Vanishing Water Landscapes in the Middle East

Public Perceptions, Political Narratives and Traditional Beliefs Surrounding Water and Scarcity in an Arid Region

FRANCESCA DE CHÂTEL

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Doctoral Thesis

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De Châtel, F. (2007). 'Perceptions of Water in the Middle East: The Role of Religion, Politics and Technology in Concealing the Growing Water Scarcity'. In: Shuval, H. and Dweik, H. (eds.) *Water Resources in the Middle East*. Heidelberg: Springer.

De Châtel, F. (2014). 'Damascus: The Death of the Garden of Eden'. In: Tvedt, T. and Oestigaard, T. (eds.) *A History of Water, 3(1)*. London: I.B. Tauris.

De Châtel, F. (2014). 'The Role of Drought and Climate Change in the Syrian Uprising: Untangling the Triggers of the Revolution'. *Middle Eastern Studies*, January 2014 (online), DOI: 10.1080/00263206.2013.850076.

De Châtel, F. (2014). 'Leaving the Land: The Impact of Long-term Water Mismanagement in Syria'. In: Holst-Warhaft, G., de Châtel, F., Steenhuis, T. (eds.) *Water Scarcity, Security and Democracy: a Mediterranean Mosaic*. Cornell University and Global Water Partnership Mediterranean, Ithaca/Athens, forthcoming.

De Châtel, F. (2009). 'Bathing in Divine Waters: Water and Purity in Judaism and Islam'. In: Tvedt, T. and Oestigaard, T. (eds.) *A History of Water, 2(4)*. London: I.B. Tauris.

De Châtel, F. (2014). 'Baptism in the Jordan River: Immersing in a Contested Transboundary Watercourse'. *WIRES Water* 1(2), DOI: 10.1002/wat2.1013.

List of Abbreviations

BCM	billion cubic metres
GDP	Gross Domestic Product
ha	hectares
m/yr	metres per year
m^3/s	cubic metres per second
m asl	metres above sea level
m bsl	metres below sea level
MCM	million cubic metres
MCM/yr	million cubic metres per year
MENA	Middle East and North Africa
mg/L	milligram per litre
mm	millimetre
mm/yr	millimetre per year
SYP	Syrian Pound
US$	United States Dollar

List of Acronyms

DAWSSA	Damascus Water Supply and Sewerage Authority
FAO	Food and Agriculture Organization
FoEME	Friends of the Earth Middle East
UN	United Nations
UNICEF	United Nations Children's Fund

PART I

The Nile at Aswan, Egypt, 2007.
Source: Terje Oestigaard.

INTRODUCTION

This PhD dissertation is the result of 14 years of fascination with the Middle East and North Africa (MENA) region[1] and its water resources (Fig. 1). During this period, I travelled widely from Iran to Morocco and from Turkey to Sudan, and lived in the Syrian capital Damascus from 2006 until 2010. I worked as a journalist, writer and editor, but also researched and wrote a non-fiction book about the history, culture and politics of water in the MENA (de Châtel 2007). The chapters in this cumulative PhD dissertation reflect this trajectory, with three chapters dedicated to different aspects of water management in Syria and three chapters covering a broader geographical scope in the MENA. All chapters are based on empirical and qualitative research and fieldwork carried out in the MENA region since 2001. All chapters have been published separately in academic journals and publications between 2007 and 2014.

BACKGROUND

My first foray into Middle Eastern water issues was in 2001, when I travelled from Granada to Istanbul through North Africa and the Middle East on a nine-month "Water Journey" in search of the meaning of water in the most water-scarce region in the world. I had prepared the trip with extensive reading about water, losing myself in libraries, weaving my way between narrow isles of books, and searching the catalogues for "water", "water + Middle East" and "water + desert". I read voraciously, anything I could get my hands on, from travel journals written by intrepid 19th-century desert explorers, to semantic discussions of the symbolic value of water in the Koran and countless theoretical books on the "Middle East water question". These were written by political scientists, economists, geographers and engineers, for whom water was an economic resource, a commodity to be traded,

1 Various definitions of the MENA region exist. Unless otherwise specified, regional figures quoted in this chapter are based on World Bank (2007), which defines the region to include Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, the United Arab Emirates, West Bank and Gaza, and Yemen. My research since 2001 has included fieldwork in Egypt, Israel, Iraq, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia and Turkey, with a focus on Syria, Palestine, Israel and Jordan.

the "blue gold" that would soon replace the black gold, oil, as a strategic resource. It was a political weapon to be wielded against, withheld from, or sold to, neighbouring countries. Water would be the cause of the wars of the 21st century, some authors affirmed with candid authority; others refuted these theories and said that, on the contrary, water scarcity would lead to peace and collaboration between nations.

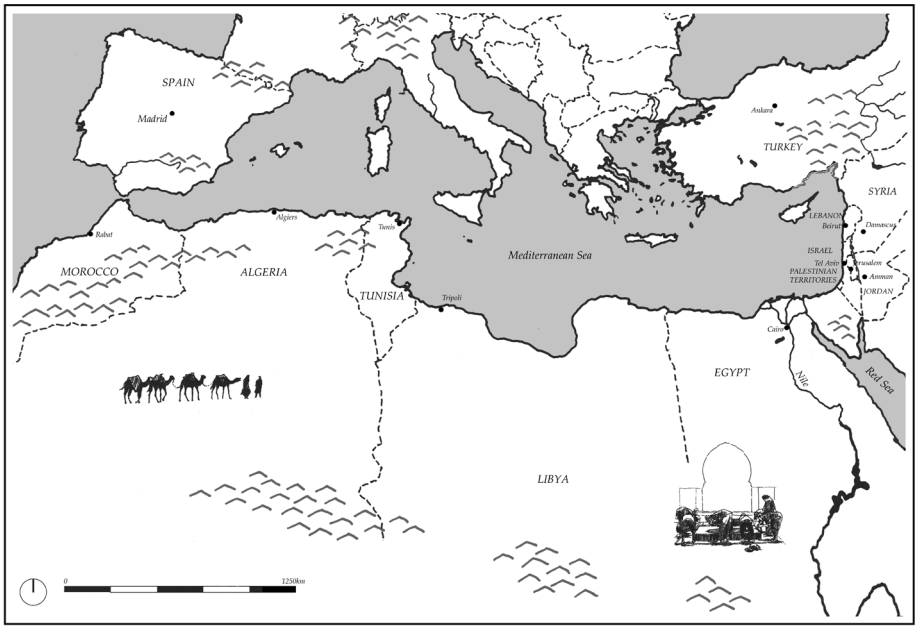

Figure 1. The Middle East and North Africa. Source: Michael Durran.

Here I was in the realm facts and figures and clearly delineated problems that were sliced into chapters and handed to the reader in clear analytical order. It was reassuring to read books like this, but as soon as I had left the ordered discipline of the library behind me, the neat hierarchy collapsed, as I had known it would. From a distance it was easy to label and classify, decanting the torrent of ideas, thoughts and images into separate jugs. Once I stepped into reality, and found myself in the valleys of the High Atlas in Morocco, the Western Desert of Sudan, or the dying Ghuta Oasis around the Syrian capital Damascus, seeing the land and the water and speaking to the people who used it, it all became a tangled, rushing stream of meanings, values and perceptions with currents and counter-currents whirling through my mind.

Water is an elusive subject, ungraspable and fleeting; its significance, usages and values so layered and manifold that it is impossible to distil a single meaning. It plays a

central role in the region's three main religions: the Bible and the Koran are filled with metaphors of water as a source of life, fertility and prosperity. Yet as soon as one looks at how this is reflected in everyday practice in this region where religion continues to play a defining socio-cultural and political role, one notices that water is wasted, polluted and undervalued. How can this disconnect be explained?

Before setting off, I had expected the beliefs, attitudes and traditions surrounding water to reflect water's natural scarcity in the Middle East and to be very different from perceptions of water in the wet Dutch climate I had grown up in. I imagined people had more respect for the resource, used it more sparingly and valued its presence more highly than we did. Yet in most places I found water was an unquestioned resource that was taken for granted like the air people breathed. In the eyes of many, water was still an abundant resource. And in places where scarcity was a daily reality, few felt any sense of responsibility to resolve the problem. As I travelled through the region, I became increasingly aware of the gap between individual perceptions of water and the reality of growing scarcity. But I also found that these perceptions and individual realities are just as important as the physical reality of growing scarcity because the facts of hydrology, demography and meteorology are often only known and fully understood by scientists, whereas local realities and perceptions determine the behaviour of water users from the Moroccan Sahara to Tel Aviv. As the articles in this thesis show, much of my subsequent research has continued to focus on these discrepancies and different perceptions and narratives of water and scarcity in the MENA region.

My initial choice to explore water in the MENA was partly motivated by the fact that the region is today the most water-scarce region with one of the highest population growth rates in the world. However, it was also grounded in a desire to gain a better understanding of the region's history and culture in general. For beyond its role as a natural resource in the ecosystem, the way water is used and perceived also reflects a society's cultural, religious, economic and political values. As Tvedt and Oestigaard (2006: ix-xxii) have argued:

> A knowledge of how people have conceived water throughout history helps us to understand the impact of human activity on the worlds of water and, indeed, to comprehend how water has influenced human activity. The fundamental and dual character of water being both culture and nature, and being both essential to life yet also a taker of life through water-borne disease and flooding, meant that people in all societies attached a significance and a complex web of meaning to water that is unmatched by any other element of nature. From everyday activities to religious ceremonies and festivals all over the world, water has always been interwoven in social interaction (Ibid.: xviii).

HISTORICAL AND GEOGRAPHICAL CONTEXT

Water history in the MENA region

Since ancient times, the MENA region has been exposed to water scarcity, aridity and high climatic variability. Through history, the region's populations adapted to these harsh conditions, developing sophisticated water collection, storage and supply systems. The world's first irrigation systems were developed in the region, in the alluvial plain between the Tigris and Euphrates Rivers. Here the Sumerians managed to control the unruly waters of the Twin Rivers from the fifth millennium BC onwards, diverting water into canals and leading it to the fields where they cultivated a mixture of grain, forage and date palms. From the third millennium BC onwards, the Ancient Egyptians also harnessed the water of the Nile (Fig. 2), constructing irrigation channels and irrigating the surrounding desert land. Later in the first millennium BC, the Persians developed the *qanat* system, a network of tunnels and wells that tap a subterranean source and lead water down a slow gradient to communities and crops. Over the centuries, this technology spread through the Middle East, North Africa and beyond to Kyrgyzstan, China, Japan, Spain and Mexico. While many have dried up or been abandoned, *qanats* are still in use today across the MENA region. The *qanat* technology remains one of the most sustainable methods of exploiting groundwater as it relies entirely on gravity (de Châtel 2007a; Balali et al. 2012).

Besides the need for these advanced technologies of water collection and supply, the precious nature of water in the MENA region made careful management and distribution in the community essential. This led to the development of complex and detailed water management systems and legal frameworks, which were most often administered on a local level. These customary laws, which had evolved through the pre-Roman, Roman and Byzantine eras, were later integrated into the sharia, the body of Islamic law, and the Ottoman legal system. According to the sharia, water – together with grass as pasture for animals and fire – is one of the three things to which every Muslim has an inalienable right. Water also plays an important role in Judaism and Christianity. It is the primeval element from which God created life, and it plays an important role in ritual ablutions, purification and baptism. Thus for centuries, communities from the Moroccan Sahara to the Nile Valley and from the Damascus Ghuta Oasis to the Mesopotamian plains on the banks of the Euphrates and Tigris Rivers in Iraq developed their own water civilisations. On a practical level, they adapted to the arid conditions, erratic rainfall patterns, droughts and floods by developing elaborate water management systems and technologies. But the local water conditions also reflected on culture and society, influencing urban design, architecture, art, religious scripture and practice, and social structures.

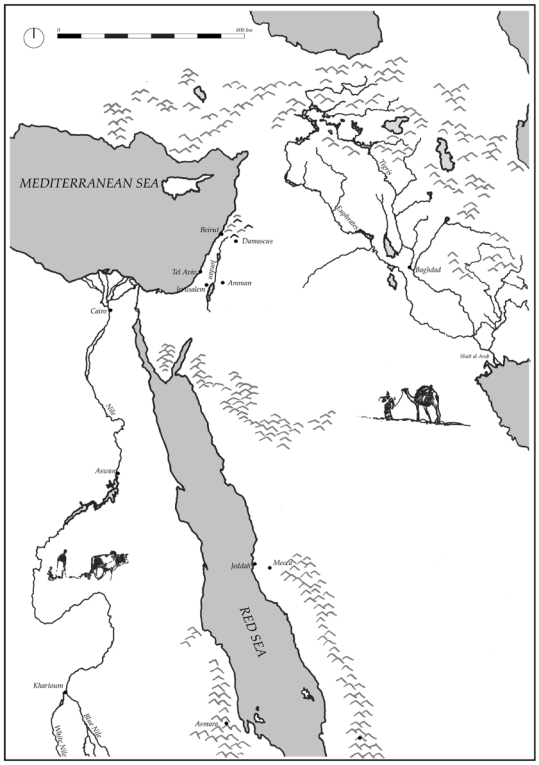

Figure 2. The main rivers in the MENA region: the Nile, Jordan, Euphrates and Tigris. Source: Michael Durran.

Demographic, technological and political changes in the 20th century

Over the last century, profound demographic, technological and political changes in the region have disrupted the fragile ecological balance that was kept in place for millennia. Today, the MENA is the most water-scarce region in the world.[2] Regional per capita availability of renewable water resources has dropped from around 4,000 m^3 per year in 1950 to 1,100 m^3 per year in 2007. Projections suggest this figure will be further reduced to an annual 550 m^3 by 2050. These figures compare to the current global average of 8,900 m^3 per person per year and an estimated 6,000 m^3 per person per year in 2050 (World

2 The literature generally applies a number of thresholds to define water availability. They include water security (>1,700 m^3 per capita per year of renewable water), water stress (<1,700 m^3 per capita per year), water scarcity (<1,000 m^3 per capita per year) and absolute scarcity (<500 m^3 per capita per year). However, such definitions also have their limitations, as they do not take into account trade in agricultural products, efficiency of water use in agriculture, and other variables such as the social ability to adapt to water-scarce conditions (World Bank 2007). They also conceal local inequalities in water availability within countries.

Bank 2007). Rapid population growth throughout the region, technological advances and the intensification and expansion of agriculture have resulted in an exponential increase in water demand, while over-exploitation of both surface and groundwater resources, pollution and climatic changes have caused sharp deterioration in freshwater supplies. Furthermore, uncontrolled urbanization, desertification and deforestation have destroyed water landscapes throughout the region.

The MENA region's population has increased from 82.2 million in 1950 to 384.1 million in 2010. Projections show this number will further increase to 524 million by 2030 (Ibid.). The political make-up of the region also changed dramatically over the 20th century with the collapse of the Ottoman Empire, the creation of the state of Israel, the end of colonial rule and the creation of new nation states across the region. From the 1950s onwards, these newly independent states embarked on ambitious national water development schemes aimed at increasing supply and expanding irrigated areas. In the process, the MENA region fully embraced the "hydraulic mission", extolling new technical achievements such as high dams, hydropower and well-drilling, and inspired by projects in the United States and the Soviet Union to tame nature and make deserts bloom. Thus "hydraulic bureaucracies were created to take up the challenges of flood protection, hydropower generation and large-scale public irrigation. These bureaucracies had their secular priesthoods, acting in the name of the common good and in tandem with politicians and national leaders. Not a single drop of water should reach the sea without being put to work for the benefit of Man" (Molle et al. 2009: 332).

In the following decades, infrastructural developments such as dams, barrages and diversion canals, but also the introduction of motor pumps to extract groundwater profoundly altered the flow regime of rivers and reduced groundwater levels throughout the region. Today, the MENA region's rivers are the most heavily dammed in the world in relation to fresh water available (World Bank 2007) and their discharge has dropped dramatically. Thus the Jordan River has been reduced to 2% of its historic flow, with dams, diversion canals and large-scale irrigation projects on the river itself, its tributaries and headwaters. Water quality has sharply deteriorated, with raw sewage and agricultural run-off polluting the remaining water (FoEME 2010). Turkey's partially completed Southeastern Anatolia Project (GAP), which foresees in the construction of 22 dams and 19 hydroelectric power plants on the Euphrates and Tigris Rivers, has had a far-reaching impact on water quantity and quality in both rivers. According to estimates, upon completion the project will consume more than 50% of the Euphrates and about 14% of the Tigris (UN-ESCWA and BGR 2013: 64). Additional large-scale water infrastructure and irrigation projects on the Euphrates and Tigris in Syria and Iraq have further diminished the rivers' stream flow and water quality.

Throughout the MENA region, groundwater reserves have also been severely reduced following the introduction of low-cost drilling technologies and motor pumps in the 1960s. A 2013 report on the depletion of global groundwater reserves found that parts of Turkey, Syria, Iraq and Iran in the Euphrates and Tigris River basins had lost 144 billion cubic metres (BCM) of total stored fresh water in the period between 2003 and 2010. Nearly two thirds of this water (90 BCM) was lost as a result of groundwater over-exploitation (NASA 2013). In the same region, one of the largest karst springs in the world on the Syrian-Turkish border, the Ras al-Ain Spring, has dried out completely since 2001 as a result of over-pumping from 6,000 wells that have been drilled in Syria and Turkey in recent decades (UN-ESCWA and BGR 2013).

The long-term over-exploitation of surface and groundwater resources in the MENA region was partly spurred by a desire for national food self-sufficiency, which was driven by ongoing regional instability and conflict since the 1940s. This led to the implementation of policies that were economically and environmentally unsustainable, such as Saudi Arabia's decision to use non-renewable water resources to produce - and until recently export - wheat in the desert (World Bank 2007). However, national water mega-projects from the Aswan High Dam in Egypt to Libya's Great Manmade River and Israel's National Water Carrier also form powerful political symbols, as the material expression of the capacity of a state, ideology or individual ruler to control nature and make the desert bloom.

The desire for food self-sufficiency also drove the investment of massive financial and natural resources into the agricultural sector. Despite growing water scarcity, agriculture still consumes more than 85% of water resources in the MENA region today. Water use is, however, often inefficient and efforts to increase efficiency and boost productivity have had limited success. A phenomenal amount of water is still wasted in the agricultural sector due to the cultivation of low-value crops, wasteful irrigation practices, continued price supports for staple crops, subsidies for water and energy, and rigidities in land, real estate and financial markets. The continued support for the agricultural sector throughout the MENA region and failure to implement any far-reaching change in water and agricultural policies appears contradictory, particularly given the continuously decreasing share of agriculture in the region's economy. As Selby (2005) has shown, agriculture's contribution to Gross Domestic Product, foreign earnings and employment across the Middle East is rapidly waning. Yet at the same time, "the significance attached to water, at least in political rhetoric, often continues to outlive its dwindling economic value" (Selby 2005: 337). This apparent contradiction – between the low macro-economic value of agriculture and continued government support for the sector – indicates the complex and layered role of water in MENA societies and its non-economic values.

> Water problems are not water problems alone, but are in a large measure products of relative ability or inability of different states and societies to address their economic and social problems, water problems included. And it is this differential capacity of different societies to control and produce water in accordance with social needs [...] that one must above all concentrate on, if one wants to understand the roots of water crisis (Selby 2005: 333).

Public perceptions of water and scarcity

Despite the drastic transformation of landscapes and the sharp drop in renewable water resources throughout the region over the last century, public awareness of the mounting regional water crisis remains low. Traditional representations, images and ideals of water and local water landscapes often no longer correspond to the reality on the ground, yet due to their enduring strength they still overshadow the increasingly bleak and arid reality. There are several reasons for this disconnect between public perceptions of water availability and the reality of growing scarcity. My conversation with a Damascene family in 2006 aptly illustrates some aspects of this disconnect.

Damascus was historically famed for its abundant freshwater resources, but had been struggling with a worsening water crisis since the 1990s (see Chap. 1). In 2001, the Damascus Basin had a water deficit of more than 300 million cubic metres (MCM) (Sagardoy et al. 2001). The combination of rapid population growth since the 1950s, uncontrolled urbanization and ongoing government support for inefficient agricultural practices in this arid region led to a rapid drop in groundwater levels; the drying up of the city's main river, the Barada; widespread pollution of surface and groundwater sources; and the destruction of gardens and orchards in the surrounding Ghuta Oasis. Yet most inhabitants of central Damascus, a city of around 6 million inhabitants on the edge of the Syrian Desert, were unaware of any water shortage. Thus when I mentioned to a working-class mother and her four adult children that I had written a book on water in the Middle East, they looked at me uncomprehendingly. "What about water?" I explained that it looked at various aspects of water scarcity in the region, and they all smiled as the mother said: "Oh well it's not about Syria in that case."

This lack of awareness can be explained through the different layers of cultural-religious, political and technological narratives that still succeed in concealing the growing local scarcity in urban environments. Even though the water supply in central Damascus was cut between four and 10 hours a day, all households had reserve water tanks, which provided water when the central supply was cut. Thus technology ensured the scarcity was concealed on a practical level. Water was also heavily subsidized and domestic water bills were low. There was therefore little incentive to conserve water or even reflect on water-

saving practices. In addition, while the government narrative acknowledged the threat of growing shortages in the Damascus area, there was little questioning of the deeper causes of the growing scarcity and no serious effort to resolve the rapidly worsening crisis. Thus while Damascenes saw the Barada being reduced from a broad fast-flowing river to a slimy trickle of sewage water in the space of barely 20 years, Damascus remained in the minds of many the city described by medieval writers as the "Paradise of the Orient… bedecked in the brocaded vestments of gardens" (Broadhurst 1952: 271-272).

METHODOLOGY AND SOURCES

As explained at the beginning of this introductory chapter, my initial approach to the question of water and scarcity in the MENA region was empirical, with a strong emphasis on fieldwork and interviews. I wanted to understand local attitudes towards and perceptions of the resource in this arid region and place them in their socio-cultural and historical context. This approach was perhaps a little unorthodox, as I set out with limited knowledge of the science of water and sought to first understand the resource in a cultural-historical / human (and therefore strongly multidisciplinary) context. On the other hand, my lack of scientific grounding meant that I came to the subject without theoretical assumptions or preconceptions and by speaking to a wide range of people, from farmers to scientists and ministers, I was able to identify different levels of narrative around water and scarcity. Over the years, I built up considerable knowledge of different aspects of water in the MENA region and my research inevitably took in aspects of (geo)politics, geography, hydrology, environmental science and agronomy. However, the work always remained rooted in fieldwork and empirical observation.

Bibliographical sources and interviews

The six chapters of this dissertation were – with the exception of Chapters 3 and 4 – based on separate research projects and fieldwork. However, a similar methodological approach was employed in all chapters, combining data from the literature and official sources with data from interviews with a broad cross-section of people.

With regards to hydrological, geographical and meteorological data, it is important to note that it is very difficult to obtain reliable, accurate and recent data on the state of water resources in all MENA countries. This is partly due to the fact that data systems are inefficient and incomplete. However, equally important is the dominant perception among government officials in the region that water is a strategic resource and that data regarding availability and use should remain confidential (see Ch. 3 for more on the culture of secrecy around water). This means that researchers are often confronted with outdated,

incomplete or contradictory data, with different data being issued by different national ministries and international organizations.

I have relied on various sources in my research, including:

- Reports and studies by UN organizations and other international organizations;
- Online global databases such as Aquastat, the FAO's Information System on Water and Agriculture;
- Reports and studies by local, regional and international non-governmental organizations;
- Reports, studies and data sets of national governments and research institutes in the region;
- And local, regional and international media sources.

In addition, I consulted literature from the fields of hydrology, environmental science, political science, international relations, sociology, anthropology, philosophy, history and religious studies, as well as historical sources such as travel accounts and historic texts describing religious practices around water, local water management practices and legal aspects of water management through history. Each chapter includes a separate list of references.

Throughout the dissertation, desk and bibliographical research is complemented with data from extensive fieldwork and interviews with a broad range of people. Depending on the interviewee and the setting of the interview, conversations were held in English, Arabic, French, Dutch or German. For a number of official interviews I used an Arabic-English interpreter. I conducted most other Arabic interviews myself. Interviews were held with the following people:

- Ministers and other national and local government representatives;
- Hydrologists, agronomists and other experts;
- Representatives of non-governmental (environmental) organizations;
- Priests, imams, rabbis, religious experts and practicing believers of the Jewish, Muslim and Christian faiths;
- And members of local communities, (former) farmers, and their families.

Particularly during my time in Syria, where I worked for as the managing editor and editor-in-chief of a Syrian current affairs magazine, I gained unparalleled access to government sources and experts, and was able to travel with relative ease. The fact that I was able to speak to interviewees in Syrian-Arabic dialect was obviously a great advantage here. Because the process of applying for permits and gaining permission to travel was often very lengthy in Syria (permits could take months to be granted), few foreign journalists and

researchers were able to access the diversity of sources I did – from obtaining repeated permission to interview the minister of irrigation to being allowed to travel to the country's north-east during the 2006-10 drought. In addition, as I was not registered as a journalist with the Ministry of Information, I was able to circumvent limitations imposed on other foreign journalists, and travel to areas that were off-limits to other foreigners.

Levels of analysis: macro- and micro-level views

This dissertation is divided into three parts. After this short introductory chapter, the regional scope of Chapter 1 provides a conceptual framework and outlines key themes that are further developed in subsequent chapters. Part 2 is made up of three chapters that examine the past and present of water use in Syria and analyse the growing gap between government narratives, public perception and the on-the-ground reality of growing water scarcity. Part 3 analyses the role of water in the region's three main religions and explores the spiritual value and ritual use of water in Christianity, Islam and Judaism.

As such, the dissertation examines aspects of regional cultural-religious perceptions and uses of water, but then zooms in, first to the national and then to the local level, to provide a more in-depth analysis of the political narratives surrounding water and scarcity. While the macro (regional) level can provide an insight into broad regional trends and highlight the specificities of the MENA region's geographic, climatic, economic and socio-cultural conditions as compared to other regions, it is only by scaling down to national and local levels that one can gain a thorough understanding of the profound discrepancies that exist between the images, beliefs and narratives of water and abundance on the one hand and the reality of growing scarcity and vanishing water landscapes on the other.

Moreover, the recent history of water use in Syria can in many ways be considered representative for the wider region. Like other countries in the MENA, Syria has a high population growth rate: the population has risen from 3.3 million in 1950 to approximately 20.4 million in 2010 and the annual average population growth rate remains among the highest in the region (Elhadj 2005; United Nations 2008). Syria also embarked on ambitious hydraulic development, land reclamation and irrigation projects from the 1950s as part of a sustained drive to achieve food self-sufficiency and boost the irrigated surface area (see Chap. 4). Between 1960 and 2000, the government spent about US$ 20 billion on agricultural projects, the equivalent of 20% of the country's total investment resources. However, this investment did not bring the promised returns, but instead resulted in widespread depletion of the country's surface and groundwater resources: by 1997, five of Syria's seven water basins had a negative water balance, while the quality of the remaining reserves had been degraded (Elhadj 2005). In the decade between 1995 and 2005, annual per capita water availability decreased from 1,791 m^3 to 882 m^3 (FAO 2009), placing Syria

below the water scarcity line of 1,000 m^3 per person per year. Despite the alarming state of the country's water resources in 2010, the government narrative continued to uphold the image of Syria as a country with "an excellent water resources management system" (de Châtel 2010) that was struggling to confront conditions of growing scarcity beyond its control. Meanwhile on a local level, Syrians across the country suffered the consequences of years of water and land mismanagement and over-exploitation. They watched landscapes around them change as springs and rivers ran dry and fertile land turned to desert.

SUMMARY OF CHAPTERS

The first chapter, 'Perceptions of Water in the Middle East: The Role of Religion, Politics and Technology in Concealing the Growing Water Scarcity' (de Châtel 2007b), explains why there is such low awareness of water scarcity in the MENA region. It identifies religious, political and technological narratives that conceal the reality of growing water scarcity and explores local perceptions of abundance and scarcity. It shows that the subsidization of water and the continued support for agriculture, combined with a false sense of security created by large-scale engineering projects strengthen the mythology of plenty. Constructed upon age-old traditions and beliefs, but also on the convincing rhetoric and imagery of modern-day politicians and engineers, these myths conceal the reality of growing water scarcity. The chapter provides a structural framework for the dissertation, introducing key themes that are further developed in subsequent chapters.

Chapter 2, 'Damascus: The Death of the Garden of Eden' (de Châtel 2014a), illustrates and develops the themes introduced in Chapter 1 through a historical overview and case study of water management in the Syrian capital Damascus from pre-Roman times to today, highlighting the contrast between the poetic historic image of Damascus as an oasis in the desert and the rapid depletion of the city's water resources and destruction of its water landscapes over the last 60 years.

Chapter 3, 'The Role of Drought and Climate Change in the Syrian Uprising: Untangling the Triggers of the Revolution' (de Châtel 2014b), examines political narratives around water scarcity in Syria. The chapter focuses on a severe drought that hit the country between 2006 and 2010, which affected more than 1.3 million people in the country's north-east and resulted in dramatic crop failure, the decimation of flocks, and the migration of an estimated 65,000 families to urban centres. Recent analysis of the triggers of the current conflict in Syria has often included references to the 2006-10 drought and the impact of climate change. Closer analysis of the broader economic and historic context shows that the link between drought/climate change and the uprising is tenuous and forms an unhelpful distraction that diverts attention from tangible and real problems in the Syrian

water sector. Moreover, it strengthens the narrative of the Syrian government that blames external factors for its own inability to reform. The chapter examines the dissonance between the government narrative that portrayed Syria as a naturally water-scarce country actively working to 'modernize' its water sector and the reality on the ground of an inefficient, corrupt and rigid water management system that enabled large-scale over-exploitation of water and land resources and disenfranchised rural communities. It shows that while climate change may cause more frequent and harsher drought in Syria, the ongoing failure to rationalize water use and enforce water laws certainly constitutes a much greater threat to the country's natural resources.

Chapter 4, 'Watching Landscapes Disappear: Local Perspectives on the Impact of Long-term Water Mismanagement in Syria' (de Châtel 2014c) delves further into the discrepancy between government rhetoric and on-the-ground realities in rural Syria. Drawing extensively on personal accounts from Syrians across the country in the period 2006-10, it shows how the Syrian government's fixation on food security and the constant drive to increase the irrigated surface area meant that the limits of the country's land and water resources were disregarded, which in turn led to the destabilization of fragile ecosystems, the depletion and pollution of water resources and the salinization and desertification of steppe lands. Accounts from farmers across the country highlight not just the depth and breadth of the environmental damage inflicted over the last 60 years, but also the extraordinary speed with which water resources and landscapes were destroyed. While the fragile balance of local ecosystems across the country had been maintained for millennia, in the last 60 years uncontrolled population growth, technological advances and over-ambitious agricultural expansion programmes have destroyed the country's water and land resources.

Together, Chapters 2-4 underscore how ongoing disregard for the limits of natural resources in Syria and the growing discrepancy between the government narrative of abundance on the one hand and growing poverty and disenfranchisement on the ground on the other hand ultimately destabilized the country and spurred the first anti-government protests in March 2011. Since then the country has been physically, economically and socially destroyed: more than 100,000 people have died, one third of the population has had to leave their homes and the economy is shattered. While there is no end in sight to the conflict and no indication of what Syria's future will look like, when reconstruction begins it will be crucial to emphasize the importance of a sustainable and sound natural resource management system that can provide sufficient fresh water to a growing population. The experience of the last 60 years shows that disregarding the balance of ecosystems and exploiting natural resources beyond their sustainable limit comes at a high cost.

Part 3 explores the role of water in religious rituals and beliefs in the wider MENA region. More specifically, it focuses on the discrepancy between the scriptural ideal and

spiritual value of holy water on the one hand, and everyday practice and the physical state of pollution on the other.

Chapter 5, 'Bathing in Divine Waters: Water and Purity in Judaism and Islam' (de Châtel 2009) examines the role of water in Judaism and Islam, both in the scriptures and in the respective purification rituals. Specifically, the chapter examines the spiritual qualities attributed to water and analyses the concepts of purity/impurity in a ritual sense and cleanliness/dirt in a strictly physical sense. It also discusses the evolution of practices through history and in different cultural settings, and shows how the often-blurred distinction between ritual purity and physical cleanliness was – and still is – frequently confused.

Chapter 6, 'Baptism in the Jordan River: Immersing in a Contested Transboundary Watercourse' (de Châtel 2014d), highlights the layered complexity of meaning associated with the Jordan River. Indeed, the river that marked the boundary of the biblical Land of Israel and in which Jesus Christ was baptized by John is today not only a source of holy water, but also a geopolitical border, a contested transboundary watercourse, a threatened ecosystem and a tightly regulated water resource system. In particular, the chapter examines the dissonance between the far-reaching physical transformation and degradation of the river during the 20th century and the experience of Christian pilgrims baptizing in the river who perceive its water as eternally and unchangeably holy. The chapter examines the evolution of the concept of holy water in Christianity, the historical-religious role of the Jordan River as the "prototypical river of life" and current transboundary efforts to revive the river.

Together Chapter 5 and 6 reflect the central role of water in Christianity, Judaism and Islam, but also highlight the gap between the scriptures, where water is extolled as the source of life and a sacred resource, and everyday practice where it is polluted, wasted and undervalued.

CONCLUSION

This dissertation does not endeavour to offer solutions to the water crisis in the MENA region. Rather, it is a snapshot of the situation before 2011 and an examination of the complex web of economical, social and cultural elements in which water is inextricably entangled. In addition, it explores the discrepancy between the reality on the ground of the growing water crisis and the public perception and political narratives that uphold the image of plenty.

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CHAPTER 1

Perceptions of Water in the Middle East: The Role of Religion, Politics and Technology in Concealing the Growing Water Scarcity

INTRODUCTION

Around the world water is becoming an increasingly scarce and valuable resource: 40% of the world's population in 80 countries suffers from serious water shortages, and more than a billion people worldwide do not have access to safe drinking water (UNEP 2002: 69-71). The countries of the Middle East and North Africa (MENA) are among the poorest in the world in terms of water resources. About 10% of the world population lives in the region, yet it only has access to 2% of the world's total freshwater resources (World Bank 1995: 1). Pressure from population growth, the introduction of more modern techniques of water collection and distribution, higher standards of living, and a decrease in the already low rainfall levels all mean that this situation is only deteriorating (UN-ESCWA 2001b: 3). The UN Global Environment Outlook 2002 foresees that 95% of the Middle East will be suffering from severe water shortages by the year 2032 (UNEP 2002: 385-390).

Given the gravity of this situation, it is surprising that the general public in the MENA region remains largely unaware of the impending water crisis and the far-reaching effects it could have at all levels of society. In this chapter I will argue that this lack of public awareness is due to the tenacious presence of religious, political and technological myths which create the illusion of plenty. Constructed upon age-old traditions and beliefs, but also on the convincing rhetoric and imagery of modern-day politicians and engineers, these myths conceal the reality of growing water scarcity. Like the current levels of water consumption in the region, the perpetration of these myths is highly unsustainable; in fact, the longer they are upheld, the sooner the region will be confronted with serious shortages. It is however difficult to call attention to a problem which has until now remained invisible to most. In many countries water scarcity is not yet tangible on a daily basis. And, sadly, it appears that people will only change their attitudes towards water use once it is 'too late' – when reserves have reached critical levels and water is rationed. Programmes to raise awareness of water scarcity therefore seem to be most successful in areas where the crisis is most acute. The material presented in this chapter is based on four years of research

in the MENA region. During this period I visited Morocco, Tunisia, Libya, Egypt, Sudan, Jordan, Israel, Palestine, Syria, Lebanon and Turkey. In each of these countries I carried out interviews and field and literature research with the aim of gaining an understanding of local attitudes towards water and perceptions of the growing problem of water scarcity. Before embarking on this project, I had expected the beliefs, attitudes and traditions surrounding water in the Middle East to be very different from those in the wet northern climates in which I had grown up. I imagined people used the resource more sparingly and valued its presence more highly than we do in The Netherlands where water is only a problem through its abundance.

Yet in most places I found people had exactly the same perception of water as I do: they never really think about it. It is an unquestioned resource that is taken for granted like the air one breathes, and few seem to cherish it to its true value. Only those who experience acute scarcity at a physical level – the Sudanese farmers who send their daughters to fetch water three hours walk away; the Amman housewife who has to run her household on a ration of 24 hours of water a week – seem to fully acknowledge the value of water's presence. And even those who acknowledge that there is a problem feel little incentive to alter their behaviour towards the resource. Instead, water management is left in the hands of God or the government. Due to the heavily centralized system of water distribution in countries like Egypt, Turkey and Israel, the individual user has little control over the resource and therefore feels no responsibility for the water he uses. But also in countries with less centralized systems – Syria, Jordan and Morocco for instance – users feel little compulsion to become actively involved in water management. Thus in the Jordan Valley, farmers are reluctant to join the newly established water user associations: they simply do not see the point. As water represents only 2-5% of the cost of running a farm, it is very low on the farmer's list of priorities; many other things are more important.

