

Legal Analysis of Transboundary Waters in the Upper Jordan River Basin

**The Association of the
Friends of Ibrahim Abd El Al
The Order of Engineers &
Architects - Beirut**

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THE ASSOCIATION OF THE FRIENDS OF IBRAHIM ABD EL AL (AFIAL)

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NOTES

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AFIAL would like to emphasize that the analysis and recommendations are suggested without any prejudice to the state of relations between the Government of Lebanon and the Occupying State of Israel, and the non-recognition of the latter by the Government of Lebanon.

Table of Contents

TABLE OF CONTENTS	III
FIGURES	VII
TABLES	IX
ACRONYMS	X
EXECUTIVE SUMMARY	XI

SECTION 1 – INTRODUCTION 1

1. INTRODUCTION 1

1.1. WHY A LEGAL ANALYSIS OF THE UPPER JORDAN RIVER?	1
1.2. PURPOSE AND SPECIFIC OBJECTIVES	2
1.3. METHODOLOGY	2
1.4. LIMITATIONS	3
1.5. STRUCTURE	3

2. BACKGROUND TO THE JORDAN RIVER CONFLICT 4

2.1. THE BROADER JORDAN RIVER CONFLICT	4
2.1.1. DISTRIBUTION OF THE JORDAN RIVER BASIN FLOWS	4
2.1.2. TREATIES, NEGOTIATIONS, AND STRATEGIES OF CONTROL IN THE JORDAN RIVER BASIN	6
2.2. THE UPPER JORDAN RIVER CONFLICT	8
2.2.1. CONTROL AND USE OF THE UPPER JORDAN RIVER (UJR) FLOWS	10
2.2.2. THE GOVERNMENT OF LEBANON POSITION REPORT ON THE 2002 WAZZANI SPRINGS DISPUTE	11

3. INTERNATIONAL WATER LAW AND NORMS 14

3.1. CONFRONTING THE DISSONANCE BETWEEN RIVER BASINS AND POLITICAL BORDERS	14
3.2. FOUR DOCTRINES OF INTER-STATE WATER SHARING	15
3.3. EVOLUTION OF THE PRINCIPLES OF INTERNATIONAL WATER LAW	16
3.3.1. 'NO HARM' VS. 'EQUITABLE AND REASONABLE USE': A STERILE DEBATE	19
3.4. THE MAIN LEGAL INSTRUMENTS AND NORMS OF IWL	20
UN WATERCOURSES CONVENTION	20
UNECE WATER CONVENTION (UNECE CONVENTION)	21
DRAFT AQUIFER ARTICLES (DAA)	21
ARAB WATER CONVENTION (AWC)	22
HUMAN RIGHT TO WATER	23
THE PRIMARY SUBSTANTIVE AND PROCEDURAL OBLIGATIONS OF IWL	23
3.5. OTHER RELEVANT INTERNATIONAL LAW AND PRINCIPLES	24

3.5.1. INTERNATIONAL HUMANITARIAN LAW (IHL)	24
3.5.2. TREATY LAW (AND COERCION)	24
3.5.3. <i>EXCEPTIO</i> , RECIPROCITY, AND ‘COUNTERMEASURES’	25
3.6. CRITIQUES OF INTERNATIONAL LAW: LAW VS. POLITICS AND POWER?	27

