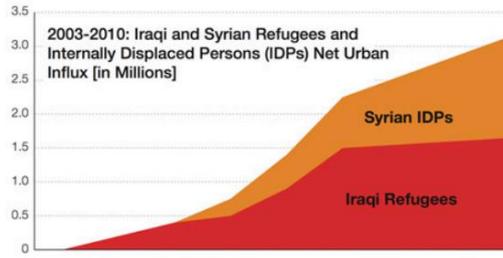
Timeline of Events

Prior to the 2011 Uprising

1970s-1990s

Agricultural policies promote production of staple crops, leading to increase in number of groundwater wells and use of inefficient and outdated irrigation methods

Drought (1988-1993) Drought (1998-2000)



12 March, 1971
Hafez al-Assad becomes president of Syria

Syria achieves self-sufficiency in wheat production

Drying of the Khabur River in NE Syria

Since 2005 Apartment prices in Damascus have more than doubled

Winter 2007-08: Driest in observed record
Since 2007 Wheat, rice, and feed prices have doubled

March 2011 Uprising in Syria

Timeline of events leading up to the civil uprising that began in March 2011, along with a graph depicting the net urban influx (in millions) of Syrian IDPs and Iraqi refugees since 2005.

Source: Kelley *et al.* (2015b)