> In the farmer's eyes it is like this: if there is no water, you go and do something else, and if there is water, then why should you have to take responsibility over it, and pay for it and go to boring water user association meetings? Water only becomes important when it stops flowing, when it is polluted and when it is saline. That's when it becomes an issue. And in their eyes, God provides. So you see it is difficult to change attitudes (Courcier 2003).

RELIGION AND IDEOLOGY: WATER AS A GOD-GIVEN RIGHT

While perhaps not the primary cause of water's undervaluation in the MENA, religion and ideology are certainly the most deep-rooted and tenacious reasons for the lack of

awareness surrounding the issue of water scarcity.[1] Because of the strength of religious and ideological beliefs, water is perceived as a gift from God to which one should have an inalienable right. This means that in many predominantly Islamic countries in the region water remains heavily underpriced, which in turns leads to widespread waste of the resource on both domestic and agricultural levels.

In Syria, the domestic user only pays a nominal price for water: in 2001 an inhabitant of Damascus paid just US$ 0.05 per 1,000 litres of water he consumed (World Bank 2001). In agriculture Syrian farmers have recently started paying a fee for water diverted from government irrigation networks. However, out of the total irrigated area, 59% of the land is irrigated with water from private – and often illegal – wells. The absence of any control over the water that is pumped from these wells has led to a severe decrease in groundwater levels throughout the country (Bazza et al. 2002: 13). In Egypt neither municipal users nor farmers pay for the water they use and monthly water bills in Cairo can be as low as US$ 1 (World Bank 2001). Pricing in agriculture remains a taboo, as I realized during several interviews at the Ministry of Water Resources in Cairo, where I received shocked responses when I enquired about the price of water for agricultural use (Mahmoud 2001; Al Din Al Qosy 2002). In both cases the gross underpricing of water is justified on religious grounds. In his time, the Prophet Mohammed discouraged the selling of water and according to Muslim teaching, water is a gift from God that should be freely available to all. But the Koran also incites believers to use water sparingly and constantly reminds them that it is a gift from God that he can withhold if he so pleases (see Chap. 5).

Yet in practice most users appear to see the resource as a God-given right, instead of a precious gift that should be treasured. In conversations with a wide range of people in the MENA – from government officials to local farmers – I observed a certain resignation and an acceptance of the situation. Thus in the dying Ghuta Oasis near Damascus a disillusioned farmer explained the degradation of the environment and the pollution of the local Barada River as God's punishment for the sins of the believers. At the site of the Hassan Addakhil Dam in southern Morocco the director of the dam smiled happily as he looked down into the nearly empty reservoir and commented: "We trust God will send us rain soon." He seemed completely carefree: it was out of his hands. In both cases higher forces are held responsible for situations that are entirely manmade. In a sense this is a way of shirking responsibility: as though the blame can be laid on God's shoulders and his omnipotence can be used as an excuse for the human neglect and destruction of the environment.

In Israel, Zionist ideology has strongly coloured public perceptions of water and its availability. Even before the establishment of the state of Israel, the Zionist movement

1 For more details on the role of ideology and religion in shaping public perceptions of water availability, see also de Châtel, F. 2007: Chap. 2, 5, 7.

made the quest for water in the Land of Israel its priority. For without sufficient water supplies, the dream of returning to the Jewish homeland could never be fulfilled (Rouyer 2000: 80).

The quest for the development and acquisition of water resources continued to play an important role in the definition of national policy after Israel's independence in 1948. Former Prime Minister Levi Eshkol described water as "the blood flowing through the arteries of the nation" (Ibid.), and it came to be seen not just as a natural resource but as the instrument of Israel's transformation and prosperity. Water was more than an economic commodity; it was part of an ideology. And as technological capacities increased, water resource development became a symbol of the unlimited power of technology in transforming the land. The Israelis believed that with hard work and the development of sophisticated hydrological projects, there was no limit to the development of the land and its water. Thus ideology and geopolitics took precedence over economic and environmental realities (Ibid.; Tal 2002: 200). Water was only valuable if it could be harnessed for agricultural expansion; climatic considerations such as low and unpredictable rainfall were ignored by politicians of the day, while unsustainable use of the resource was seen as a necessary ill.

Tal (2002) describes the passion for water that dominated during the early years of the Israeli state as almost a "Shakespearean tragic flaw": on the one hand it led to the development of innovative water development projects on a scale hitherto unknown in the Middle East. On the other hand, it created an unrealistic appetite and blinded decision makers to the long-term implications of stress on a fragile resource. "The argument could be made that they almost loved Israel's water resources to death" (Tal 2002: 200). While the Zionist movement thought of itself as liberating the Holy Land and restoring it to its former glory, the underlying attitude towards the environment would, over the years, place a growing and unsustainable demand on the country's water resources. Today this attitude has become an inextricable part of Israeli policy and as agriculture and the water it uses play such a key role in Israel's founding myth, it is difficult to question the policymaking in either domain.

WATER AS A POLITICAL AND SOCIAL ISSUE

The reluctance to price water at its true value is however not only based on pious principles and religious conviction; more often than not the main motivation behind low water fees is the support of the agricultural sector that guzzles between 60% and 90% of water resources throughout the region. The continued support and expansion of the agricultural sector partly stems from a concern over food security. While MENA countries

can never be fully self-sufficient, they seek to attain relative food security, ensuring basic food needs are met.

In the Arab countries of the region, there is also another social reason for supporting agriculture, as it effectively limits further urbanization, and supports small-scale subsistence farming in the region. In these rural societies, water cannot be considered as an isolated resource and water management and allocation have far-reaching social, political and economic implications.

> There is a strong social dimension. Most people here live in the countryside and have a rural lifestyle. Water has a very special status in their life. This is why many countries in the region aim to maintain an agricultural society: to ensure stable societies. That is also why there are subsidies. It is not just economics that affects the use of water in these countries; you also need to evaluate the other aspects that come into the equation such as environment, society and politics (Oweis 2001).

The continued support for agriculture as it exists now is unsustainable; at the same time any kind of reform is fraught with difficulties as this traditional agriculture also represents a way of life that has existed for thousands of years in the Middle East. It is thus easier for governments to maintain the status quo, subsidize agriculture and turn a blind eye to the lowering groundwater levels, the depletion of aquifers and the huge waste that takes place everywhere.

In Israel the continued support for agriculture is not so much a social necessity as a political choice. Current agricultural and water management policies are still strongly tinted by Zionist ideology and the desire to transform the desert landscape into green pastures. Around 60% of Israel's water supply goes to agriculture (Bar-Shiva 2005). When compared to the other countries in the region, this is still relatively low. However, unlike other MENA countries, in Israel agriculture represents only a small portion of the national income. In 1991 it made up only 3% of the country's Gross Domestic Product, while only 4% of the total workforce was employed in the agricultural sector (Lipchin 2003). Yet it continues to enjoy strong support from the government, most conspicuously through the water pricing system which blatantly favours agriculture over household and industry. Therefore farmers pay much less than users in other sectors and the water they use is heavily subsidized.[2] Critics of Israel's water pricing and agricultural policies are numerous. They point out that

2 Bar-Shiva, Cohen & Kislev (2005): Israeli farmers pay around 70% of the real cost of the water they use. Household users are charged much higher rates, both by the state water company Mekorot and the municipalities. While farmers paid an average of US$ 0.25/m^3 in 2005, household users paid at least twice that price at US$ 0.61-1.27.

the high subsidies for water used in agriculture create a net loss for the national economy and that water-thirsty crops such as bananas and citrus should be imported. According to Lipchin (2003) any change in this status quo will require the revision of Zionist ideology to match the reality of Israel's arid environment and scarce water resources. He argues that to break through the entrenched views of Zionism, the system needs to be decentralized, allowing for privatization and local-level decision-making. In his view this could help reduce the buffer zone that exists between water management and the public perception of water availability. "Because the public is encapsulated in a centralized system over which they have no control, changing ideological values that actually represent the situation on the ground will prove daunting," he says, adding that it is at the same time a necessity if the country is to confront the regional water crisis (Lipchin 2003). While Israel's current water policy is perhaps irrational and, in the long term certainly unsustainable, it will be difficult to change. This is partly due to the power of the agricultural lobby within Israeli politics, but, on a deeper level, Zionist ideology also plays an important role. It is perhaps less influential than 25 years ago, but its values and the image of Israel it represents are still deeply engrained in the national psyche.

GREENING THE DESERT: THE PROMISE OF TECHNOLOGY

Technology and the impact it has on daily life and the functioning of society at large is an important cause for water's undervaluing. Indeed, modern technology deeply affects the way people think about water and use it. As soon as water starts flowing from a tap, it is taken for granted; people forget that a fluctuating river or an erratic weather system lies at its origins. By making its source invisible, water's existence is divorced from the elements and the seasons, and it becomes paradoxically omnipresent. The user can comfortably assume that it flows from an endless supply. It is indisputable that the technological advances of the 20th century have enabled the development of MENA economies and improved standards of living. However, on a psychological level – and because many of these projects were hailed by their creators as the answer to all problems – there is now a complacency about water. The Egyptian President Gamal Abdel Nasser spoke of the High Aswan Dam as a "source of everlasting prosperity". Indeed, the High Aswan Dam has transformed the country: not only has it allowed Egypt to intensify its agriculture, it also saved the country from the drought and famine that devastated Ethiopia and Sudan in the 1980s. But on a more abstract level the Aswan High Dam has given the Egyptians a false sense of security over water.

Mohamed Sid Ahmed, a political journalist and commentator in Cairo, comments: "[Since the construction of Aswan High Dam] people are less aware of the value of the

water they use. They take it for granted in a way and don't see it as a precious resource. They think they can just press a button and that the water will come" (Sid Ahmed 2001).

Two issues are at stake here: in the first place there is the issue of scale. Twentieth-century technology brought large-scale engineering schemes with it. Projects like the High Aswan Dam in Egypt, the Great Manmade River in Libya and the Southeastern Anatolia Project (GAP) in Turkey all have one thing in common: their dehumanizing scale. The sheer size of the dam reservoirs and the huge amount of water that is transported through these pipelines simply surpasses the individual imagination. This in turn leads the general public to believe that water supplies are endless. The second issue is distance. Through the development of modern water distribution systems, the link that used to exist between the individual user and his water is severed. Water now flows from the source through an intricate network to arrive at a user many dozens or even hundreds of miles away. This is the case in Israel where the nationalization of water resources in 1959 and the construction of the National Water Carrier in 1964 has created an extremely efficient and sophisticated system of water distribution. According to Tal, there should have been a transition at this point: after a first stage in which water resources were developed and made accessible across the country, there should have come a second stage during which the limits of the resource were acknowledged and the emphasis would have been placed on conservation and an improvement in efficiency. "The fundamentally ideological approach to water, however, prevented a successful transition to the more mature, sustainable stage" (Tal 2002: 200-201). The seamless ease with which water is now delivered throughout the country is without a doubt remarkable, but Lipchin (2004) believes it is a double-edged knife. For the system's efficiency has also blunted people's sense of awareness of water scarcity. In the eyes of the general public there is endless potential in technological development and neither decision-makers nor the general public have acknowledged that there are limits to the country's water resources.

Today the solution to scarcity is being sought not in conservation or a change in agricultural policies but in new technology: desalination, a method that promises unlimited supplies. While the schemes can indeed provide a large volume of water, the technology does not address the underlying political and institutional problems. In fact, desalination makes it possible to avoid these issues and maintain a system in which household users pay for the water that is used – and because of the low prices, also wasted – in agriculture. Thus the promise of large-scale desalination in Israel has the same effect as the High Aswan Dam has had in Egypt: it has created an over-reliance on technology. In the case of Israel has slowed the discussion on water allocations: not only between the agricultural, industrial and domestic sectors, but also between Israel and the Palestinian Authority. Indeed, in the eyes of some, the fact that Israel can rely on desalination implies that it

will in the future no longer have to look at the issue of water supply in a regional context. Arnon Soffer, a professor of geography at Haifa University, is a protagonist of a "total divorce" between Israel and the Palestinian Authority. He says that because Israel can rely on desalinated water, it no longer needs the water of the Mountain Aquifer.[3] "I am very clear on the steps that should taken. There should be a total separation of all aspects. Also of water. They [the PA] are a third-world country and they will pollute the Mountain Aquifer and all the resources they have. So let them have it" (Soffer 2003). Because Israel can rely on technology to resolve its water problem, it holds the strong position in any water negotiations with the Palestinian Authority. The Palestinians cannot afford modern technologies such as desalination.

The current political situation and the ongoing conflict between Israel and the Palestinian Authority means that it is very difficult to form an image of the public perception of water among Palestinians. Where religion, politics and technology conceal the reality of scarcity in many MENA countries, in Palestine, water scarcity is a daily reality for many. However, the scarcity here is construed: it is not so much about availability as about access. At the same time, while water scarcity is a serious problem, it is just one of a dozen problems Palestinians have to worry about on a daily basis. The acuity of the political situation – both internal and with Israel – also makes it difficult to carry out research on the popular perceptions of water in Palestine.

This review of dangerous modern myths is not a condemnation of modern technology or a nostalgic eulogy of traditional water wheels and hand-dug wells. The point is that modern engineering projects through their impressive scale and grand allure conceal the reality of water scarcity. This reality needs to be urgently acknowledged. For while a new dam can alleviate the immediate effects of water scarcity, it does not change the geographical conditions of the region. It does not transform desert climates to temperate ones or guarantee abundant rainfall levels. It is just one component among many that can help in confronting the problem of water scarcity.

RAISING AWARENESS AND CHANGING ATTITUDES

Around the MENA region there is an increasing number of initiatives – by governments and NGOs; on national and local level – to raise awareness about water scarcity.[4] In Morocco,

3 "The Mountain Aquifer is one of the most significant sources of water for both Israelis and Palestinians. Nearly the entire Palestinian population in the West Bank is dependent on springs, wells or extracted water from the Mountain Aquifer for drinking and other uses. In Israel, the Mountain Aquifer supplies water to major population centers" (www.foeme.org).

4 See also de Châtel, F. 2007, Chap. 10, 11.

Egypt, Jordan, Israel and Turkey a variety of programmes are being implemented with the aim of educating and involving the user, and ultimately, changing his behaviour towards water. The most obvious way to make people aware of the value of water is by introducing water prices that reflect the true cost of the resource. As mentioned above, there are many political and ideological obstacles preventing this. Still, many Muslim countries, including Iran, Morocco, Jordan and Tunisia, have started implementing pricing policies in both urban and (local) rural contexts. But pricing alone is not enough; this policy should be complemented by education programmes that involve users in local water management. Instead of shielding the user from reality through the perpetration of deceptive policies, these programmes can give them an insight into the gravity of the situation and restore water to its true value. On an agricultural level, such projects are being widely implemented through the creation of water user associations in which small groups of farmers are given the direct communal responsibility over the water they use. In Egypt the Irrigation Improvement Project (IIP) aims to rationalize and simplify water use along the Nile's side channels. By replacing the numerous individual hand pumps by a single pump at the head of each channel, water is divided more equally and farmers become more involved in the process of water management. The IIP has been in place since 1997, creating more than 6,000 water user associations throughout the country. The programme is seen as a success, also because many farmers who are not yet involved are signing up to it. However, there has been no net reduction of water use and critics question the project's effectiveness (Bron 2002; Roostee 2002; Doma 2002).

Nasr Allam (2002) argues that while user participation and privatization of water management are important, IIP is perhaps not the best way to do it.

> We need to encourage the cooperation of users. The government has a shortage of financing and technical capacities [and] it is important for the government to transfer water management to other sectors. But the IIP programme is very slow and its results are not very conclusive in terms of water conservation. It achieves lower cost for the farmer and better production, but no water is really saved (Nasr Allam 2002).

Thus while Egyptian farmers may today be more involved in the process of water management, their involvement has not yet led to water savings.

On a domestic level, awareness campaigns focus on measures that can help save water in the household. In Jordan, USAID introduced a programme between 2000 and 2005. Water Efficiency and Public Information for Action (WEPIA) set itself the ambitious goal of not only raising awareness, but also changing behaviours. The programme

focused on the dissemination of *Water Saving Devices* (WSDs), small attachments that can be screwed on to taps, showerheads or installed in toilets to reduce the water flow. The project was successful, amending several laws, launching two major media campaigns and designing education programmes for everyone from toddlers to university students, women, and even imams. WSDs were also introduced to 60% of the large users including hotels, hospitals and universities. WEPIA's mandate was taken over in 2004 by the Water Demand Management unit within the Jordanian Ministry of Water Resources. Its challenge is to ensure the durability of WEPIA's work, not only perpetrating its education and media projects, but also making sure that the general public remembers WEPIA's core message: "The Solution is at Your End" (Dahlan 2003; Abdel Khaleq 2003). This is the difficulty with many of these programmes: as their mandate and financing are limited, their message is all too often forgotten, leaving little tangible results. Durability and sustainability are therefore of key concern.

CONCLUSION

> There are too many priorities. You look at the situation and you see only priorities. It is a big challenge: we have to maximize our benefit from the water we have – use it more efficiently. Then we have to prevent pollution and also work with our neighbours. In parallel we have to look to modernize the irrigation system, encourage drainage water reuse and limit the birth rate… It is a great challenge and it is hard to know where to begin (Abu Zeid 2002).

The then-minister of water resources of Egypt, Mahmoud Abu Zeid, summed it up; he was talking about Egypt, but, by and large, the same is valid for the whole region. Water is an increasingly scarce resource throughout the Middle East. Many foresee that the severe shortages that will afflict the region in the future will have far-reaching implications for the lives and livelihoods of the population there. Yet this population remains largely unaware of the impending crisis (Nasr Allam 2002; Al Ansari 2003; Boutros Ghali 2003).

The harsh reality of water scarcity is shrouded in religious, political and technological myths, which make it possible to ignore reality and continue using water as it has been used for centuries. However, the problem is taking on such proportions that it can no longer be resolved on the sidelines of the society.

Water is first of all a natural resource, but it is also part of an intricate web of economic, social and political issues from which it cannot be dissociated. It is impossible to consider water in the MENA without considering its users, and their beliefs and attitudes. Because water is not an isolated issue and because its availability influences the life of everyone

in the MENA region, the problem of water scarcity should be addressed by society as a whole, not just by policymakers and engineers. For a part, it is a technical issue that can be resolved through engineering works, better distribution and less waste. But it is also a social issue that is aggravated by unrestrained population growth, pollution and lack of education.

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PART II

The Euphrates at Jarablous on the Syrian-Turkish border, 2009.
Source: Adel Samara.

CHAPTER 2

Damascus: The Death of the Garden of Eden

Variously described as the "bride of cities," "the grain of beauty on the world's cheek", and "a lover's torment", (Gibb 1958: 118-120) the Syrian capital Damascus was famed through history for its abundant freshwater resources and the shady gardens that surrounded it. Some speculated that it must be the site of the biblical Garden of Eden (Gibb 1958), while the Prophet Mohammed was so enchanted when he looked down on the city from Mount Qassioun that he had to avert his eyes from what he believed to be an earthly paradise. Convinced that man cannot enter paradise twice, he refused to enter the city and resolved to continue his quest for heavenly paradise (Rogerson 2003: 64).

However, as the city grew and water demand rose beyond the capacity of the Damascus Basin and its water resources, the situation changed. Damascus gradually engulfed the surrounding villages to create a sprawling city of more than 4 million inhabitants. The Barada River, the source of the city's prosperity through the centuries, was reduced to a slimy trickle of sewage and garbage. In 2009, farmers in the Barada Valley, who until the late 1990s irrigated their orchards with water from the river, feared that their grandchildren would not even remember the river's existence. By 2001 the gardens that surrounded the city had all but disappeared, covered in concrete and asphalt, as they were swallowed by uncontrolled urban growth. The situation has only worsened since 2011, as what started as a peaceful uprising against the authoritarian regime of Bashar al-Assad has spiralled out of control into a brutal civil and proxy war. While most parts of central Damascus still received a regular water supply in 2013, large parts of the suburbs no longer received any water.

This chapter traces the history of water use in Damascus from the early beginnings of the city to today, examining the causes of the current water crisis and discussing proposed solutions. More specifically, it examines how the sustainable pattern of water use that had been in place for millennia has been disrupted in the past 60 years by a number of factors including high population growth, poor agricultural water practices, and uncontrolled urban expansion – and, perhaps most importantly, a lack of political will and technical capacity to implement and enforce a sustainable water management strategy.

The chapter draws on historic and literary descriptions of the Syrian capital and its

surroundings. Data on the more recent evolution of water use in Damascus were gathered from: Syrian government databases and reports; scientific studies and media reports; personal communications with Syrian government representatives and Syrian and foreign water experts working in the Damascus region; and on-the-ground research in Damascus in 2001 and in the period 2006–10. Regarding data on water availability and use, and the hydrology of rivers in the basin, it is important to note that the Syrian water sector as a whole suffers from a lack of comprehensive and accurate data, particularly when it comes to groundwater resources.[1]

THE BARADA RIVER AND ITS SEVEN CANALS

Until the early 20th century, Damascus inspired poets, travellers, kings, and prophets. The 10th-century geographer Ibn Hawqal wrote that water was "everywhere" in Damascus: "in the houses, in the streets and in the baths" (Degeorge 1997). The 12th-century Moorish traveller Ibn Jubayr even wondered whether there was too much water and claimed that "its ground is sickened with the superfluity of water so that it yearns even for a drought, and the hard stones almost cry out to you" (Broadhurst 1952: 271).

Writing in the 13th century, the Sufi imam Shams ed-Din Abu Abdullah Mohammed (known as Dimashki), qualifies Damascus as "one of the healthiest, prettiest, most beautiful and most elegant cities in the world" (Dimashki 1874: 262). In his detailed account of the city, he describes three parts: the urban core and the buildings around it "which resemble a white bird, resting in a green meadow, drinking the waters that come to it, one after the other"; the Ghuta Plain that surrounds the city; and a third subterranean part "that forms a separate city of water courses, channels, rivers, springs, reservoirs, underground canals; wherever one looks, one finds water courses interlaced to the right and the left, one layer above another" (Dimashki 1874: 262-3).

European travellers were also enchanted by the sight of this Oriental city hidden away in thick forests[2] and living to the rhythms of gurgling springs. In the 15th-century, Bertrandon de la Broquière, standard bearer and advisor to Duke Philip the Good of Burgundy, described it as "a large and spacious city with beautiful large gardens the likes of

1 On the issue of accuracy and availability of data, Elhadj (2003) quotes a 1998 study by Environmental Resource Management (ERM), which states: "Many estimates of water balances have been made in the past 10 years. Of those reviewed, no one set of data appeared totally free from contradictions, either internally or with other data sets." Elhadj adds that there are discrepancies in the figures published by different government ministries and international agencies.

2 A 14th-century account of Alexander the Great's conquest of Damascus in 333 BC records that "the valley where the river of Damascus [the Barada] flows today was at the time a cedar forest". According to Degeorge (1997: 53), in the 4th century BC, Lebanon's cedar forests stretched from Mount Lebanon to the Damascus Plain.

which I have never seen before with the best fruits and large amounts of water" (Degeorge 1997: 325). The 19th-century traveller Alexander Kinglake wrote that Damascus was:

> a city of hidden palaces, of copses, and gardens, and fountains, and bubbling streams… Close along the river's edge, through seven sweet miles of rustling boughs and deepest shade, the city spreads out her whole length. As a man falls flat, face forward on the brook, that he may drink, and drink again, so Damascus, thirsting forever, lies down with her lips to the stream, and clings to its rushing waters (Kinglake 1996: 229–30)

The combination of Damascus's abundant water resources and its strategic location at the crossroads of desert caravan routes from India, Persia, the Arabian Peninsula, East Africa and Anatolia ensured that it rapidly became a centre of economic, cultural, and political exchange. It was a meeting place for nomadic populations from the east and settled coastal populations from the west. But the water was not only essential for the survival of the city and its surroundings, it was also cherished as part of Damascus's cultural heritage. The presence of abundant water influenced the planning of urban space and the design of the Damascene house, and inspired the development of a highly sophisticated irrigation network that covered 25,000 hectares (ha) in its heyday.

Without the waters of the Barada River and its main tributary, the Fijeh Spring, Damascus would never have flourished as one of the region's most important cities. Shielded from the coastal rains by the Lebanon and Anti-Lebanon Mountain ranges, the ancient city on the edge of the Syrian Desert lies in an arid to very arid climatic zone, with an annual precipitation of around 250 mm on the city's western outskirts and less than 100 mm in the Eastern Ghuta (Hobler and Rajab 2002).

The first traces of human settlement in the area of Damascus can be traced back to the Neolithic era, with the first written mention of the city appearing in the cuneiform texts of Ebla in the 3rd millennium BC. The first reference to its fertile surroundings can be found in 9th-century BC texts describing the city's siege by the Assyrian King Salamanazar III, where reference is made to the king's men cutting down the dense forests around the city (Degeorge 1994: 11).

The city's two main water sources originate in the Anti-Lebanon Mountains: the source of the Barada Spring lies 40 km from Damascus at an altitude of 1,090 metres above sea level (m asl) (JICA 1996) and flows through a narrow valley to the Damascus Plain (Fig. 3). Writing in the 12th century, the Damascene historian Al-'Umari described the Upper Barada Valley as one of the "most admirable spectacles one can see": "The water from the heavens and the land are plentiful here, the sun and the air are full of dew; the two mountains that

Figure 3. Waterfalls in the Barada Valley, 1898–1914. Source: Library of Congress, Prints & Photographs Division.

surround it are covered in violets that lie in the shade of the tangled branches of willow trees" (Degeorge 1997: 269).

Nineteen kilometres from the Barada Spring, the Fijeh Spring (altitude: 820 m asl) joins the river's course through the narrow gorges of the Barada Valley. At the foot of the Anti-Lebanon in the village of Rabwe, the Barada River[3] branches off into seven channels;[4] these flow at different elevations and fan out through the city into the Ghuta Plain[5] (altitude: 600-700 m asl), where they in turn branch off into smaller canals (Fig. 4). Historically, before the intensification of irrigation in the Ghuta, the Barada River used to discharge into the Lake Ateibeh, which was surrounded by dense reed beds. However, the river's water has not reached this lake since 1969 and it has today dried out completely (Fig. 10).

A second important river in the Damascus Basin is the Awaj, which originates on the eastern slopes of Mount Hermon and flows into the plain south of Damascus, where it

3 The Barada River is mentioned in the Old Testament, 2 Kings 5:11 as "Abana" when the Syrian general Naaman tells the Prophet Elijah: "Are not the Abana and Pharpar, rivers of Damascus, better than all the waters of Israel?" The name Pharpar has variously been interpreted as a reference to the Banias or the Awaj, respectively a branch of the Barada and a river running south of Damascus (see Chap. 6 for the biblical story of Naaman).

4 Named in Dimashki (1874: 263) as the Yezid, Tawra, Mezzawi, Darajja, Qanawat, Banias, and Barada.

5 In Arabic, a *ghuta* is a green and well-watered area. *Al ghuta* – preceded by the article – designates the oasis around Damascus.

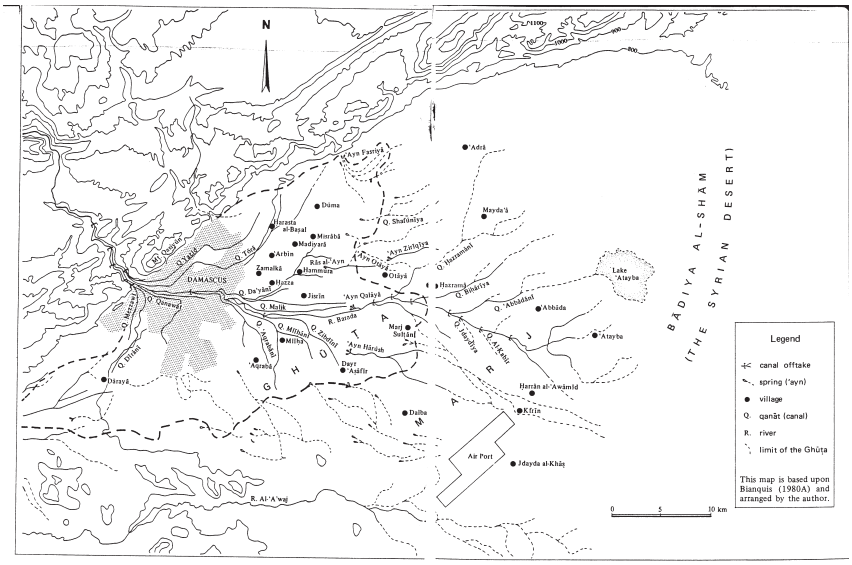

Figure 4. Schematic map of the Barada River and its canals. Source: Naito 1986.

splits into a series of irrigation canals. Historically, the Awaj used to drain into Lake Hijaneh south-east of Lake Ateibeh. However, due to intensive irrigation, the water no longer reaches the lake, which has dried out (JICA 1996: C-7).

Many of the Barada's channels date back to the Aramaean era (8th c. BC) or earlier (Degeorge 1997: 7). The oldest written manuscript recording the existence of Damascus's water network dates back to 670 AD and was written by the Gallic Bishop Arculf, who recorded the existence of "*IV magna flumina*" (four large rivers) in Damascus (Degeorge 1997). The oldest record from Arabic sources comes from the 12th-century historian Ibn Asakir, who writes about the Barada canals and describes the modifications carried out by the various caliphs. He also says: "Every time one questions the farmers on the origins of the works, the answer is identical; in every village everything is attributed to the Romans" (Tresse 1929: 472). Simple gravity and the construction of seven canals with countless side channels allowed for the development of one of the most fertile and productive agricultural areas in the Middle East.

In its early days, the Ghuta of Damascus covered 8,000 ha, later expanding to 25,000 ha, as more canals were dug and the irrigation network grew more sophisticated. The gardens were set out in concentric rings, with the most intensive irrigation and fertile grounds situated near the city. As one travelled east into the Ghuta, cultivation became less intensive and water less abundant. Dimashki counted 110,000 gardens of orchards

and vegetable plots in the Ghuta, and described the cultivation of apricots, pomegranate, walnut, apple, pear, plum, cherry, peach, fig, myrtle, cucumbers, courgettes, tomatoes, beans, chickpeas and aniseed (Dimashki 1874: 263).

Beyond the inner ring of intensive cultivation was an area of fruit orchards followed by the *Zor*, where vegetable gardens were planted between poplar trees. As water became scarcer to the east, vegetable plots made way for vines, wheat and olives. Further out, livestock was kept in a less densely populated area known as *Al Marj* (meadow). Covered in green pasture in spring, this area on the edge of the desert steppe was arid during the rest of the year (Degeorge 1997: 9). Numerous springs and shallow groundwater supplemented the network of rivers and canals, contributing further to the irrigation of the Ghuta's gardens and orchards.

Surrounded by dense greenery, the city itself (altitude: 680 m asl) was just a small dot on the map, an area of less than 2 km from east to west at the foot of the 1,150 m Mount Qassioun (Fig. 5). The seven main canals supplied water to both domestic and agricultural users. The Yezid, commissioned by the 7th-century Umayyad Caliph Yezid ibn Mu'awiya, is the northernmost canal and was traditionally used to irrigate fields at the foot of Mount Qassioun, often using waterwheels to haul the water uphill. The Tawra,[6] described by Al-'Umari as the "Nile of Damascus", irrigated fields and orchards on the left bank of the Barada, whereas the Qanawat and Banias supplied the residential areas within the city walls. Each of these canals had countless branches and derivations: the 12th-century Ibn Asakir counted 19 canals outside the city walls and 130 *intramuros*, most of them with picturesque names such as Cucumber Canal and Pearl Market Channel. The Qanawat, which is thought to have been dug by the Romans in the 2nd or 3rd century AD, continued to supply three quarters of the Old City until the early 20th century, while a separate sewage network collected waste water (Degeorge 1997). Drainage water from the Yezid, Tawra and Barada flowed downhill into a second network of canals that stretched east from the Old City at Bab Tuma (Saint Thomas' Gate), irrigating the Eastern Ghuta and the Zor. The main channels of this network were the Aqrabani, the Da'iyani, the Malika and the Majdul, each named after the last village along its course (Degeorge 1997).

Until the beginning of the 20th century, these urban canals were cleaned on an annual basis. This process took 14 days for each canal and was carried out in succession for the Tawra, Qanawat and Banias. The cost of cleaning of the canals was divided among local residents, though along the Qanawat only the owners of bathhouses, cafés and inns contributed; private residences were exempt. Besides this yearly expense, users did not pay for water in Damascus. This was a rare luxury that did not escape the attention of

6 According to Dimashki (1874), the Tawra was dug by a Greek king of the same name. According to Degeorge (1997), the name is derived from the Aramaic word for bull, *tōr* or *tawrā*.

Figure 5. View of Damascus from Salhiyeh, with the Ghuta Oasis in the background, 1898–1914. Source: Library of Congress, Prints & Photographs Division.

medieval chroniclers such as Ibn Asakir, who saw it as "one of the fortuitous advantages of this town", as in most other countries, water could only be obtained by payment (Degeorge 1997). According to Tresse (1929), this custom continued into the early 20th century, with users only paying for the upkeep of the canals.

The cleaning took place after the rainy season, so that the land was sufficiently irrigated to cope with several weeks without water. Each village appointed a team of workers to drain the canals and clean them out one by one, starting with the most northern branch and working gradually southward. Banks were rebuilt, and silt and mud were removed. When the water was let back into the canals – a procedure known as *fatah al thaqab* (the opening of the hole) – a torrent of spring water and hundreds of fish would come gushing down, to the great delight of fishermen, who threw themselves into the floods armed with nets and baskets (Tresse 1929).

The presence of an uninterrupted flow of fresh water was also reflected and celebrated in the layout of the Damascene house, which was designed to provide coolness in the stifling summer months. Centred on its sheltered green courtyard, the traditional two-storey house featured a fountain in the middle of the courtyard (Fig. 6). A range of fruit trees and scented plants such as apricot, pomegranate, lemon and orange trees, vines and jasmine ensured much-needed shade. Together with additional small fountains in the reception and living rooms, the sound of running water was always present, a feature

which was not only pleasant, but which also ensured that private conversations in the rooms could not be overheard by curious ears outside. Before all houses were connected to a piped water supply network, inhabitants drew water from wells in the courtyards, or from one of the seven branches of the Barada that ran nearest to the house.

Figure 6. Fountain in a Damascus courtyard, 1900. Source: Library of Congress, Prints & Photographs Division.

As the city's population increased to reach approximately 200,000 in 1906,[7] water demand rose and the canals became increasingly polluted. The construction of the Ain al Fijeh water distribution system in the early 20th century allowed Fijeh Spring water to be conveyed by gravity through a pipeline from its source in the Anti-Lebanon Mountains to an underground reservoir in the Damascus neighbourhood of Salhiyeh, at the foot of Mount Qassioun. From the reservoir, which was inaugurated in 1908, the water was distributed to about 200 public fountains, which became the city's main source of water (Hudson 2008). This system survives today with two tunnels from the Fijeh Spring: the old

7 According to the Baedeker Guide to Damascus cited in Degeorge (1994).

one to Salhiyeh is rarely used and has been replaced by a new one that delivers water to the Wali Reservoir. The spring water is supplemented with water from various other sources in a bid to meet the ever-growing domestic demand.

ELEMENTS OF THE WATER CRISIS

In the 1860s, the Scottish barrister John MacGregor explored Egypt, Palestine, and the Red Sea in his seven-metre-long canoe, the Rob Roy. During his journey, he also paddled through Syria and was the first traveller to sail down the entire course of the Barada, which he declared to be "one of the most interesting of the ten rivers explored on this journey" (MacGregor 1870: 115). MacGregor set off from the source of the Barada River, which he described as "a Scotch salmon-stream, with high snow-clad mountains on one side and bluff rocks on the other" (Fig. 7). From here he descended into the Ghuta Plain, where the Barada "was about sixty feet broad… The stream is swift, and tumbles along in a rugged bed, with a very lively noise". Further down he commented on "a waterfall and torrents of foam with dense woods all round" (Ibid.: 121–5).

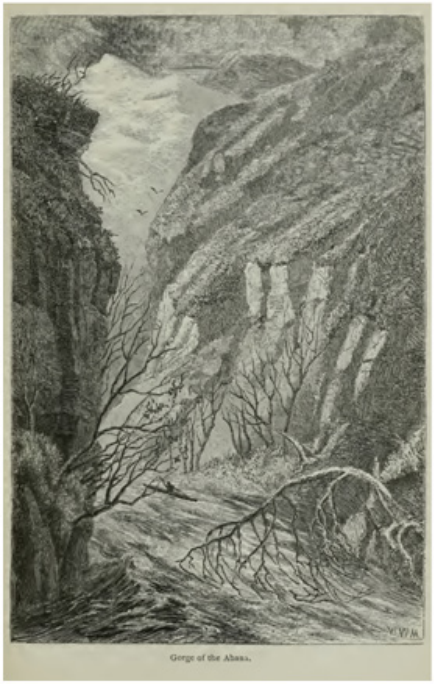

Figure 7. Illustration from John MacGregor's travel account showing his descent through the Barada Valley. Source: MacGregor 1870.