SECTION 2 – ANALYSIS 30

4. AUDIT OF WATER RESOURCES AND INSTITUTIONS IN LEBANON (2013) 30

4.1. GENERAL CONDITION OF THE WATER SECTOR (POOR WATER RESOURCE GOVERNANCE) 30

4.2. LEBANESE WATER INSTITUTIONS AND POLICY 31

4.2.1. HISTORY OF DEVELOPMENT OF WATER INSTITUTIONS 31

4.2.2. MAIN ACTORS AND THEIR ROLES 32

SUB-NATIONAL RESPONSIBILITIES 32

RESPONSIBILITIES IN SOUTHERN LEBANON AND THE HASBANI BASIN 33

EXTERNAL SUPPORT TO THE WATER SECTOR 35

4.2.3. CURRENT AND FUTURE WATER POLICIES 35

4.3. WATER RESOURCES AUDIT 38

A NOTE ON THE QUALITY OF DATA 38

4.3.1. CLIMATIC CONDITIONS (RAINFALL, SNOWMELT, FLOODS) 38

CLIMATE AND PRECIPITATION – A HIGHLY VARIABLE HASBANI MICRO-CLIMATE 39

EVAPOTRANSPIRATION 43

SNOW AND SNOWMELT 43

FLOODS 44

4.3.2. SURFACE WATER 46

RIVERS 46

4.3.3. GROUNDWATER AND GEOLOGY – THE AQUIFER SYSTEM 50

BASIC GEOLOGY 51

GEOMORPHOLOGY 53

THE IMPORTANCE OF THE NORTH-SOUTH ORIENTATIONS UPON WATER MOVEMENT
AND AVAILABILITY 53

INFILTRATION CAPACITY 54

THE AQUIFER SYSTEM 56

SPRINGS 57

TRANSBOUNDARY AQUIFERS AND TRANSBOUNDARY GROUNDWATER 59

5. LEGAL AUDIT OF ENVIRONMENTAL AND WATER OBLIGATIONS OF THE UPPER JORDAN RIVER STATES 61

5.1. AUDIT OF EXISTING ENVIRONMENTAL LEGAL INSTRUMENTS OF THE UPPER JORDAN CORIPARIAN STATES 61

5.2. AUDIT OF EXISTING AND POTENTIAL INTERNATIONAL WATER LEGAL INSTRUMENTS OF THE

UPPER JORDAN RIVER CORIPARIAN STATES	62
5.2.1. POSITIONS OF UJR RIPARIAN STATES TO THE LEGAL INSTRUMENTS	62
POSITIONS OF UJR RIPARIAN STATES TO THE LEGAL INSTRUMENTS	62
BACKGROUND TO THE LEBANESE POSITION ON THE UN WATERCOURSES CONVENTION	63
LEBANESE AND OSOI POSITIONS ON THE DRAFT AQUIFER ARTICLES	64
5.2.2. COMPATIBILITY OF THE SUBSTANTIVE OBLIGATIONS/PRINCIPLES/RULES	66
SUBSTANTIVE OBLIGATIONS/PRINCIPLES/RULES	69
5.2.3. COMPATIBILITY OF THE PROCEDURAL OBLIGATIONS/PRINCIPLES/RULES	73
PROCEDURAL OBLIGATIONS	75
6. IMPLICATIONS FOR LEBANON OF BASIC RIGHTS AND OBLIGATIONS	78
6.1. IMPLICATIONS OF SUBSTANTIVE OBLIGATIONS / PRINCIPLES / RULES FOR LEBANON	78
6.1.1. 'EQUITABLE AND REASONABLE USE'	78
THE CASE FOR DETERMINING LEBANON'S BASIC RIGHT TO AN EQUITABLE AND REASONABLE SHARE	78
IMPLICATIONS OF 'EQUITABLE AND REASONABLE USE' FOR LEBANON	79
6.1.2. PROTECTION IN TIME OF ARMED CONFLICT / VITAL HUMAN NEEDS	79
6.1.3. GOOD FAITH / GENERAL OBLIGATION TO COOPERATE / MUTUAL ASSISTANCE / DATA EXCHANGE / INDIRECT PROCEDURES / RESOLUTION OF PLANNED ACTIVITIES	80
6.2. IMPLICATIONS OF PROCEDURAL OBLIGATIONS/PRINCIPLES/RULES FOR LEBANON	81
6.2.1. PRIOR NOTIFICATION	81
6.2.2. PREVENTION OF SIGNIFICANT HARM	81
6.3. IMPLICATIONS OF THE LEGAL INSTRUMENTS FOR LEBANON	82
6.3.1. UNWC (ALREADY RATIFIED)	83
6.3.2. UNECE WATERCOURSES CONVENTION (GENERALLY POSITIVE)	83
6.3.3. DRAFT AQUIFER ARTICLES (GENERALLY NEGATIVE)	83
6.3.4. HRW (VERY POSITIVE)	85
7. CONCLUSION - TOWARDS A LEGAL FRAMEWORK FOR LEBANON	86
7.1. MAIN FINDINGS	86
7.1.1. BIOPHYSICAL FINDINGS	86
7.1.2. LEGAL FINDINGS	87
7.2. WATER POLICY RECOMMENDATIONS	87
7.3. OUTLINE OF A STRATEGY FOR ENSURING LEBANON'S BASIC RIGHTS AND MEETING ITS OBLIGATIONS	88
7.3.1. RECOMMENDATIONS OF ACCESSION AND NON-ACCESSION TO LEGAL INSTRUMENTS	89
7.3.2. THE DEVELOPMENT AND EXECUTION OF A TRANSBOUNDARY WATER POLICY CONSISTENT WITH IWL	89
7.3.3. DEVELOPMENT OF THE LEBANESE BATNA	90

ANNEXES	92
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A – DRAFT OUTLINE OF OSOI STRATEGIC INTERESTS IN THE JORDAN RIVER BASIN	92
B – UNWC VOTING RECORD AND ACCESSIONS	100
C – LEBANESE BI-LATERAL LEGAL INSTRUMENTS	102
D – LEBANESE WATER INSTITUTIONS	103
E – METHOD TO CALCULATE AN ACTOR’S BASIC RIGHT TO EQUITABLE AND REASONABLE USE OF TRANSBOUNDARY WATERS	105

REFERENCES	106
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FIGURES

FIGURE 2.1 RELATIVE HYDRO-HEGEMONY OF RIPARIAN ACTORS IN THE JORDAN RIVER BASIN – AS ESTIMATED IN 2006 (ZEITOUN AND WARNER 2006).	6
FIGURE 2.2 SHIFTS IN HYDRO-HEGEMONY IN THE UPPER JORDAN RIVER, OVER TIME (FROM ZEITOUN ET AL (2013: FIGURE 5)).	9
FIGURE 2.3 RELATIVE (A) CONTROL OVER TERRITORY, (B) CONTROL OVER SURFACE WATER AND GROUNDWATER, AND (C) USE OF TRANSBOUNDARY WATER FLOWS IN THE UPPER JORDAN BASIN (FROM ZEITOUN, ET AL. 2013A: FIG 5).[.....	11
FIGURE 3.1 EVOLUTION OF INTERNATIONAL WATER LAW. SOMETIMES CO-EVOLVING, OTHER TIMES EVOLVING INDEPENDENTLY.	17
FIGURE 4.1 INSTITUTIONAL ARRANGEMENT OF WATER SECTOR IN LEBANON, IN RELATION TO THE HASBANI RIVER BASIN.	34
FIGURE 4.2 LEBANESE WATER SECTOR NATIONAL STAKEHOLDERS, AND INTERNATIONAL DONORS (MoEW 2010A).	36
FIGURE 4.3 PHOTO SHOWING THE HASBANI MICRO-CLIMATE, WITH SNOW STILL PRESENT ON JEBEL EL SHEIKH (MT. HERMON) IN THE BACKGROUND, AND GROUNDCOVER OF HASBANI VALLEY IN FOREGROUND (JUNE 2013).	41
FIGURE 4.4 THE HASBANI MICRO-CLIMATIC ZONE, SHOWING PRECIPITATION PATTERNS, AND DISTRIBUTION OF METEOROLOGICAL STATIONS <i>BEFORE</i> [BCW] AND <i>AFTER</i> THE CIVIL WAR [ACW]	42
FIGURE 4.5 MONTHLY AVERAGE MEASUREMENTS OF PRECIPITATION, HUMIDITY, AND TEMPERATURE AT KFAR QOUQ METEOROLOGICAL STATION IN THE HASBANI REGION. ...	42
FIGURE 4.6 CALCULATED MONTHLY AVERAGE POTENTIAL EVAPOTRANSPIRATION IN AND NEAR HASBANI BASIN (2010-2012) (THORNWAITE METHOD).	43
FIGURE 4.7 MAXIMUM EIGHT DAY SNOW COVERAGE EXTENT (SHOWN IN RED) FROM MODIS SATELLITE IMAGES (MOD10A2) OF 2003 OVER LEBANON WHERE A) DAY 9, B) DAY 57, C) DAY 73, D) DAY 89, E) DAY 97 AND F) DAY 113..	44
FIGURE 4.8 FLOOD HAZARD MAP OF THE LOWER HASBANI RIVER (ABDALLAH, ET AL. 2013). ...	45
FIGURE 4.9 FLOOD DAMAGES ON THE HASBANI RIVER, 8 JANUARY 2013. LEFT: THE AL AFRAH RESORT, JUST DOWNSTREAM OF WAZZANI SPRINGS; RIGHT: DAMAGED HASBAYA ROAD JUST SOUTH OF HASBAYA..	46
FIGURE 4.10 SURFACE WATER FLOWS OF THE UPPER JORDAN RIVER, SHOWING THE HASBANI, LIDDAN, AND BANIAS RIVERS, AYOUN STREAM, AND RELATED SPRINGS..	47
FIGURE 4.11 A) MEAN ANNUAL DISCHARGE, AND B) SPECIFIC MEAN ANNUAL DISCHARGE OF THE HASBANI, BANIAS, AND DAN RIVERS, FROM 1944 – 2008 (ESCWA-BGR 2012: FIG 6). THE FIGURES SHOWN IN M ³ /S REFLECT CLOSELY THE ESTIMATES OF 241, 123, AND 114 MCM/Y FOR THE LIDDAN, HASBANI, AND BANIAS, RESPECTIVELY (.	48