As he progressed through Damascus to the Ghuta Plain, MacGregor was puzzled to find that the river's course eastward was shrouded in mystery, with locals describing it as "a silent and desolate region", and claiming that the bleak morass at the end of the Barada was "impenetrable" and "full of whirlpools, which sucked people down; of hyenas, panthers, and wild boars, which ate people up; and of fevers, agues, snakes, jungle, sun-strokes, and many other horrible things" (Ibid.: 130). Undeterred by the "stolid ignorance or stupid exaggeration" of the "natives" (Ibid.: 129), MacGregor set out on a reconnaissance mission to explore the Damascus Plain on horseback, which allowed him to discover the "marvellous ingenuity and perseverance with which the Abana has been led through the desert to water it" (Ibid.: 130). He commented: "Certainly, as a work of hydraulic engineering, the system and construction of the canals by which the Abana and Pharpar are used for irrigation may be still considered as the most complete and extensive in the world" (Ibid.: 120).

As he launched the Rob Roy down the Barada, he delighted in being the first to discover this rich landscape by boat:

> The water was now red in colour and two feet deeper than before, being swollen high by mountain storms, and the channel led us away and away among orchards and groves and thick osier-beds and smiling water-meadows. Tortoises sleeping on the bank toppled into the stream as we passed, and land-crabs lazily crawled out of sight. There were many wild ducks in the river brakes, most of them too fat or lazy to rise, and I had to get out only seven or eight times to haul the canoe past obstructions, until on a sudden the ruddy current bore the Rob Roy right into an impassable jungle of osiers ten feet high (Ibid.: 133).

MacGregor's account is all the more remarkable for his description of a landscape and a water network that can today hardly be imagined. Reduced to a seasonal stream that was fed more by sewage and wastewater than by spring water, the Barada River and its network of canals had largely disappeared by 2009. The gardens of the Ghuta had been decimated to a fifth of their original size, while some of the most fertile lands had been swallowed up by the sprawling city and transformed into chaotic suburbs. Meanwhile, Damascus was confronting a growing water shortage that authorities were struggling to resolve.

Pre-conflict assessments of the extent of the water deficit in the Barada/Awaj Basin varied widely, ranging from 212 million cubic metres (MCM) (Hoff 2009), to 311 MCM, 450 MCM and 762 MCM.[8] According to the Damascus Water Supply and Sewerage Authority

8 Figures for 2000-1 cited in Elhadj (2003) from the Food and Agriculture Organization, World Bank and Syrian Ministry of Irrigation respectively.

(DAWSSA) statistical yearbooks, there was even a deficit for drinking water.[9] Various Syrian sources indicated a fluctuating annual deficit of at least 190 MCM, and much higher in drought years (Fallouh 2007), for the whole Barada/Awaj Basin, while 14 water units in the Ghuta reportedly faced a chronic deficit.

In practice, domestic users in Damascus City were hardly affected by the decline in water resources and still received tap water for 8-16 hours a day, with rooftop storage tanks providing uninterrupted supply during outage periods. Water bills also remained low, at around US$ 8/month. Conversely, agricultural users in the Barada Valley and Ghuta were severely impacted by the sharp decline in both surface and groundwater resources in the Damascus area. Villagers and farmers in the Barada Valley had seen the landscapes around them and their lives change, as the river had gradually dwindled to a seasonal stream over the last two decades. Farmers along the river's course were forced to abandon agriculture and large parts of the Ghuta had been swallowed by urban sprawl encroaching from the west, or the desert advancing from the east (de Châtel 2007).

While Damascus is certainly not the only Middle Eastern city to suffer from growing water scarcity and problems of pollution, it does uniquely combine many of the factors that characterize the Arab region's water crisis at large, including rapid population growth and soaring water demand, unsustainable groundwater use, pollution, uncontrolled urban expansion and illegal settlements, high water allocation to irrigated agriculture, low water tariffs, both for urban and agricultural water use, poor governance, and a weak legal framework. The current conflict, with protracted fighting in the suburbs all around Damascus and in the Barada Valley, has only worsened the situation.

Rapid population growth

Like many other countries in the region, Syria's population has grown exponentially over the past 60 years, from 3.42 million inhabitants in 1950 to 20.4 million in 2010 (UN-ESCWA 2010). Syria's annual average population growth rate remained among the highest in the Middle East and North Africa (MENA) region, at 2.94% in 2008.[10] However, over the last 60 years, Damascus has grown at an even faster rate. This trend can mainly be ascribed to the influx of migrants from rural areas, and successive waves of refugees settling in the capital and its suburbs. In 1950, Damascus and its suburbs had a population of 701,000 (Elhadj 2003: 18); in 2009, the population reached 4.12 million (Syria Today 2009a).[11] Following

9 Exact figures were not available, as DAWSSA had no comprehensive data on the volume of water it abstracted from aquifers in the Ghuta Plain.

10 The growth rate has dropped from an average of 3.75% in the 1970s (UN-ESCWA 2008).

11 Official government figure. Others estimated the capital's population to lie closer to 6–7 million, a third of the country's population before 2011.

the Ba'ath Party takeover through a military coup in 1963, the country's political power structure changed, which instigated a flood of migrants from coastal rural areas between 1963 and 1970 (Elhadj 2003). The capital's population expanded further with successive waves of refugees from Palestine, the Golan Heights and Iraq in 1948, 1967 and 2003 respectively.

In general, over the past 40 years, the Syrian regime has concentrated institutions and services in Damascus, which has further encouraged centralization and disproportionate growth in the capital. Government efforts to decentralize the economy and develop regional towns such as Homs, Tartous and Aleppo only started in the mid-2000s.

The movement of rural-urban migration that started in the 1960s has accelerated over the past decade, as Syria started transitioning to a "social market economy". Among others, this resulted in the liberalization of the agricultural sector and the cancellation of agricultural subsidies, which led many farmers to abandon their land and seek work in the capital (see Chap. 3 and 4). According to Aita (2009), 460,000 active people left the agricultural labour force between 2001 and 2007, representing a 33% decrease in jobs in this sector (and 10% of the total labour force). Moreover, a devastating drought in north-eastern Syria between 2006 and 2010 spurred further internal migration, with an estimated 300,000 people leaving their drought-stricken land and seeking refuge in makeshift tent camps and illegal housing in the capital's suburbs (De Châtel 2014).

Rising demand, dwindling supply

Damascus's soaring population has obviously had serious consequences for the city's water resources, which are being stretched far beyond their sustainable limit. Hoff (2009) points out that the Barada/Awaj Basin disposes of less than 5% of the country's total water resources, while 30% of the country's population is concentrated in the area. Based on government figures from 2001, the water balance for the Barada/Awaj Basin presents an annual deficit of 311 MCM, with a total water availability of 1,277 MCM and a total use of 1,588 MCM. The figures show that the deficit is mainly caused by a very high agricultural water use, estimated at 1,207 MCM, or 76% of total water use (Varela-Ortega and Sagardoy 2003).[12]

Elhadj (2003) blames the cumulative effect of unsustainable water use for irrigation in the Barada/Awaj region for the depletion of the aquifer. Taking the long view of irrigation development in the Damascus area, he estimates an annual groundwater over-abstraction of 200 MCM for irrigation for the period between 1950 and 2001, bringing the aggregate water balance deficit to 10 billion cubic metres (BCM) just for irrigation (and a further

12 Compared to an estimated 85-90% on a national level.

10 BCM for domestic use). In 1950, an estimated 80,776 ha of land were irrigated in the Ghuta Plain, suggesting a longer history of groundwater over-abstraction for irrigation and adding to the 10 BCM abstracted after 1950.

As the population of the Damascus rose to 200,000 in the early 20th century, and demand from the domestic sector increased, water allocation to irrigation should have been reduced in order to maintain a positive water balance. Elhadj (2003) argues that successive rulers of Damascus[13] lacked both the necessary knowledge of the aquifer and its sources, and the political will to implement such a sectoral reallocation strategy in the basin. Thus instead of balancing demand from different sectors, authorities were unable to control growing use in both the agricultural and domestic sectors, resulting in the depletion of the aquifer, a lowering of the water table, and a drop in spring flow.

Damascus's water supply – for domestic, agricultural, and industrial use – comes from three main sources today: the Barada Spring, the Fijeh Spring – both of which mainly supply drinking water to Damascus City – and groundwater, which is intensively abstracted in the Barada catchment area and in the Ghuta Plain for drinking water and agricultural purposes. As mentioned above, the Awaj River, which originates on the eastern slopes of Mount Hermon, no longer flows beyond the village of Kisweh, due to intensive abstraction for irrigation purposes (JICA 1996: C-7). The Fijeh Spring still forms the city's main source of drinking water supply with a long-term annual average discharge of 200 MCM (Al-Charideh 2011). The karstic spring in the Anti-Lebanon Mountains is replenished annually through rainfall and snowfall in the catchment area. The creation of a protection zone in 1989 has successfully protected the aquifer, with a ban on all construction, well drilling, and any commercial, industrial, agricultural, tourism or urban activities (Al Assad 1989). For most of the year, the entire Fijeh flow volume is captured and transferred to Damascus for drinking water purposes. However, in periods of peak flows, spring water is still released into the riverbed. For the remainder of the year, only rainwater, untreated sewage, and irrigation return flows enter the riverbed (Fig. 9). In periods of low flow, additional water is pumped from the spring to supply Damascus City with drinking water.

The Barada Spring, which until 1978 had a mean long-term annual yield of 99 MCM, has shrunk considerably. Figures for the period 1983-93 show a significant reduction in spring yield to 70 MCM/yr (JICA 1996: C-15). Since 2000, the spring only flows for seven to eight weeks a year, as most of the water is captured by wells in the catchment area (Fig. 8). These wells are used for irrigation and domestic purposes in the Zabadani Valley (Ibid.). In addition, a well field made up of 22 wells in the Barada Spring catchment area pumps water to the Fijeh Spring and on to Damascus (Ibid.: C-18). The well field was commissioned

13 The Ottomans (1517-1918), the French Mandate (1920-46), and Syrian governments after 1946.

in 1995 and became fully operational a year later, with a pumping rate of 1m^3/s (15.76 MCM/yr). An additional well field at Jabous in a different area of the Barada catchment supplements the drinking water supply.[14]

Figure 8. The Barada Spring, here pictured in 2009, used to form a lake at the head of the valley before flowing down to Damascus. After the spring almost dried up in 2000, the lake disappeared. Source: Adel Samara.

Figure 9. The Barada flowing south through the Damascus Plain, 2009. Source: Adel Samara.

14 According to villagers in the Barada Valley, the creation of this well field had a severe impact on river flow, and after the wells started pumping water out of the catchment, the level of the river dropped dramatically.

Figure 10. Lake Ateibeh, into which the Barada River used to discharge until 1969. Source: Adel Samara.

Overexploitation and pollution of groundwater

As the water of the Barada and Fijeh no longer meet demand for drinking water in Damascus and its suburbs, supply is augmented by groundwater from seven well fields in the Ghuta Plain that are operated by DAWSSA. Water from the Fijeh/Barada Reservoir is mainly used to supply Damascus; the villages around Damascus are supplied by water from over 1,000 wells in the Ghuta Plain. In 1995, these wells abstracted an estimated 30 MCM/yr (Ibid.: C-35). No recent abstraction figures exist, as most of these wells are not metered, but the drinking water deficit in Damascus Countryside reportedly lies around 34 MCM/yr.

The city's rapid population growth since the 1950s has had a far-reaching impact on the Ghuta Plain. With the influx of new populations, urban areas rapidly expanded into the plain, swallowing up villages into the urban fabric, destroying parts of the irrigation network, and transforming agricultural lands into residential areas. On the other hand, the growing demand from the domestic sector meant that water from the Barada and Fijeh Springs no longer reached the Ghuta canal network, and that the agricultural sector increasingly had to rely on groundwater (Naito 1986: 14) with an exponential increase in the number of wells, from 622 wells in 1947 (JICA 1996: C-36) to nearly 57,000 in 2010 (SADB 2012). Over-pumping of groundwater and illegal well drilling have become serious problems, despite the issuing of successive laws since 1959 to prohibit further drilling of wells.

Over-pumping of aquifers became a problem across the country after diesel motor pumps were introduced in the 1960s. Increased groundwater exploitation was part of the government policy to increase agricultural output and boost production of water-thirsty crops such as cotton, wheat and sugar beet. Farmers obtained cheap loans to drill wells and install pumps, while fuel prices were heavily subsidized. In the 1980s and 1990s, tens of thousands of new wells were sunk with and without licences (Kloosterman 2009), boosting Syria's total groundwater-irrigated area from 318,000 ha in 1985 to 727,000 ha in 2005 (SADB 2012). From the late 1990s onwards, the government has tried to limit the drilling of illegal wells and legalize existing wells, most recently through a new water law issued in 2005. Despite this, 57% of wells across the country were still illegal in 2010, and new wells continue to be dug.

Nearly a quarter (24.7%) of the country's wells were concentrated in the Damascus region (Damascus Countryside Governorate) in 2010 and more than three-quarters of these were illegal (76%).

Table 1. Number of wells in Syria and in the Damascus area (1982–2010)

Year	Number of wells				Source
	Syria		Damascus + Damascus Countryside		
	Total	Unlicensed	Total	Unlicensed	
1982	-	-	-	12,000	Ministry of Irrigation 1982, cited in Naito 1986.
1999	135,089	63,078	31,880	26,795	SADB 2012.
2010	229,881	130,997	56,961	43,246	SADB 2012.

Historically, the depth to groundwater in the plain around Damascus ranged between 2 m in areas near the Barada River up to 70 m in the eastern and north-eastern Ghuta. Water tables have, however, dropped over the past 30 years as a result of over-abstraction. This led to the depletion of the shallow aquifer, pumping from deeper aquifers, and upconing[15] of saline water. While abstraction rates have dropped over past decades, groundwater levels have not recovered, indicating a very low recharge rate (Hobler and Rajab 2002).

In the period 1993-2000, groundwater levels declined by more than 6 m/yr in some parts of the Ghuta, while springs ran dry. In the western and central Ghuta, levels dropped by 1-2 m/yr, while in the east, rates were closer to 3-4 m/yr. With such high rates of abstraction and rapid decline of the water table, complete recovery of the aquifer

15 "Upward movement of salt water in a cone-shaped manner from below a freshwater/ saltwater interface, under the influence of freshwater pumping above the interface" (UN-ESCWA and BGR 2009).

is unlikely, and would require several successive years of above-average rainfall. During drought periods, the situation is worse, with springs running dry and wells producing less water. Farmers resorted to drilling deeper wells, but these were often less productive, and contained more saline water.

The only area where groundwater levels were rising before 2002 was the area around Damascus's only waste water treatment plant in 'Adra, in the northern part of the Ghuta, where (partially) treated waste water allowed (unintended) artificial recharge of the aquifer, and groundwater levels rose up to 8 m/yr. However, in this area, groundwater pollution formed a growing threat, as the water treated at the 'Adra plant did not meet the required standards for use as irrigation water. Most parts of Damascus and some of its eastern suburbs were connected to the sewage network, but most towns, villages, and farms in the Damascus Countryside released their untreated waste water into surrounding wadis and channels. Farmers used this water for irrigation, with obvious risks to public health.[16] The agricultural drainage water had high levels of salinity and fertilizers, the latter causing severe pollution by nitrates. Hobler and Rajab noted in 2002 that groundwater was the only source of water for the population in rural areas but that "if drinking water standards for groundwater salinity and nitrate contents… are taken into consideration, the groundwater in large parts of the Ghuta Plain is not suitable for domestic supply anymore" (Hobler and Rajab 2002: 23). Other sources of pollution included: untreated industrial waste water from small- and medium-sized industries such as tanneries, food processing, pharmaceutical and textile plants and slaughter houses; petrol stations and fuel depots; and untreated waste water and medical waste from hospitals, which contained high levels of pathogens and viruses.

As a result of the depletion of the shallow aquifer and soil salinization, many farmers have abandoned agriculture, particularly in the south-eastern Ghuta where the desert was encroaching on agricultural land from the east. However, at the same time, the Ghuta's agricultural lands were also increasingly threatened by the urban expansion of the Damascus suburbs from the west.

Uncontrolled urban development

The Syrian authorities had long been aware of the threat of uncontrolled urban expansion and its effects on the Ghuta. Several urban plans attempted to address the city's chaotic and voracious spread into the oasis. Key among these was the Ecochard Plan, which was

16 According to figures from the Ministry of Housing and Construction from 2008, 10.2 million people (47% of the Syrian population) were not connected to the sewage system, while 14.9 million people (69%) did not have access to proper sewage treatment. As a result partially treated or untreated sewage flowed into the environment and created public health risks (GTZ and SPC 2009).

articulated in the 1930s and continued to influence urban development in the capital in the 21st century. Developed by the French urban planner Michel Ecochard and architect Robert Danger, the plan highlighted the need to protect the Ghuta.

> If this illegal mode of settlement is allowed to develop, the gardens will disappear and with them the green belt that surrounds the city. In only a very few years we will be left surprised to see that in their place there is a collection of shoddy and unhealthy huts spreading the worst diseases. (Degeorge 1994: 176)

The Ecochard Plan also focused on the city's ever-growing water requirements. These were to be addressed by the creation of dams and reservoirs along the course of the Barada and Awaj Rivers, and at the Fijeh Spring (Degeorge 1994). Nothing came of the plan though, and the Ghuta was losing an estimated 200 ha each year to the advancing city in the late 2000s. As Damascus's population grew after independence in 1946, the city sprawled uncontrollably, swallowing the Ghuta and its orchards, and expanding from 1,900 ha in 1945 to 8,500 ha in 1988 (Ibid.). Thus the oasis was gradually eaten away from its grand 25,000 ha to less than 6,500 ha in 2010 (Syria Today 2010b).

The city's uncontrolled expansion into the Ghuta can be explained by several factors, including housing shortage, the absence of a government housing policy, and a weak legal framework, which led to uncontrolled and illegal urban development on the most fertile lands in the Ghuta. As many farmers in the area did not benefit from the land reforms of 1958 and 1963-70, they sold their plots to the migrants who flocked to the capital in the 1960s and 1970s. The new landowners could then build cheap new homes, a development that destroyed large parts of the oasis and its canal networks (Lababedi 2008). The results were disastrous: high-rise blocks were slapped together along narrow streets and basic facilities such as sanitation, electric power, water supply and ventilation were virtually non-existent (de Châtel 2007). During the 1980s, more than 70% of housing belonged in this category. In 2009, 50% of urban growth in Damascus was illegal (Syria Today 2009b) and 40% of the city's population lived in informal settlements. The construction of this concrete ring around the Old City was the last step in destroying the link between the city and its gardens. Further uncontrolled urbanization has engulfed the small villages around Damascus into the urban fabric, and thousands of trees were felled to make space for small workshops and light industries (Degeorge 1994: 196).

A prime ministerial decree issued in 1977 aimed to put a stop to uncontrolled development in the Ghuta, but the law had little effect, and development continued unabated. Even though large parts of Damascus were illegal in 2009, and many of these neighbourhoods were poor and lacked facilities, the informal settlements cannot be

compared to the unsanitary and unserviced slums seen in South America, for instance. Middle-class families also lived in informal settlements, sometimes even in expensive villas (Syria Today 2009c). The continued spread of illegal neighbourhoods can be ascribed to a number of factors, including a continued housing shortage and continued rural/urban migration due to a lack of investment in other urban centres and in rural areas. The legal framework further enabled the growth of illegal housing areas. Houses built without government approval were referred to as "spontaneous houses", a phenomenon that resulted from a regulatory glitch that allowed Syrians to keep their house - even without a building permit - if it had a concrete roof (Oxford Business Group 2006). In addition, official government guidance from the 1980s stipulated that all informal settlements should be provided with basic services such as water, sanitation, electricity, and roads (Syria Today 2009b), further enabling the development of illegally built neighbourhoods.

OPTIONS FOR THE FUTURE

Before the uprising in 2011, Damascus did not yet suffer from water shortage on the same scale as for example the Jordanian capital Amman. However, it is clear that solutions need to be found for the medium to long term.

Water transfers

Various options have been proposed over the past decades, including water transfers from the coastal region or the Euphrates Basin in north-eastern Syria. The latter option has been repeatedly discussed since the 1980s, and consists of conveying water from Lake Assad (the reservoir of the Tabqa Dam) to Damascus, over a distance of 441 km. The scheme projected a capacity of 27 m^3/s or an annual water transfer of 850 MCM at a cost of US$ 1.5 billion or US$ 0.52/m^3, according to figures from the early 2000s (Elhadj 2003). In subsequent elaborations of the plan, mention was made of building a pipeline via the city of Palmyra in the eastern desert, in order to develop the town into a major tourist attraction (Syria Today 2009b). Elhadj (2003) points out that this scheme is not viable – not only because of high cost, but also because the flow regime of the Euphrates River has been significantly reduced in the past three decades following Turkey's construction of a series of five dams (with a further nine planned) on the Euphrates, as part of the Southeastern Anatolia Project. The option of import from the coastal region would involve transfer over a shorter distance (225 km), but over greater altitude (1,000 m). Water in the coastal region could come from two potential sources: freshwater springs off the coast of Lattakia, or desalination (Elhadj 2003). Regardless of costs of transfer and pumping, both options would present added expense: either extracting water from the offshore springs,

or desalinating seawater. The cost of either project has been estimated in the region of US$ 2 billion, bringing the cost of one cubic metre of water to US$ 1.22/m^3.

Improved water management

Mualla (2008) pointed out that while such projects would resolve the Syrian capital's water crisis, both projects were prohibitively expensive and should only be considered after all other local management options had been explored. These included improved demand management, increasing water use efficiency, reducing network losses, reallocation of shares between sectors to favour domestic and industrial use over agricultural use and the development of a water treatment and reuse strategy. In addition, the city's urban growth needed to be slowed to curb the growing water demand. While the implementation of such policy measures is most viable in terms of cost, it poses a number of challenges, such as the reallocation of water from irrigation to domestic use, which is likely to be politically problematic (Elhadj 2003). Moreover, until the current conflict is resolved, it is unlikely that authorities will focus on future domestic and agricultural demand or rehabilitation of the aquifer.

CONCLUSION

The rapid and uncontrolled development of the Syrian capital over the last 60 years has had a severe environmental impact on the city of Damascus and the surrounding Ghuta Plain. Rapid population growth, unsustainable water resource development, and uncontrolled urban expansion have contributed to a growing water deficit in the basin and to environmental damage that will most likely never be repaired. The city's geographic location in an arid climatic zone on the edge of the Syrian Desert means that no obvious or cheap alternative sources of water are available, though improved water management and in particular a lower water allocation to the agricultural sector could address the mounting water crisis.

However, in the short term, none of these measures – either large-scale inter-basin water transfers or policy reforms – are likely to be implemented. Since the start of the uprising in March 2011, water resources and improved water and land management have slipped even further down the list of government priorities in Syria. As the conflict escalates and state institutions gradually collapse, uncontrolled abstraction from the aquifer, unregulated discharge of pollutants into surface and groundwater bodies and further degradation of neglected water infrastructure will become more widespread and more difficult to monitor. As a result, the oasis in the Syrian Desert, which was once compared to

the Garden of Eden and for centuries was reputed for its abundant freshwater resources, is likely to suffer further decline, as landscapes and waterscapes that were sustained for millennia slowly disappear.

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CHAPTER 3

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

INTRODUCTION

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. The United Nations (UN) estimates that more than 100,000 people died between March 2011 and September 2013 and that more than 5,000 are dying per month since July 2012, while millions of officially registered and unregistered refugees are scattered from Egypt to Turkey and beyond, and an estimated 6.5 million people are internally displaced.[1]

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,[2] 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'.[3]

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.[4] More recently, media and analysts have also suggested that climate change plays an indirect role in the Arab Spring and the

1 http://syria.unocha.org/ accessed 27 March 2014.

2 J. Solomon and B. Spindle. 'Syria Strongman: Time for "Reform"', *Wall Street Journal*, 31 Jan. 2011.

3 A. Bank and E. Mohns, 'Die Syrische Revolte: Protestdynamik, Regimerepression und Internationalisierung', in A. Jünemann and A. Zorob (eds.), *Arabellions. Zur Vielfalt von Protest und Revolte im Nahen Osten und Nordafrika* (Wiesbaden: VS Springer, 2013), pp.85-106.

4 Ibid.

Syrian uprising.[5]

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 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

5 T. Friedman, 'The Scary Hidden Stressor', *The New York Times,* 2 March 2013; C.E. Werrel, and F. Femia (eds.), *The Arab Spring and Climate Change*, Centre for American Progress, Stimson, The Centre for Climate and Security (2013); F. Femia and C.E. Werrel, 'Climate Change Before and After the Arab Awakening: The Cases of Syria and Libya', in Werrel and Femia, *The Arab Spring and Climate Change*, pp.23-38; S. Mohtadi, 'Climate change and the Syrian uprising', *Bulletin of the Atomic Scientists*, 16 Aug. 2012.

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 had 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.

DROUGHT IN SYRIA

The Syrian climate is characterized as arid to semi-arid, with broad variations in precipitation levels between the Mediterranean coast in the west (≤1,400 mm/yr) and the eastern desert areas (<200 mm/yr). About 55% of the country is covered in desert and steppe land; annual precipitation in more than 90% of the country lies below 350 mm.

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% of the period. On average, the droughts lasted around four and a half years each, though a drought in the 1970s lasted 10 consecutive years.[6] 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% of the camel population and 50% 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".[7]

6 C. Breisinger, T. Zhu, P. Al Riffai, G. Nelson, R. Robertson, J. Funes, D. Verner, 'Global and Local Economic Impacts of Climate Change in Syria and Options for Adaptation', International Food Policy Research Institute, Discussion Paper 01091 (2011), p.23.

7 F. Hole, 'Drivers of Unsustainable Land Use in the Semi-Arid Khabur River Basin, Syria', *Geographical Research*, Volume 47(1) (2009), pp.4-14.

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.[8] 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."[9]

Data collected in Syria shows that the overall frequency of droughts had not increased over the last 20 years, except in one of the country'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 socio-economic consequences can be much greater than that in the past."[10] 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.[11]

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".[12] Experiments carried out over a period of 10 years in Al Talila Reserve, Syria's first nature reserve, in the eastern desert conclusively showed that the mismanagement and over-exploitation 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

8 Breisinger et al., 'Global and Local Economic Impacts'; M. Hoerling, J. Eischeid, J. Perlwitz, X. Quan, Z. Zhang, P. Pegion, 'On the Increased Frequency of Mediterranean Drought', *Journal of Climate*, 25 (2012), pp.2146–2161; H. Hoff, 'Climate Change, impacts and adaptation in the MENA region, with focus on Syria', Stockholm Environment Institute and Potsdam Institute for Climate Impact Research (2012), unpublished draft.

9 B. Tertrais, 'The Climate Wars Myth', *The Washington Quarterly*, 34:3 (2011), p.21.

10 Breisinger et al., 'Global and Local Economic Impacts', p.24.

11 Hole, 'Drivers of Unsustainable Land Use'.

12 Interview with Gianluca Serra, conservation biologist, July 2009.

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 (Fig. 11).[13]

Figure 11. Experimental enclosure outside Al Talila showing different effects of grazing tenure: uncontrolled sheep grazing (left, outside the enclosure) versus no grazing (right, inside). Source: Serra 2009.

> 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

13 G. Serra, M. Mirreh, H. Kaddour, T. Razzouk, A. Al Jundi, A. Kanani, C. Batello, D. Williamson, *Assessment And Characterization of Al Talila Reserve and Surrounding Palmyrean Desert*, Italian Development Cooperation, Food and Agriculture Organization, Syrian General Commission for Badia Management and Development, Syrian Ministry of Agriculture and Agrarian Reform (2009), pp.35-6, 81-2.

> desertification in many parts of the world has fuelled socio-economic conflict and wars because when people start to starve, tension rises. It should be taken very seriously.[14]

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".[15] 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."[16]

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.

The long dry spell

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% of the long-term average, with some regions receiving no rain at all (Fig. 12). The drought also affected Iraq, Israel, Jordan, Lebanon and Palestine.[17] 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

14 Interview with G. Serra.

15 S. Johnstone and J. Mazo, 'Global Warming and the Arab Spring', in Werrel and Femia, *The Arab Spring and Climate Change*, p.15.

16 Ibid., p.20.

17 A. Brown, 'Middle East Faces Widespread Drought and Devastated Crops', *Alertnet*, 14 Aug. 2008.

Figure 12. Drought in Raqqa Governorate, Syria, 2008. Source: Adel Samara.

registering shortfalls of 66%, 60% and 45% respectively.[18] As a result, average yield of basic crops dropped by 32% in irrigated areas and as much as 79% in rain-fed areas. Wheat and barley yields dropped by 47% and 67% 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.[19]

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,

18 Syria Drought Response Plan 2009-2010 *Mid-Term Review*. United Nations Office for the Coordination of Humanitarian Affairs (2010), p.4 (hereafter UN-OCHA, 2010).

19 J. Lennert, 'Tough Times', *Syria Today*, May 2009.

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.[20] However, precipitation levels in this governorate recovered to average levels in 2008-9 and exceeded the average in the 2009-10 season.[21] 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,[22] 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.[23] 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.[24]

Malnutrition and migration

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,[25] 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 healthcare level, high illiteracy and few economic alternatives to agriculture.

Figures from 2004 show that the north-eastern region (governorates of Aleppo, Deir

20 For example, R. Mills, 'Long drought that helped to spark an uprising in Syria', *The National*, 21 Aug. 2012; Z. Karam, 'Syrian troops fire on protesters, kill 20', *The Globe and Mail*, 25 March 2011.

21 Syrian Agricultural Database, available at http://www.napcsyr.org/sadb.htm, accessed on 13 March 2013.

22 Bank and Mohns, 'Die Syrische Revolte'.

23 *Report of the Special Rapporteur on the right to food on his mission to Syria, Addendum*, United Nations Human Rights Council, 27 Jan. 2011 (hereafter UN-HCR, 2011).

24 'Yellow wheat rust hits supplies', *IRIN News*, 19 Aug. 2010.

25 'Jezira' means island in Arabic and refers to the region situated between the Tigris and Euphrates Rivers in Syria, comprising the governorates of Deir ez-Zor, Hassakeh and Raqqa.

ez-Zor, Hassakeh, Idleb and Raqqa) had the greatest incidence, depth and severity of rural and urban poverty, with 58.1% 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% and 21.59% 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.[26]

The 2006-10 drought enhanced this trend. According to several UN assessments between 2008 and 2011,[27] 1.3m people were affected by the drought, with 800,000 people "severely affected".[28] 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 had no seeds anymore, while herders were forced to sell or slaughter their flocks due to a lack of pasture and fodder.[29]

Malnutrition, which was already widespread in the impoverished north-east, rapidly increased, with up to 80% of those severely affected surviving on a diet of bread and sugared tea.[30] Data from the three worst-affected governorates indicated a drastic increase in nutrition-related diseases between 2006 and 2010, with 42% 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% of the Syrian population, were food insecure, which included more than 2 million people who were living in extreme poverty in 2003-4.[31]

Economic reforms

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

26 *Poverty in Syria 1996-2004, Diagnosis and Pro-Poor Policy Considerations*, United Nations Development Programme (2005), p.27. Syria's north-eastern region is usually defined as encompassing the governorates of Deir ez-Zor, Hassakeh, Raqqa and Qamishli. However, this report defines north-eastern Syria as including Idleb, Aleppo, Al Raqqa, Deir ez-Zor and Hassakeh.

27 *Drought Assessment Mission Syria 2007/2008*, Food and Agriculture Organization, World Food Programme, United Nations Development Programme, World Health Organization, The United Nations Children's Fund, International Organization of Migration (2008); *Syria Drought Response Plan 2009*, United Nations Office for the Coordination of Humanitarian Affairs (2009) (hereafter UN-OCHA, 2009); UN-OCHA, 2010; UN-HCR, 2011.

28 The UN needs assessment mission in June 2009 concluded that the severely affected population was largely below the extreme poverty line of US$ 1/person/day with high vulnerability due to loss of assets, lack of future sources of livelihood, and degradation of fields and pastures.

29 UN-OCHA, 2010, p.5.

30 UN-OCHA, 2009, p.9.

31 UN-HCR, 2011, p.4.

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.[32] 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 (2006-2010) 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% of the country's workforce in 2005-6.[33] However, others estimate the figure at 40-50%, particularly given the growing proportion of the workforce employed in the informal sector.[34] 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% decrease in jobs in this sector (and 10% of the total labour force), while agricultural Gross Domestic Product rose by 9%. Most jobs were lost in 2003 and 2004, two years not affected by drought.[35]

The cancellation of the subsidy on diesel fuel in May 2008 pushed prices up overnight from SYP 7 (US$ 0.14) to SYP 25 (US$ 0.53).[36] Farmers in Syria use diesel to extract groundwater for irrigation and pump surface water to their fields, but also to transport

32 R. Hinnebusch, 'Syria: from "authoritarian upgrading" to revolution?' *International Affairs*, 88:1 (2012), pp.95-113.

33 Y. Meslmani, *National Circumstances/Syria's Initial National Communication to the UNFCCC*, United Nations Development Programme (2008).

34 H. Harding, 'Working in the Grey Zone', *Syria Today*, May 2010. According to the United Nations Development Programme, Syria's informal sector was increasing in size in 2010, making up 45% of the workforce.

35 UN-HCR, 2011.

36 D. Haidar and F. de Châtel, 'Leaving the Land', *Syria Today*, May 2009, pp.35-7. On 12 April 2008, the government instated a coupon system allowing poor families to buy 1,000 L of diesel at SYP 9/L (0.19 US$/L). While this was intended to cover home heating costs, many farmers used the fuel for agricultural production and heated their house with dried sheep dung and other agricultural waste products. The validity of the government-issued coupons expired on 1 April 2009. On 31 March 2009, the government announced it would cut the prices of diesel nationwide from SYP 25 to SYP 20 (US$ 0.53 to US$ 0.42), but for many farmers it was still impossible to make a profit.

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.[37] 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 SYP 450 to SYP 900 (US$ 9.60 to US$ 19.15) per 50 kg, worsening the plight of farmers.[38] The average monthly salary in Syria in 2009 was US$ 242, but most farmers earned significantly less than this, with 30% of workers in the agricultural sector earning US$ 109 or less.[39]

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 Hamouriyeh 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 10 years. The drought just meant it had expanded (see Chap. 4).

While no exact figures exist, UN agencies estimated that up to 65,000 families or around 300,000 people migrated from the north-east,[40] and that 60-70% of villages in the governorates of Hassakeh and Deir ez-Zor had been deserted in 2009.[41] 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

37 F. de Châtel, 'Mining the Deep', *Syria Today*, Jan. 2010, pp.48-51.

38 UN-HCR, 2011, p.15. Prices of fertilizer rose 293% for superphosphate, 202% for nitrate and 458% for potassium.

39 'Syria's average monthly salary at SYP 11,133,' *Syria Today*, May 2010.

40 UN-OCHA, 2010.

41 UN-OCHA, 2009.

Figure 13. Drought victims from north-eastern Syria living in a tent camp near the Jordanian border in 2009. Source: Adel Samara.

workers and families who crossed to Lebanon. The migrants settled in makeshift illegal tent camps scattered around the Aleppo and Damascus suburbs and southern governorates and sought work in agriculture, construction or small industry, earning SYP 200-400 (US$ 4.25-8.50) a day.[42] 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 (Fig. 13).

The humanitarian response

After initially ignoring the mounting crisis, officials acknowledged that the drought had pushed up food prices and put pressure on basic food supplies,[43] 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% of the US$ 20 million requested, while the 2009 Syria Drought Response Plan[44] received just 33%

42 2009 exchange rate: US$ 1=SYP 47

43 'Drought blamed for food scarcity', *IRIN News*, 22 Feb. 2009.

44 UN-OCHA, 2009.

of the requested US$ 43 million.[45]

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.[46] 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.[47]

The media spin

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 more frequent drought.[48] 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.[49]

There was also disagreement within the government, with the minister of irrigation questioning the severity of the drought in November 2009.[50] 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

45 *Syria Drought Response Plan (Revised) (July 2009-June 2010) List of Appeal Projects*, United Nations Office for the Coordination of Humanitarian Affairs, available at http://fts.unocha.org, accessed on 28 April 2012.

46 *Syrian Association for Health Promotion and Development and UNICEF Participatory Rural Assessment for Migrant Communities in Rural Damascus due to Drought in North-Eastern Areas*, The United Nations Children's Fund, July 2009.

47 Interviews in Jan. 2010 with Mohammed Hassan Katana, director of statistics and planning at the Ministry of Agriculture and Mohannad Hadi, country director of the United Nations World Food Programme in Syria.

48 Interviews in Jan. 2010 with Abdulla Tahir Bin Yehia, representative of the Food and Agriculture Organization in Syria, Niklas Kebbon, Sweden's ambassador to Syria and Mohannad Hadi.

49 UN-HCR, 2011, p.8.

50 F. de Châtel, 'Q&A: Nader al-Bunni. Syrian Minister of Irrigation', *Syria Today*, Jan. 2010, pp.44-6.

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.[51]

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.[52] 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.[53]

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.

DECONSTRUCTING DROUGHT AND WATER SCARCITY NARRATIVES

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 mind-set 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

51 For example, W. Erian, B. Katlan and O. Beby Babah, *Drought Vulnerability In The Arab Region, Case Study - Drought in Syria, Ten Years of Scarce Water (2000-2010)*, Arab Centre for the Study of Arid Zones and Dry Lands and United Nations, Secretariat of the International Strategy for Disaster Reduction (2011).

52 'Minister of Housing and Construction: No Water Shortage in Damascus, *SANA*, 21 May 2008; 'Safar: Syria to Witness Agricultural Changes Based on Research', *SANA*, 11 June 2008.

53 'Drought Repercussions and Means for Facing Them Locally and Internationally', SANA, 20 Oct. 2008.

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'.[54] 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,[55] 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 over-exploitation of water and land resources and engendered growing poverty and disenfranchisement among rural communities.

The official narrative

The official narrative portrays Syria as increasingly water stressed due to a range of extraneous environmental and socio-economic 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

54 M. Kabalan, 'Syrians want change, not reform mirages', *Gulf News*, 2 Nov. 2012.

55 Officials preferred the term 'modernization' to the more politically charged 'reform'.

never achieved, and the minister of water can boast of 'an excellent water resources management system',[56] 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 reality on the ground

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.[57] 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 until 50 years ago considered a breadbasket for Syria and the region.[58]

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 (ha) in 1985 to 1.35 million ha in 2010.[59] Sixty percent of this surface area is irrigated with groundwater, which is being extracted at an unsustainable rate. Ninety percent of the country's water goes to agriculture, by far the highest percentage in the region, with very low irrigation efficiency. Over 80% of irrigated land is still irrigated through traditional flooding methods and losses in the open concrete government irrigation canals range from 10% to 60%.[60]

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 BCM in 2007. Total average annual water withdrawal in the same year was 19.2 BCM.

56 De Châtel, 'Q&A: Nader al-Bunni'.

57 M. Ababsa, 'Frontières de développement en Syrie: l'adaptation du projet Ba'thiste aux logiques tribales dans le front pionnier de la Jazîra', *A Contrario*, Vol.3, No.2 (2005), p11-25.

58 Hole, 'Drivers of Unsustainable Land Use'.

59 Syrian Agricultural Database.

60 Hoff, 'Climate Change, impacts and adaptation', p.9-10.

The resulting 3.59 BCM deficit was compensated with water from dam reservoirs and groundwater reserves. Syria's per capita water availability had dropped to 882 m^3 per year in 2007, classifying it as a water-scarce country.[61] 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 3.42 million in 1950 to approximately 20.4 million in 2010,[62] with 53% 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.[63] Syria's annual average population growth rate remains among the highest in the region at 2.94%, down from around 3.75% in the 1970s.[64]

According to the official narrative, the strong drive to develop irrigated agriculture is linked the demands of a growing population and the desire to achieve food self-sufficiency. Yet the national wheat production target of 4-5m 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'.[65] 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,[66] 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.[67]

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61 *Baseline Water Sector Report*, GTZ Modernization of the Syrian Water Sector, Support to Sector Planning and Coordination, State Planning Commission (2009), unpublished draft (hereafter GTZ and SPC).

62 UN-ESCWA (2010). 'The demographic profile of Syria, citing world population prospects: the 2010 revision.' Available at www.escwa.un.org/popin/members/syria.pdf, accessed 26 May 2012.

63 A.J. Al-Tamimi and O. Svadovsky, 'Demography is Destiny in Syria', *American Spectator*, 2 June 2012.

64 *World Population Prospects: 2008 Revision*, United Nations Economic and Social Committee for Western Asia, available at www.escwa.un.org/popin/members/syria.pdf, accessed 19 March 2013.

65 J. Barnes, 'Managing the Waters of Bath Country: The Politics of Water Scarcity in Syria', *Geopolitics*, 14:3 (2009), p. 515.

66 Hole, 'Drivers of Unsustainable Land Use'; Ababsa, 'Frontières de développement en Syrie'.

67 A US$ 2,1 billion mega-project launched in March 2011 on the Tigris River in Syria's far north-east was to pump an annual 1,25 BCM of water to irrigate 200,000 ha of land in Hassakeh Governorate (L. Ibrahim and N. Razzouk, 'Syria Starts $2.1bn Irrigation Project on Tigris River', *Bloomberg*, 7 March 2011). In addition, several new hydropower dams were being planned and built on the Euphrates and Orontes Rivers ('Otri, Erdogan Lay Cornerstone of Friendship Dam', *SANA*, 7 Feb. 2011), providing hydropower and irrigation water to new cropping areas in the north and east of the country.

Lack of transparency

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.[68] 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.[69] 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.[70] 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% of employees having only completed preparatory school or lower.[71] Moreover, low salaries in senior positions, clientelism and nepotism within the ministries have encouraged corruption.[72]

68 GTZ and SPC.

69 Ibid.

70 R. Hinnebusch, 'The Ba'th's Agrarian Revolution (1936-2000)', in R. Hinnebusch, A. El Hindi, M. Khaddam, M. Ababsa (eds): *Agriculture and Reform in Syria* (Fife, Scotland: University of St Andrews Centre for Syrian Studies, 2011), pp.3-14.

71 GTZ and SPC.

72 Hinnebusch, 'The Ba'th's Agrarian Revolution'.

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.

PROTECTING GROUNDWATER RESERVES

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.[73] The number of wells is estimated to have increased from around 135,089 in 1999 to over 229,881 in 2010.[74] Fifty-seven percent of wells were unlicensed in 2010. During 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 m between the 1950s and 2000.[75] 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 m/yr in certain areas (see Chap. 2).[76]

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

73 De Châtel, 'Mining the Deep'.

74 Syrian Agricultural Database.

75 Kloosterman, F. (2009). Geologist/hydrogeologist, Syrian-Dutch water partnership, Deltares, The Netherlands.

76 M. Hobler and R. Rajab, 'Groundwater Vulnerability and Hazards to Groundwater in the Damascus Ghouta Plain in Syria', Arab Centre for the Study of Arid Zones and Dry Lands and Bundesanstalt für Geowissenschaften und Rohstoffe (2002).

supported the digging of new wells for cotton cultivation.[77] 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 licenses 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.[78] The government required well licenses 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 licenses, which in turn triggered strong resentment in rural areas.[79] 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,[80] 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 Spring on the Syrian-Turkish border, has disappeared completely since 2001 following extensive over-abstraction in the spring catchment area over the last 50 years.[81] The area of Nebk north of Damascus, which used to be renowned for its vines and wheat fields, has turned to desert following extensive over-exploitation of groundwater. In 2009, farmers there worked as real-estate developers (see Chap. 4).

77 Interview with Omar al-Shamali, head of Homs water directorate, 14 Nov. 2009.

78 De Châtel, 'Mining the Deep'.

79 N. Marzouq, 'The Economic Origins of Syria's Uprising', *Al Akhbar English*, 28 Aug. 2011.

80 Hole, 'Drivers of Unsustainable Land Use'.

81 *Inventory of Shared Water Resources in Western Asia* (Beirut: United Nations Economic and Social Committee for Western Asia and Bundesanstalt für Geowissenschaften und Rohstoffe, 2013), Ch.24.

CONCLUSION

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 inter-related 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 over-exploitation 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.[82]

82 For example, on 30 March 2011, Bashar al-Assad addressed the Syrian Parliament, saying: 'You know what happened in Lebanon in 2005, and later the war of 2006 and its repercussions, and the war against Gaza at the end of 2008. So, the whole period was that of continued pressure. What added to the problems was that we had four years of drought, which damaged our economic program. [...] Of course I am not justifying. I am simply explaining these facts and separating the subjective from the objective. When I say that we had drought, this is beyond our powers'. See 'President al-Assad Delivers Speech at People's Assembly' *SANA*, 30 March 2011.

CHAPTER 4

Watching Landscapes Disappear: Local Perspectives on the Impact of Long-term Water Mismanagement in Syria

INTRODUCTION

While the general state of water resources in Syria and the overall impact of current and future water scarcity in the Middle East and North Africa (MENA) region have been extensively discussed in the literature (Salman and Mualla 2003; Sagardoy and Varela-Ortega 2001; Erian et al. 2011; World Bank 2007), comparatively little attention has been paid to the smaller-scale impact of the decline of freshwater resources on individuals, communities, landscapes and local environmental conditions. This chapter aims to provide a micro-level view, focusing on the human impact of long-term water and land mismanagement in Syria by scaling down to the level of personal accounts from across the country. Drawing on research carried out in 2000/2001 and 2006-10, it presents a series of snapshots of pre-conflict Syria and highlights the startling depth and breadth of the environmental damage inflicted over the last 60 years. This has obviously had far-reaching social repercussions, undermining small and medium-scale agricultural businesses, dislocating rural communities and forcing farmers to seek new sources of income, often in other parts of the country or abroad. Reading between the lines of the conversations I had with farmers, water experts and government officials over a 10-year period, growing feelings of anger, frustration and powerlessness become apparent as Syrian farmers saw their livelihood disappear and landscapes irreversibly destroyed, mainly as a result of mismanagement and a lack of coherent policies and law enforcement.

The chapter is divided into three sections, which each focus on specific themes. Each section is broken down into sub-sections, including several local case studies and a sub-section that provides historical and political background and a geographical context (Fig. 14). Part 1 provides a brief summary of Syria's agricultural and water policies since 1960. Two case studies, one in the rural town of Nebk around 80 km north of Damascus and one in the surroundings of Damascus, highlight how unsustainable population growth rates have led to the over-exploitation, pollution – and, locally, depletion – of groundwater resources.

Figure 14. Overview map of places, regions and rivers in Syria mentioned in this chapter. Source: Ghazal Lababidi.

Part 2 moves to the rural north-east of the country where the ambitious Euphrates Basin Project, a massive hydropower and irrigation scheme which included the construction of three dams on the Euphrates River, has profoundly transformed landscapes, land and water use patterns and social structures. However, despite massive government investment in the project – a quarter of the national budget for 20 years – it never even came close to meeting its objectives and the north-eastern governorates remained the least developed and poorest in 2009. This section starts with a description of the project's historical background and regional scope and then zooms in on the specific case of the village of Tel al Banat, which lies on the banks of the Tishreen Dam reservoir. Interviews with villagers from 2009 reveal the far-reaching impact of the scheme, which displaced the village out of the Euphrates Valley and left its inhabitants scattered across the country in

"new villages" in the government irrigation projects, tent camps in the Damascus suburbs and disused buildings and sheds in Lebanon. Interviews in this section show that the depletion of water resources was already a problem in the late 1990s and that farmers from the Euphrates Basin, but also Idlib and Hassakeh Governorates, were gradually forced to abandon agriculture.

Part 3 focuses on the *badia*[1] or steppe lands in the area of the Khabur River in north-eastern Syria, where the ecosystem has effectively been destroyed over the last 60 years. This semi-arid area was until the 1950s used for livestock grazing and small-scale irrigation in the river valley with a traditional land management system that maintained the ecological balance. However, a series of changes – the nationalization of the steppe, resettlement of displaced populations, government support for the drilling of wells and cultivation of cotton – caused widespread soil salinization, desertification and depletion of groundwater reserves. The chapter concludes with a brief discussion of possible links to the start of the Syrian uprising in March 2011 and the role of water management in Syria's future.

THE LIMITS OF AGRICULTURAL GROWTH IN AN ARID REGION

Syrian agricultural and water policies since 1963

While the Syrian government has been keen to ascribe growing problems of water scarcity to high population growth, growing water demand, the unequal distribution of water resources in the country and climate change, Barnes (2009) has shown that scarcity in Syria has been constructed and is a direct product of the Syrian government's promotion of irrigated agriculture and the desire to attain self-sufficiency in the main agricultural staples. From the time the Ba'ath Party came to power in 1963, agriculture was its main focus. Due to its strong roots in the rural areas, it prioritized the development of the agricultural sector and promised to redress the imbalance between the political and economic elite and the marginalized class of workers and peasants. First of all, it introduced a far-reaching land reform programme for the benefit of landless farmers and, secondly, it channelled huge investment into large-scale, centrally managed irrigation schemes, with large dams, ambitious land reclamation targets and wide support for the development of groundwater resources. The state's strong ties to its rural support bases was further strengthened after President Hafez al-Assad came to power through an internal coup in the Ba'ath party in 1970. Originally from a rural village in the Coastal Mountains near Lattakia, Assad highlighted his peasant origins and cultivated an image of himself as a "one of the people". In a speech on 8 March 1980, Assad said: "I am the first and the last [...] a peasant and the

1 *Badia* is the Arabic word for steppe, an area with less than 200 mm of annual rainfall where the vegetation is mainly made up of low shrubs and grass.

son of a peasant. To lie amidst the spikes of grain or on the threshing floor is, in my eyes, worth all the palaces in the world" (Barnes 2009: 521).

The Ba'ath party nationalized much of the economy and introduced a central planning strategy for agriculture, with heavy subsidization of "strategic crops"[2] such as wheat, barley, sugar beet and cotton. Syria prided itself on its agricultural development and self-sufficiency in certain main staples. Until the incidence of a severe drought in 2007, Syria was even one of the only Arab countries to export wheat, with an average annual production of 4.25 million tonnes for the period 1998-2007 (NAPC 2013). Moreover, it had more than doubled the irrigated surface area in a period of 25 years from 651,000 hectares (ha) in 1985 to 1,4 million ha in 2011 (Ibid.).

But the massive investment in irrigation projects and agricultural development failed to provide the promised returns, both on a financial and non-financial level. Elhadj (2005) calculated that the government spent about US$ 20 billion on agricultural projects between 1960 and 2000, the equivalent of 20% of the country's total investment resources. In the period 1995-2000, it allocated 3.3% of the country's Gross Domestic Product (GDP) to agricultural projects, which generated a loss of US$ 150 million or US$ 1,087/ha. Non-financial returns were also poor as Syria remained dependent on the country's capricious rainfall patterns, rural to urban migration continued to grow and – except for wheat, barley and eggs – food independence was not achieved. On the other hand, the government's policies depleted large volumes of Syria's limited water reserves. By 1997, five of Syria's seven water basins had a negative water balance, while the quality of the remaining reserves had been degraded (Elhadj 2005: 33). In 2007, the country – historically one of the most water rich in the region after Iraq and Iran – had a water deficit of an estimated 3.59 billion cubic metres (BCM), which was made up for through the use of water from dam reservoirs and groundwater reserves (GTZ and SPC 2009).

Yet despite the clear signs that the country's water and land resources were overstretched, the government continued to pursue an agricultural strategy aimed at further increasing production and expanding the irrigated surface area. A 2001 Ministry of Irrigation report outlines new plans for the construction of more dams and the reclamation of nearly 500,000 ha of land in five of the country's seven basins at a cost of around US$

2 Every year, a number of crops such as wheat, barley, sugar, cotton, tobacco, lentils and chickpeas were designated as 'strategic'. The government heavily supported these crops with a range of subsidies on agricultural inputs, energy and water, and guaranteed it would purchase them at fixed prices that were announced prior to each planting season. From the mid-1980s there was a shift to a less tightly regulated "indicative planning" system and from the 1990s onwards efforts to cut back on subsidies led to a reduction in the number of designated strategic crops so that by 2009 only wheat, cotton and sugar beet remained (Syria Report 2013; Hinnebusch 1989; Katana 2009).

2.42 billion.[3] This amount is almost equal to the investment in irrigation between 1988 and 2000 (Elhadj 2005: 137). While certain agricultural policies were adjusted – the cultivation of water-intensive crops like cotton and sugar beet was forbidden in certain governorates (Shamali 2009), summer irrigation was banned and new laws aimed (but failed) to prevent illegal well drilling and modernize irrigation systems – no concession was made to the strategy of food self-sufficiency and, more specifically, wheat self-sufficiency. In meetings with government officials and water experts between 2006 and 2010, I was repeatedly told that wheat was a "red line".

Moreover, despite the evidence that much of the land in the north-east of the country was not suited for intensive cultivation, the government continued to reclaim new land. Thus in March 2011, the Syrian government launched a US$ 2.1 billion mega-project on the Tigris River in Syria's far north-east that aimed to pump an annual 1,25 BCM of water to irrigate 200,000 ha of land in Hassakeh Governorate (Ibrahim and Razzouk 2011). In addition, several new hydropower dams were being planned and built on the Euphrates and Orontes Rivers, providing electricity and irrigation water to new cropping areas in the north and east of the country. All these projects have obviously been halted since the outbreak of the conflict in Syria, but they underscore the Syrian government's inability to adapt to changing environmental and economic realities. "Once the wrong strategy is put in place it becomes progressively more difficult for the government to reverse the policy [...]. [R]aising the operational efficiency of desert irrigation projects will not correct the original strategic flawed decision to achieve food self-sufficiency. [...] Modifying a wrong strategy is like slowing down on a road which is going in the wrong direction" (Elhadj 2005:38). Effectively, Syria's agricultural sector was structured around the abstract framework of food self-sufficiency, strategic crops and subsidies, rather than the reality of economic or environmental constraints. "... Syria's political leaders paid little attention to sound economic planning. They focused on short-term political solutions, ignoring the fact that their country does not possess sufficient and reliable water endowment" (Ibid.: 142).

From farming to real-estate management, Nebk (2009)

Continued government support for well drilling and the expansion of the irrigated surface area soon resulted in groundwater over-exploitation and a rapid drop in groundwater levels, with springs, streams and even rivers running dry in the 1990s and 2000s. This was also the case around the towns of Nebk and Yabroud at the foot of the Qalamoon Mountains, an area that used to be famous for its grape and raisin production. "In the 1960s there were thousands of hectares of vines here," said Abu Mohammed, a former

3 Exchange rate 2005 cited in Elhadj (2005) US$ 1 = SYP 50.

farmer from Nebk who turned to real estate development when the water ran out in the 1980s. "The crops were so thick that the soil never saw the light of the sun; the air was the best in the world and the water was fresh and abundant. Now if a farmer owns 150 vines it's a lot. It shows he has lots of water. Or a lot of money to drill deep wells." Today the town of Nebk, 80 km north of Damascus, stretches haphazardly across a dusty plain, with new neighbourhoods and half-finished housing projects slowly swallowing the land that was until 40 years ago covered in wheat fields and vineyards.

Situated in an arid zone with annual precipitation levels of just 250 mm, the area of Nebk and Yabroud historically relied on seasonal surface water in the form of melted snow from the Anti-Lebanon Mountains and groundwater from wells and *qanat romani*.[4] While it was never rich in water resources, this area was nevertheless known for its agricultural wealth. The 12th-century geographer Ibn Jubayr said Nebk had "much running water and broad arable fields", while the 13th-century Yaqut al-Hamawi wrote that "[Nebk is] a fine village with excellent provisions" and described "a curious spring which runs cold in the summer, and with clear, excellent water. They say its source is at Yabrud" (Le Strange 1890). This was part of the intricate network of *qanat romani* that brought water down the valley from Yabroud to Nebk and the surrounding Salhiye Plain. In 1900, the British writer Gertrude Bell also recorded her visit: "At Nebk the desert ended. The whole valley upwards was full of corn and to the north the mountains rose high with patches of snow on them. Yabrud was a lovely prosperous village. The valley narrows and is bounded by fine cliffs and the water, the fruit trees, the corn were good to see after so many days' desert" (Bell 1900).

Abu Mohammed also remembered such scenes and described Nebk's traditional agricultural areas: Wadi al Miya (the Valley of Water); Al Saqi, an area of 500 ha where wheat, barley, sesame and burghul were cultivated on a mixture of rainfed and irrigated lands; and the Mleita Plain, which he described as "Nebk's pantry" that "fed the whole town" and where local farmers grew vegetables, wheat, chickpeas, beetroot and barley. "But that was in the old days," he said. "I'm not talking about now." Indeed, the agricultural wealth he remembered was difficult to imagine in this desolate desert-like landscape: the Salhiye Plain had become a residential neighbourhood, while the Mleita Plain was a dusty wasteland where a couple of half-finished apartment blocks withered away (Fig. 15).

"Twenty-five years ago you could still find water at 15 metres depth," said Abu Mohammed. "Each farm used to have a shallow well with a windmill beside it. Then in the 1980s, the water dried out. You can still see the windmills, but they are just decoration.

4 A *qanat* is a network of tunnels and wells that taps the groundwater and provides a reliable supply of water for human settlements and irrigation in hot, arid and semi-arid climates. *Qanats* are often referred to as *qanat romani* in Syria.

Figure 15. The Mleita Plain, described as "Nebk's pantry" in the past, with the town of Nebk in the background, 2009. Source: Adel Samara.

They serve no purpose. When I started using a motor pump in 1984, I had to dig down to 35 metres. Today, you have to go down to 250 metres. Water is a luxury now. That's why everyone in Nebk has abandoned agriculture. People just have small vegetable gardens as a hobby."

Abu Mohammed explained the dramatic changes in Nebk as a combination of factors: more people, less rain- and snowfall and over-pumping of groundwater in the whole area since the 1980s. "There has always been low rainfall here, and agriculture was always hard. In winter the farmers worked their fields, in summer they went to the city to find work. From the Ottoman times onwards people started migrating further away: to the Damascus Ghuta, to Palestine and to South America. The emigration to the Gulf started in the 1950s." But people always kept ties with the homeland and many returned. "All the construction you see here is the result of money earned in the Gulf." As the population of Nebk grew from 9,000 in 1944 to 52,000 in 2007, more land was cultivated and the groundwater level gradually dropped, driving farmers to use motor pumps to extract water from greater depths. While detailed figures for the area of Nebk and Yabroud are not available, national figures are indicative of the massive increase in wells from 135,089 in 1999 to 229,881 in 2010 (NAPC 2013). Around 57% of these remained illegal in 2007, despite the issuing of a decree in the late 1990s and the issuing of a new water law in 2005 that sought to license illegal wells and prevent further illegal drilling. Abu Mohammed was unfazed by this failure

to enforce legislation. "Law? Good God. We don't have law, there is something called 'law', but it's like someone who is called Shereef, but who isn't *shereef* (honourable). Applying for a permit to drill a well is for the weak. The others just do it."

Memories of a water landscape and a river, Damascus (2001, 2009)

Illegal well-drilling has also had a far-reaching impact on the surroundings of the capital Damascus, an area once famed for its abundant freshwater resources and its gardens and orchards (see Chap. 2). By 2001, the plain around Damascus, the Ghuta Oasis, had almost disappeared, as green space was replaced by a sprawling mass of mainly illegally built housing. In other parts of the oasis, springs had dried up and in the place of orchards there was a flat grey wasteland where dead tree stumps were piled up waiting to be used as firewood. Nizar Hussein, an employee at the General Directorate for Irrigation in the Barada and Awaj Basins, the office that oversaw water management in Damascus and its suburbs, took me to the heart of the Ghuta Oasis, a place that was now a desert. "All this was apricot orchards," Nizar said. "As far as the eye could reach".

While the entire area of the Ghuta Oasis was officially classified as agricultural land and construction was forbidden in 1977, uncontrolled growth and government failure to enforce legislation meant the urban sprawl steadily continued to infringe on green spaces. As the city spread into the oasis, farmers gradually shifted their agricultural activities eastward into the more arid steppe lands, where they drilled wells for irrigation. In 2010, nearly a quarter (24.7% or 56,961 wells) of the country's wells were concentrated in the Damascus region and more than three quarters of these were illegal (76% or 43,246 wells). Overpumping had rapidly led to the depletion of the shallow aquifer, forcing farmers to drill into deeper aquifers (de Châtel 2014b).

"Ten years ago, more than 90% of the wells in this area was less than 20 metres deep," Nizar told me in 2001. "Now we have to go down to 200 metres." We drove through a deserted village, where dust clouds flew up between the houses. Nizar pointed to an empty water channel. "Five years ago, this was a good spring, Deir Asafir. It flowed at 200 L/s. Now it's dry." Further up, the Fayed Spring was a huge crater on the edge of the village. In the past it had been a small freshwater lake. I asked what the government was doing about the situation in the Ghuta. Nizar hesitated, then said: "Arab governments have no idea about long-term planning. They have no vision, no plan. The Israelis, when they took water from Lebanon, Jordan and Syria in 1967 and 1973, they were clever. They were planning. They looked ahead. In Syria, we are all sleeping. And maybe, just maybe, once the water really runs out and we face disaster, we will wake up."

The city's main source of water, the Barada River, also dried up in 2000 as a result of excessive pumping in the area of the spring and the large-scale deviation of spring water

to supply Damascus with drinking water (de Châtel 2014b). The exponential growth of Damascus from a population of 423,000 in 1955 (Lababedi 2008) to an estimated 4.12 million in 2010 (Syria Today 2009)[5] severely strained local water resources. The drying up of the river also affected farmers in the Barada Valley. In 2009, Abu Hassan showed me his apple and quince orchard on the bank of the Barada River, which was now a trickle of water. "That's rainwater, it's not from the spring," he said despondently. The 60-something father of 10 looked helpless and defeated. "It never used to be like this," he said of the land that he had inherited from his father. "There used to always be water, summer and winter. The Barada used to be famous. Everyone knew about it. It was a powerful river, six or seven metres deep and very cold. People drowned in its strong current. But eight years ago, the spring suddenly disappeared. If my father saw this, he wouldn't believe it. He wouldn't believe that the Barada has died. My great-grandchildren won't even know that there ever was a river here" (Fig. 16).

Figure 16. Abu Hassan standing on the banks of the dwindling Barada River near Damascus. The high banks behind him indicate the river's former depth, 2009. Source: Adel Samara.

While urbanization has obviously transformed landscapes across the world over the last century, the irrevocable rapidity with which Damascus's green belt was destroyed is shocking. In 2008, a 35-year-old Damascene remembered that when he was a boy in

5 Official government figure. Others estimated the capital's population to lie closer to 6–7 million, a third of the country's population before 2011.

the late 1970s he could walk from his home near the Old City gate of Bab Sharqi to his grandmother's village in the Ghuta Oasis 5 km away without crossing a single paved road. In 2008, Bab Sharqi was flanked by a six-lane ring road and beyond there was only an endless stretch of concrete and bricks.

HYDRAULIC AND SOCIAL ENGINEERING ON THE EUPHRATES

The promise of the Euphrates Basin Project

Until the 1980s, the sustained drive for agricultural growth improved living standards in rural areas, but this trend slowed in the 1990s as the limits of land and water resources were overstretched, particularly in the north and east of the country. Thus while Syria prided itself on its self-sufficiency in certain main staples and on its wheat exports, 11.4% of its population lived in extreme poverty in 2005, unable to satisfy its basic food and non-food needs.

Nonetheless, agriculture remained the largest sector throughout the 1990s and retained a prominent role even as the oil and industry sectors expanded. It remained the backbone of the rural economy in the 2000s, even though the agricultural labour force was halved to 15% between 2000 and 2010. Despite the impact of drought in the late 2000s, which reduced agricultural exports, the agricultural sector accounted for about 20% of Syria's GDP in 2010 (Syria Report 2013). But farmers and herders were increasingly forced to abandon agriculture even though there were few employment alternatives, especially in the impoverished north-east of the country where illiteracy rates were the highest.[6] This was also the only place where poverty levels had increased in the period between 1996 and 2004, with 58% of the country's poor living in this region (UNDP 2005).[7] These disparities were exacerbated after 2000, when Bashar al-Assad acceded to power after his father's death and started implementing policies to liberalize the economy and open Syria up to world markets. Ba'athist policies were abandoned and in 2005 the government announced a transition to a social market economy, which led to the cancellation of a number of state subsidies including those on fuel and fertilizer in 2008 and 2009. These subsidy cuts coincided with a four-year drought between 2007 and 2010, which had a devastating impact in the north-east (de Châtel 2014a). Agriculture remained an important economic sector, but the government was much more focused on attracting foreign

6 For example, in 2004, 38.6 percent of the population of Raqqa Governorate was illiterate according to a census by the Central Bureau of Statistics in Syria.

7 Syria's north-eastern region is usually defined as encompassing the governorates of Deir ez-Zor, Hassakeh, Raqqa and Qamishli. However, UNDP (2005) defines north-eastern Syria as including Idleb, Aleppo, Al Raqqa, Deir ez-Zor and Hassakeh.

investment for the development of trade, housing, banking, construction and tourism. Moreover, despite nominal government efforts to attract investment to the north-east, economic activity remained concentrated in the two large cities Damascus and Aleppo and along the coast.

Yet 40 years earlier, the Syrian Ba'ath party had had high hopes for the north-eastern region, also locally referred to as the Jezira,[8] where it had aimed to create the new model of a socialist society. With encouragement and substantial financial support from the Soviet Union, the Syrian state in 1968 embarked on a large-scale irrigation and reclamation project that would transform agriculture in the Euphrates Basin from small-scale irrigation and dry-land farming into massive agricultural projects, with large-scale irrigation and drainage systems (Springborg 1981).

The Euphrates Basin Project that was launched in 1968 was a showcase of Ba'athist development policies. Among its ambitious goals, it aimed to regulate the water of the flood-prone Euphrates River,[9] boost agricultural production through the creation of 640,000 ha of new irrigation areas, and generate 2.5 billion kW/yr of electricity to run irrigation pumps, power local industry and electrify villages. The project's centrepiece, the Soviet-funded Tabqa or Thawra Dam, was among the world's 10 largest. Even before it was completed in 1973, it became an emblem of Ba'athist power, a fact that was affirmed when the dam reservoir was named after President Hafez al-Assad (Hinnebusch 1989). The Euphrates Basin Project became a main priority for the regime, which dedicated 25% of the national budget to the project for more than 20 years (Ababsa 2011: 88).

The project also had clear socio-political goals, aiming to instigate social change in the backward eastern provinces and gain political control over the unruly Jezira region by breaking down the strong tribal structures and constructing a new progressive rural society based on socialist methods of cooperative production and state farms (Ababsa 2005: 17). The filling of the Tabqa Dam reservoir in 1973 flooded 250,000 ha of arable land, 66 villages and 126 hamlets in the fertile Euphrates Valley, displacing between 65,000 and 75,000 people. The government planned to resettle this population on 15 model farms in the pilot irrigation project, dispersing the displaced from each village across several farms in an effort to sever tribal ties.[10] However, poor design and lack of space in these

8 'Jezira' means island in Arabic and refers to the region situated between the Tigris and the Euphrates.

9 With a length of 661 km in Syria, the Euphrates is the country's most important water resource, providing an annual average 5,574 MCM of water or more than 40 percent of the country's water resources (GTZ and SPC 2009). This transboundary river that is shared with upstream Turkey and downstream Iraq is the longest river in Western Asia with a total length of 2,786 km (UN-ESCWA and BGR 2013).

10 According to Ababsa (2011: 94), quoting Hinnebusch (1989), 260 families from 67 different villages and hamlets were installed on the Rabi'a farm.

new villages made them unattractive to the communities from the Euphrates Valley who strongly resisted the move. In the end the government offered to resettle them in the 42 newly built villages[11] in the Khabur Basin in Hassakeh Governorate. Around a third of the displaced population made the move to Hassakeh, while only 9% settled in the pilot project's state farms. Many more, around 55%, remained in the area and built new villages in the steppe lands on the edge of the new dam reservoir. Some of them were herders with large numbers of sheep who would not have had enough space in the new villages and farms; others were landless or could not prove ownership of their land in the valley. Many also moved to Raqqa, Aleppo or Damascus (Hinnebusch 1989: 236; Ababsa 2005: 18; Rabo 1986: 35).

Like many other "hydraulic mission" schemes of its type, the Euphrates Basin Project failed to meet its targets, which were often unrealistic. As in Egypt, where the Soviet-backed construction of the Aswan High Dam did not achieve far-reaching agricultural transformation, the Tabqa Dam did not turn agriculture in Syria into a highly profitable enterprise. The annual reclamation target of 50,000 ha set by President Hafez al-Assad was never attained, let alone the ultimate goal of 640,000 ha (Springborg 1981). Unexpected ecological problems posed serious challenges, slowing the pace, increasing costs, and considerably reducing the project's scale. The salt content of the Euphrates[12] increased after irrigation started in south-eastern Anatolia in Turkey and this combined with the hot, dry conditions, and rising groundwater levels made soil salinization a constant problem (Hinnebusch 1989).[13] The problem of soil salinization in the Syrian Jezira was further exacerbated by the gypsiferous soils in this area, which have a high potential for salt mobilization (UN-ESCWA & BGR 2013). Between 1976 and 1985, 4,000 ha of arable lands became salinized every year and by the early 1980s 20,000 ha had been lost to salinization and a further 35,000 ha had lost half its productivity due to salt formation (Ababsa 2011: 91). Furthermore, the high gypsum content of large parts of the area made reclamation

11 This was the 'Arab belt', a 280 km-long and 10-15 km-wide band of arable land along the Turkish border, that the government outlined in the 1960s as part of a plan to 'Arabize' this predominantly Kurdish region. "The plan anticipated deportation of 140,000 Kurds living in 332 villages situated inside this band who were supposed to be replaced by Arabs. However, the plan was not realized until 1975 when around 4,000 Arab families of the Walda tribe were moved to forty-one model farms in Jazira as well as to fifteen model farms north of ar'Raqqa. The Arabization campaign of Jazira was halted by Hafiz al'Asad in 1976." (DIS & ACCORD 2010: 8)

12 The high salinity of Euphrates water can partly be explained by the fact that almost all of the river's discharge is generated in the headwaters in Turkey, and the river then flows through semi-arid and arid areas with high evaporation for over 1,500 km (UN-ESCWA and BGR 2013).

13 This problem started in the 1940s and 1950s when rich Aleppan merchants started growing cotton in the Jezira region and pumping water from the river without proper irrigation or drainage systems (Ababsa 2011).

uneconomic and caused the collapse of irrigation canals. As a result, only 60,000 ha were irrigated from Lake Assad by 1984 (Collelo 1987). In 2000, the irrigated surface had risen to 124,000 ha, or nearly 20% of the projected 640,000 ha (Elhadj 2008).

The state farms, designed as "'avantgarde' structures to train farm labourers with modern techniques of production and to diffuse the Ba'ath Socialist ideological principles" (Ababsa 2011: 88), failed from the time of their establishment in the 1960s, both from an economic and social point of view. Costs were higher than revenues and productivity remained low. In 2000, the income of all state farms in the Euphrates Project was SYP 25.5 million (US$ 0.57 million) while production costs reached SYP 645 million (US$ 14.3 million) (Ibid.: 94-95).[14] Overall costs also far exceeded initial projections, as a result of international inflation and the other unforeseen complications. Reclamation had been estimated at SYP 2 billion (US$ 500 million), but by 1977 cost estimates had been adjusted to SYP 13-14 billion (US$ 3.25-3.5 billion) not counting the cost of resettlement. In comparison, the construction of the dam and the adjacent town of Thawra had only cost SYP 1.4 billion (US$ 350 million) (Hinnebusch 1989).[15] The dam itself had also failed to meet planners' optimistic expectations so that two additional dams, Al Baath and Tishreen, were built in 1986 and 1999 respectively to provide additional flood regulation and hydroelectricity.

A flood and three droughts (Tel al Banat, 2009)

The recent history of Tel al Banat, a hamlet on the Euphrates that lies around 100 km upstream from the provincial capital Raqqa, illustrates the far-reaching social repercussions of the Syrian government's infrastructural and political projects in the Jezira region over the last 50 years. The original Tel al Banat hamlet was flooded by the construction of the Tishreen Dam and the creation of Lake Tishreen, and its inhabitants were scattered across the country. Some moved to the newly reclaimed lands in the Maskaneh Pilot Project, one of the seven Euphrates Basin government irrigation schemes situated about 200 km south-west of Tel al Banat in a vast dusty steppe (Fig. 14). Others moved to Raqqa or the Damascus suburbs. Around 50 families remained in the area, and rebuilt their homes on the banks of Lake Tishreen on the edge of the steppe. Their reasons for staying were diverse: some could not prove ownership of their land in the valley and therefore received no new lands in the Maskaneh project, others received such small plots in Maskaneh that they could not have made a living. Farming and settlement are officially forbidden on the government-owned lands around Lake Tishreen. But local communities all around the lake have stayed, illegally cultivating the land and pumping irrigation water from the lake. The

14 Approximate 2000 exchange rate: US$ 1= SYP 45.

15 Approximate 1975 exchange rate US$ 1 = SYP 4 (Hinnebusch 1989).

story of Tel al Banat is characteristic of many of the flooded villages of the Euphrates Valley whose population were uprooted and scattered through Syria and Lebanon after 1973 (Fig. 17).

Figure 17. View of the "new" village of Tel al Banat with Lake Tishreen in the background, 2008. Source: Adel Samara.

Ahmed al Yehya, a 45-year-old farmer whose family had lived in Tel al Banat for generations, remembers that the flood came very suddenly: "We had been hearing about it for 10 years and then suddenly, within a week, it was there. We took whatever we could before the old family home disappeared in the water, even the wooden roof beams, and pushed it up the hill in carts. Some people didn't want to leave. They were going to lose all their belongings in the flood. They said they would rather die in the flood than move to the new lands in Maskaneh. And some did. My father had a heart attack and died on the day of the flood." Like many other farmers in the Euphrates Valley, Yehya's family could not prove ownership of their land. They only had the deeds to the land on which their home was built, which made them eligible to a 0.4 ha patch of land in Maskaneh. This would have had to be shared out between five brothers. "We had land in the valley, but it wasn't registered. We didn't think to register it because we never thought it would be taken from us. We had been farming that land for 100 years or more, but we had no papers to prove it. Only one of my brothers moved to Maskaneh, the three others are in Damascus. I am the only one

who is still here. We are now illegally on this land, but the government leaves us in peace. [...] The land here is much poorer than the land in the valley, it is weak. We started farming it in 2000 and I think that within 20 years it will be useless. Many of the lands get salinized. For example, people who started farming olive trees five years ago have had to abandon the land because the trees are dying. There are thousands of hectares of dead salinized land now. The problem is that the quality of the land is bad. The land that was flooded by the dams yielded 20 times more than the land here or in the area of Maskaneh. The land is poor from the outset, so how are you going to make it productive? An old lady won't ever be a bride, even if you put make-up on her."