FIGURE 4.12 PHOTOS OF THE HASBANI BASIN IN 2013, FROM UPSTREAM TO DOWNSTREAM (FROM TOP AND FROM LEFT). A. DRY RIVER COURSE DOWNSTREAM NEAR RACHAYA (WEST BEKA'A), MAY 2013; B. HASBANI SPRINGS AT FULL FLOW DURING FLOODS IN FEBRUARY; C. FLOW AT NABA'A EL WAZZANI RESORT, JUST DOWNSTREAM OF THE WAZZANI SPRINGS, 3 MARCH; D. FARDESS TRIBUTARY ON RIGHT JOINING HASBANI MAINSTREAM, FEBRUARY; E. HASBANI RIVER FLOWING TOWARDS SOUTH (TOWARDS THE RIGHT) NEAR IBL EL SAQI, FEBRUARY.	49
FIGURE 4.13 THE AJOUN STREAM FLOWING SOUTH WITHIN LEBANON, WITH OSOI IN BACKGROUND, IN 2013 (LEFT TO RIGHT): FEBRUARY, MARCH, JUNE, AUGUST.....	50
FIGURE 4.14 AQUIFERS IN THE UPPER JORDAN RIVER BASIN (.	51
FIGURE 4.15 ROCK FORMATION, MORPHOLOGY, RIVER BASINS AND AQUIFERS IN THE NORTHERN PARTS OF THE UPPER JORDAN RIVER BASIN. NOTE THE ORIENTATION OF THE FAULTS IN A ROUGHLY NORTH-NORTH-EAST DIRECTION, REFLECTING THE PLATE TECTONICS. THE FIGURE IS INTENDED TO SHOW BOTH THE LINKS BETWEEN SURFACE WATER AND GROUNDWATER (COVERED IN THE UNWC), AND THE "AQUIFER SYSTEM" (AS DEFINED IN THE DAA).....	52
FIGURE 4.16 INFILTRATION CAPACITY MAP OF HASBANI WATERSHED (MERHEB, 2010).	55
FIGURE 4.17 HYDROGEOLOGICAL CROSS-SECTIONS AT EACH OF THE MAIN SPRINGS IN THE UPPER JORDAN RIVER: A) BANIAS, B) LIDDAN, C) WAZZANI, D) HASBANI.	56
FIGURE 4.18 RESULTS OF THE WEAP WATER MODELLING OF THE HASBANI WATERSHED (MERHEB, 2010). OF PARTICULAR RELEVANCE TO THE STUDY AT HAND ARE THE CHANGES IN INTRA-ANNUAL FLOWS TO GROUNDWATER, AND SOIL MOISTURE.	59

TABLES

TABLE 2.1 BASIC INDICATORS OF JORDAN RIVER BASIN (JORDAN RIVER BASIN) WATER USE (ABOUT 2007 – 2011). SOIL WATER NOT INCLUDED.	5
TABLE 3.1 THE MAIN LEGAL INSTRUMENTS AND NORMS OF INTERNATIONAL WATERS CONSIDERED IN THIS STUDY. NOTE THE HELSINKI RULES HAVE ALSO PIONEERED AND INFLUENCED CODIFICATION (IF UNOFFICIALLY), THOUGH ARE NOT CONSIDERED FURTHER IN RELATION TO THE CASE AT HAND.	20
TABLE 4.1 PROPOSED ACTIVITIES UNDER THE 10-YEAR PLAN OF LEBANON MINISTRY OF ENVIRONMENT AND WATER (TO 2020). NOTE THE PLAN DOES NOT MAKE REFERENCE TO TRANSBOUNDARY WATER. <i>SOURCE: (MOEW 2010B)</i>	37
TABLE 4.2 COMPARISON OF RESEARCH ON LEBANESE WATER-CLIMATE FACTORS. <i>COMPILED BY AUTHORS FROM VARIOUS SOURCES</i>	40
TABLE 4.3 SPRINGS IN THE HASBANI BASIN. <i>MODIFIED FROM JACOBS GIBB (2007)</i>	58
TABLE 5.1 INTERNATIONAL ENVIRONMENTAL TREATIES AND POLITICAL DECLARATIONS AGREED BY LEBANON, SYRIA AND OSOI. [PRIMARYLY FROM WATERLEX LEGAL DATABASEWWW.WATERLEX.ORG/WATERLEX-LEGAL-DATABASE].	61
TABLE 5.2 INTERNATIONAL WATER CONVENTIONS AND POLITICAL DECLARATIONS AGREED BY LEBANON, SYRIA AND OSOI.....	63
TABLE 5.3 SUBSTANTIVE OBLIGATIONS/PRINCIPLES/RULES IN THE MAIN RELEVANT INTERNATIONAL LEGAL INSTRUMENTS	67
TABLE 5.4 <i>PROCEDURAL</i> OBLIGATIONS/PRINCIPLES/RULES IN THE MAIN RELEVANT INTERNATIONAL LEGAL INSTRUMENTS.	74