By 2009 the farmers of Tel al Banat and the wider Jezira region were facing the third successive year of drought and drastic cuts on fuel and fertilizer subsidies, a lethal combination that was forcing many to abandon their land (de Châtel 2014a). Three quarters of the houses in Tel al Banat were boarded up after families had left. They chose Damascus and the southern governorates, more than 600 km from the Euphrates Valley, instead of nearby Aleppo. "Aleppo is full," they said, with migrants who could not find work. Not that they had any expectations of life in the capital. "Damascus is the mother of the poor." They knew life there would be worse than in Tel al Banat, but life there had become impossible.

Abdullah Ahmed, a father of seven, stopped farming wheat and cotton on his 0.8-ha plot of land after the soil "died". In April 2009 he was preparing to leave Tel al Banat to find work in Damascus or Lebanon, but had few hopes of finding a better life for himself or his children. "They will be like their father: they will be alive, they will have food and drink. But that's all. We don't have land and land is dignity." Agriculture, in the words of one of Ahmed's neighbours, was dead, but none of the farmers in Tel al Banat had any other employment options – most had barely finished primary school. "It is difficult to get a government job," said Ahmed. "One needs languages and computer skills. And the thing is, we are farmers, that's what we know how to do. What am I going to do in a factory?" But in the end, he said, he would have no choice: he would move to Damascus and find any work he could. "Many people we know have moved to Damascus, they are living in tents for SYP 1,000 (US$ 21.27) a month."[16]

Leaving the land (Hamouriyeh/Mzeirieb/Lebanon, 2009)

Ahmed al Yehya's brother, Mahmoud Hamadeh, locked up his house in Tel al Banat in 2008 and moved to the Damascus suburb of Hamouriyeh. He rented a plot of land for SYP 1,500 (US$ 31.90) a month and lived in a woollen Bedouin tent with his wife, eight children and two daughters-in-law. His wife and daughters-in-law worked on nearby farms and his sons

16 2009 exchange rate: US$1 = SYP 47

tried to get odd jobs as builders and porters in neighbouring suburbs. "We have faced many difficulties since we came here," he said, sitting outside his tent by the roadside. "It is not as we expected it to be. There is no work here either, but we had no choice but to leave Tel al Banat. We had to eat."

Hamadeh's tent bordered on a larger plot of land where three or four families from the Euphrates Valley had been living in squalid conditions since the flooding of Lake Tishreen in 1999. Like thousands of others, they had been unable to prove ownership of their lands and had lost everything when the Euphrates Valley was flooded. Instead of staying in the area though, they had taken their chances and moved to Damascus in the hope of finding a better life. But 10 years later they still lived in a haphazard collection of makeshift tents and shacks that had been drawn up around a central yard. Half-naked children played in the mud, women filled large plastic vats with water that they had bought from a private vendor (Fig. 18). Like Hamadeh's family, these families survived by finding temporary farm and construction work. None of the children went to school: their parents could not afford the 10 SYP (US$ 0.20) return bus fare, or the notebooks, pen and shoes they would need. Moreover, the children were more useful if they worked to help support their families (De Châtel 2014a).

Figure 18. After the flooding of Lake Tishreen in 1999, this group of migrants from north-eastern Syria moved to the Damascus suburbs where they were still living in makeshift tents in 2009. Source: Adel Samara.

Makeshift camps like this one and larger were dotted around the Damascus suburbs and in the southern governorates of Dara'a and Suweida. Ahmed al Yehya's daughter-in-law Fatima, 20, grew up in one of the 42 "new villages" that were built in Hassakeh Governorate after the flooding of Lake Assad in 1973. Her family had received 2.5 ha of land there in compensation for the land they lost in the valley. They planted cotton and wheat, which they irrigated with groundwater. But in the early 2000s the water ran out and in 2007 the whole family moved to a camp near Mzeirieb, a village in Dara'a Governorate near the Jordanian border. There they joined hundreds of other migrants from Qamishle, Hassakeh, Deir ez-Zor and Raqqa Governorates. There was also a small group of Sudanese. Before she was married and moved to Tel al Banat, Fatima also lived in Mzeirieb. "There was no electricity, no water, no bread in Mzeirieb – nothing," she said. "You got SYP 25/hr (US$ 0.55) to work on other people's land." According to farmers in Tel al Banat, the camp had existed since the early 2000s but started attracting more migrants after the drought started in 2007.

Crammed on to a small plot of land on the edge of the village, the camp looked like a slum, with ragged tents sewn together from odd pieces of fabric and plastic (Fig. 19). The camp dwellers had developed a precarious contraption of electric wiring to tap power off a nearby pylon, a system which they quickly dismantled as soon as they saw security forces coming to the camp. Conflicts regularly broke out between camp inhabitants and locals, but also among inhabitants themselves who originated from different regions and tribes. The local authorities were obviously aware of the camp on the edge of town, which was steadily growing as more migrants fled the drought in the north-east. However, camp dwellers received no government support or food assistance. Even as the impact of the drought worsened and the government launched aid appeals to the international community, all food assistance was distributed in the north-east. International and Syrian aid organizations were not granted permission to provide support to migrants, who got financial incentives (20% of their income in Dara'a) to return to the north-east (see Chap. 3).

As water ran out across north-eastern Syria from the late 1990s onwards, many men and young boys also left their families in Idleb, Hassakeh, Qamishle, Raqqa and Deir ez-Zor Governorates to seek work in Lebanon. While this form of temporary or circular migration between Syria and Lebanon has existed for decades, water scarcity and lack of job opportunities in Syria's north-east had led to an increase in the late 1990s. The decision to migrate to Lebanon was spurred by the abolition of visa procedures between the two countries after the end of the Lebanese civil war in 1990, easing transit between the two countries. No official figures exist for Syrian workers in Lebanon, but estimates

Figure 19. The tent camp near the Syrian town of Mzeirieb on the Jordanian border, here pictured in 2009, attracted migrants from across north-eastern Syria from the early 2000s. Source: Adel Samara.

range between 300,000 and 500,000 during the post-war period from 1990 to 2005, representing 10-15% of the overall Syrian labour force (Di Bartolomeo et al. 2012).

Ahmed al Yehya's nephew, Ahmed, 28, had also made the move to Lebanon in 2005 and lived in the disused concrete shell of a half-finished building in the mountain village of Qartaba above Jbeil. For a US$ 20 monthly rent, he shared a narrow windowless space on the ground floor – probably intended as a storage space in the building's garage – with 15 other men, mostly from the village of Daife near Tel al Banat. There was no hot water and no heating, which was particularly difficult during the winter months when temperatures can drop below zero and the village, which lies at an altitude of 1,250 m, can get snowed in (Fig. 20). But they were better off than the Syrians across the road, who had built tents from plastic sheeting in an unfinished parking garage and were fully exposed to the elements. Ahmed was a relative newcomer compared to Hassan and Abdul Mustafa who had been working in Lebanon for twelve and nine years respectively. Since then, the situation back in Daife, where their wives, children and extended family still lived, had only gotten worse. "They can't irrigate anymore," Hassan said. "There is no water. There is nothing. In the 1980s life was good in the Jezira, there was water, but now there is drought and the price of diesel has gone up from US$ 30 to US$ 100 per barrel. It's impossible to keep farming. Even if you have land these days, you can't work on it. The land has given us nothing since the 1980s

Figure 20. Syrian workers living behind a disused parking garage in the village of Qartaba, Lebanon, 2009. Source: Adel Samara.

– it is good for nothing, fit for the rubbish [...]. If I had had an education, I wouldn't be here. It is the same for our children. All we can do is bring them here to Lebanon and put them to work on a building site. It's desperate. We want our children to receive an education, but most of the teachers in Daife don't last long. They leave."

TRAGEDY OF THE COMMONS IN THE BADIA

The country's breadbasket runs dry (Bir Hassan, Beirut, Lebanon, 2009)

In 2009, the Beirut suburbs were teeming with Syrian migrants. There was even a corner of Bir Hassan, near the Palestinian refugee camp of Burj al Barajneh, where you only saw Syrian licence plates.

In 2009, Adnan al-Sahn, a 32-year-old bricklayer, had been living in Beirut for six years. He left his hometown on the Khabur River in Hassakeh Governorate following the construction of the Bassel Dam in 1999. "As soon as they built the dam, the river's level was lower, but we tried to continue farming our land," he said. "We started using a drip irrigation system, but soon there was no water at all anymore, and we were forbidden from taking the water from the dam reservoir for irrigation. Before, we irrigated most of our land with water from the river, some of it was rainfed. But if there is no rain, then there is

no way to sustain rainfed land either. Over the last 10 years, water levels have constantly decreased. And now with the price of diesel going up, there is no point at all anymore in practising agriculture. Everyone is leaving to Dara'a, Aleppo, Damascus and Lebanon…"

It was quite a change from the 1990s when Hassakeh Governorate was known as *Al Khaleej Al Thaniy* or the Second Gulf region for the wealth and the prosperity of its local population. "We used to have employees working for us, now we have to work for others. We have had to abandon our homes and we have lost our dignity," said Adnan who lived in a disused shed behind a tall apartment block between the south Beirut suburbs of Burj al-Barajneh and Bir Hassan, a space he shared with eight others. They all used to work as farmers and shepherds because "that's the kind of work you do if you are from Hassakeh," according to Adnan who, like his seven brothers, did not finish primary school. "The situation in Syria is bad and it's getting worse. In the days of Hafez al-Assad it wasn't like this. Farmers were better off than civil servants. Now civil servants get paid more for doing nothing. We live in terrible conditions: we earn low wages, we eat bad food… Look at me: I'm 32 and I'm not even married yet – I've been working for 10 years. And for what? What happens after this? Another 10 years of this?"

A perfect storm in the Khabur Basin

The transformation of the area around the Khabur River and Hassakeh over the last 75 years illustrates how a series of human and environmental factors have disrupted the fragile environmental balance in the semi-arid steppe. The 388-km Khabur River originates in the Turkish Highlands and joins the Euphrates River near Deir ez-Zor as its most important tributary (Fig. 14). Along its course, the river receives water from a series of streams and from the springs at Ras al Ain, which was once one of the largest karst springs in the world (UN-ESCWA & BGR 2013). Until 75 years ago, this area had a small, mainly nomadic population, with a few settlements along the river. "In 1940, the Khabur could be considered a self-sustaining steppe for the pasturing of camels and sheep, with highly productive rainfed agriculture, and equally productive gravity irrigation along stretches of the river. Fishing and hunting of wild gazelle were important contributors to the diet" (Hole 2009: 11).

The vast steppe was controlled by nomadic tribes, who grazed their sheep and camels seasonally. They applied the customary law of the tribal *hima* system, annually migrating to fresh pastures, which allowed the vegetation to regenerate. The steppe had a rich wildlife and diverse vegetation. According a description from the 1960s, it was full of wild gazelles, rabbits, foxes, wolves, hyenas, while goats and sheep grazed in fields dotted with red poppies and other colourful flowers (Karabet 2013). But the events of the 20th century

brought far-reaching change and soon disrupted the steppe's fragile ecological balance.

After the fall of the Ottoman Empire, the traditional migration routes, which had spanned from the Turkish Highlands into current-day Iraq, Jordan and Saudi Arabia, were cut off by the closing of the borders, thus limiting the freedom of movement of the Bedouin. At the same time, during the 1940s and 1950s, tribal sheikhs leased large tracts of steppe land to urban merchants from Aleppo who mainly cultivated irrigated cotton (Hole et al. 2007). Around 13,000 motor pumps were installed along the Euphrates in the 1950s and the area dedicated to irrigated cotton in the Jezira rapidly increased from 10,000 ha in 1952 to 120,000 ha in 1962 (Ababsa 2005: 14). However, the absence of proper drainage rapidly led to problems of salinization. The abolishment of the *hima* system and the nationalization of the steppe in 1958 led to further changes in land use patterns in the steppe from pastoralism and extensive rainfed agriculture to intensive irrigated cultivation of wheat and cotton. Nomadic tribes were encouraged to settle and plough the land so that the majority of pastures located in areas of between 200 mm and 350 mm rainfall were converted to crops.

As a result, the population of Hassakeh Governorate increased exponentially from the low ten thousands in 1950 to more than 1.1 million in 2007, centred around the regional capital Hassakeh but also scattered in several smaller cities and hundreds of villages and hamlets. Besides the high birth rates that are common across Syria, this sharp rise can be explained through the settlement of nomadic tribes in the region from the 1950s and the resettlement of families displaced by the dams in the Euphrates Valley in the 1970s and 1980s (Hole 2009).

As Syria started expanding irrigated agriculture in the 1950s and 1960s, the development of the Khabur Basin was prioritized,[17] and with substantial foreign aid, three dams were put into operation on the Khabur and its tributaries in the 1990s, supplying the large-scale Khabur River Basin Irrigation Project. Land "irrigated by surface water in Hassakeh Governorate increased eightfold from 7,400 ha to 65,000 ha between 1990 and 2000. Over this period, Hassakeh became the most important agricultural region in Syria, producing around 40% of the country's wheat and cotton supply, two of the main irrigated crops in Syria" (UN-ESCWA and BGR 2013: 92).

Groundwater formed a much more important source for irrigated agriculture in the Khabur Basin, with more than 87% of the irrigated surface area supplied by wells and generous government subsidies for the drilling of wells until the 1990s. Soon massive over-

17 Following the results of the nationwide survey of soils and water resources carried out by the United States Department of Agriculture in 1978, which saw great potential for irrigation in the Khabur Basin (Hole 2008).

extraction in Syria and Turkey caused a rapid fall in water tables and major springs ran dry. The Ras al Ain Springs, which used to discharge 45 m^3/s, disappeared completely in 2001 and groundwater levels in this area dropped at an average rate of 1.68 m/yr between 1999 and 2003 (UN-ESCWA and BGR 2013). As a result, most wells in the basin pumped from depths of more than 100 m. According to figures from 2003, the Khabur Basin had a 3.1 BCM water deficit, the largest water deficit of all basins in Syria (Varela-Ortega et al. 2003).

Moreover, the poorly developed and shallow soils in the arid steppe suffered from the massive intensification of agriculture. Deep ploughing removed native vegetation and exposed soils to wind and water erosion, while the use of flood irrigation without adequate drainage and the failure to observe fallowing cycles and crop rotation caused widespread soil salinization, which in turn lowered productivity. Nonetheless, the state continued to encourage expansion, with plans in 1988 to cultivate 100% of the "potentially arable land", which inevitably resulted in further degradation of the rangeland to the point where it was not even suited for grazing. Cultivation of the steppe was finally banned in 1994 though licensed wells were allowed to operate until 1997 (Hole et al. 2007). Meanwhile overgrazing also rapidly took its toll, primarily due to the massive increase in the sheep and goat population, which more than doubled between 1985 and 2007.[18] Moreover, in areas of the steppe that had been ploughed, shrub cover and the soil crust had been removed and were exposed to wind erosion. This in turn led to the abandonment of farms. By 2008, "the entire landscape ha[d] been modified by humans" and the region that was once considered the breadbasket of Syria was described as "in danger of agricultural collapse" (Hole 2009: 5). Nearly all native vegetation had disappeared, groundwater levels had dropped below levels of economic extraction and wind and water erosion had removed the thin steppe soils. As land and water resources were exhausted, poverty levels rose and settlements were gradually abandoned.

The economic and social implications of desertification (Palmyra, 2009)

Desertification was increasingly becoming a problem throughout eastern Syria in 2009. The government was keen to blame this on external factors like drought and climate change, but both Syrian and foreign experts and even some officials at the Ministry of the Environment identified overgrazing, over-exploitation of groundwater, poor land management, the expansion of agriculture in the steppe and the removal of vegetation and trees for use as firewood as the main culprits (Sharaa 2010).

18 Nationally, Syria's sheep population rose from around 11 million in 1985 to nearly 23 million in 2007. Successive years of drought after 2007 forced many herders to sell or slaughter their sheep, resulting in a drop in the sheep population to 18 million in 2011. The goat population more than doubled in the same period from about 1 million in 1985 to 2.3 million in 2011 (NAPC 2013).

Gianluca Serra, an ecologist who worked on several conservation projects in the Syrian steppe between 2000 and 2010 warned in 2009 of the implications of desertification, which he said was spreading at an alarming pace in the area of Palmyra where he was working to rehabilitate parts of the Syrian desert. "The Bedouins tell us that the *badia* [the steppe] was covered in thick vegetation until 20 or 30 years ago," he said. "Now it's becoming a rocky desert. There were many animals like gazelles, so it was rich in biodiversity. Nowadays you are lucky if you see a hare or a rabbit, it is very hard to see anything at all." According to Serra, locals also reported an increase in dust storms, indicating that the removal of vegetation had caused soil erosion.

"Desertification is a serious matter. I'm not saying this out of concern for the environment; it is not because I care about nature and we love birds and flowers. Natural resources are the base of the economy, especially here in the desert where people live off livestock grazing. Ecosystems have a major economic value, so trying to combat desertification is important for the national economy." Serra pointed out that desertification could also fuel socio-economic conflict and wars, as in Darfur and Somalia. He added that people in Syria's eastern governorates were "very angry" and that there was suffering and growing poverty. "I think Syria is facing a risk. Demographic growth is putting huge pressure on the country's natural resources. The government is aware of this, to a point, but there is a lot of indulgence in saying that the causes are external, saying that it is climate change and that it is drought. Of course, climate change and drought are facilitating and accelerating this process, but the main cause is the mismanagement of the natural resources of the desert, which are the pastures, the vegetation and water" (Serra 2009).

CONCLUSION

Sadly, Serra's premonitions in 2009 proved to be more valid than anyone could have imagined. Years of land and water mismanagement, growing water deficits, the dismantling of the state subsidies and the growing disenfranchisement in rural areas spurred the outbreak of the first protests against the government of Bashar al-Assad in March 2011. Starting in the agricultural area around Dara'a in southern Syria, the protests spread to other rural areas such as Homs, Hama, but also the suburbs of Damascus where many migrant workers from the Jezira had settled. The initially peaceful protests, which demanded freedom, dignity and an end to corruption, soon made way for armed conflict and escalating violence across the country (de Châtel 2014a). Now, after more than three years, the human, economic and environmental cost of war can hardly be measured. The country has been physically, economically and socially destroyed: more than 100,000 people have died, one third of the population has had to leave their homes and the

economy is shattered. Looking forward, there is no end in sight to the conflict and no clear prospect of what the Syria of the future will look like. However, when reconstruction begins it will be crucial to emphasize the importance of a sustainable and sound natural resource management system that can provide sufficient fresh water to a growing population. As Serra said in 2009, this is not because of a love of the environment; natural resources form the basis of the local rural economy in this arid region. The experience of the last 50 years shows that disregarding the balance of ecosystems and exploiting natural resources beyond their sustainable limit comes at a high cost. Without a reliable and safe supply of fresh water and a policy that includes sound water management and sustainable agricultural practices, it will be impossible to rebuild a stable country.

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PART III

The Lower Jordan River flowing south from Lake Tiberias to the Alumot Dam, Israel, 2013. Source: Francesca de Châtel.

CHAPTER 5

Bathing in Divine Waters: Water and Purity in Judaism and Islam

INTRODUCTION

In Judaism and Islam, as in Christianity, purification through water is a means of attaining spiritual purity. The underlying common belief is that water has certain sacred qualities that give it the capacity to cleanse the mind, wash away sin and elevate the spirit to a higher realm. In Judaism, immersion in the ritual bath filled with the sacred "living waters" symbolises a spiritual cleansing, bringing the believer to an elevated spiritual status. Islam requires purity of body and mind in worship, and water is considered the ultimate means of attaining a state of ritual cleanness.

In this article I will discuss the role of water in Judaism and Islam, both in the scriptures and in the respective purification rituals. Besides describing the various water rituals, I will examine the spiritual qualities attributed to the water. In doing so, it is important to differentiate between the concepts of purity and impurity in a ritual sense and "cleanliness" and "dirt" in a strictly physical sense. The article will also discuss the evolution of the varying practices through history and in different cultural settings, and show how the often blurred distinction between ritual purity and physical cleanliness was – and still is – frequently confused.

In Judaism, the scriptures describe the various water rituals as strictly spiritual acts that do not remove dirt, while the state of impurity is emphatically dissociated from the idea of physical uncleanness. In practice though, the concepts of purity and impurity have through the centuries often become associated with physical hygiene and dirt, leading to the development of alternative practices. In Islam the distinction between the physical and spiritual value of the various rituals is more difficult to discern as the body and the soul are seen as a single entity in matters of worship. In practice, the water rituals are considered to have a religious meaning, but they are also practiced for hygienic purposes, health reasons and as purely social and leisure activities.

WATER IN THE SCRIPTURES

Judaism and Islam acknowledge water as a primary element, the source of all life. As such, both religions consider water to be a holy good, a gift from God that symbolises his benevolence and mercy. Water features prominently in both the Hebrew Bible and the Koran, but also in the Talmud,[1] the Hadith[2] and in prayers and blessings. Water is a gift and a blessing from God. Conversely, both the Hebrew Bible and the Koran warn believers that if they disrespect their God and turn away from his teachings, he will withhold water (*Tanakh* Deuteronomy 11:17) or make it bitter (*The Qur'an* 56:68-70).

Water in the Hebrew Bible

Water is an important theme in many biblical stories: in the Hebrew Bible there are more than 580 direct references to water (*mayim*) and many more indirect references to rivers, wells, dew and rain (Hillel 1994: 26). Right from the first lines of the Book of Genesis, water plays a prominent role. It is the source of creation, the element that was present when the earth was still "unformed and void". Water features in the story of the flood, the crossing of the Red Sea and the crossing of the Jordan River, while springs, wells and rivers form a key theme in the stories about Abraham, Isaac, Lot and Moses. Here water's scarcity often made it a source of conflict.

The Hebrew Bible dedicates extensive passages to the description of the Land of Israel and its environment. In the book of Deuteronomy, God tells the Israelites that the land they are about to enter (Israel) is not like Egypt, where the grain had to be irrigated. "The land you are about to cross into and possess, a land of hills and valleys, soaks up its water from the rains of heaven. It is a land which the Lord your God looks after, on which the Lord your God always keeps his eye, from year's beginning to year's end." (*Tanakh* Deuteronomy 11:10-13) But this life-giving gift from God is not accorded freely and He warns the believers that if they turn away from Him, they will be punished: "Take heed lest your heart be deceived, and you turn aside and serve other gods and worship them, and the anger of the Lord be kindled against you, and he shut up the heavens, so that there be no rain, and the land yield no fruit, and you perish quickly off the good land which the Lord gives you" (Ibid.: 11:16-17).

The importance of water in Israel's arid desert environment is reflected in the rich vocabulary the Hebrew language has for rain. Thus *yoreh* designates the first rains of

1 The Talmud is the collection of ancient rabbinic writings consisting of the Mishnah and the Gemara, constituting the basis of religious authority in Orthodox Judaism.

2 The Ahadith (sg. Hadith) are a collection of texts that record the actions and sayings of the Prophet Muhammad. Together they form the Sunna. The Ahadith form a supplement to the Koran as a source of Islamic religious law.

autumn and *malkosh* the late rains of spring, while there are several words for different types of floods and drought (Tal 2002: 199). Water is also the subject of prayers. *Tefillat Hageshem*, the Prayer for Rain, is recited on the eighth day of Sukkoth, the Feast of the Tabernacles, marking the beginning of the rainy season in Israel. Composed in the 8th century, the prayer is pronounced by Jews around the world, who pray for rain in the Holy Land. During the festival of Passover, the Prayer for Dew, *Tefillat Tal*, is recited to express the hope for fertilization of the land in Israel.

In the Hebrew scriptures, rain is deemed more precious than the Torah and creation itself, as these rabbinical sayings show: "The sending of rain is an event greater than the giving of the Torah. The Torah was a joy for Israel only, but rain gives joy to the whole world, including birds and animals," and "The day of rainfall is greater than resurrection; [...] than that whereon the Law was given to Israel [...]; than when the heaven and the earth were made" (Isaacs 1998: 159). Again, these prayers and blessings show how valuable water was in the arid Middle Eastern climate in which Judaism developed.

Water in the Koran

As a religion born in the deserts of Arabia, Islam ascribes the most sacred qualities to water, as a life-giving, sustaining and purifying resource. It is the origin of all life on earth, the substance from which God created man (*The Qur'an*: 25:54) and the Koran emphasises its centrality: "We made from water every living thing" (Ibid.: 21:30) Water is the primary element that existed even before the heavens and the earth: "And it is He who created the heavens and the earth in six days, and his Throne was upon the waters" (Ibid.: 11:7) The word water (*ma'*) occurs more than 60 times in the Koran, rivers over 50 times and the sea (*bahr*, which also signifies lakes or large rivers) over 40 times (Hillel 1994: 26).

The water of rain, rivers and fountains runs through the pages of the Koran to symbolise God's benevolence: "We send down pure water from the sky, so that we can revive a dead land with it, and We give it as a drink to many animals and people We have created" (*The Qur'an*: 25:48-49). At the same time, the believers are constantly reminded that it is God who gives them sweet water, and that he can just as easily withhold it: "Consider the water you drink – was it you that brought it down from the rain-cloud or We? If We had wanted, We could make it bitter: will you not be thankful?" (Ibid.: 56:68-70) In this verse the believers are warned that they are only the guardians of God's creation on earth; they must not take His law in their own hands. The Koran also makes a distinction between fresh water and sea water, comparing the two. "The two are not alike, the one is fresh, sweet and pleasant to drink from, while the other is salt and bitter" (Ibid.: 35:12).

Water is frequently used as a metaphor for paradise, righteousness and God's mercy. Koranic paradise is made up of spacious gardens where one feels neither the heat of the

day, nor the cold of the night (Toelle 1999: 33). The rivers and streams that flow through and underneath the gardens are filled with fresh, flowing and rushing waters (Abdel Haleem 1999: 97), suggesting sparkling, cooling and enlivening sounds (*The Qur'an:* 15:45; 44:52; 51:15; 55:50; 76:6). Besides these springs of clear water, there are also scented rivers and the Koran states that the believers will be rewarded for their piety by "rivers of water forever pure, rivers of milk forever fresh, rivers of wine, a delight for those who drink, rivers of honey, clarified and pure" (Ibid.: 47:15). Water is also compared to moral qualities in paradise: "In the garden is no idle talk; there is a gushing fountain" (Ibid.: 88:11-12).

The enchantments of paradise stand in stark opposition to hell, which is dominated by scalding fires and unbearable heat. Instead of the vast open spaces of paradise, hell is a deep abyss surrounded by a curtain of flames which rise up in tall columns and close in on the occupants. The single source in hell is filled with boiling water that never quenches the thirst of the occupants (Toelle 1999: 33).

The many descriptions of the gardens of paradise in the Koran inspired Muslims across the Middle East and North Africa to replicate the heavenly delights in earthly parks and gardens, creating luxuriant green spaces with elaborate water features, pools and fountains (Lehrman 1980: 32). The gardens of the Alhambra in Spanish Granada, the Bagh-é-Tarikhi in Iran's Kashan and the Taj Mahal in India were inspired by the image of Koranic paradise.

The English word "paradise" is derived from the Ancient Greek *paradeisos*, which was in turn adopted from the Old Persian *pairidaeza*, a walled enclosure (*pairi* – around; *daeza* – wall). The earthly equivalent of such a heavenly walled garden is the *hayr*, a word that is derived from the word *ha'ir* which means "tank" and was extended to include the garden that was watered from it, again indicating the importance of water as the base of such a paradisiacal space (Ibid.: 31). The Oriental enclosed garden with artificial irrigation in fact predates Islam; it was often inspired by the oases which offered a welcome respite from the waterless desert environment. Islamic gardens are often centred around a fountain or a water tank, which symbolise the overflowing sources of paradise, while four watercourses symbolise the four rivers of paradise: Jayhan, Sayhan, the Nile and the Euphrates (Dickie 1992: 1016). These rivers of Koranic paradise are inspired by the rivers that flowed from the Garden of Eden and which are mentioned in the Bible as Pishon, Gihon, Tigris and Euphrates (*Tanakh* Genesis 2:10-14).

The story of Hagar and Ishmael

The poignant story of Hagar and Ishmael – or Hajir and Ismail, as they are known in Islamic tradition – who are sent into the wilderness by Abraham, is recorded in both the Jewish and Islamic tradition (*Tanakh* Genesis 21; Bukhari 55:583). Abraham's second wife, Hagar, an

Egyptian slave woman, bears Abraham's first son, as his wife Sarah cannot conceive. After Hagar's child, Ishmael, is born, Sarah also falls pregnant and gives birth to Isaac. She grows resentful of Hagar and her child, and asks Abraham to send them away. The Hebrew Bible records that Abraham is greatly distressed, but, heeding God's words, he sends Hagar and Ishmael into the desert with some bread and a skin of water. Hagar wanders in the wilderness of Beer-Sheba and when her water runs out, she despairs, fearing that her son will die. She leaves him under some bushes and sits down at a distance, waiting for him to perish. It is then that God hears the crying child and speaks to Hagar, revealing a "well of water" from which she makes the child drink.

In Islamic tradition it is recorded that Abraham accompanied Hajir and Ismail all the way to Mecca. Here he leaves them in a desolate valley, assuring Hajir that God has ordered him to do so. When her water runs out, she frantically crosses the valley in search of a spring, running seven times between the mountains of Safa and Marwa[3] until she hears a voice and sees an angel digging the earth with his heel until water starts flowing. She makes a basin around the source to contain the water and fills her water skin with it.

This is the Zamzam spring that still lies in Mecca today. It is considered to be a source of life-giving water that can satisfy both hunger and thirst,[4] and cure illness. Pilgrims are recommended to drink Zamzam water and to sprinkle it on their head, face and chest, while some also dip their pilgrimage clothes in the holy water. These white robes are then preserved and used as burial clothes when they die; thus the believer will go to the grave touched by Zamzam water. Because of the water's healing and nourishing qualities,[5] it is also a popular gift for pilgrims to take home to friends and relatives. Saudi authorities have prohibited the commercial export of Zamzam. Nevertheless, the holy water can be found on sale in many countries around the world. Often these bottles of holy water are fakes. In 2006, the British government environmental agency tested purported Zamzam water that was on sale in London, and found high arsenic levels in much of it, making the water not only fraudulent, but also dangerous (*Environmental Health News* 2006). The holy Kaaba, the large granite structure inside the mosque in Mecca that forms the holiest place in Islam, is also washed twice a year with Zamzam mixed with rose water. The ritual is led by members of the Saudi royal family and attended by prominent representatives of the Saudi government and ambassadors from Islamic countries (*Arab News* 2005).

3 Hajir's desperate running to and fro is today remembered during the yearly *hajj*, the pilgrimage to Mecca, when pilgrims walk back and forth seven times between the two hills.

4 In the Ahadith of Sahih Muslim, Book 31, number 6046, the Prophet says: "It [Zamzam water] is blessed (water) and it also serves as food."

5 Research has shown that Zamzam water contains calcium and magnesium salts and natural fluorides.

PURITY AND HOLY WATER

Having discussed the role of water in the respective scriptures, I will now look at the role of water in religious rituals, as a means of purification and spiritual cleansing. To do this, it is important to first examine the concepts of purity and impurity in Judaism and Islam.

The concept of purity in Judaism

In Judaism, the terms *tahara* "pure" and *tamei,* "impure" are complex, abstract concepts that are often misinterpreted and associated with physical cleanliness and uncleanness. In fact, they should be understood in a ritual context. *Tahara* and *tamei* describe one's status after touching a source of impurity, and the acts of purification that can remove that impurity. "If you touch a reptile, you may not be dirty, but you are unclean. If you undergo a ritual immersion, you may not be free of dirt, but you are clean" (Neusner 1973: 1).

The laws of purity as outlined in the biblical books of Leviticus and Numbers date back to the time of the Second Temple in Jerusalem.[6] To be able to bring offerings or participate in the Temple service, worshippers had to be in a state of ritual purity. The biblical books of Leviticus and Numbers devote extensive passages to the concept of purity with detailed descriptions of the types and causes of impurity and which procedure should be followed to restore the believer to the state of purity. The sources of impurity include certain animals, the woman after childbirth, skin ailments, mildew in the house, bodily discharges, especially menses and seminal flux, sexual misdeeds and the corpse (Neusner 1975: 17). A believer who had been defiled by any of these sources first had to purify himself before he could enter the Temple precinct. Ritual immersion in the *mayim chayim*, or living waters – the water of rain, rivers or seas – was one of the main means of purification. After the destruction of the Second Temple in 70 AD, many of the laws of purity were no longer applicable as the purity of the Temple sanctuary no longer needed to be protected. Instead, the rabbis who replaced the priests of the Temple increasingly used the concepts of purity and impurity metaphorically, and associated them with sin, such as sexual misdeeds, idolatry, or unethical behaviour.

> The metaphors of purity and impurity are used by the rabbis because the community of Israel now is regarded as the Temple. What kept people out of the sanctuary in olden times will now exclude them from the life of the community. [...] Just as the rabbi is the new priest, study of Torah is the new cult and deeds

6 Situated on Jerusalem's Temple Mount, the Temple was the centre of ancient Judaism. The first temple, Solomon's Temple, was destroyed by the Babylonians in 586 BC. The second temple, which was built after return from Babylonian captivity in 536 BC and rebuilt by Herod in 19 BC, was destroyed by the Romans in 70 AD.

> of loving kindness are the new sacrifice, so the community formed on the basis of the rabbinic Torah is going to be protected from social uncleanness just as the old Temple was protected from cultic uncleanness. This accounts not only for the preservation, but for the considerable elaboration and extension, of the cultic symbols of uncleanness. (Ibid.: 23)

The concern for purity continued in the period of Talmudic Judaism, and over the centuries the laws of purity, particularly those pertaining to the menstruant woman, were studied and elaborated. The various rituals of purification carried out today recall the Temple, but are at the same time seen as spiritual acts in which the water changes the status of the believer, cleansing the mind and the soul and washing away sin, thus bringing him closer to God.

Jewish water rituals

The ritual of *Nitilat Yada'im* (literally "the lifting/washing of the hands"), consists of pouring water over each hand from a two-handled cup. Before eating bread, before rising in the morning, before touching the scriptures, and after having been near death – returning from a funeral for instance – *Nitilat Yada'im* marks a transition that prepares the believer for what is to come, giving water a mystical value. Today this ritual is mainly carried out by Orthodox and observant Jews.

The ritual of *Tashlich*, that is performed on the Jewish New Year, Rosh Hashanna, illustrates water's ability to spiritually cleanse and in this case wash away sin. *Tashlich*, which literally means "you will cast away", refers to a custom dating back to the 14th century or earlier, that is probably based on the following verse from the Book of Michah: "...he will have compassion upon us; he will subdue our iniquities; and thou wilt cast all their sins into the depths of the sea" (*Tanakh* Michah 7:19) The *Tashlich* prayer, which consists of certain chapters from the Psalms and the verses quoted above, is recited on the first day of the New Year near a body of water. Some believers also throw breadcrumbs into the water while reciting the prayer to symbolise the casting away of sin.[7]

Water is also associated with death in the following verse from the Book of Samuel: "... for we must needs die, and are as water spilt on the ground, which cannot be gathered up again" (*Tanakh* 2 Samuel 14:14). In a medieval custom still practiced by some today, which is possibly derived from this biblical phrase, mourners pour out the water that is stored in their homes, sending news of the loss flowing through the streets. Water was thought to act as a barrier against the spiritual forces that accompanied death and prevented

7 Explanations of the rituals of *Nitilat Yada'im and Tashlich* were given by Rabbi Michael Cohen, Kibbutz Ketura, Israel, February 2006.

them from causing any more harm. At death, the body is also purified through the ritual of *tahara*, in which a number of attendants pour water over the body in a continuous flow while reciting prayers.

Mikvah, the Jewish ritual bath

The ability of water to bring spiritual purity and change is however most clearly represented in the mikvah ritual, which involves immersion in a special bath filled with *mayim chayim*. At first sight the mikvah appears to be a plain bathing house, similar to those found elsewhere in the Middle East since time immemorial – the Greek and Roman baths and the Islamic hammam. But unlike its regional counterparts and despite the fact that the ritual involves immersion in water, it has nothing to do with physical purification.