Acronyms

ACW	After Civil War
ATI	Absolute Territorial Integrity
ATS	Absolute Territorial Sovereignty
AWC	Arab Water Convention
BATNA	Best Alternative to a Negotiated Agreement
BCW	Before Civil War
CDR	Council for Development and Reconstruction
CFA	Nile Basin Cooperative Framework Agreement
CoI	Community of Interests
DAA	Draft Aquifer Articles
EIF	Entry Into Force
ERU	Equitable and Reasonable Use
GDHER	General Directorate of Hydraulic and Electrical Resources
HRW	Human Right to Water
ICRC	International Committee of the Red Cross
IHL	International Humanitarian Law
IHP	International Hydrological Programme (UNESCO)
IIL	Institute of International Law
ILA	International Law Association
ILC	International Law Commission (UN)
IWL	International Water Law
LARI	Lebanese Agriculture Research Institute
LRA	Litani River Authority
LTS	Limited Territorial Sovereignty
MoEW	Ministry of Energy and Water
NERP	National Emergency Rehabilitation Plan
OSoI	The Occupying State of Israel
RWE	Regional Water Establishment
UJR	Upper Jordan River
UNECE WC	United Nations Economic Commission for Europe Water Convention
UNWC	United Nations Watercourses Convention

Executive Summary

The purpose of this study is to *provide the basis for the development of a national Lebanese policy on transboundary waters on the Upper Jordan River*. It does this by undertaking comprehensive audits of the relevant water resources and legal instruments, and interpreting the results of these within the international hydropolitics of the basin.

Rationale for a legal study

The importance of founding a national transboundary water policy upon International Water Law (IWL) became clear during the 2002 Wazzani Springs dispute and, to a lesser extent, during the diplomatic activity surrounding the Ayoun stream in 2009. From a Lebanese perspective, the goal of achieving Lebanon's basic rights to an equitable share of the transboundary waters is understood as the basis for resolution of the water conflict.

This study also comes during a period in Jordan River hydropolitics that is significant in a number of ways. First, the great need for economic development in the Hasbani Basin is leading to increased use of the region's water resources (e.g. the proposed Ibl el Saqi dam). Second, the fact that four of five Jordan River riparian states have acceded to the 1997 UN Watercourses Convention¹ provides a distinct opportunity to push for resolution of the conflict through an equitable re-distribution of the flows. Third, the Government of Lebanon (GoL) is engaged in three legal processes currently underway: a) the late 2013 opening of the UNECE Water Convention to non-European countries; b) the ongoing drafting of the Arab Water Convention; and c) ongoing debate of the International Law Commission's Draft Aquifer Articles (DAA, relating to transboundary groundwater law). The former two provide opportunities for Lebanon that have not yet been capitalised upon, while the latter holds threats as well as opportunities.

Audits of water resources and of legal instruments

The Water Resources Audit collates all of the most recent biophysical studies available to the authors. Noting three major biophysical studies currently underway, this study could not aim to determine the water availability and use required to estimate Lebanon's 'legal' (i.e. equitable and reasonable) share of the flows. Thorough hydrogeological investigations show that the "recharge zone" (employing the terms of the Draft Aquifer Articles) of transboundary groundwater in the Upper Jordan River Basin lies primarily in Lebanon, and partly in Syria. The "discharge zone" of the aquifer

¹ 'Palestine' has indicated that it intends to accede to the UNWC; OSol has not acceded to it.

system is shared between Lebanon (the Hasbani and Wazzani Springs), OSol² (the Liddan Springs), and Syria (the Banias Springs). Snowmelt has also been estimated for the first time, at roughly 150MCM/y. The bulk of the snow infiltrates into the “aquifer system” (to return to the wording of the DAA), contributing to the estimated 250 – 350 MCM/y of transboundary groundwater (though some of it also counts towards the estimated 480 MCM/y of transboundary surface water).

The study’s main contributions derive from the comprehensive Legal Audit. The audit makes use of all relevant legal documentation available from the Government of Lebanon (including from the archives of the Ministry of Foreign Affairs), and from UN databases and minutes of treaty negotiations. The audit compares the existing international environmental obligations of each state (related to climate change, desertification, etc.), but concentrates on the four most relevant water instruments, notably: i) the 1997 UN Watercourses Convention (UNWC); ii) the UNECE Water Convention (UNECE WC); iii) the Draft Aquifer Articles (DAA); and iv) the Human Right to Water (HRW).

The compatibility of the substantive and procedural obligations/principles for each of these legal instruments are checked against each other in some detail. Perhaps the most important elements of these instruments are the principle of transboundary water sharing (i.e. *equitable and reasonable use* of transboundary waters), and the obligations related to transboundary injury (i.e. *prior notification*, and *no significant harm*). The analysis exposes the extent of contradictions between the instruments, thereby setting the legal foundation upon which a coherent Lebanese transboundary water policy can be developed.

Findings

On the whole, IWL is found to support Lebanon’s interests, though there is nuance to be considered. In light of the political context that underwrites the legal analysis, the study finds that a solid legal foundation rests on two pillars:

1. For Lebanon to achieve its basic right to an equitable share of the transboundary waters, the Government of Lebanon must achieve consistency with International Water Law. While Lebanon’s basic right deriving from the principle of ‘equitable and reasonable use’ remains unquantified, it is clear that OSol is in ‘serious and material’ breach of IWL, notably for decades of un-coordinated downstream water development and use.
2. For Lebanon to meet its legal obligations, the Government of Lebanon may adopt *the exceptio non adimpleti contractus* as the primary legal principle, and

² The term ‘Occupying State of Israel’ (or OSol) is used throughout the study, in compliance with the Lebanese designation.

‘countermeasures’ (and ‘reciprocity’) as secondary principles.³ The principle of *exceptio* asserts that a violation of a legal obligation by one State could lead to a legitimate breach of a corresponding obligation by another State, so long as the initial violation consists of a ‘serious or material’ breach. ‘Countermeasures’ are measures taken by an injured State that are a necessary recourse and proportional to the breach of the responsible State, and which would otherwise be contrary to the international obligations of the injured State.

Lebanon’s accession to the UNWC obliges it (under Art. 12) to provide a specified period of notification to other states of any planned measures that may cause the latter any “significant adverse effect”. The Ibl el Saqi dam or discharge of olive oil waste are cases in point. For both the obligations of ‘prior notification’ and ‘no significant harm’, however, OSol’s extensive development of water resources downstream must be taken into account. As such development ‘forecloses’ future use by Lebanon (see Section 5.2), it similarly obliges OSol to notify Lebanon of any similar projects. The Government of Lebanon may then not be obliged to provide prior notification, under the principle of reciprocity / *exceptio*. However, the political interests of non-notification should be weighed against the merits that come from Lebanon providing prior notification. The Government of Lebanon would also be required to ensure that its actions conform to the required purpose of countermeasures when the latter are applied (to induce OSol to comply with its obligations), as well as to the limits and conditions placed by international law on their use.