The mikvah ritual is one of the 613 commandments that God gave to man. It is a *chukk*, a commandment that cannot be understood, over which the human mind can form no judgement. Observing the *chukkim* shows real devotion, the obeying of God's word without questioning. The immersion ritual is thus not about physical purification; it is a spiritual purification through which the believer achieves an elevated spiritual status. The 12th-century Jewish rabbi and philosopher Moses Maimonides, who codified the laws of purity and the rules of mikvah in his commentary, Mishnah Torah, explains: "It is plain that the laws about immersion as a means of freeing oneself from uncleanness are decrees laid down by Scripture and not matters about which human understanding is capable of forming a judgement.[...] Now 'uncleanness' is not mud or filth which water can remove, but is a matter of scriptural decree and dependent on the intention of the heart" (Maimonides Bk 10 Yad Mikva'ot 11:12). This commentary again shows how the original laws of purity pertaining to worship in the Temple were over time abstracted and interpreted as rituals of spiritual purification. One could argue that just as the act itself evolved to be a metaphor of the original cleansing, the water that was used for the purification also acquired an abstract and sacred value that enabled it to cleanse away ritual impurity and sin.

The use of the mikvah is closely connected to the concepts of *tahara* and *tamei* and goes back to Temple times in Jerusalem when worshippers had to perform a ritual immersion in the waters of the mikvah before being allowed to enter the Temple precinct. Scribes also had to immerse themselves in the mikvah before writing God's name, and on Yom Kippur the High Priest even immersed himself five times before entering the Holy of Holies where the Stone Tabernacles were kept. (Hagg 1998: 10) After the destruction of the Second Temple, the ritual immersion became less relevant and was mainly applied to proselytes converting to Judaism and menstruant women who immersed themselves as part of the laws of *niddah.* According to these laws, which are based on the biblical texts but were considerably expanded in rabbinic times, a woman is impure during her menstruation

and for seven days after. During this time, she is *niddah*, separated, and must not have any physical contact with her husband; she may not touch him or sleep in the same bed with him. After counting at least five days for her menstruation and seven additional "clean days" during which she looses no blood anymore, she returns to a state of purity after immersion in the ritual bath. But before immersing herself she has to be scrupulously clean. All barriers or *chatzitzot* have to be removed: any dirt, jewellery or make-up, even the smallest piece of grime below the nails or a knot in the hair, can make the ritual invalid.[8]

In accordance with the laws of purity and the concept of *tamei* and *tahor*, the scriptures explain that the status of *niddah* does not entail dirt or a lack of physical hygiene. Rather, it refers to Judaism's vision of cycles of life and death. The Torah considers sexual intercourse between husband and wife to be extremely holy. Not only does it represent the possibility of new life; it is also a sacred joining of the flesh and the spirit. Menstruation on the other hand represents death, in that the potential life that can be born in a woman's womb every month is being removed through the menstrual blood. Just as the laws of the kashrut[9] consider the mixing of milk and meat products to be a confusion of categories, the laws of *niddah* forbid the "confusion" of having sexual intercourse – which embodies the possibility of life – with the death of that potential life.

The rabbis emphasised the importance of the use of the mikvah by menstruant women. Women who failed to observe the laws of *niddah* and men who had intercourse with a *niddah* were liable to *karet* or excommunication, while children conceived when a woman was in a state of impurity were considered as *mamzerim* or bastards (Wasserfall 1999: 13). The observance of the mikvah ritual was therefore essential for the perpetration of the Jewish family according to Jewish law. The *halakhah*, Jewish law, states that the mikvah is more important than the synagogue. Indeed, private or communal prayer can take place anywhere, so that the synagogue is not essential to the religion's survival. The absence of a mikvah however, makes the perpetration of the Jewish family according to Jewish law impossible. The Talmud even says that its value surpasses that of a Torah scroll and a synagogue, as both can be sold in order to raise funds for the construction of a mikvah. In fact, a community is not recognised as a village or a town by Jewish law until it has a mikvah (Slonim 1995: xxviii).

8 The detailed description of the mikvah ritual and its significance were given by Mrs. Elisheva Shushan, a mikvah attendant and expert on Jewish family law from Ramat Shlomo near Jerusalem, Israel, March 2004

9 The body of Jewish dietary law.

Mikvah use through the centuries and across cultures

Despite the stringency of the laws of *niddah* and the emphasis on the importance of the mikvah in rabbinical texts, the ritual has through history been subject to reinterpretation and adaptation, leading rabbis to complain about "incorrect" practice in the various Jewish communities across North Africa, Europe and the Americas. Influences from the host cultures and developments such as secularisation and assimilation meant that the purification ritual for the menstruant woman was practiced in diverse ways. In 19th-century Europe, the mikvah was massively abandoned by women who perceived the immersion as humiliating and unnecessary. Today it is being "rediscovered" by members of the Reform movement who interpret the immersion as a spiritual moment and seek to dissociate it from the laws of *niddah*.

In 12th-century Egypt, many women had adopted the practice of aspersion, of asking another woman to sprinkle them with water in order to purify them from the *niddah* status. Others used "drawn water" – i.e. water from a tap – instead of the prescribed "living waters" to effect the purification. The practice of sprinkling, which was described by the Egyptian rabbi Maimonides and other rabbis as "heresy", was common practice among the Karaites, a sect of Judaism that rejects rabbinic authority and law and conforms to the written Torah and its rules. Following the rules outlined in Leviticus 15, these women considered that a woman was impure for seven days only, that she did not have to observe the additional days and that she did not need to immerse in a mikvah to be purified. Instead, they practiced purification through sprinkling. After trying to eradicate this "heretical" practice for several years, Maimonides and his colleagues issued an edict in 1176 in which they threatened the recalcitrant women with divorce and the loss of their marriage settlement. The move had immediate effect and many marriage contracts issued after this date include the promise by the two spouses to observe rabbinic laws on sexual purity (Wasserfall 1999: 91).

Elsewhere, in medieval Byzantium (Greece and Asia Minor), Spain, France and Germany, leading religious experts also complained that women were not immersing themselves "properly". They were either using plain water, transforming the purification into a simple bath and making the ritual invalid, or not respecting the seven days of "whitening". Texts from the period show that the women were in fact concerned about purity after menstruation, as they did perform some form of purification. However, they saw their practices as being at least as legitimate as those of the rabbis and several communities also resisted the rabbinical reforms.

Following the expulsion of Jews from Spain at the end of the 15th century and the persecution of Jewish communities in Eastern Europe in the 16th and 17th centuries, the Jewish communities that settled in Poland and Eastern Europe sought to reforge the

unity of the Jewish people. They resisted assimilationist practices by reinforcing religious practices, especially with regards to wedding customs and conjugal rights. The laws of *niddah* were therefore applied with great stringency in Ashkenazi[10] communities (Ibid.: 122-123). The views regarding the menstruant woman in this period were also influenced by the 6th-century book *Beraita de Niddah,* an anonymous work that described the menstruant woman as an abomination, leading to a number of extreme rabbinic commentaries on menstrual laws. Among them was the idea that the gaze of a menstruating woman "poisoned the air", that her breath brought about evil and that the ground she walked on was as impure as the ground that was contaminated by the bones of the dead (Hagg Ibid.: 31). Menstruant women were also prohibited from entering a synagogue or lighting the Sabbath candles, while all the utensils and objects they touched and the food they prepared became impure. As a consequence of such derogatory comments, and with the secularisation and liberal reform of Jewish life in Europe, many women stopped using the mikvah from the 19th century onwards, considering the practice to be primitive, sexist and Orthodox (Wasserfall 1999: 32-33).

In the Jewish communities of the Middle East, the mikvah was perceived quite differently than in Europe. These communities living in Muslim cultures which also observed rules of purity were often more flexible with the application of the rules of *niddah* (Ibid.: 123). In these communities the mikvah ritual became associated with the Islamic bathing house, the hammam, as women visited the latter to cleanse themselves thoroughly before dipping in the mikvah (Ibid.: 13). Just as in Ashkenazi communities, the mikvah ritual was a private affair, except on the occasion of the first visit prior to the wedding day, when the immersion in the mikvah formed part of weeklong festivities in preparation of the wedding day. In early 20th-century Algeria, these celebrations included, among other things, the painting of the bride with henna, and a visit to the Islamic bathing house, the hammam, where the bride spent an afternoon with female family members and friends, enjoying the waters, singing, dancing and sharing cakes and other sweets that were meant to presage a "sweet" marriage. The visit to the mikvah took place after the party at the hammam and was much more solemn. The ritual, which was carried out unquestioningly by observant and non-observant women, was seen as a blessing on the future couple. Instead of being seen as a ritual purification, the water of the mikvah was considered to be a source of life and attributed with fertilizing and beneficial powers for conception.

Subsequent monthly visits to the mikvah took place quietly and often women felt ashamed of having to undress in front of the attendant and share intimate details about their marital life. The meaning of the ritual had also been lost to many, who saw it merely

10 Jews descended from the medieval Jewish communities of the Rhineland.

as something one was "meant to do because it had always been that way". As such, many women abandoned the ritual as soon as they had private bathrooms, considering that taking a bath in running water at home effected the same purification as the mikvah. Like in medieval Byzantium and Egypt, the distinction between ritually pure and physically clean had been lost and the only reason for adhering to the practice was a strong, superstitious belief that immersion in running water would bring beautiful, healthy children.

Interestingly, many Algerian Jewish women who emigrated to France after 1962 are today rediscovering the traditions of their home country and incorporating old traditions in their wedding festivities. The mikvah is conspicuously absent from these celebrations, while joyous events like the henna ceremony and hammam parties are increasingly popular among Jewish brides of Algerian origin. As a place associated with fear and mystery, the mikvah is overshadowed by more simple and light-hearted celebrations. Women who observe Jewish tradition and superstition, but who have little real knowledge of Jewish culture, consider that using their bathroom to perform the purification is sufficient. The spiritual and non-hygiene-related aspect of the ritual has thus been lost (Ibid.: 199).

A quite separate and particular case is that of the Ethiopian Jews of the Beta Israel tribe who lived isolated from other Jewish communities for centuries. As part of their strict rules of female purity, menstruating women and women who had just given birth were segregated in special "huts of blood" for seven to 80 days. During this time they were effectively excluded from the community and certainly forbidden from preparing food for their family or even consuming food with them. After the period of segregation,[11] the woman carried out the purification by immersing herself in a nearby river, washing her clothes and cutting her fingernails. Then after fasting all day, she returned to the family hut at sunset.

Following the mass airlift of Ethiopian Jews from their native Gondar region in northern Ethiopia to Israel in 1991, anthropologist Lisa Anteby carried out several years of fieldwork among the Ethiopian Jews in Israel, examining how they were adapting to the new conditions. As the refugee centres, caravan sites and apartments in which the new immigrants were accommodated did not include a facility that could serve to segregate impure women, they sought other ways to deal with female impurity by creating special spaces and, later on, creating separate sleeping arrangements within one caravan.

Anteby recorded that over time, certain traditions were abandoned and rules faded. Because women could no longer bathe in a river at the end of their period of segregation,

11 The period of segregation in Ethiopian tradition was seven days for menstruating women or for women who had miscarried. After giving birth, women were secluded for 40 or 80 days, depending on whether it was a boy or a girl, in accordance with the degrees of impurity caused by childbirth stated in Leviticus (12:1-8)

they adopted the shower to perform the ritual purification. The Ethiopian women were not familiar with the mikvah and rejected it as "dirty" and unsuitable for ritual purification, as the water contained in the mikvah is not in a strict sense "running water" as stipulated in Leviticus (Ibid.: 166-186). The different interpretations of the ritual purification led to tense situations and disagreement between the new immigrants, who saw their practice as legitimate, and the Israeli authorities who rejected it and failed to accommodate the immigrants' needs.

Today the mikvah is predominantly used by the Orthodox community, where women adhere strictly to the rules of *niddah*. Some Orthodox men also use the mikvah before the Sabbath and important holidays. Besides the Orthodox community, only a small percentage of Jewish women use the mikvah on a regular basis and many continue to perceive the bath as "dirty". In Israel the rabbinate still tries to enforce the observance of menstrual laws as much as possible. The most significant opportunity they have to do this is before a wedding. All weddings in Israel are conducted by religious officials selected by the state and the Israeli Religious Authority requires brides to hand over a note from the mikvah attendant attesting that they have performed the ritual purification. This "forced" immersion has become a source of contention between the observant and secular communities in Israel, and many women consider it to be a form of religious coercion (Ibid.: 35-36).

Conversely, the Reform and Reconstructionist movements have in the last 20 years created new interest in the mikvah, encouraging women to "reclaim" the ritual as a moment of spirituality, and as a ritual that can also be practiced outside of the context of *niddah*, for example after an unsuccessful relationship, miscarriage, illness or trauma, such as rape or assault. Several mikvahs in the United States have also started introducing new immersion rituals for men.[12] Finally, the immersion in the ritual bath is also the final stage in the conversion to Judaism, transforming a non-believer into a Jew. Observant Jews also use the mikvah to immerse new dishes and kitchen utensils and make them kosher (Slonim 1995: xxvi).

The mikvah and Christian baptism

Christian baptism traces its roots to the Jewish practice of proselyte baptism, the baptisms of John in the Jordan river and the periodic baths for ritual purity in Judaism (see Chap. 6). At the beginning of the Christian era, Jews adopted a new custom of baptizing proselytes seven days after their circumcision. To become Jewish, the candidate had to undergo a series of special interrogations before being circumcised. Baptism in a pool of flowing

12 http://www.mishpacha.org/gender-mikveh.shtml and www.mayyimhayyim.org

water in front of a group of witnesses formed the final stage in the conversion. It was believed that after he immersed naked in the water, the new convert emerged as a true son of Israel. This baptism, which formed a rite of unification with the believers, was seen as a new birth. "Every proselyte is like a newborn child" (Babylonian Talmud, Yeb., 22a).

The ministry of John the Baptist in the Judean Desert announced the coming Reign of God and called for baptism in the Jordan River as a sign of repentance, symbolically linking immersion to a new and supernatural life. John administered the baptism of water to erase sin. However, by performing the ritual in the Jordan River and not in the ritual water of the mikvah, he made a clear departure from official practice. John baptized Jesus, but the manifestations of the Father and the Holy Spirit during Jesus's baptism gave it a new dimension. The baptism of Jesus also inaugurated his public ministry, and he subsequently gave his disciples the mission of baptizing in the name of the Holy Trinity. The apostles continued to practice the baptism of water as carried out by John, but emphasized the necessity for an inner conversion preceding the profession of the Trinitarian faith.

The apostle Paul was the first to define the theological and symbolic significance of Christian baptism, associating the converts' immersion in water to Christ's death and rebirth to a new spiritual life through resurrection (The Holy Bible, Rom. 6:3-4). In Titus 3:5, he describes baptism as the gift of "a bath of regeneration and renewal". The flowing water brings about change, symbolizing the death of the old, sinful man and the emergence of a new man from the waters of life. This is very similar to the spiritual renewal that the waters of the mikvah effect. Talmudic texts say that the believer emerges from the mikvah as pure and clear as the first man and woman created by God in Eden (Slonim 1995: xxviii). The major difference of course is that Christian baptism is only performed once, as an initiation rite, while immersion in the living waters takes place periodically. Early Christian writers compared baptism to the Jewish practice of circumcision as a sign of inclusion into the covenant community. By the 5th century these theological ties to Judaism had largely been lost and baptism was understood to be an act of salvation, ensuring the eradication of sin and more particularly original sin (Kessler & Wenborn 2005: 47-48).

The belief that every child is born in original sin, a sin inherited by all humans from Adam, is unique to Christianity. Muslims believe that Adam was expelled from the Garden of Eden for his sin and that God accepted his repentance; this means that each child is born sinless and innocent. While mainstream Judaism, both in antiquity and today, acknowledges that each person is responsible for his or her guilt, it also describes the existence of an innate sinfulness in each human being. A teaching in the Talmud for instance states that the serpent seduced Eve and impregnated her with spiritual-physical "dirt" which was inherited through the generations. However, the revelation at Sinai, when

Moses received the Torah, cleansed Israel of this sin (Ibid.: 323-324).

In the early period of the church, baptism was only carried out on adults, to ensure that they realized the full consequences of conversion. Baptism of children only became common from the 10th century onwards and was also associated to the belief in original sin: children or babies who died before being christened would not be saved (Jones 2005:780-781). The baptismal ritual itself also evolved over time: from the 14th century baptism by immersion was replaced in the Western Church by the pouring of water over the child's head. In the 16th and 17th centuries, these practices were once again questioned by dissident Christian movements such as the Anabaptists, who insisted on adult baptism, arguing that children were not conscious of their salvation through Christ. The American Baptists founded their beliefs on the theological baptism of Paul and insisted on a return to strict apostolic practice with baptism through immersion. The tradition of immersion was always maintained in the Orthodox Church.

THE CONCEPT OF PURITY IN ISLAM

The Prophet Mohammed said that cleanliness is half of faith (Muslim 2: 432). These well-known and oft-repeated words reveal not only the importance of purity, but also the essential role water plays in Islam. Purity (*tahara*) plays a central role in Islam: in manuals of Islamic law (*fiqh*), purification is always the first section, just as ritual purification is the preliminary to most acts of Islamic practice (Reinhart 1990: 2). The Muslim concept of purity incorporates both physical and spiritual aspects. Purifying oneself shows submission to the will of God and washes away sin, but it also implies physical cleanliness of body and clothes.

The fact that in Islam purity refers to both spiritual and physical cleanness is related the Islamic belief in the unity of body and soul. Islam means "surrendering to God" and Muslims, "those who have surrendered to God", do so entirely. Most religious obligations in Islam, such as prayer, fasting in the holy month of Ramadan and the pilgrimage to Mecca, have both a spiritual and physical component. The Muslim prayer is performed in the direction of Mecca and involves a series of movements. Fasting requires both physical and spiritual commitment: besides abstaining from food, drink and sexual intercourse, believers are encouraged to avoid arguments and sinful thoughts. This means that to attain a state of ritual purity believers must be physically and spiritually pure.

One fundamental difference between the Jewish and Muslim concept of purity and impurity is that in Islam impurity is not "contagious", in the sense that an impure person does not contaminate the objects he touches. Thus the strictures imposed on the Jewish

menstruant woman in certain circles and periods are not applicable to Muslim menstruant women. While the Muslim woman is considered impure during her menstruation, she cannot transfer that impurity to objects or people around her.

Muslim water rituals

The Koran tells believers "God loves those that seek to purify themselves" (*The Qur'an* 9:108) and instructs them: "You who believe, when you are about to pray, wash your faces and your hands up to the elbows, wipe your heads, wash your feet up to the ankles and, if required, wash your whole body [...] God does not wish to place any burden on you: He only wishes to cleanse you and perfect his blessing on you, so that you may be thankful [...]" (Ibid.). Purification through ablution is obligatory before prayer, touching or even reading the Koran; prayers carried out in impure state are not valid. This means Muslims are obliged to carry out ritual ablution before each of the five daily prayers. In addition, a more thorough ritual is required on specific occasions.

Entire chapters of the Ahadith are dedicated to ablutions, detailing when and how they should be performed, and explaining in which order the various parts of the body should be washed, how the feet are to be cleaned, how the head should be rubbed – even how often the nostrils should be cleared. They also specify that the water used for ablutions should be pure, *mutlaq*, which means it should not be mixed with any other liquid. Water from rain, wells, flowing water from taps, rivers and streams, and still water from lakes, ponds, seas and oceans, are all considered to be pure and suitable for ritual ablution (Muslim Bk 2; Bukhari Bk 4, 5).

There are three types of ablution. *Wudu'* – the minor purification carried out before prayer – consists of washing the hands, the face, the forearms, the head and the feet. It is required after going to the toilet, after touching a person of the opposite sex (with desire), or after touching the genitals, but also after laughing, coughing or sleeping (Reinhart 1990: 10). It is however also a spiritual purification: the Ahadith explain that by performing *wudu'* the believer washes away sin, and that each drop of water that falls in the hand makes the devil flee. It is also recorded that the Prophet Mohammed said: "He who performs ablution well, his sins would come out from his body, even coming out from under his nails" (Muslim 2:0476).

The Hadiths describe *wudu'* in a very physical way, as though the sin were a visible stain, an insidious little demon that clings to the believer and can only be chased away with water. Thus when a believer washes his face during *wudu'*, the Ahadith say that every sin that he contemplated with his eyes is washed away from his face with the last drop of water; when he washes his hands, every sin they wrought is effaced; and when he washes

his feet, every sin toward which his feet have walked is washed away, until he comes out pure of all sins (Muslim 2:0475).

The major purification, known as *ghusl*, cleanses the whole body from impurities by pouring water over it, and is required after sexual intercourse, menstruation, childbirth, before adopting Islam, and at death, but also before important celebrations and during the *hajj*.

Through *wudu'* and *ghusl* believers can attain a state of *tahara*, which allows them to worship and read the Koran. As such, these rituals include a spiritual component, which means that even if one is physically clean, but has not carried out the purification in a ritual fashion, one cannot touch the Koran (Abdel Haleem 1999: 32). This prohibition has nothing to do with physical purity – whether one has clean hands or whether one might stain the pages of the holy book for example. It is purely a question of reverence towards the word of God.

Ablution should not be carried out mechanically, but only after *niyyat* or intention, the silent expression of sincerity and obedience to God. This is the spiritual component of the purification ritual: while the body is purified with water, the mind must be completely focussed on God. Carrying out *wudu'* or *ghusl* simply for refreshment in hot weather for example makes them invalid. In practice, *ghusl* is of course often combined with washing and the religious, spiritual component merges with the physical.

The Ahadith also offer advice for times of scarcity, using the Prophet's actions as a guideline: one day when the Prophet was travelling through the desert with his companions, his wife Aisha lost her necklace. They spent time searching for it and when prayer time came, the company was nowhere near a water source. It was then that God revealed the ritual of *tayammum* or "dry *wudu*" to the Prophet: "O you who believe, […] if you are ill, on a journey, have relieved yourselves, or had intercourse, and cannot find any water, then find some clean sand and wipe your faces and hands with it" (*The Qur'an* 4:43) This is the third form of purification in which clean earth or sand can thus be used as a substitute for water. This again underlines the spiritual component of the purification ritual: the use of dust does not cleanse the believer physically, but makes him ritually clean and allows him to worship.

This principle of dry ablution is also mentioned in the Talmud: "If someone does not have water with which to wash, he should clean his hands with dust, a rock or a piece of wood" (Brandt 1910: 11). Even in biblical times, Israel was an arid land with a harsh climate and in the months of drought, people commonly used sand or earth to cleanse themselves, both in everyday life and in the context of religious ritual.

The hammam, between heaven and hell

Water's importance in Islamic culture has over the centuries also left its mark on the design of the city. The fountains, cisterns, and public baths that can still be found today in cities around the Islamic world survive as a physical testimony to the central role water plays in Muslim society. In Cairo the water fountain, the *sabil*, was traditionally donated to the community by rich or powerful citizens as a charitable and pious deed. Sometimes they were part of a mosque or *medrasa* complex, but during the Ottoman period they evolved into freestanding structures. *Sabils* soon became architectural features in the urban texture, expressing the value of water and reminding passers-by of the Koranic obligation to share water.

Thus the development of the *sabil* is directly linked to the Islamic law that says that water should be freely available to all. It also draws upon the Prophet's words that the two greatest mercies are "water for the thirsty and knowledge for ignorant", and many *sabils* are combined with small *medrasas*, Koranic schools, on the first floor. They are called "*sabil-kuttub*", literally "fountains of books" or "fountain schools". Today some of the schools still function but the *sabils* themselves have all fallen into disuse since most of Cairo's houses are connected to the central water supply system (Parker et al. 1985: 27-35).

The public bathhouse or hammam is another element of the Islamic city that shows the importance of water in Muslim societies. Already in the Middle Ages, it was unimaginable for a town not to have a hammam: in 10th-century Baghdad, chroniclers boasted there were 27,500 baths for a population of 60,000 and, depending on the prosperity of the inhabitants, even the smallest village would have a bathhouse (Grotzfeld 1970: 13). Middle Eastern bathing culture long predates Islam, going back to prehistoric times. The tradition was handed down through ancient Mesopotamian and Egyptian cultures via the Greeks and Romans to the Arabs. Islamic tradition has however attributed the creation of the bathhouse to King Solomon: the 11th-century *Stories of the Prophets*, a book about the Prophet Mohammed's predecessors, describes how he built the first hammam for Bilqís – known in Hebrew tradition as Balquis – the Queen of Sheba (Buitelaar 1996: 105). While this story is also recorded in the Koran, the hammam itself is not mentioned and scholars generally agree that the Prophet never visited one. Writing in a seemingly random order about the Prophet's habits, one of his companions, Ibn al-Khajjim, claims that the Prophet never ate garlic or onions and never entered, or even saw, a bathing house.

Despite its popularity, the hammam was an ambiguous space in the eyes of many theologians and Islamic scholars. While medieval medical experts praised the medicinal value of the steam and hot water of the hammam, early Islamic scholars saw it as a space on the edge between heaven and hell. The word hammam is related to *hamiem*, the boiling waters of hell, implying a demonic element (Ibid.: 7). The Arabic expression "the

whole world is a mosque, except the graveyard and the hammam" further illustrates the duality: the whole world is pure enough for prayer, except the bathhouse and the burial place. Al-Ghazali also wrote about the paradoxical nature of the hammam: thus Ibn Omar, the son of the second caliph, was once seen standing blindfolded and facing the wall of a bathhouse, so shocked was he by the shameless display of flesh there. Yet later he was quoted as saying that the bathhouse is a "heavenly blessing created by man" (Ibid.: 97). Similarly, authoritative sources affirm that the Prophet Mohammed only once ever mentioned the hammam, declaring that Jesus was as pure as if "he had just emerged from the bathhouse". Again, ambiguously, other versions of this tradition mention not Christ but the Antichrist, *al Dajaal,* in this context (Ibid.: 108).

Water is strongly associated with spirits and genies in Islamic culture. Springs and caves, but also hammams, are believed to harbour djinns and demons. They like to dwell in impure places – toilets, garbage dumps – and places that mark a transition: the edge of the desert, burial grounds, spaces between light and dark and the hammam, which marks the spaces between ritual purity and impurity. In normal circumstances, one can shield oneself from demons or other evil forces by invoking the protection of God. But in the bathhouse one is neither pure nor impure, so that it is forbidden to pray or recite passages from the Koran. The belief in spirits and demons goes beyond superstition; it forms part of traditional Islamic belief. One Koranic tradition even records a conversation between God and the Devil, in which the Devil tells God: "My Lord, you have let me descend upon the earth and cursed me. Now give me a house!" God answers: "The bathhouse." (Ibid.: 109-115)

The hammam today, religious and social meanings

Because of its ambiguous character, women were initially forbidden from using the hammam, except in exceptional circumstances – after menstruation, childbirth or illness. Over time however, women did gain access to the baths and today hammams often have separate men and women's sections or are exclusively male or female. The hammam in fact acquired a very important role in the lives of women, not only as a bathing facility, but also as a social meeting place, one of the few public spaces where they could feel completely relaxed away from male eyes and exchange gossip and news with friends and relatives.

At the same time, its ambiguous nature as a liminal space between purity on the one hand and impurity, sin and temptation on the other, continues to taint its image to the extent that some husbands are still reluctant to allow their wives to visit the bathhouse. But despite the fact that many houses have bathrooms and that the ritual ablutions can therefore be performed at home, the hammam continues to serve an important religious

and social role both in the Middle East and in Muslim communities in Europe.

Anthropological studies conducted in Morocco in the 1990s (Ibid.: 1-18) show that many women in Morocco's cities continue to visit the hammam on a weekly basis. Asked whether there was a connection between the baths and their faith, they usually responded negatively, but, as the researcher observed, "there often is a difference between what people do, what they think they do and what they say they do" (Ibid.: 121). Thus many of the women interviewed saw the hammam as a predominantly Muslim space, and some of them even said they would refuse to share it with Christians or Jews because they were "dirty", i.e. unclean in a ritual sense. It is also during the weekly visit to the hammam – often on a Friday (the Muslim holy day) or before important holidays – that most women perform the large ablution, *ghusl*. And while this ritual can in principle be performed in any other bathing space, it has become so strongly associated with the hammam, that most women say they do not feel really "clean" unless they have spent at least an hour scrubbing themselves in the hammam. Certain Moroccan bathhouses are also associated with a specific saint, giving the water in this hammam – often a warm spring – "baraka", holy powers from God. The water of certain hammams is thus believed to have healing powers, bring good luck or make women more fertile.

Perhaps more important than its religious role, is the hammam's role as a social meeting place and a place of relaxation. In Morocco, women often visit the hammam with relatives and help each other wash their hair and scrub each other's backs. Besides being a treasured moment of relaxation and rest, the visit to the hammam is also an occasion for women to discuss health issues, exchange news and catch up on gossip. The visit to the hammam is also an important preparation for a wedding. The bride is carried to the hammam by female friends and family members and traditionally spends an afternoon both celebrating and washing herself before the big day. There is nevertheless also an element of shame attached to the hammam. As the ritual purification that takes place there is often carried out after sexual intercourse, women do not want to be seen in the hammam too often.

In the Netherlands and Belgium, both countries with large Moroccan and Turkish populations, several hammams have opened since the 1980s. These bathhouses are used by Moroccans, Turks and locals and fulfil an important social function as a meeting place for foreign women. Because they now all have showers at home, many Moroccan and Turkish women said they were worried that their husbands would prevent them from going to the hammam as it was not strictly necessary. For many Muslim women in the Netherlands it is a real treat to go to the hammam; it is one of the few places where they feel really at home. Visiting a Dutch hammam one can observe how Moroccan and Turkish women there seem much more self-assured and relaxed than in other contexts. It is as though the roles had

been reversed: Dutch women often feel uncomfortable and awkward, while the Muslim women are proud to show them how to use the various facilities (Ibid.).

Social workers in larger cities like The Hague, Amsterdam and Utrecht found that the hammam can play a key role in taking women out of the social isolation they often live in. Many immigrant women living in the Netherlands have lost the social networks within which they operated in their country of origin and do not speak Dutch, leading to feelings of loneliness and often even health problems. Instead of organizing group therapy sessions at the local community centres, which were often experienced as artificial and forced, social workers found that communal hammam visits really allowed women to relax and share their troubles as they had in their local hammams in their country of origin. Thus the hammam and the water rituals associated with it continue to play an important socio-cultural and religious role for Muslims, as a space for meeting friends and relatives, but also as a Muslim space that is strongly associated with Islamic practice, even if the importance of the rituals themselves is often overshadowed by other social functions (Ibid.).

CONCLUSION

Water is rich in meanings and symbolism – it is a source of life and fertility, but also of purity and refreshment. On a more abstract level water has a deep spiritual value: it has the capacity to wash away sin and cleanse the mind. The water rituals described in the Jewish and Muslim scriptures reflect this symbolism and emphasize that water is the primary means through which believers can attain a state of ritual purity.

The spiritual value of water is especially emphasized in Judaism, where the concept of ritual purity is emphatically dissociated from ideas of physical hygiene. In Islam, the belief in the unity of body and soul means that the water used in purification rituals also serves a dual purpose of washing away physical and spiritual impurities. Over the centuries the practice and interpretation of the various water rituals has evolved. In Judaism, the dispersion of Jewish communities around the world meant that different communities interpreted the scriptures differently, as in the case of Ethiopian Jewry who used running water to perform the purification and rejected the Israeli use of the mikvah. The distinction between purity and cleanliness was also often confused. This meant that the mikvah ritual was in certain cases interpreted as a physical purification, leading women to use plain water instead of the sacred "living waters". The confusion between the ideas of "dirty" and "impure" also lent a negative connotation to the mikvah ritual, with many women rejecting the practice in the 19th and 20th centuries. The association with the mikvah as something shameful, mysterious and private, contributed to its decline.

In Islam, water rituals continue to play a much more central role. This is on the one

hand due to the fact that a larger percentage of Muslims are observant and practice their faith actively, but also because of the importance of the idea of purity in Islam. In Judaism, the laws of purity are articulated in reference to worship in the Second Temple, and many of them are no longer relevant or applicable. The laws of *niddah* form a notable exception, but they are seen by many as arcane. In Islam, the laws of purity are in a way much more practical and down-to-earth. They include an important spiritual component but they also reflect concerns for health and hygiene. In addition, the hammam continues to fulfil an important social function as a place of leisure, relaxation and social exchange.

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CHAPTER 6

Baptism in the Jordan River: Immersing in a Contested Transboundary Watercourse

Figure 21. Baptism in the Jordan River at Qasr al Yehud, West Bank, 2013. Source: Francesca de Châtel.

INTRODUCTION

Dressed in white gowns, the group of Russian pilgrims gathered silently by the steps that led into the river. The priest, a tall figure with shoulder-length hair and a beard, intoned a hymn and the pilgrims joined in, bowing their head in prayer. Barely five metres away on the opposite shore, two Jordanian soldiers looked on from the shelter of a reed-covered platform – no visitors had come to visit their side of the river yet today. As the pilgrims sang, the priest slowly descended into the muddy water, which reached only to his thighs, so that he almost had to lie down to immerse himself fully. He emerged with closed eyes, gasping for breath. The women, their heads covered, lined up on the steps, some holding young children by the hand. One by one, they descended into the water, knelt in front of

the priest and crossed themselves before he placed his hand on their head and immersed them in the water. Three times – in the name of the Father, the Son and the Holy Spirit (Fig. 21).

Meanwhile, a group of young Americans sat in the shade of some palm trees on the bank and listened to their guide, an American woman wearing a safari hat and khaki desert trousers. They took turns to read excerpts from the Bible and the guide explained the significance of this holy river. "You can see that the river is quite muddy," she said as she pointed to the timid murky flow, "but it's actually not dirty, because there's so many bends in the river." Her audience nodded and one girl complained it was too hot.

The Russian baptism ritual completed, the pilgrims emerged from the water and took photos of each other by the river, while three young boys started a water fight in a corner of the baptismal pool. Their mothers scolded them loudly and dragged them off to the showers. Half an hour later, both groups were getting back on their Israeli tourist buses, off to the next stop on their day tour of biblical sites.

Compared to other well-known transboundary rivers in the Middle East and North Africa (MENA) region such as the Euphrates, the Tigris and the Nile, the Jordan River was never more than a stream.[1] Yet from biblical times, its cultural-religious significance as the boundary of the Holy Land and the site of the baptism of Jesus has dominated popular imaginations, magnifying the river to mythical proportions well beyond its physical size. Thus one of the earliest cartographic representations of the Holy Land, the 6th-century Madaba Map, represents key sites such as Jerusalem, but also the Jordan River, on a larger scale to emphasize their importance as biblical sites. Over the centuries, the image of the "mighty Jordan" has been elaborated through hymns and songs, which were mainly written and sung by people who lived in distant places and had never seen the river before, thus further increasing the discrepancy between the physical river and its symbolic counterpart.

This widening gap between the actual river and its magnified image clearly came to the fore in the 19th century when US Navy Commander William F. Lynch undertook an expedition to explore the Jordan River and the Dead Sea with the aim of assessing their viability as a shipping route (Fig. 22). Driven by his religious beliefs and very literal readings of the Old Testament, Lynch was able to convince the US Navy to fund the expedition and provide him with a crew of 13 men, even though accounts from earlier travellers clearly indicated that the winding course of the Jordan River with its many rapids made it unsuited for shipping. He "was consumed with biblical descriptions of the 'mighty Jordan' and the

1 With a total length of just 223 km and a historic annual discharge of 1,300 MCM, the Jordan River has always been considerably smaller than the region's other transboundary rivers such as the Nile (6,825 km, 84 BCM), the Euphrates (2,786 km, 25 BCM) and the Tigris (1,800 km, 26 BCM). (UN-ESCWA and BGR 2013; Collins 1996).

multitudes of Israelites crossing it en route to Palestine. His impression of the Jordan was of a wide and significant river, like those he was accustomed to sailing in the Americas" (Hallotte 2007: 15). The discrepancy between Lynch's mental image of the Jordan River and its much smaller and unwieldy physical state shows the enduring strength of its symbolic value, which subsequently also inspired the founding father of Zionism, Theodor Herzl. In his utopian book, *Alt-Neuland*, he described his vision of hydraulic engineers transforming the Jordan River Valley into a productive agricultural region where rice, sugarcane, tobacco and cotton fields were irrigated by river- and rainwater that was stored in dams and barrages (Herzl 1919: 201).

Figure 22. Illustration from Commander William Lynch's narrative account of his expedition to the Jordan River and the Dead Sea. Source: Lynch 1853.

The river's symbolic significance became evermore layered and complex in the 20th century, while the physical river and its tributaries underwent far-reaching infrastructural changes that severely reduced water levels and impaired water quality. Following the collapse of the Ottoman Empire and the creation of the state of Israel in 1948, the Jordan River was drawn deep into the Arab-Israeli conflict. It became one of the most contested transboundary rivers in the MENA region, and, after 1967, a heavily militarized political border between Jordan to the east and Israel and the Palestinian West Bank to the west. Hydrologically, large-scale unilateral water resource development in Israel, Jordan and Syria transformed the river into a utilitarian and largely artificial water resource system made up of dams, drinking water conduits, irrigation canals and sewage drains. However, in the religious

realm, the Jordan River's mythical status and its association with defining moments of Jewish and Christian biblical history continued to dominate collective imaginations. Today, hundreds of thousands of pilgrims continue to visit the Jordan River every year to remember the baptism of Jesus Christ and immerse themselves in the river's holy, but severely degraded, water.