Recommendations for the foundation of a cohesive transboundary water policy

In regards to the specific legal instruments under consideration, the analysis concludes that the Government of Lebanon should :

- > Clarify its positions in relation to the UNWC, and to anchor current and future policy and action firmly within its principles, except when a breach thereto is justified notably by the *exceptio*.
- > Accede to the UNECE Water Convention without delay, as there are no contradictions with existing commitments, and it provides possible platforms for support;
- > Not ratify the current draft of the DAA, because of its contradictions with the UNWC and the possible risks to Lebanon’s interests (deriving mainly from the clause on ‘sovereignty’);

³ This is based on a) the state of (simple) armistice between Lebanon and the OSol, b) an understanding that IWL is as binding upon the OSol as it is on Lebanon, and c) serious and material violations of IWL, by the OSol.

- > Fully engage in the development of the Arab Water Convention, particularly since Lebanon is uniquely placed among the Arab states as an upstream riparian with commitment to and understanding of IWL;
- > Implement all aspects of the Human Right to Water, to ensure better access and more equitable distribution within Lebanon.

The Government of Lebanon is further advised to strengthen analysis of both political and legal aspects of water, through the development of a) a solid understanding of the OSol strategy, and b) an alternative to a negotiated agreement regarding the transboundary flows. Regardless of the nature of eventual interaction, if any, between states, Lebanon's position would be strengthened if the government were to develop such an alternative along the following lines.

Act in consistent and entire accordance with the principles of IWL. This includes providing notification of any national development projects and measures to ensure the prevention of significant harm to all downstream states – or invoking the *exceptio* if the contrary is decided (i.e. when a breach thereto is justified).

Provide an explanation of its position and policy to the Lebanese public (including e.g. Lebanese environmental NGOs, and academic institutions), to ensure their support for both Lebanon's legal rights and obligations;

Develop a campaign of quiet diplomacy amongst the international diplomatic community. This could include initiating a campaign leading the three other Jordan River co-riparian States that have ratified the UNWC to issue a statement expressing a view that the UNWC reflects customary international law, in the expectation that other states in the region (i.e. OSol) would also abide by it.

Systematically disclose OSol violations of IWL to the Lebanese public and the international community. This could be highlighted, for instance, every three years at the meeting of the parties of the UNECE Water Convention, and in forums of the League of Arab States, Union for the Mediterranean, Global Water Partnership, etc.;

Build a case for violations of a) equitable and reasonable use; and b) protection of water resources and infrastructure in times of armed conflict. The establishment of such a case provides the Government of Lebanon the capacity for pro-active diplomacy.

These recommendations would be in the best interest of all residents of Lebanon, while a concerted effort along this path is the surest way to achieving Lebanon's basic rights as per IWL, notably to an equitable share of the transboundary waters.

Section 1 – INTRODUCTION

1. Introduction

1.1. Why a legal analysis of the Upper Jordan River?

Lebanon's construction of a pumping station at the Wazzani Springs in 2002 was the first development of the Hasbani River in nearly four decades. The effort soon exposed the dynamics of the Lebanese-OSol water conflict over these reaches of the Upper Jordan River, and drew in international negotiators from the US, UN, and EU. Both sides claimed International Water Law supported their position (Zeitoun, *et al.* 2013b).

From one perspective, the 2002 Wazzani Springs Dispute can be viewed as an example of the successful management of tensions created by transboundary waters. The anxiety over the construction of the Wazzani Pumping Station by the Government of Lebanon never grew beyond a 'war of words', and the Government of the Occupying State of Israel (OSol) did not prevent its neighbour from building the pumping station.

On the other hand, the dispute was never resolved, and should be re-considered for having highlighted aspects of the Jordan River conflict that are even more pronounced over a decade later. These include: i) the lack of basic water infrastructure development in southern Lebanon; ii) opposing Lebanese and OSol positions on control and use of the flows; iii) continued tensions created by the asymmetry in use of the flows and possible transboundary pollution; and iv) inconsistent and selective use of international water law to inform unofficial negotiations positions.

While the conflict lingers un-resolved, its impact is primarily in the form of compromised livelihoods of local farmers and general 'development' in the region. It also continues to carry the risk of fuelling other Lebanese-OSol political tensions and thus contributing to international armed conflict. At the same time, technological developments (desalination) and International Water Law (IWL) are taking on new directions that — in theory — can open up doors to the ultimate end goal: an equitable distribution of the flows of the Upper JR.

At the broadest possible level, this study seeks to provide the legal basis for the realisation of that goal. It is the second stage of a wider research project entitled *National Water Security* of Lebanon, the first of which was the *Upper Jordan River Hydro-Political Baseline* (hereafter referred to as the 'Baseline Study'). Amongst other conclusions, the *Baseline Study* concluded that there existed "significant gaps in surface and groundwater flows, quality and use" (p126) and the role of international water law is "currently minimal" (p132) but "may be greater in the future" (p134).

One clear recommendation that followed from the study was that Lebanon “undertakes a thorough and complete legal analysis of the transboundary flows” — the very subject of the study at hand.

1.2. Purpose and specific objectives

Following on from the recommendations of the Baseline Study, the Main Objective of this study is to ***“provide the basis for the development of a national policy on transboundary waters on the Upper Jordan River Basin”***. It meets this objective by exploring the hydrological and legal setting of Lebanon, and by pursuing each of the following original Specific Objectives:

- The estimation of past and current transboundary surface water and groundwater flows, quality and use;
- The review and assessment of compliance with procedural rules of the 1997 U.N. Watercourses Convention (UNWC) by Lebanon and OSol, in relation to Upper Jordan surface water and groundwater flows;
- The consideration of the relevance of the substantive and procedural rules of the UNWC, the Draft Aquifer Articles, the UNECE Water Convention and other relevant water law to the Upper Jordan surface and groundwater flows;
- The assessment of the *legal* implications of the 1997 UNWC principles on Lebanon, for Upper Jordan surface water and groundwater flows;
- The assessment of the *political* implications of the 1997 UNWC principles on Lebanon, Upper Jordan surface water and groundwater flows;
- The examination of the legal implications of the ‘established use’ and ‘prior use’ of the Upper Jordan flows;
- The initial estimation of Lebanon’s legal entitlement and obligations with respect to development of the water resources in the Upper Jordan basin;
- Identification of the Legal and Hydrological cases, as part of a strategy to achieve this entitlement;
- The examination of the relevance of rules of international law and legal instruments relevant to the destruction of water infrastructure and resources during times of armed conflict, and the law of belligerent occupation; and
- The development of the structure of national legal framework for transboundary waters in the Upper Jordan River Basin.