This article traces the history of baptism in the Jordan River from biblical times to the present day. It is divided into three parts. After a short description of the river course, the first part of the article examines the role of the Jordan River in the Bible and explores different aspects of early baptismal practice. In particular, it looks at the role of the Jordan River in defining the Christian concept of holy water. The second part of the article presents a brief review of early pilgrimage to the Jordan. Finally, the third part of the article examines baptismal practice today. It discusses how infrastructural developments and ongoing regional conflict have caused severe environmental degradation and limited access to the river. The article then looks at efforts to rehabilitate the river as a single, interconnected ecosystem. The article combines historic accounts, biblical exegeses and literature with fieldwork and interviews that were carried out in Jerusalem, Amman and at the three baptism sites in the Jordan Valley in June 2013.

THE CHANGING COURSE OF A HOLY RIVER

Topographically, the Jordan River lives up to its name as the river that "descends".[2] From its sources at altitudes of around 2,000 metres above sea level on the western and southern slopes of Mount Hermon, the river winds its way through the Jordan River Valley over a distance of about 223 km to discharge into the Dead Sea, the lowest point on earth at 422 metres below sea level (UN-ESCWA and BGR 2013) (Fig. 23).[3] The river's headwaters, the Dan, Hasbani and Banias, originate in Israel, Lebanon and the Israeli-occupied Golan Heights respectively and meet inside Israel to form the Upper Jordan River.

From here it flows south, first into the Hula Valley, a former wetland that was drained in the 1950s, and then into Lake Tiberias,[4] historically a naturally brackish lake. In the mid-1960s, Israel started diverting the water from saline springs along the shores of Lake Tiberias through the Saline Water Carrier (SWC) to the Lower Jordan River. As a result, Lake Tiberias gradually became less saline and has today become Israel's largest freshwater reservoir that supplies approximately one third of the country's annual water requirements.

2 Yarden in Hebrew = to descend. Palestinians refer to the river as Al-Shariah meaning "place from which one descends to water" but also "law" (Mallat 1995: 128).

3 From the confluence of the headwaters to the Dead Sea.

4 Lake Tiberias is also known as Lake Kinneret and the Sea of Galilee.

Figure 23. The Jordan River. Source: Ghazal Lababidi.

Israel annually uses a total of between 538 million cubic metres (MCM) and 640 MCM from the Jordan River basin, of which about 329 MCM are diverted from Lake Tiberias through the National Water Carrier, a 120 km water conveyance system that supplies the country's coastal and southern regions.

The Jordan River resumes its course south of Lake Tiberias, covering a distance of 143 km to the Dead Sea. Historically, the Lower Jordan River received water not only from Lake Tiberias but also from the Jordan River's largest tributary, the Yarmouk, as well as several smaller seasonal wadis. Today, water levels in this part of the river have been sharply reduced due to large-scale regulation and diversion works in Israel, Jordan and Syria. The Degania and Alumot Dams in Israel regulate water flow from Lake Tiberias into the Lower Jordan River, while the flow of the Yarmouk River has dropped from a historical 450-500 MCM to around 40 MCM as Jordan and Syria both store and divert water. In addition, Israel, Jordan and Syria all abstract large amounts of groundwater in the upper parts of the Yarmouk River basin, further reducing the river's natural flow. Lebanon, which shares one of the Jordan River headwaters, the Hasbani, has made limited use of the river, mainly for political reasons.[5] Syria has no access to the river itself since the 1967 Six-Day War but controls the sources of the Yarmouk River. The Palestinians have not had access to the Jordan River since 1967, as it either falls under the Israeli-controlled and -administered Area C or has been fenced off as a closed military area (UN-ESCWA and BGR 2013).

By 2009, the Lower Jordan River's historic annual flow of 1,300 MCM had been reduced to an estimated 20-30 MCM. Moreover, most of the fresh water in this part of the river has been replaced with saline flows from Israel's SWC and water from fishponds, sewage and agricultural run-off. The transnational Israeli-Jordanian-Palestinian environmental organization Friends of the Earth Middle East has extensively documented the impact of damming and diversion on river flows and water quality, describing the Lower Jordan River as a "severely degraded river system" that has been reduced to less than 2% of its historic flow. It warns that parts of the river will run dry if fresh water is not urgently returned to the river (FoEME 2010).

Two of the three baptism sites that are currently in operation lie along this lower stretch of the river, just north of the Dead Sea. The Al Maghtas/Baptism Site in Jordan and the Israeli-operated Qasr al Yehud in the occupied Palestinian West Bank lie straight across from each other so that pilgrims immersing in the water are just metres apart, separated only by the invisible borderline that runs through the middle of the river. The river here has been reduced to a small, extremely saline muddy stream, barely three metres wide. Yet staff on both sides of the river insists that pollution does not pose a public health risk

5 See UN-ESCWA & BGR 2013; Zeitoun et al. 2012.

to pilgrims immersing in the water. Further upstream, the Yardenit Baptismal Site lies just south of Lake Tiberias on the short stretch between the Degania Dam and the Alumot Dam.

THE JORDAN RIVER IN THE BIBLE

The Jordan River plays an important role in the Old Testament as the border of the land that God gives to the Israelites. It is repeatedly mentioned as a geographical boundary, as for example in Deuteronomy 27:2: "[…] when ye shall pass over Jordan unto the land which the Lord thy God giveth thee". The river not only marks the eastern border of the biblical Land of Israel, but also serves as a "legal, temporal, and territorial boundary" (Havrelock 2011: 19), separating "the old era and the new, the foreign and the familiar, the other and self, chaos and law, death and life, exile and homeland" (Ibid. 2011: 88). Deuteronomy 12:10 clearly delineates the area "over Jordan", west of the Jordan, as a place of safety where the tribes of Israel will be protected from "all your enemies around you", while the areas to the east are characterized as foreign spaces of exile.[6]

The Book of Joshua describes the crossing of the Jordan River into the Land of Israel as a miraculous episode in which "the water flowing down stopped and piled up in a single heap […]. The downstream waters that flow into the Sea of Arabah/the Salt Sea were completely cut off and so the nation crossed near Jericho. The Kohanim, who bore the Ark of God's Covenant, stood on dry land at exactly the middle of the Jordan, while all Israel crossed over on dry land, until the entire nation had finished crossing the Jordan" (Joshua 3:15-17, in Havrelock 2011: 91-92). This miraculous "piling up" of the waters recalls the "flowing heap" of water that rose up at the parting of the Red Sea, thus reinforcing the symbolic significance of the episode.

The Jordan River's ritual role in the Old Testament is carried forward into the New Testament, where John's baptism of Jesus marks a seminal moment in the life of Christ and a defining event in the Christian Church. But where in the Old Testament the Jordan River functions as a territorial marker dividing Israel from other lands and separating home from exile, in the New Testament it marks the divide between heaven and earth, which Jesus bridges by descending into the Jordan and emerging reborn to receive the Holy Spirit as the heavens open up.

The coming of the Messiah had been announced by John, who received the word of God in the wilderness and went to "all the country about Jordan, preaching the baptism of repentance for the remission of sins" in preparation of the coming reign of the Lord

6 All quotes from the Old and New Testaments of the Bible are taken from the King James Version, unless otherwise specified.

(Luke 3:2ff). As people flock to the Jordan River to confess their sins and be baptized by John, he tells them that "[t]here cometh one mightier than I after me, the latchet of whose shoes I am not worth to stoop down and unloose. I indeed baptized you with water: but he shall baptize you with the Holy Ghost" (Mark 1:7-8). Then Jesus comes from Nazareth to be baptized.

> And Jesus, when he was baptized, went up straightaway out of the water; and lo, the heavens were opened unto him, and he saw the Spirit of God descending like a dove, and lighting upon him: And lo a voice from heaven, saying, This is my beloved Son, in whom I am well pleased (Matthew 3:16-17).

The baptism of Jesus marked the beginning of his public ministry and continues to be celebrated today in the Orthodox Church during the feast of Theophany[7] in January.

Early biblical commentators drew a number of parallels with key events described in the Old Testament, which in their view prefigured Jesus's baptism in that same river. Thus both Israel's crossing of the Red Sea out of Egypt (Exodus 14:22-29) and the crossing of the Jordan River into the Promised Land (Josh 3) were seen as a foreshadowing of Jesus's baptism in the Jordan River. In his letter to the Corinthians, Paul described the crossing of the Red Sea as a baptism in water and the Holy Spirit (1 Corinthians 10:1-4). Reference was also made to Psalm 114, which commentators interpreted in the context of baptism: "The sea looked and fled, Jordan turned back." This was seen as a foretelling of John's command to stop the Jordan River when Jesus was baptized (Jensen 2011), a miracle that was later reported as recurring by the Piacenza Pilgrim in the 6th century and that is still celebrated today in Orthodox communities during the Great Blessing of the Waters on the Feast of Theophany. Another event that was seen as prefiguring the baptism of Jesus was Elijah's parting of the waters, his subsequent ascent to heaven and his son Elisha's parting of the river (2 Kings 2:9-14).

In this context, Havrelock (2011) describes the Jordan River as a site of prophetic succession (Moses-Joshua; Elijah-Elisha; John-Jesus) that marks the transition from old to new eras. "Moses and Elijah both appoint their successors on the east side of the Jordan River, and the successors carry the spirit of their teachers into the new era by crossing the Jordan from east to west" (Ibid.: 136). The story of Jesus's baptism draws on these scenes, using certain narrative aspects but also consciously reversing elements. Thus Joshua and

7 "This feast is also sometimes referred to as *Epiphany* by English-speaking Orthodox Christians, but that name more properly refers to the Western Christian feast falling on that same day and commemorating the visit of the Magi to the child Jesus. The term *epiphany* does appear in some of the service texts for this feast, however." (Orthodoxwiki 2013)

Elisha fulfil the mandates of their predecessors, but remain spiritually subordinate to them. Conversely, John the Baptist, the last of the prophets, is positioned as subordinate to Jesus. He is the forerunner who, very soon after he has baptized Jesus, is arrested, beheaded and thus effectively removed from the narrative so that the focus is placed on Jesus. Also unlike his predecessors, Jesus does not cross the Jordan from east to west into a new era, but instead immerses himself in the water "thereby tilting the temporal axis of the biblical plot from horizontal to vertical" (Ibid.: 140).

The biblical story of Naaman, the Syrian general afflicted with leprosy, is also evoked as a foretelling of Jesus's baptism and a sign of the Jordan River's holiness. Having travelled to the Promised Land upon his maid's advice, Naaman was cured of his affliction after the Prophet Elijah told him: "Go and wash in Jordan seven times and thy flesh shall come again to thee, and thou shalt be clean" (2 Kings 5:11). After some initial resistance to the idea of washing in the Jordan (for why, Naaman asks, are the waters of Abana and Pharpar, the rivers of Damascus, not better than all the waters of Israel?), he does as Elijah tells him and after dipping seven times in the Jordan "his flesh came again like unto the flesh of a little child and he was clean" (2 Kings 5: 14). This was seen as a clear allusion to the baptism of Jesus. In a 4th-century sermon to mark the feast of Epiphany, Bishop Gregory of Nyssa said that the cleansing of the sick man in the Jordan was clearly an indication of what should come "both by the use of water generally, and by the dipping in the river in particular. For Jordan alone of rivers, receiving in itself the first-fruits of sanctification and benediction conveyed in its channel to the whole world, as by itself, the grace of Baptism" (Gregory of Nyssa in Jensen 2011: 119). The healing of Naaman's flesh to that of a "little child" strengthened the idea that those baptized in the Trinitarian faith were reborn, as Paul wrote: "For ye are all the children of God by faith in Christ Jesus" (Gal 3:26). Equally, those seeking to be baptized are to accept the kingdom of God with child-like innocence as Jesus tells his followers: "whosoever shall not receive the kingdom of God as a little child, he shall not enter therein" (Mark 10:15 in Havrelock: 186).

Early baptismal practice

Eliade (2005) has written extensively about the role of water in religion as *fons et origo,* the source and origin of all existence, universally worshipped for its life-giving, healing and cleansing properties. Across cultures and cults, water is central to cosmogony, mythology, ritual and iconography. Water's purifying qualities gained literal and symbolic significance in ancient Indian, Iranian, Greek and Roman cults: ablution in water could purify from crime, the presence of death and insanity; it abolished sin and reversed processes of physical or mental disintegration. Immersion in water symbolizes the regression to the pre-formal state, a total regeneration. By disintegrating every form and abolishing all history, water

possesses this virtue of purification, regeneration and rebirth: what is immersed in it "dies" and emerges from the water like a child, sinless and without history, able to receive a new revelation and to start a new "clean" life (Ibid.: 204).

Jewish laws of purity, which date back to the Second Temple period (530 BC-70 AD), required believers to immerse in *mayim chayim* or "living waters" – the water of rain, rivers or seas – to cleanse themselves of ritual impurity before accessing the Temple precinct.[8] After the destruction of the Second Temple in 70 AD, many of the laws of purity were no longer applicable. However, the ritual of immersing in living waters continued to be practiced, evolving into an act of spiritual cleansing. The ritual immersion became a metaphor of the original cleansing and the water acquired an abstract and sacred value that enabled it to cleanse away ritual impurity and sin (De Châtel 2009).

The baptisms that John carried out in the Jordan River were inspired by the Jewish rituals of purification and the practice of proselyte baptism, though instead of cleansing ritual impurity this was "a baptism of repentance for the remission of sins" (Mark 1:4). The Apostle Paul defined the theological and symbolic significance of Christian baptism, associating immersion in water to Christ's death and his rebirth to a new spiritual life through resurrection (Rom. 6:3-4). In Titus 3:5, he describes baptism as "a bath of regeneration and renewal". The flowing water brings about change, symbolizing the death of the old, sinful man and the emergence of a new man from the waters of life. This is very similar to the spiritual renewal effected in the Jewish purification in the ritual bath, the mikvah (see Chap. 5). Talmudic texts say that the believer emerges from the mikvah as pure and clear as the first man and woman created by God in Eden (Slonim 1995). In Christianity, baptism is a pre-condition for entry into the kingdom of Heaven as stated in John 3:5: "No one who has not been born again in water and the Holy Spirit can enter the kingdom of Heaven."

However, in contrast to the stringent Jewish laws of purity and their meticulous specification of the effectiveness of different types of water to cleanse impurity, Christian prescriptions were much more lenient. Thus the early 2nd-century *Didache* states that cold, running water is preferable, but that other types may also be used:

> Concerning baptism, baptise thus: [...] 'baptise in the Name of the Father and of the Son and of the Holy Spirit,' in running water; 2 but if thou hast no running water, baptise in other water, and if thou canst not in cold, then in warm. 3. But if thou hast neither, pour water three times on the head 'in the Name of Father, Son and Holy Spirit' (Lake: 319).

8 Sources of impurity include certain animals, the woman after childbirth, skin ailments, mildew in the house, bodily discharges – especially menses and seminal flux – sexual misdeeds, and the corpse (Neusner 1975).

The 2nd-century Christian author Tertullian even states that any water will do: "[i]t makes no matter whether one is washed in the sea or in a pond, a river or a fountain, a cistern or a tub: and there is no difference between those whom John baptized in Jordan and those whom Peter baptized in Tiber" (Evans 1964: 11). Water is a symbol, and the physical act of washing or immersion is a metaphor for the spiritual renewal and the cleansing of sin that takes place. "[J]ust as in baptism itself there is an act (*carnalis actus*) that touches the flesh, that we are immersed in water, but a spiritual effect (*spiritualis effectus*), that we are set free from sins" (Ibid.: 17).

Historians have often assumed that early baptisms were carried out by submersion or immersion in flowing water. The word "baptism" comes from the Greek words *bapto* or *baptizo*, to plunge or dip into water. However, Jensen (2011) has found that archaeological and iconographic evidence is ambiguous as most surviving baptismal fonts are too shallow to have allowed for submersion. Many images of early baptism show the candidates standing in a shallow pool while water was poured over their head (affusion). Nevertheless, most ancient documents specify baptism by immersion.[9] Thus John Chrysostom instructs priests to push the candidate's head down in the water three times with his right hand (Jensen 2011), according to the Trinitarian formula of baptizing in the name of the Father, the Son and the Holy Spirit, which was commonly in use by the time the Gospel of Matthew was written (Evans 1964).

While other texts refer to baptism by affusion or sprinkling, the full submersion of the body more accurately expressed "the action of dying to an old life, being buried, and rising newly born from the font" (Jensen 2011: 141). In the words of Pope Leo I (ca. 447 AD): "For, in the rite of baptism, death comes from the slaying of sin, and the triple immersion imitates the three days of burial, and the rising out of the water is like his rising from the tomb" (Ibid.).

Early baptisms were carried out in flowing water, i.e. in rivers or streams, or by water that flowed or was poured from above. Examples of this can be found in the mosaics in the Arian and Neonatian Baptisteries in Ravenna, which show Jesus being baptized by John in the running waters of the Jordan River (Fig. 24). The preference for flowing waters can be traced to Jewish tradition regarding ritual purity. The Mishnah distinguished six types of water supply, ranging from water in cisterns, ditches and caverns to rain water, well water, salty or hot spring water and "living waters" – cold, running water from streams or rivers (Ibid.).

Early Christian texts and iconography suggest that the baptism ritual took place outdoors, with converts being led to the water – presumably a river or spring where flowing water would be available – and then being brought back to pray with the community (Ibid.).

9 Tertullian, *Homily on Baptism*; Hippolytus, *Apostolic Tradition*; Zeno of Verona *Invitatio fontis* cited in Jensen (2011: 139).

Figure 24. John baptizing Jesus with the personified Jordan on the left. Arian Baptistery, Ravenna, Italy (late 5th-early 6th c). Source: Sharon Mollerus, 2011.

The early 3rd-century Roman priest Hippolytus also specified that the ritual should be carried out first thing in the morning "when the cock crows" in "water flowing into a font or flowing from above", another indication of the preference for living water (Cramer 1993: 9).

The practice of outdoor baptism gradually disappeared with the construction of churches and baptisteries from the 4th century onwards, even though the iconography continued to depict baptisms in natural settings, with lush vegetation, birds, animals, fish and starry skies.[10] This may also be explained by the fact that nearly all iconography from this period represents or alludes to Jesus's baptism in the Jordan River. Such images usually show the baptizer standing on a bank or a rock surrounded by trees, shrubs or grass, while the candidate is shown partly immersed or standing in a running stream or under a waterfall. The Jordan River is also represented, personified as a third figure in the scene and often turning his back in reference to Psalm 114 (Jensen 2011) (Fig. 24).

The move from outdoor to indoor baptisms also meant it was no longer possible to use flowing and fresh water in the same way. While the use of living water is not mentioned

10 The presence of fish, an early Christian symbol, in the iconography emphasized the "living" character of the water and symbolized spiritual rebirth. (Daniélou 1961: 56). Thus Tertullian writes: "But we, being little fishes, as Jesus Christ is our great Fish, begin our life in the water" (Tertullian 1.9-11). This association predates Christianity and can also be found in Jewish art where waters containing fish signify resurrection. (Daniélou 1961: 56).

after the 3rd century, its symbolic significance was preserved by simulating flow in baptismal fonts with drains, which allowed the water to circulate, but also fountains, which simulated the flow of a spring. Nonetheless, the literal purifying power of water became increasingly abstracted. Baptism scenes from this early period featuring angels or the personified Jordan River suggest that the water in baptismal fonts was sanctified or exorcised. Texts confirm that by the late 3rd century, baptismal water, which was by then mainly kept indoors in fonts, had to be sanctified. After a priest invoked the Holy Spirit over the water, it would be transformed from ordinary to sacred (Ibid.).

Thus the link in Christianity between "living" and holy water is complex and layered. In the non-religious realm, the term living water designates spring water as opposed to stagnant water. In its ritual sense it designates baptismal water. In the biblical sense it designates God as a source of life, and finally in its Christian sense it symbolizes the Holy Spirit. These different meanings are not necessarily linked: for example references to living water in a baptismal context do not necessarily entail that the ritual was carried out in running water, but rather that the water used in the ritual is considered to be holy (Daniélou 1961).

Tertullian says that water, "having received holiness from the Holy, itself conceived the power to make holy", suggesting that all water is by itself holy. However, further on he specifies that a blessing is required as "all waters, when God is invoked, acquire the sacred significance of conveying sanctity: for at once the Spirit comes down from heaven and stays upon the waters, sanctifying them from within himself, and when thus sanctified they absorb the power of sanctifying". He warns that without such a blessing, water could also pose a danger as the devil also uses water in baptism and "unclean spirits do settle upon waters [...] as witness shady springs and all sorts of unfrequented streams, pools in bathing-places [...] and those wells called snatching-wells" (Evans 1964: 13; see also Chap. 5 on the ambiguity of the hammam).

The Jordan River and interpretations of holy water

As for the role of the Jordan River itself in defining the meaning of holy water, early Christian texts assert that Jesus's baptism in the Jordan River made all water holy and that he had been "born and baptized, in order that by his passion, he might purify water" (Ignatius of Antioch in Jensen 2011: 135). This resolved the paradox of why Jesus, who was born pure and without sin, needed to be baptized: through his baptism, he sanctified the water of the Jordan, which in turn made all water holy. For the 5th-century writer Maximus of Turin, the baptism of Christ was not a washing of Christ but a washing of the water. Thus the Jordan was seen as the prototypical "river of life", but also the site of a divine manifestation of God, for just as water had been the primeval element that witnessed God's creation, the Jordan

had witnessed the beginning of the Gospels (Jensen 2011). Hilary of Poitiers had a similar reasoning, adding that the descent of the Holy Spirit after Jesus emerges from the water of the Jordan River signals the birth of the Son, which marks the beginning of a new way of existing and acting (McDonnell et al. 1991).

The 3rd-century Christian theologian Origen saw the baptism of Jesus as the model of Christian baptism and extolled the qualities of the Jordan River, which is "of sovereign virtue and very good to drink. Just as no man is good save God the Father, so no river is good except the Jordan". It is the holiest of rivers "capable of receiving twice-over the graces of the Spirit and ready to welcome the Spirit. The dove of the Spirit does not fly over any other river" (Origen, On John 6:48, in McDonnell et al. 1991: 146). Elsewhere, he equates the river to Jesus. "'Jordan' means 'descending'. But the descending river of God, one running with a vigorous force, is the Lord our Savior. Into him we are baptized with true water, saving water" (Origen, Homilies on Luke 21:3-4 in Havrelock 2011: 190).

EARLY PILGRIMAGE TO THE JORDAN RIVER (300-1500 AD)

With the rise to power of the Byzantine Emperor Constantine in the 4th century AD, the Holy Land started attracting a growing number of pilgrims. Their first destination was Jerusalem, which both Jews and Christians considered to be centre of the Land of Judah and of the world. Thousands of pilgrims visited the holy sites before the Crusades, but few wrote about their experiences. The first written account of a pilgrimage to Jerusalem was left by a Christian who travelled from Bordeaux in 333, the so-called Bordeaux Pilgrim. Other early sources on pilgrimage to the Holy Land include Egeria, a woman who spent three years in the Holy Land in the 4th century; St. Jerome, who accompanied the Roman noblewoman Paula on a pilgrimage in 385 AD; the 6th-century Piacenza Pilgrim; and Adomnan, who reported on the Gallic Bishop Arculf's travels through the Holy Land in the 7th century (Wilkinson 1977).

Many of these writers also visited the Jordan River and went to pray and perform baptism at the site where John baptized Jesus at Bethany Beyond the Jordan. Especially during the feast of Epiphany, this site attracted large congregations. Depending whether pilgrims went on foot, by donkey or by camel, the journey from Jerusalem to the baptism site on the Jordan River took one to two days along a road that ran east from Jerusalem to Jericho and across the Jordan River to Heshbon near the biblical Mount Nebo, where Moses died.

The baptism site itself was described in some detail in different sources. The 6th-century geographer Theodosius relates that a marble column topped by an iron cross had been erected at the place where Jesus was thought to have been baptized. He also

describes the Church of St John the Baptist, built by the Emperor Anastasius, which "stands on great vaults which are high enough for the times when the Jordan is in flood" (Ibid.: 69).

Perhaps the most vivid description of early pilgrimage to the baptism site comes from the 6th-century Piacenza Pilgrim who celebrated Epiphany there and reported that "special miracles" took place on Epiphany at the place where Jesus was baptized.

> There is an obelisk there surrounded by a screen, and in the water, where the river turned back in its bed, stands a wooden cross. On both banks there are marble steps leading down to the water. The eve of Epiphany is a solemn vigil with an enormous congregation. They begin matins at the fourth or fifth cock-crow and at dawn, when matins is over, the ministers come outside, and accompanied by deacons, the priest goes down into the river. The moment he starts blessing the water the Jordan turns back on itself with a roar and the water stays still till the baptism is finished (Ibid.: 82).

The Piacenza Pilgrim also describes how ship owners from Alexandria sent men to the site on that day to draw holy water that was sprinkled on their ships before they set out to sea. The sick and disabled also came to the Jordan for healing, as Jacinthus the Presbyter relates in the late 11th century: "On the feast of the Epiphany cripples and sick people come and, using the rope to steady themselves, go down to dip themselves in the water: women who are barren also come here" (Ibid.: 72). Pilgrims collected mementos of their visit to the Holy Land, such as souvenir *ampullae* and medals depicting scenes of the life of Jesus and his baptism. Examples of such souvenirs from the 6th century show John baptizing a nude Jesus, while one or two angels look on and a dove descends from heaven. For those who were too sick to make the journey to the Jordan River, water could also be drawn from the river and brought to them. Thus the late 12th-century Russian Princess Euphrosine of Polatsk, who had come to Jerusalem to die, was unable to travel to the Jordan River, but an acquaintance brought her holy water from the river in a bottle "which she received with joy and gratitude, drinking it and spreading it over her body to wash away the sins of the past" (Sumption 1975: 129).

However, more generally, baptism in the Jordan River was seen as a spiritual cleansing that washed away sins. One of the most popular legends of the Middle Ages was the story of the 5th-century Mary, a prostitute from Alexandria who undertook the journey to the Holy Land not as a pilgrimage but in search of more partners to satisfy her wild lust. She continued prostituting herself when she arrived in Jerusalem, but also went to visit the Church of the Holy Sepulchre on the feast of the Invention of the Cross. As she joined the crowds entering the church, she was mysteriously prevented from crossing the threshold.

Realizing that this was because of her impurity, she repented and prayed to the Virgin Mary. After venerating the relic of the True Cross and praying to an icon of the Virgin Mary, she heard a voice telling her that if she crossed the Jordan she would find "glorious rest". She subsequently walked from Jerusalem to the monastery of St John the Baptist on the Jordan River, where she prayed and received Holy Communion. She washed her face and her hands in the Jordan and drank its water. The following day she sailed across, taking with her only two and a half loaves of bread, and lived as a hermit in the wilderness east of Jordan for 48 years. She told her story to the priest-monk Zosimus who encountered her in the desert beyond the Jordan when he was on a retreat. The story of St Mary the Egyptian was hugely popular during the 11th and 12th centuries, seen as proof that by reliving the baptism of Christ, St Mary had erased the sins of her past and been reborn. Her story was repeated as part of sermons, poems and in sculptures. After the Christian conquest of Jerusalem, the door through which she had been unable to enter and the place of her baptism were marked so pilgrims could pray there (Ibid.).

By the later Middle Ages, the Jordan was venerated almost exclusively as a relic. A late-13th-century guidebook gave just one reason for immersion in the river: "these are the waters which came into contact with the body of Christ, our Redeemer" (Ibid.: 130). Writing in 1483, Felix Faber described how several knights of his party had jumped into the Jordan fully clothed, convinced that their clothes would become impenetrable to enemy weapons. Others dipped bells in the river and believed that these would be able to stave off lightning or thunder if they were rung. Pilgrims also took bottles of holy water and burial shrouds dipped in the river home with them and cut branches off the reeds on the riverbanks.

Thus the Jordan River has since biblical times been more than just a river. Imbued with powerful symbolic meanings, it is also a boundary and a crossing point, a site of prophetic succession, a metaphor for spiritual rebirth and salvation, and a source of holy water. It has for centuries existed on multiple levels: on the one hand a rushing river that winds its way down through the Jordan Valley to the Dead Sea; on the other an abstract idea and site of religious ritual with strong symbolic connotations in Christianity and Judaism. The powerful imagery that developed around the abstracted river rapidly overshadowed the river per se, creating a discrepancy between the mythical holy river and the reality of an increasingly modest muddy stream. As the American Reverend J. L. Leeper wrote when he visited Palestine in 1900: "Least beautiful and least useful perhaps of all rivers, there is none the world will go so far to see" (Leeper 1900: 326).

THE JORDAN RIVER IN THE 21ST CENTURY

The Jordan River has undergone far-reaching changes over the last century. It is no longer simply a river and a pilgrimage site, but also a geopolitical border, a contested transboundary watercourse, a threatened ecosystem and a tightly regulated water resource system. The strength of these different geopolitical, hydrological, environmental and religious narratives is sharply crystallized on the Lower Jordan River where holiness, pollution, hydropolitics and national boundaries collide.

The 20th-century transformation of the Jordan River has been extensively analysed from the perspective of international relations, international law, politics, geography, history, hydrology, ecology and social studies. It has been placed in conceptual frameworks and used as a textbook example of *the* disputed transboundary watercourse in a water-scarce region par excellence, caught in the middle of a protracted political conflict and subject to multilateral power struggles.

This extensive body of research and analysis has only further fragmented and abstracted perceptions of the river. Thus the river that flows from the foothills of Mount Hermon to the Dead Sea is now commonly described and analysed as a composite of separate units: the Upper Jordan River, Lake Tiberias/Lake Kinneret, the Yarmouk River and the Lower Jordan River. The drastic infrastructural interventions along the river, which have fundamentally altered flow regimes, water quality and local ecosystems, are schematically represented in conceptual flow diagrams.

Historically described as "the most crooked river in the world" (Leeper 1900: 424), "sometimes dashing along in rapids by the base of a mountain, sometimes flowing between low banks" (Lynch 1853: 217), the river is now a system that has been transformed into a series of contiguous and artificially controlled water bodies. Even the water itself has been dissected, quantified and qualified: separating the saline from the fresh, diverting drinking water away from the valley and pumping raw sewage back into the river, abstracting irrigation water from side wadis, tributaries and dam reservoirs and releasing contaminated return flows back into the river.

Yet despite the extensive infrastructural developments which have led to a dramatic drop in water levels and deterioration in water quality, public awareness of the slow demise of the Lower Jordan remains low. The main reason for this is that the river itself has been largely inaccessible and thus invisible since 1967. As the geopolitical border between Jordan to the east and Israel and the Palestinian West Bank to the west, the Lower Jordan River remains a largely closed – and in many places mined – military zone that can only be reached at a few points along its course. The only place where Jordanians can visit the river is at the Al Maghtas/Baptism Site just north of the Dead Sea, a site which has only

been accessible since Jordan signed the Peace Treaty with Israel in 1994. Israelis have no access south of the Yarmouk River, while Palestinians can only access the river at the Israeli-controlled baptism site in the West Bank, Qasr al Yehud (FoEME 2012). The fact that the physical river has been largely out of sight since 1967 further strengthens its conceptual representations and increases the disconnect between the two.

Baptism in the 21st century

This same disconnect exists in the religious realm in the sense that the reality of a diminished, polluted river does not appear to affect the spiritual value of the water. The three baptism sites – Al Maghtas/The Baptism Site in Jordan, Qasr al Yehud in the West Bank and the Yardenit Baptismal Site in Israel – present themselves as religious sites focused on biblical history and archaeological remains, and gloss over the multiple other narratives that are played out along the river. Yet the region's recent history flows just beneath the surface, cluttering the mythical narrative of the Jordan River as a source of spiritual cleansing and renewal with the starkly utilitarian and political narratives of modernity that materialize in the form of dams, sewage flows, landmines and security checkpoints.

Figure 25. Al Maghtas/The Baptism Site in Jordan (left) is just a few metres removed from the baptism site at Qasr al Yehud in the West Bank (right), with the diminished Jordan River flowing between the two, 2013. Source: Francesca de Châtel.

Just north of the Dead Sea, the Al Maghtas/Baptism Site in Jordan and the Israeli-operated Qasr al Yehud site in the West Bank lie just a few metres apart on the two banks of the river with an invisible border running between them (Fig. 25). Both sites argue that theirs is the "authentic" site of Jesus's baptism, presenting biblical, archaeological and historical evidence to corroborate their claim.

As one of the earliest Christian pilgrimage sites, the Jordanian Al Maghtas/Baptism Site was largely abandoned after WWI due to tensions and conflict and became part of an inaccessible military zone after the 1967 Six-Day War. After Israel and Jordan signed a peace treaty in 1994, the area was demined and "rediscovered". Extensive archaeological work carried out under the patronage of the Jordanian Prince Ghazi bin Mohammed uncovered a series of churches, monasteries and other sites, including the cave where John the Baptist retreated in the desert and the church described by Theodosius and the Piacenza Pilgrim in the 6th century (Fig. 26). Together with further textual references, these archaeological finds have led the Jordanian authorities to declare the site to be Bethany Beyond the Jordan, the place mentioned in John 1:28 as the place where John the Baptist conducted his baptisms in the Jordan River, but also the site of a church built by the Empress Helena, and the place from where the Prophet Elijah ascended to heaven.

Figure 26. The remnants of a Byzantine church built on the Jordan River, on the site where Jesus is said to have been baptized, Al Maghtas/The Baptism Site, Jordan, 2013. Source: Francesca de Châtel.

The Jordanian claim has been further strengthened by a series of "letters of authentication" from world religious leaders, and visits by two popes and numerous monarchs, heads of state and other dignitaries (Havrelock 2011; 282, n. 10, www.baptismsite.com). Moreover, the Jordanian government's move to donate national land for the establishment of 12 churches of different denominations[11] on the site adds a layer of modern mythology to the layers of biblical and archaeological mythology. The fact that a range of denominations have "endorsed" Al Maghtas through the construction of places of worship reinforces the site's claims to authenticity and its image as a space for spiritual and religious contemplation and dialogue where communities can gather to pray, baptize and meditate. In the words of the site's director Dia al-Madani, the Al Maghtas/Baptism Site is "the fruit of peace on the land" and an opportunity to "rewrite the future".

Just as its transboundary neighbour, the Qasr al Yehud site in the Israeli-occupied West Bank uses archaeological remains and historic accounts to prove it is the authentic site of Jesus's baptism. It refers to the 6th-century Madaba Map, which places "Bethabara" (Bethany Beyond the Jordan) and the church of John the Baptist west of the Jordan River (Fig. 27).

Figure 27. Fragment of the Madaba Map, showing the Lower Jordan River and the Baptism Site "Bethabara" to the west of the Jordan River. Source: Soon Kim, 2013.

11 The site has Greek Orthodox, Syrian Orthodox, Armenian Orthodox, Maronite, Coptic, Anglican (yet to be built), Catholic (accommodated in the largest church complex in the Middle East and currently under construction) churches as well as a Russian Orthodox church and pilgrims' house, an interfaith conference centre and a mosque.

Palestinians consider this to be the Palestinian baptism site, and the late President Yasser Arafat had outlined plans in the 1990s to restore it in time for the visit of Pope John Paul II in 2000. However, Israeli restrictions, lack of funding and corruption meant this never materialized. While the site at Qasr al Yehud could in the future become a Palestinian site as part of a peace settlement, for the time being it remains firmly under Israeli control, as it has been since 1967 (Havrelock 2011).

As the Al Maghtas/Baptism Site in Jordan, the area around Qasr al Yehud was affected by the regional conflict and became an inaccessible military zone after 1967, cordoned off by a security fence and surrounded by minefields. After 1980, limited access was granted to local church communities who came to celebrate Epiphany and Easter. During the rest of the year, pilgrims could only visit the site by appointment with a military escort (Ginat 2010).

South of the site, an area of about 10 km^2 known as the Land of Monasteries remains off-limits and is still mined. The chapels, monasteries and hermits' cells, some dating back to the Byzantine era, were used by pilgrims, monks and religious communities until 1967, when Israel took control of the West Bank and closed the area off behind a security fence to prevent Palestinian refugees from crossing the Jordan River back into the West Bank. Soil erosion has shifted the mines that were placed in the area in the 1970s, making their removal risky. Furthermore, the historic buildings, which were damaged by an earthquake in 1965, are threatened with collapse as they have been neglected since then (Ginat 2010; Gal 2011).

After the papal visit in 2000, when Pope John Paul II visited the Al Maghtas/Baptism Site in Jordan and came over to Qasr al Yehud by helicopter for 15 minutes – a visit from which then-Israeli Prime Minster Ehud Barak excluded Yasser Arafat – Israel decided to refurbish the site. The project was jointly implemented by the Israeli Nature and Parks Authority and the Civil Administration, the Israeli body that governs the West Bank. The site was reopened to the public in 2011. Funding for the project came from the Israeli Ministry of Tourism and the Ministry for Regional Cooperation, a controversial move, as part of the US$ 2 million budget was effectively drawn from funds reserved for West Bank development, "meaning that money for Palestinian infrastructure has been diverted to the development of an Israeli tourist site" (Havrelock 2011). Thus in addition to being a biblical site, Qasr al Yehud also makes a number of political statements, as it competes for authenticity with its Jordanian neighbour, but also reiterates and reinforces Israeli presence in the West Bank.