1.3. Methodology

The study achieves its objective through distinct investigations conducted by an interdisciplinary research team: a Water Resources Audit, and a Legal Audit. The previously mentioned gaps in basic hydrological and hydro-geological data are tackled in the Water Resources Audit through collection and synthesis of the very latest (i.e. 2013)

data, including the observed record of surface water flows, and estimates of snowmelt.

The Legal Audit makes use of all relevant legal documentation available from the Government of Lebanon, including from the archives of the Ministry of Foreign Affairs. The Audit also briefly considers commitments over water with Syria, and existing international environmental obligations (related e.g. to climate change, desertification, etc). The Audit then checks compatibility of the obligations and entitlements of all of the various potentially applicable instruments of IWL, and analyses potential areas of conflict or complement to develop arguments for or against their adoption / support.

The data has been collected and analysed by a team of inter-disciplinary researchers. It has been extensively reviewed by the AFIAL Executive Committee, HBDT Law Firm, an eminent international water lawyer, and a senior water engineer.

1.4. Limitations

The study is limited first and foremost by the lack of reliable biophysical data. The absence of reliable data on the flows (especially estimates of groundwater and soil water) undermine the utility of the Legal Analysis. It prevents, for example, an estimation of Lebanon's 'equitable and reasonable' share of the transboundary flows. To partially overcome this limitation, the most recent and reliable data has been used, including from non-published (but verified) sources, and the authors' own estimates.

As it is based on desk-based research, furthermore, the study has not documented or interpreted the views and opinions of decision-makers involved. As with all desk-based research, the interpretation of some of the findings may be served further by additional qualitative analysis.

1.5. Structure

The remaining two chapters of Section 1 present the historical and theoretical background required for the hydro-political analysis. This covers the basic politics of the Jordan River conflict, and the main debates and principles of International Water Law. The second section starts with Chapter 4, which presents the findings of the Water Resources Audit, including the relevant national water policy and institutions. The Legal Audit is presented in Chapter 5, which explores the relevance of different legal instruments to Lebanon, and discusses their compatibility with each other. Chapter 6 discusses the implications of an initial estimation of Lebanon's basic right to develop the Jordan River flows within its territory, and develops the arguments in favour of this. The final chapter discusses the paths the Government of Lebanon is advised to follow in order to achieve the basic right and thus equitable distribution throughout the entire basin.

2. Background to the Jordan River Conflict

2.1. The Broader Jordan River conflict

Just as the Upper Jordan River is a part of the broader Jordan River Basin, the Lebanon-OSol water conflict should be seen within the broader context. The basin as a whole is characterised by a lack of coordinated management and inequitable distribution, and is a good example of a case in which water-sharing agreements are part of the problem.

2.1.1. Distribution of the Jordan River Basin flows

A recent estimate of use of groundwater and surface water in the basin is shown in **Table 2.1**. The distribution of the flows shown in **Table 2.1** reflects the power asymmetry of the riparian actors, with Syria taking the lion's share of the Yarmouk tributary, and OSol taking the bulk of the rest.

The table shows a number of other features that are also relevant to the case at hand. For instance, Lebanese use of water in the basin is minimal — even lower than the relative portion of land in the basin, and much lower than the 'Lebanese' contribution of water to the basin (as we shall see, essentially the entire flow of the Liddan and Banias Springs fall as rain in southern Lebanon). Second, the distribution is particularly extreme in the case of the *Upper* Jordan River, with Syria using none of the flows, Lebanon about 3%, and OSol using the rest.

Third, Syrian use of water in the basin is much larger than most commonly reported — typically because estimates of (not very visible) groundwater use are left out. Finally, OSol's share is made up predominantly of surface water (551 MCM/y), and it is this most visible of resources that attracts the attention of media and politicians in the conflict.

Table 2.1 Basic indicators of Jordan River Basin (Jordan River Basin) water use (about 2007 – 2011). Soil water not included.

	Population in the Jordan River Basin (via BGR (2012: Table 1)) [million]	% of Jordan River Basin area (Phillips, <i>et al.</i> 2007b: 42)	Contribution to flow in Jordan River Basin (Phillips, <i>et al.</i> 2007b: 42)	Johnston Allocation (Phillips, <i>et al.</i> 2007a)	Total Abstractions from Jordan River Basin (various sources via Phillips (2007b: Table 5))	Total Abstractions from Jordan River Basin (various sources)	Surface Water abstractions (various sources)	Groundwater abstractions (various sources)
Lebanon	0.105	3.6	120*	35	10	11 ⁴	3.7	4.4
Syria	1.3	37.3	435	132	260	453 ⁵	165 ⁶	288
OSol	0.294	9.7	160	616	700	686 ⁷	596	90 ⁸
Jordan	5.05	41.2	530	720	320	365 ⁹	135	240
West Bank	0.431	8.2	155	n/a	109	109	0 ¹⁰	109

*This figure is contested as it does not include groundwater contributions – see Section 2.2.

⁴ Zeitoun *et al.* (2012: 53).

⁵ ESCWA-BGR (2012: 29)

⁶ Estimated. ESCWA-BGR (2012: 29) states that of the 453 MCM/y total, 327 is for agriculture (of which 60% is irrigated with groundwater), 92 for domestic use (assumed all from groundwater) and 34 for industry (assumed all from surface water).

⁷ Includes 520 MCM/y in the Upper Jordan River Basin (including use in Tiberias and Golan) (Zeitoun, *et al.* 2012: 55); 1994 Peace Treaty allocations of 70 MCM/y from existing use (Courcier, *et al.* 2005: 19) from the confluence of the Yarmouk and Tirat Zvi / Wadi Yabis, and 45 from the mainstream (20 exchanged with Jordan) (el Musa 1997; Courcier, Venot and Molle 2005: Fig 9); 1994 Peace Treaty allocations from Lower Jordan River (el Musa 1997); and 44 – 60 (say 50) from OSol wells inside the West Bank (mainly in the Jordan River Valley) (Zeitoun 2008: Table 3.2).

⁸ Includes 40 MCM/y in Upper Jordan River Basin (Zeitoun, *et al.* 2012: 55) and 44 – 60 (say 50) from OSol wells inside the West Bank (mainly in the Jordan River Valley) (Zeitoun 2008: Table 3.2).

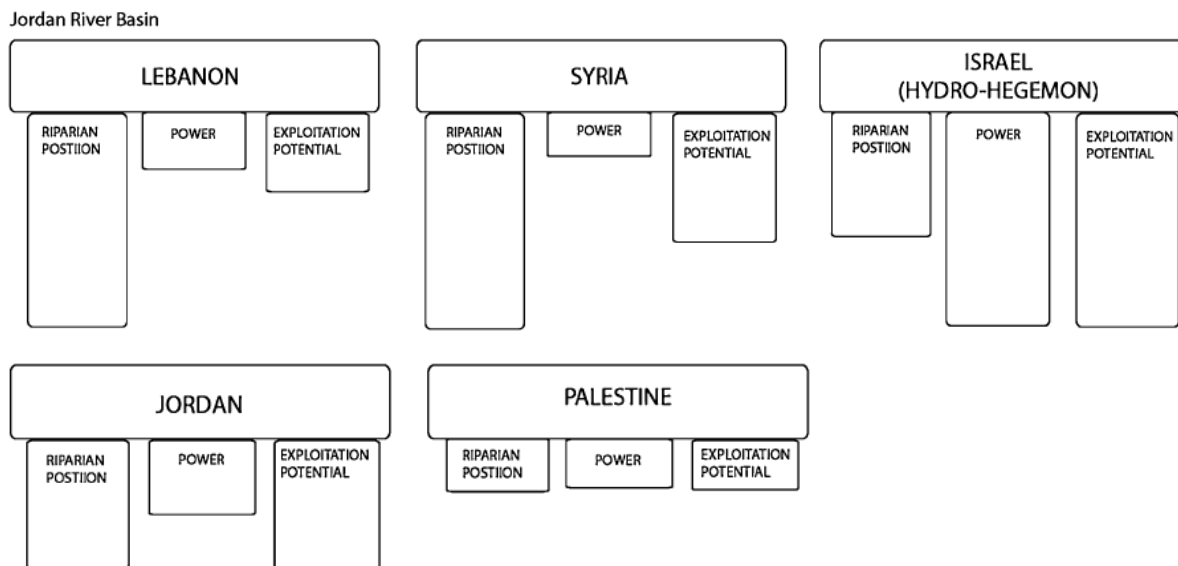
⁹ Includes 240 from groundwater (Courcier, Venot and Molle 2005: 20) and 135 from surface water (Courcier, Venot and Molle 2005: Fig 9)

¹⁰ Palestinians are denied by the Government of OSol any access to the Jordan River.

A ‘hydro-hegemonic’ reading of control and use of flows in the basin (see

Figure 2.1) displays the relative greater power and ability to exploit the flows of OSol, even from its mid-stream position. While the detail of this hegemony has been explored in detail for the lower reaches of the river (in e.g. Selby 2003b; Zeitoun 2008), the dynamics of control of the upper reaches have been explored only more recently – see Figure 2.2.

Figure 2.1 Relative hydro-hegemony of riparian actors in the Jordan River Basin – as estimated in 2006 (Zeitoun and Warner 2006).



2.1.2. Treaties, Negotiations, and strategies of control in the Jordan River Basin

The Jordan River Basin is remarkable for the relative high number both of treaties and of countries supporting International Water Law. While there are no treaties governing use of the Upper Jordan River flows, three bi-lateral treaties govern the use of transboundary water between the riparians on the Lower Jordan, each of them skewed towards the more powerful actor.

The Syria-Jordan 1953 Treaty and 1987 Agreement. The original 1953 Treaty reads as the legal framework for construction of the Maqarin / al Wehdah Dam on the Yarmouk River’s mainstream. It gave Syria the right to use most of the springs in its territory above the dam, and much of the water downstream — ambiguously reserving for Syria the right for “irrigating Syrian lands situated in the lower basin of the Yarmouk... or other Syrian

schemes” (Article 8). The treaty accords Jordan the right to use the releases from the dam as well as “the right to use within Jordanian boundaries the water which is in excess of Syrian needs” (Article 9). The 1987 Agreement lays the legal framework for construction of the Wehdah Dam on the Yarmouk mainstream, as well as 25 smaller dam projects on tributaries in Syria. It re-affirms the 1953 Treaty in letter and in spirit, with Jordan retaining the “right to use the overflow” from the dam (Art. VII) and receiving 25% of the electricity generated. The principles of equitable use or provisions for conflict resolution are not mentioned, suggesting that IWL was not used to guide the agreements (even though the principle of equitable utilisation was already well-known at the time, via government exchanges during the 1966 Helsinki Rules – as we will see in Section 3.3).

The 1994 Israel-Jordan Peace Treaty. The terms of the agreement regulating use between OSol and Jordan of the Lower Jordan River are found in Annex 2 of the broader political agreement. The treaty has been assessed as beneficial for both OSol and Jordan (Haddadin 2001; Sosland 2007), or favouring OSol (Beaumont 1997). Fischhendler (2008: 100) asserts that ambiguity in the quantities of flows to be distributed was deliberately used in the text of the agreement to permit “differential accounting” by both sides, and thus the reaching of an agreement. Jordanian accounting suggests that OSol conceded 225 – 295 MCM/y to Jordan, while OSol accounting puts it at only 35 – 105 MCM/y (Fischhendler 2008: Table II). The resultant use of the flows suggest the ambiguity has worked to the favour of the more powerful actor, and tensions over the treaty thus remain. The principles of equitable use or provisions for conflict resolution are not mentioned, suggesting that IWL was not used to guide the agreements.

The 1995 Israel-PLO Oslo II Agreement. The terms of the agreement regulating water use between OSol and the PLO are found in Article 40 of Annex III. Whilst once lauded as a historic compromise between former enemies, the terms of the agreement have been heavily criticised on a number of counts. The distribution of transboundary flows, first of all, is roughly 90%-10% in favour of OSol, and the surface water flows of the Jordan River are not even mentioned (Zeitoun 2008). The Palestinian-OSol Joint Water Committee created by the agreement has been widely criticised as a tool of coercion, furthermore (Selby 2003a; World Bank 2009; Selby 2013). As with the other agreements, the principles of equitable use or provisions for conflict resolution are not mentioned, and the principles of IWL were not used to guide the agreements. More fundamentally, there is some dispute about whether Oslo II can actually be characterized as a binding treaty, in part because one of the parties (the PLO) may not have qualified as a “state” under international law (see e.g. Watson 2000).