The river that runs between the two sites has also become a more complex and layered space since the 1950s. Its image as a holy river has been overshadowed by narratives of infrastructural development, which framed the river as a utilitarian water resource system

that was to be harnessed to meet the demands of a growing population in the region. In this view the river was a commodity, an economic asset and a development opportunity that was to be mechanized, controlled and appropriated.

It also became a transboundary resource after the creation of the state of Israel in 1948, and was soon drawn into the regional conflict as a contested resource. Israel forcefully imposed the construction and operation of its National Water Carrier, prevented Jordanian, Lebanese and Syrian attempts to develop the river, and entirely barred Palestinians from accessing it. Meanwhile Syria, which lost access to the Upper Jordan River and Lake Tiberias with Israel's occupation of the Golan Heights in 1967, turned to the development of the Yarmouk River and its tributaries, where it built 38 dams in the following decades (UN-ESCWA and BGR 2013). Jordan also started diverting water from the Yarmouk and Zarqa Rivers into the King Abdullah Canal. Unsurprisingly, the first victim of these unilateral development strategies was the Lower Jordan River itself.

As described above, the Lower Jordan River has been reduced to around 2% of its historic flow. In addition, water quality in this part of the river south of the Alumot Dam has been severely impaired. This is where Israel releases partially treated sewage and saline flows diverted from the shores of Lake Tiberias through the Saline Water Carrier. Further downstream all communities along the Lower Jordan River release agricultural run-off, water from fishponds and poorly treated sewage. Salinity levels also continue to increase along the river course, reaching more than 20 times over the international guideline for salt-sensitive crops and making the river unsuitable for use in any sector (Ibid.). The overdevelopment and degradation of the Jordan River has also affected ecosystems and caused a 50% reduction in biodiversity (FoEME 2010), shattering metaphors of the Jordan as a source of "living water" (Fig. 28).

Friends of the Earth Middle East (FoEME) has drawn attention to the severe degradation of the Lower Jordan River through several detailed studies and a wide-reaching international campaign to rehabilitate it. It also warned in 2010 that "[o]rganic pollution is present in extremely high concentrations in the northern river segments and in levels that pose seasonal risks to public health in the southern segments – including at the southern baptism sites" (FoEME 2010: 16). This led to a flurry of media coverage over whether the river was safe for immersion at the baptism site in the West Bank (O'Sullivan 2010; Oster 2010; Sherwood 2010). The Israeli authorities subsequently issued statements declaring that the water was regularly monitored and safe for immersion. But as neither the Israelis nor the Jordanians make comprehensive long-term data publicly available, it is easy to

Figure 28. The Lower Jordan River below the Alumot Dam is made up largely of saline flows, untreated sewage and other wastewater, Israel, 2013. Francesca de Châtel.

speculate about the degree of pollution and whether it poses a public health threat.[12]

The Yardenit Baptismal Site in Israel is far removed from such unsettling reports of polluted holy water and the history of conflict and shifting borderlines. Situated just south of Lake Tiberias before the Alumot Dam, Yardenit gives a bucolic impression of the Jordan River as a free-flowing, tree-lined river, which at first glance recalls Commander Lynch's poetic 19th-century descriptions as "fringed with perpetual verdure; winding in a thousand graceful mazes" (Lynch 1853: 233). According to the Yardenit website, this is one of the only places along the Jordan River where the river still flows naturally. However, from a hydraulic point of view, the river here is an artificial reservoir, regulated by the upstream Degania Dam that controls inflow from Lake Tiberias, and the Alumot Dam, 1.5 km downstream. The water at Yardenit is essentially the same as that in Lake Tiberias and

12 At the Al Maghtas/the Baptism Site in Jordan a monitoring station set up by Mutah University in cooperation with the Baptism Commission continuously measures water quantity and quality on the basis of seven parameters. The Jordan Valley Authority also carries out quarterly tests. In Israel, the Ministry of Health analyses water samples from the Qasr al-Yehud site on a weekly basis. None of this data is publicly available however. Partial data from the Jordanian Ministry of Irrigation for the period 2006-2012 suggests the water at the baptism site in Jordan meets World Health Organization standards for bathing (MWI 2013).

therefore close to drinking water quality – though this is of course also not "natural", as Israel has transformed Lake Tiberias from a brackish into a freshwater lake.

In this 'pristine' setting, the site presents a bright and uncomplicated narrative that merges spirituality, tourism and consumerism into a seamless modern-day religious-retail experience. In the vast landscaped parking lot, tourists – often on a day tour of Sea of Galilee biblical sites as part of a Mediterranean cruise – walk past the "Wall of New Life", a multilingual mural "dedicated to 'Christians throughout the world, who at this place have followed their Savior through the waters of baptism'." The visitors' centre, designed in the shape of a church's nave, includes a large gift shop selling everything from bibles and olivewood crucifixes to holy water (125 ml, US$ 6) and "I Was Baptized in the Jordan River" T-shirts, but also Jewish and Israeli souvenirs. Across from the gift shop, the Manna Restaurant serves "biblical food", including St. Peter's Fish and dates produced at the nearby Kibbutz Kinneret. Outside near the baptismal pools, visitors can pick up a video recording of their own baptism ceremony and buy empty plastic bottles and jerry cans to fill up with water from the Jordan River. Access to the site is free but pilgrims who wish to baptize are required to buy or rent a baptismal kit, which includes a baptismal gown and a baptism or re-dedication certificate to take home with them.

Figure 29. The Yardenit Baptismal Site, Israel, 2013. Source: Francesca de Châtel.

As Yardenit is more than 100 kilometres from the two southern sites, there is less need to legitimize it as the authentic site of Jesus's baptism – tourists who visit as part of a day

tour may not even be aware that there are any other sites. Yet, by omitting any biblical references to Bethany Beyond the Jordan and emphasizing the "scenic landscapes [described in the Bible…] that have been preserved to this day", the site's tourist brochure implicitly suggests that this is the authentic site of baptism, or at least the place where it can be relived most authentically (Fig. 29).

Billed as "the perfect combination of [sic] the Christian heritage, the exciting sights of the Holy Land and the history of civilization", the Yardenit Site – like the two southern sites – also weaves in subtle political narratives, firmly rooting the story of baptism into ancient – and, implicitly, more recent – Jewish history in the Holy Land. The site's location on the grounds of Kibbutz Kinneret, the second kibbutz founded in Mandate Palestine, ties the biblical event of the baptism of Jesus into Zionist narratives that "framed the kibbutz founders as intrepid pioneers who, like the ancient Israelite tribes under the leadership of Joshua, were crossing the Jordan to an era of independence and national settlement. […] While the baptism has little to no significance in Judaism and the kibbutz members are mostly secular, its antiquity establishes a line of continuity between 1st-century Jews like John the Baptist and Jesus and the current Jewish inhabitants of the State of Israel" (Havrelock 2011: 277).

Thus while the three baptism sites present themselves as religious sites that focus on biblical history and offer a space for spiritual reflection, each also represents particular political, nationalist and economic interests, while at the same time glossing over the profound changes to the holy river itself.

Pilgrims in the 21st century

Despite the environmental degradation and changes to the river, the Jordan continues to play an important role as a pilgrimage site, with nearly one million pilgrims a year visiting the three baptism sites.[13]

Pilgrims perform baptism in the Jordan River for a variety of reasons: some seek forgiveness of sins, others see it as a renewal of faith and to many it is a way of following in the footsteps of Christ. In spiritual terms, the water has an ambiguous status. On the one hand, the Jordan River is considered the source of all holy water and remains the only type of water that does not need to be blessed, but on a ritual level, baptism in Jordan River

13 Based on verbal communications with staff at the three baptism sites: Yardenit in Israel receives 500,000 visitors annually. Al Maghtas/The Baptism Site in Jordan received 250,000 visitors in 2010. This figure fell to 120,000 in 2011, following a drop in overall tourism figures in Jordan as a result of unrest in the region. Visitor numbers at Qasr al-Yehud in the West Bank were estimated at 800 a day in summer and 3,000 a day in winter, equivalent to a total of about 700,000 per year. According to media sources (Sherwood 2010; *Daily Telegraph* 2010), annual visitor numbers in 2010 before the site was reopened were around 100,000.

water is no different from any other baptism. Yet to many, the experience of immersing in the river where Christ was baptized forms a very special experience. Despite the obvious physical changes to the river, its water is seen as eternally and unchangeably holy, and awareness of the relentless environmental degradation remains low, both among religious leaders in the region and pilgrims. At Al Maghtas/The Baptism Site in Jordan for example, visitors have the option of performing baptism in specially designed pools, which contain desalinated, chlorinated river water. However, according to the site's directors, the pools are hardly ever in use as 90% of adult visitors choose the Jordan River.

Msgr. Maroun Lahham, the Latin Patriarch Vicar General of Jordan, appeared indifferent to the state of the river, considering its physicality to be almost irrelevant. He affirmed that the ritual of baptism in the Jordan River is a spiritual act: "There is a distinction between the physical state of the water and the sacred realm. From a religious perspective it does not matter whether the water is dense or light, clear or cloudy, polluted or not polluted. This does not touch upon the aspect of faith. [...] Pollution is a Western concern, it is Cartesian. Descartes' influence stopped on the northern shores of the Mediterranean."

Thus for many Christian believers who visit the Jordan River, the physical and spiritual realms continue to exist separately, allowing the image of the holy Jordan River to persist independently of the altered physical river. An official at the Al Maghtas/Baptism Site in Jordan said that the river's holy qualities are unchangeable. "We don't like this word 'pollution'. [...] The water quality has been impaired by return flow of fertilizer, pesticides and untreated sewage water. [...] There is also inflow of saline water which Israel diverts from the saline springs in the Galilee, treated wastewater from Bet Shean, and in the winter also water from the side wadis and the Zarqa River in Jordan. All this does not affect the spiritual quality of the river though: the Jordan is the Jordan. It is a holy river."

Most religious tourists who visit one of the baptism sites as part of a whistle-stop tour of the Jordan Valley or the biblical sites in the Galilee have little time to reflect on the state of the river. Rose Horton of the Touched by Grace Ministries, who conducts baptisms at the Yardenit Baptism Site in Israel, said that while she tries to raise awareness of the state of the Jordan River, most people have other priorities. "They're coming for Jesus, not because there's water issues in the Middle East. Guides may mention it, but with the overload of information that people get during their visit to Israel, how much of this will they remember?"

Reviving the Jordan River

Despite the continued zero-sum struggle for the river's water, efforts are being made to revive the Jordan River. Friends of the Earth Middle East (FoEME) has developed a comprehensive rehabilitation plan for the Lower Jordan River based on extensive multi-

sectoral research in the three riparian countries, Israel, Jordan and Palestine. The plan outlines concrete steps to remove pollutants from the river, return fresh water flow to it and ensure Palestinian rights to a share of the river's water are fulfilled. It highlights the crucial importance of cross-border cooperation and of treating the river basin as a single interconnected ecosystem that transcends political boundaries and disputes.

Partly as a result of FoEMe's advocacy efforts, Israel started releasing 1,000 m^3/hour of fresh water from the Alumot Dam into the Lower Jordan River in May 2013, with a commitment to increase this amount to 30 MCM/yr. The Israeli Ministry of Environment has also outlined a master plan for the upper part of the Lower Jordan River up to the Bezeq Stream, the border with the Palestinian West Bank. In addition, the operation of a new sewage treatment plant near the Alumot Dam by 2015 will remove sewage from the river (Udasin 2013). If Jordanian and Palestinian plans to build wastewater treatments plants in their part of the watershed are realized, "half a century of using the Jordan as a sewage canal can now be brought to an end" (FoEME 2013).

However, as FoEME points out, the removal of the various effluents discharged by Israel, Jordan and Palestine could cause the drying up of the river. The organization therefore recommends that 400-600 MCM/yr of fresh water be returned to the river and that the river be allowed to flood once a year in order to maintain a healthy ecosystem. While critics argue that none of the riparians are willing or able to give up their acquired share of the river, FoEME says it has identified over 1 BCM of water that can be saved in Israel, Jordan and Syria. The organization is advocating for the establishment of an international commission to manage the Lower Jordan River basin and is currently developing a cross-border master plan. It is also working towards the creation of a transboundary ecological peace park on the border between Israel and Jordan.

FoEME's broad-ranging Jordan River Rehabilitation Project also seeks to engage and involve Christian, Jewish and Muslim religious leaders both in the region and internationally in an effort to raise awareness of the importance of preserving the Jordan River Valley as a site of shared religious and cultural-historical heritage. In November 2013, the organization published a series of Faith-Based Toolkits (Christian, Jewish, Muslim), which religious leaders are encouraged to use in their sermons and activities to engage faith communities in the region and beyond. Christian, Jewish and Muslim religious leaders from Israel, Jordan and Palestine also gathered at a regional conference on the Dead Sea in Jordan in November 2013, where they endorsed the Covenant for the Jordan River drawn up by FoEME. The document calls upon regional governments to work towards the rehabilitation of the Lower Jordan Valley, which "must be counted as part of the heritage of humankind" (FoEME 2013).

CONCLUSION

Just as in the time of Commander Lynch when the image of the "mighty Jordan" dominated the reality of a much smaller, irregular river, today in the religious realm the river's holiness continues to overshadow the reality of pollution and degradation. In addition, the river's ongoing inaccessibility continuously abstracts it and makes it easy to focus on the concept of the Jordan River as a source of holy water, while ignoring the reality of its rapid demise. Moreover, the unsolvable regional conflict continues to dominate other development efforts in the region, so that tackling environmental issues is often made to appear futile and irrelevant, and is in any case rarely a priority for the respective governments. Yet against all odds, the first steps towards reviving the Lower Jordan River have been taken. And while the Jordan River will never return to its natural state, it could again becoming a living river and a carrier of holy water that is not only worshipped in a religious context but also revered and respected as the key to life and livelihood in this arid region.

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CONCLUSION

According to the 19th-century French novelist Pierre Loti, the Moors called it *Bled-El-Ateuch*, the land of thirst: they described the Moroccan Sahara as a land of never-ending desolation, a great sea without water (Loti 1896: 12). But the local nomad tribes knew how to live in these arid lands and were known to have a sixth sense for water. Just as seafarers are said to be able to smell the approach of land, desert dwellers could sense the proximity of water. In a paradoxical way, they had lived with absence for so long that it had become an integral part of their life, and the search for water had become instinctive. There are even several accounts of desert caravans that were led by blind guides who, according to an account by a British explorer who travelled through Libya's Great Sand Sea in 1939, knew "by smelling the earth where the springs lay and are never known to mistake the spot" (Bovill 1958: 93 n.4). Leo Africanus, who travelled with a caravan between Morocco and the Sudan in the 16th century, also wrote that when his caravan lost its way, it was saved by a blind guide who "riding foremost on his camel, commanded some sand to be given to him at every mile's end by the smell whereof he declared the situation of the place" (Ibid.: 93).

Through history, the population of the MENA region has lived with conditions of natural water scarcity, developing sophisticated water supply and irrigation systems to cope with the harsh environment. Scarcity did not only drive technological innovation, but also elicited a unique reverence for water, as reflected in the region's three main religions – Christianity, Islam and Judaism – which venerate water as the primary element and the source of all life on earth (see Chap. 5 and 6). Knowing the real meaning of scarcity, communities in the MENA valued water in a special way, an appreciation that was reflected in urban and architectural design, art and literature, and social structures.

Today much of the knowledge about water and the special sensibility towards its value have been lost, and the fragile balance between man and water that was maintained for centuries has been disrupted. In this region where water is naturally scarce, resources have been severely overstretched and manmade scarcity has become a widespread problem. The MENA region is today the most water-scarce region in the world with an average annual per capita water availability of 1,100 m^3 in 2007 – a figure that is projected to drop just above the level of absolute scarcity of 500 m^3 by 2050 (World Bank 2007).

As discussed in Chapters 2-4 and 6 of this dissertation, the region's water landscapes, from Damascus's Ghuta Oasis to the Jordan River Valley, have been transformed in the space of a few decades: springs have dried up, irrigation systems have disappeared and rivers have been turned into sewage dumps. As discussed in Chapter 1, the factors that have led to this demise – exponential population growth; technological advances; the massive expansion of irrigated agriculture and the sustained drive towards food self-sufficiency; and increased demand due to higher living standards – have also transformed man's relationship to water, severing an invisible link that had existed for centuries between man and the water he used.

While the technological advances, which enabled the construction of dams and other large-scale water infrastructure, have engendered far-reaching progress and improved living standards throughout the region, they have also created a false sense of confidence in the power of technology to turn deserts into greenery. In the process, the sustainable limits of the region's land and water resources have disappeared from sight. Instead of recognizing these limits and reining in the growing demand, decision makers and leaders in MENA countries have driven further exploitation of water resources in the belief that "not a single drop of water [should be allowed] to flow to the sea" (Swearingen 1988: 38). Water has become a symbol of power, and control over water has come to embody the nation state's authority and dominance – over nature but also over neighbouring countries. Among others, this is exemplified in projects such as Egypt's Aswan Dam, which President Gamal Abdel Nasser described as a "double monument, immortalising the [...] forceful emancipation of Arab Nationalism" (Zaki 1961: 3), Libya's Great Manmade River, which in the words of the late Colonel Muammar Ghaddafi would make water available wherever it was needed, and Turkey's ambitious Southeastern Anatolia Project, which has drastically altered the flow of the Euphrates and Tigris Rivers in downstream Syria and Iraq. These political and technological myths create the illusion of power and plenty. Constructed upon age-old traditions and beliefs, but also on the convincing rhetoric and imagery of modern-day politicians and engineers, these myths conceal the reality of growing water scarcity, which is transforming landscapes and destroying ecosystems and livelihoods.

Despite far-reaching environmental changes, the disconnect between man and water persists. In general, there is little sense of individual responsibility with regards to the management of water resources in particular, and the environment in general. This can partly be explained by the authoritarian nature of governments in many MENA countries, which until 2011 – and still today in many cases – exerted tight control over society and developed highly centralized water management structures. This leaves citizens with a sense of powerlessness and engenders passivity and indifference towards the natural environment and public spaces. Even when people are aware that current levels of

water consumption are not sustainable, they seldom feel any personal responsibility for the situation or any compulsion to change their behaviour patterns; in their eyes this responsibility lies with God or the government and there is no sense of collective responsibility towards future generations to preserve water. Thus the MENA region has strayed far from the concept that man is the guardian and steward of the Earth's resources and that encourages Jewish, Christian and Muslim believers to use all of nature's resources with consideration. Despite the rigid frameworks that govern water management in many MENA countries, legislation is weak and corruption is rife. Water has become a tragedy of the commons, a free-for-all to be avidly and unthinkingly abstracted and exploited until exhaustion of the resource. Lack of education and understanding of environmental and water issues, over-reliance on God, the government and the power of technology, as well as simple indifference have cost the region and its environment dearly.

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Scientists and water experts in the region affirm that the technical and economic solutions to the MENA water crisis are readily available and that it is a lack of political will which prevents the implementation of much-needed change in the domain of water. Indeed, despite the fact that cities such as Amman and Damascus ran out of water more than 10 years ago, that rivers and springs throughout the region are drying up and that groundwater levels are rapidly dropping, water generally remains a low priority on the political agenda – except when it comes to the expansion of irrigated surface area and further over-exploitation of the resource. This was true already before 2011, but since the start of the "Arab Spring" (and despite feeble claims by some observers that the various revolutions will spur a movement towards greater transparency and accountability in the domain of water), it seems certain that water, its sound management and future uses will drop even further down the political agenda. In countries like Egypt, Libya, Tunisia and Yemen, key issues such as democracy, freedom of expression, human rights and greater gender equality will continue to dominate the public debate for the coming years. In Syria, there is no end in sight to the conflict in March 2014, and the Assad regime is now even using water – or rather, the contamination and withholding of freshwater supplies – as a weapon against populations in rebel-held areas (Reuters 2013; UNGA 2014).

In general, and as so often in the MENA region, many issues are more urgent and real than water and looming scarcity. Given that water scarcity is not conspicuous on an everyday basis in many places, while violence, poverty, unemployment and injustice are, this is perhaps true. In the long term, however, a clean and sufficient water supply for the region's growing population is of fundamental importance. It is necessary for human

life, but also for the preservation of the region's fragile ecosystems, which in turn support economic development and provide livelihoods to millions of people. As argued in Chapters 3 and 4 of this dissertation, the Syrian government's long-term mismanagement of land and water resources formed one of the triggers of the uprising that started in March 2011. The experience of the last 60 years in Syria shows that disregarding the balance of ecosystems and exploiting natural resources beyond their sustainable limit comes at a high cost.

Water and its sound management effectively form one of the cornerstones of a healthy economy. But water is also inextricably enmeshed in a complex web of political, economic, socio-historic and environmental factors that influence all aspects of its use and worth. It is therefore impossible to address the future of water in the MENA region without taking these factors into consideration. Importantly, and as mentioned above, a wide variety of technical and political solutions is available. But this alone will not be enough to develop a new approach to water in this increasingly arid region: a new sensibility is needed. While it is beyond the scope of this dissertation to define such an approach, it should embrace a broad, long-term view of the region's water resources, designing a structure that will provide the region with a sustainable supply of water in 50 and 100 years,[1] but also draw on the region's long – and too often forgotten – history of sustainable water management. At the same time, any new approach should also scale down to the local level and take in the socio-cultural and environmental specificities of a place before implementing any far-reaching change. By balancing scientific knowledge and technological capacity with socio-cultural considerations and the ability to adapt to local conditions, a more pliable, subtle approach will emerge, laying the groundwork for the development of sustainable water management systems in the MENA region.

1 In a textbook example of short-term vision, Syria's former minister of irrigation, Nader al-Bunni, when asked about the status of Syria's water resources in 2050, said: "We'll reach 2035. If you ask me about 2050, I will say let me rest peacefully in my grave and leave some work for our children to finish" (De Châtel 2010).

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SAMENVATTING

Dit proefschrift is het resultaat van een reeds 14 jaar durende fascinatie voor water in het Midden-Oosten en Noord Afrika (MENA). Gedurende deze periode heb ik veel gereisd in de regio, van Iran tot Marokko en van Turkije tot Soedan, en heb ik vier jaar in de Syrische hoofdstad Damascus gewoond. Ik was werkzaam als journalist, schrijver en redacteur, en deed daarnaast onderzoek voor een boek over de geschiedenis, cultuur en politiek van water in de MENA regio.

De hoofdstukken van dit cumulatieve proefschrift zijn een weerspiegeling van die periode: drie hoofdstukken zijn gewijd aan verschillende aspecten van waterbeheer in Syrië en drie hoofdstukken behelzen een groter geografisch gebied in de MENA regio. Alle hoofdstukken zijn gebaseerd op empirisch en kwalitatief onderzoek en interviews die ik vanaf 2001 in de MENA regio heb uitgevoerd. Alle hoofdstukken zijn tussen 2007 en 2014 afzonderlijk gepubliceerd in wetenschappelijke tijdschriften en publicaties.

De keuze om mij te richten op waterkwesties in de MENA regio werd bepaald door twee extremen. De regio geldt als een van de meest waterarme regio's ter wereld, terwijl het tegelijkertijd een van de hoogste bevolkingsgroeicijfers kent. Mijn keuze was echter ook ingegeven door een dieper verlangen om beter inzicht te krijgen in de algemene geschiedenis en cultuur van de regio. Want naast de rol van water als noodzakelijke voorwaarde voor leven en overleven, zegt de manier waarop water wordt gebruikt en hoe erover wordt gedacht ook veel over culturele, religieuze, economische en politieke waarden in een maatschappij.

De MENA regio kent van nature waterschaarste, droogte en sterke klimaat-schommelingen. De bevolkingsgroepen in de regio pasten zich aan deze extreme omstandigheden aan door complexe systemen van waterwinning, wateropslag, en waterdistributie te ontwikkelen. Het is niet toevallig dat de eerste irrigatiesystemen ter wereld in deze regio, in het gebied tussen de Eufraat en Tigris, ontwikkeld zijn. Hier bedwongen de Soemeriërs in het vijfde millennium v.Chr. de onstuimige wateren van de twee rivieren, waarbij zij water via kanalen omleidden naar de akkers om granen, veevoer en dadelpalmen te verbouwen. Vanaf het derde millennium v.Chr. begonnen ook de oude Egyptenaren de wateren van de Nijl te benutten door irrigatiekanalen te graven

en de omliggende woestijn te irrigeren. Naast deze technologieën van waterwinning en waterdistributie werden er ook complexe en gedetailleerde waterbeheersystemen en juridische kaders ontwikkeld om rechtvaardige toewijzing te bevorderen. Zo ontwikkelden de bevolkingen van de Marokkaanse Sahara tot de Nijlvallei en van de Damasceense Ghuta-oase tot de Mesopotamische vlakten door de eeuwen heen hun eigen waterbeschavingen. Op praktisch niveau pasten zij zich aan de extreme weersomstandigheden, onregelmatige regenval, droogtes en overstromingen aan door verfijnde waterbeheerssystemen en technologieën te ontwikkelen. Ook op religieus, cultureel en maatschappelijk vlak werd water een kernsymbool, getuige de vele verwijzingen naar water in architectuur, literatuur, religie en sociale structuren.

In de afgelopen eeuw hebben ingrijpende demografische, technologische en politieke veranderingen in de regio de fragiele ecologische balans, die millennia lang in stand werd gehouden, ontwricht. De MENA regio is daardoor op dit moment het gebied met de grootste waterschaarste ter wereld. De regionale waterbeschikbaarheid per persoon is tussen 1950 en 2007 gedaald van 4.000 kubieke meter naar 1.100 kubieke meter per jaar in 2007. Naar verwachting zal dit getal tegen 2050 nog verder dalen tot 550 kubieke meter. Ter vergelijking: het wereldwijde gemiddelde ligt op 8.900 kubieke meter per jaar en dit zal in 2050 rond de 6.000 kubieke meter liggen. Daaraan is in de eerste plaats de sterke bevolkingsgroei debet. De bevolking van de MENA regio is tussen 1950 en 2010 bijna vervijfvoudigd, van 82.2 miljoen naar 384.1 miljoen. Naar verwachting zal dit aantal verder toenemen tot 524 miljoen in 2030. Van belang is ook de politieke context van de regio die in de 20ste eeuw ingrijpende veranderdingen onderging: de ineenstorting van het Ottomaanse Rijk, het ontstaan van de staat Israël, het einde van de koloniale overheersing en de opkomst van nieuwe natiestaten. Deze jonge onafhankelijke staten begonnen vanaf de jaren vijftig aan ambitieuze nationale waterontwikkelingsprojecten om de watervoorziening te vergroten en het areaal van geïrrigeerde gebieden uit te breiden. Nieuwe technologische ontwikkelingen boden hen daarvoor de mogelijkheden. Geïnspireerd door Russische en Amerikaanse projecten om de natuur te bedwingen en woestijnen tot bloei te brengen, omarmden overheden in de verschillende MENA landen vol enthousiasme de “hydraulische missie”, waarbij technologische hoogstandjes zoals de bouw van hoge dammen en waterkrachtcentrales en het boren van putten een belangrijke rol speelden.

Als gevolg van deze technologische ontwikkelingen veranderde het stromingsstelsel van rivieren ingrijpend en daalde de waterspiegel in de gehele regio scherp. Geen regio ter wereld kent meer dammen dan de rivieren van de MENA regio in verhouding tot de beschikbare hoeveelheid water. Zo is de Jordaan niet alleen zwaar vervuild, maar ook gekrompen tot 2 procent van zijn historische debiet. Een van de grootste karstbronnen

ter wereld, de Ras al Ain bron aan de Syrisch-Turkse grens, is in 2001 volledig uitgedroogd door het overpompen van water uit de 6.000 putten die in de afgelopen decennia aan beide kanten van de grens zijn geboord. Ondanks deze dramatische afname van de waterbeschikbaarheid en de drastische transformatie van landschappen in de gehele MENA regio in de afgelopen eeuw, zijn slechts weinigen zich bewust van de ernst van de watercrisis. Er lijkt een kloof te bestaan tussen de traditionele voorstellingen, beelden en idealen van water en waterlandschappen en de realiteit van toenemende waterschaarste. Er zijn meerdere redenen voor dit gebrek aan bewustzijn. Zo verhullen verschillende lagen van cultureel-religieuze, politieke en technologische percepties de toenemende plaatselijke waterschaarste. De hoofdstukken van dit proefschrift gaan in op een aantal aspecten van deze discrepantie.

Overzicht van de hoofdstukken

Het eerste hoofdstuk, 'Perceptions of Water in the Middle East: The Role of Religion, Politics and Technology in Concealing the Growing Water Scarcity', onderzoekt waarom de realiteit van toenemende waterschaarste in de MENA regio nog steeds voor velen onzichtbaar blijft en identificeert een aantal religieuze, politieke en technologische percepties die de waterschaarste verhullen. In het hoofdstuk wordt betoogd dat de mythe van overvloed onder andere wordt versterkt door de aanhoudende subsidiëring van water en steun aan de landbouw, maar ook door het valse gevoel van zekerheid dat grootschalige infrastructuurprojecten met zich meebrengt. Bovendien wordt de realiteit van toenemende waterschaarste verhuld door mythes, die op eeuwenoude tradities en geloofsovertuigingen rusten, maar ook op de suggestieve retoriek en beeldtaal van hedendaagse politici en ingenieurs. Het hoofdstuk biedt een structureel kader voor het proefschrift en introduceert kernthema's die nader worden uitgewerkt in latere hoofdstukken.

Hoofdstuk 2, 'Damascus: The Death of the Garden of Eden', illustreert en ontwikkelt de thema's die in Hoofdstuk 1 zijn geïntroduceerd met een historisch overzicht van waterbeheer in de Syrische hoofdstad Damascus van pre-Romeinse tijden tot vandaag. Hierbij wordt het contrast geschetst tussen het poëtische historische beeld van Damascus als een weelderige oase in de woestijn en de snelle uitputting van waterbronnen en vernietiging van waterlandschappen in en rondom de stad in de afgelopen 60 jaar.

Hoofdstuk 3, 'The Role of Drought and Climate Change in the Syrian Uprising: Untangling the Triggers of the Revolution', onderzoekt de politieke percepties rond waterschaarste in Syrië. Het hoofdstuk concentreert zich met name op de extreme droogte tussen 2006 en 2010, die meer dan 1.3 miljoen mensen in het noordoosten van het land heeft getroffen en heeft geleid tot een dramatische mislukking van de oogst, de decimering van de veestapel en de migratie van naar schatting 65.000 families naar de

grote steden. Recente analyses van de oorzaken van het huidige conflict verwijzen vaak naar de droogte van 2006-10 en de invloed van klimaatverandering. Nadere analyse van de bredere economische en historische context van het huidige conflict in Syrië maakt duidelijk dat het verband tussen droogte en klimaatverandering enerzijds en de opstand anderzijds zwak is en het bovendien de aandacht afleidt van de problemen die de Syrische watersector daadwerkelijk en aantoonbaar teisteren. Een dergelijke sterke nadruk op externe factoren als droogte en klimaatverandering zou daarbij maar al te eenvoudig een excuus kunnen vormen voor het uitblijven van de al jaren noodzakelijke hervormingen en vernieuwingen op nationaal vlak. Het hoofdstuk onderzoekt de discrepantie tussen het overheidsbeeld – van Syrië als een van nature waterschaars land met een actieve inzet om zijn watersector te moderniseren – en de realiteit van een inefficiënt, corrupt en verstard waterbeleidsysteem dat grootschalige overexploitatie van natuurlijke hulpbronnen heeft bevorderd. Wellicht dat klimaatverandering tot frequentere en hevigere droogtes in Syrië zal leiden, maar het onvermogen om watergebruik te rationaliseren en de gebrekkige handhaving van wetgeving met betrekking tot water vormen een veel grotere bedreiging voor de natuurlijke rijkdommen van het land.

Hoofdstuk 4, 'Watching Landscapes Disappear: Local Perspectives on the Impact of Long-term Water Mismanagement in Syria', gaat verder in op de discrepantie tussen de overheidsretoriek en de dagelijkse werkelijkheid van het leven op het Syrische platteland. Het hoofdstuk beschrijft op basis van persoonlijke verhalen van Syriërs door het hele land in de periode 2006-10 hoe de grenzen van de natuurlijke hulpbronnen van het land werden genegeerd door de fixatie van de Syrische regering op voedselzekerheid en het daarmee samenhangende streven om het geïrrigeerde areaal te vergroten. Dit leidde tot destabilisatie van kwetsbare ecosystemen, uitputting en vervuiling van watervoorraden en verzilting en verwoestijning van steppelanden. De verhalen van landbouwers door het hele land tonen niet alleen de omvang van de milieuschade die in de afgelopen 60 jaar is aangericht, maar ook de onvoorstelbare vaart waarmee watervoorraden en landschappen zijn vernietigd.

Hoofdstukken 2-4 maken aannemelijk dat de aanhoudende veronachtzaming van de grenzen aan de exploitatie van natuurlijke hulpbronnen in Syrië en de toenemende kloof tussen de overheidsperceptie aan de ene kant en de toenemende armoede en het ontzeggen van burgerrechten aan de andere kant uiteindelijk het land hebben gedestabiliseerd en de eerste demonstraties tegen de regering in maart 2011 hebben aangewakkerd. Sindsdien is het land fysiek, economisch en sociaal verwoest: meer dan 150.000 mensen zijn omgekomen, meer dan een derde van de bevolking is ontheemd en de economie is geruïneerd. Er is voorlopig geen einde in zicht voor het conflict en er is geen indicatie te geven over de toekomst van Syrië. Wel is duidelijk dat het van cruciaal

belang is bij een toekomstig reconstructieproces de nadruk te leggen op de noodzaak van een duurzaam en doelmatig systeem voor het beheer van natuurlijke hulpbronnen. De ervaring van de afgelopen 60 jaar toont aan dat het negeren van de ecologische balans en de overexploitatie van natuurlijke hulpbronnen een hoge prijs kent.

Hoofdstuk 5, 'Bathing in Divine Waters: Water and Purity in Judaism and Islam' onderzoekt de rol van water in het jodendom en de islam, zowel in de geschriften als in de zuiveringsrituelen. Het hoofdstuk beschrijft specifiek de spirituele kenmerken die worden toegeschreven aan water en analyseert de concepten rein/onrein in rituele zin en schoon/vuil in strikt fysieke zin. Het gaat ook in op de historische ontwikkeling van de gebruiken in verschillende culturele contexten, en laat zien hoe het veelal vage onderscheid tussen rituele en hygiënische reinheid vaak miskend werd, en nog steeds miskend wordt.

Hoofdstuk 6, 'Baptism in the Jordan River: Immersing in a Contested Transboundary Watercourse', toont de gelaagde symboliek van de Jordaan. De rivier die de grens van het Bijbelse Land Israël vormde en waarin Jezus Christus door Johannes werd gedoopt, is tegenwoordig niet alleen een bron van heilig water, maar ook een geopolitieke grens, een omstreden grensoverschrijdende waterloop, een bedreigd ecosysteem en een strak gereguleerd waterbeheerssysteem. Het hoofdstuk verkent de kloof tussen de verregaande fysieke aantasting van de rivier in de 20ste eeuw en de ervaring van christelijke pelgrims die het water als eeuwig en onveranderlijk heilig beschouwen. In het hoofdstuk wordt ingegaan op de evolutie van het concept van heilig water in het christendom, de historisch-religieuze rol van de Jordaan als de "prototypische rivier van het leven" en hedendaagse grensoverschrijdende inspanningen om de rivier te herstellen.

Samen belichten Hoofdstukken 5 en 6 de centrale rol van water in het christendom, jodendom en de islam, maar tonen ze ook de kloof tussen de geschriften, die het water aanprijzen als de bron van het leven en als een heilige rijkdom, en de alledaagse praktijk waarin het water wordt vervuild, verspild en ondergewaardeerd.

De artikelen in dit proefschrift hebben niet tot doel om oplossingen voor de watercrisis in de MENA regio te bieden. Ze vormen eerder een momentopname van de situatie vóór 2011 en trachten een aantal oorzaken van de crisis te identificeren. Hierbij is het duidelijk dat water, ondanks de toenemende regionale schaarste, in veel MENA landen nog steeds geen overheidsprioriteit is en dat er bovendien nog steeds een groot gebrek aan bewustzijn van de watercrisis bestaat. Voor de toekomst van de regio is het van het grootste belang om een duurzame, lange-termijn strategie van waterbeheer te ontwikkelen.

The Jordan River has been reduced to 2% of its historic size and is heavily polluted. Across Syria, rivers are shrinking, springs have dried up and the desert is spreading. The water crisis in the Middle East, the most water-scarce region in the world, is rapidly worsening, yet decision makers appear unwilling to acknowledge its severity and water remains low on the political agenda. How can this gap between the reality of growing scarcity on the ground and the continued illusion of plenty be explained?

This is one of the key questions Francesca de Châtel explores in ***Vanishing Water Landscapes in the Middle East***, a study that combines extensive research on the ground in pre-conflict Syria and across the region with historic data to show how high population growth, overambitious agricultural development projects and uncontrolled water use over the last 60 years have irreversibly disrupted the Middle East's fragile ecological balance.