Syrian-OSol negotiations. Water was also on the table during the indirect negotiations held between Syria and OSol in the 1990s. These approached the as-yet unresolved issues

of Syrian access to the Lake of Tiberias (and, presumably, use of its flows), and OSol concerns about contamination of the Lake were it to return the Golan to Syria (Eiland 2009; Hof 2009). Daoudy's (2008) analysis of negotiations asserts that OSol security was the main process-related variable in the negotiations, revealing both that the negotiations were generally structured in OSol's favour and that water — as expected — took a subordinate position to other political issues. International Water Law was apparently not used to guide the indirect talks, which concluded, of course, with no agreement.

The fact that IWL was not used even to inform any of the four sets of water-related negotiations stands in stark contrast with the fact that 4 of the 5 riparians have acceded to the 1997 UN Watercourses Convention¹¹ (the Palestinians have indicated their intention to do so if statehood is achieved). This proportion is significantly higher than in any other basin in the world, and as we will see, can be understood as a potential opening for resolution of the conflict in particular in the basin's upper reaches.

The bi-lateral agreements and absence of IWL also suggests that OSol has observable ***strategic objectives in the water resources throughout the basin***. As detailed further in Annex A, these are considered to be: 1) maintenance of control of the use of headwaters of the Hasbani River, 2) protection of the Upper Jordan River from contamination, and 3) prevention of the establishment of a precedent of multi-lateral negotiations based on International Water Law. Each of these objectives is met either by use of force or negotiating a treaty in OSol's favour, or a combination of both.

2.2. The Upper Jordan River conflict

Compared with the southern portions of the Jordan River Basin, the basic hydrology and politics of the flows in the northern portions remain relatively unknown. No treaties govern surface or groundwater use in the Jordan's upper reaches. The Hydropolitical Baseline Study provided initial approximations of groundwater flows, and a hydro-hegemonic reading of OSol control and use of the flows. OSol hegemony was noted to shift with different hydro-political periods, as shown in Figure 2.2.

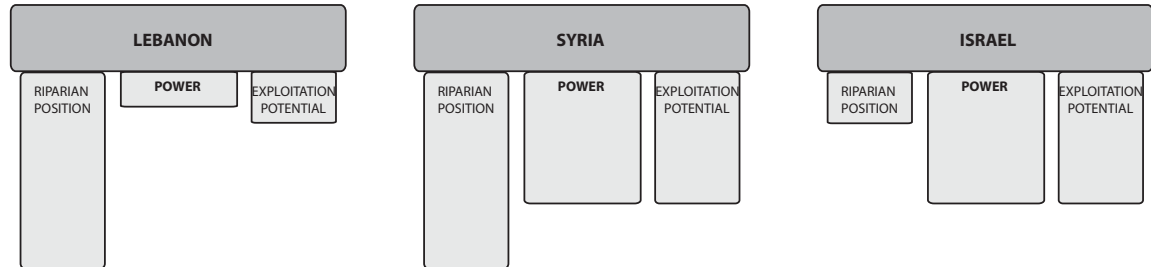
The *Upper Jordan River Baseline Study* drew several other biophysical and political conclusions, including:

- The Liddan is an international river, in the sense that all of the recharge zone for the Liddan Springs (which are in OSol) is in Lebanon or Syria;

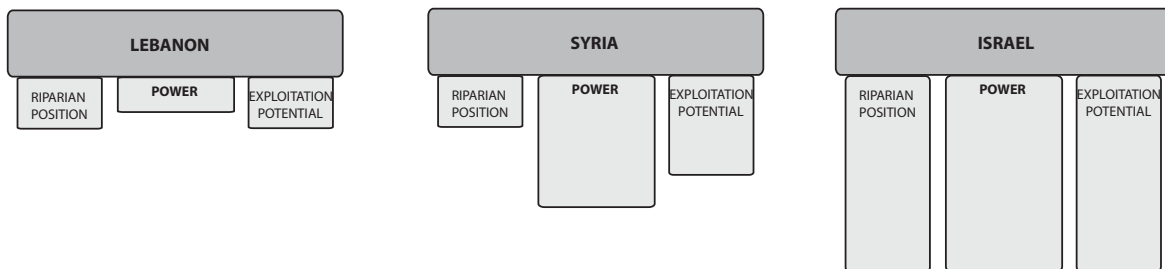
¹¹ The Palestinians have indicated their intention to accede to the UN Watercourses Convention, once statehood is achieved. In 2012, the UN General Assembly adopted a resolution declaring Palestine a Non-Member Observer State (UNGA Res. 67/19 of 29 Nov. 2012), though at the time of writing 'Palestine' as a state has not acceded to the UNWC.

Figure 2.2 Shifts in hydro-hegemony in the Upper Jordan River, over time. From Zeitoun et al (2013: Figure 5)).

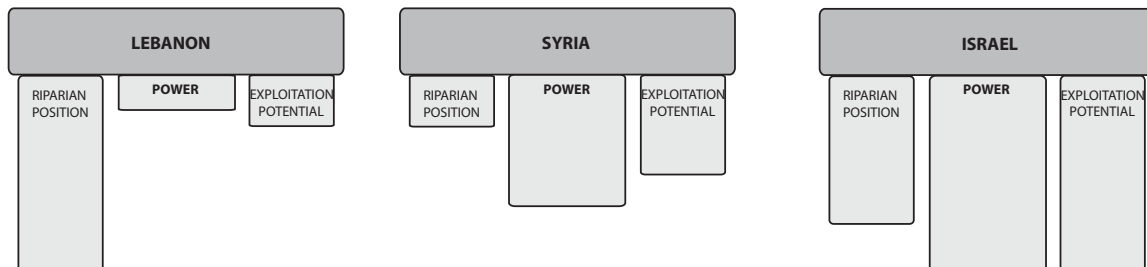
1948 - 1967: No hegemon (*control contested*)



1967 - 2000: Israel as basin hegemon (*control through dominance*)



2000 - 2012: Israel as basin hegemon (*remote control*)



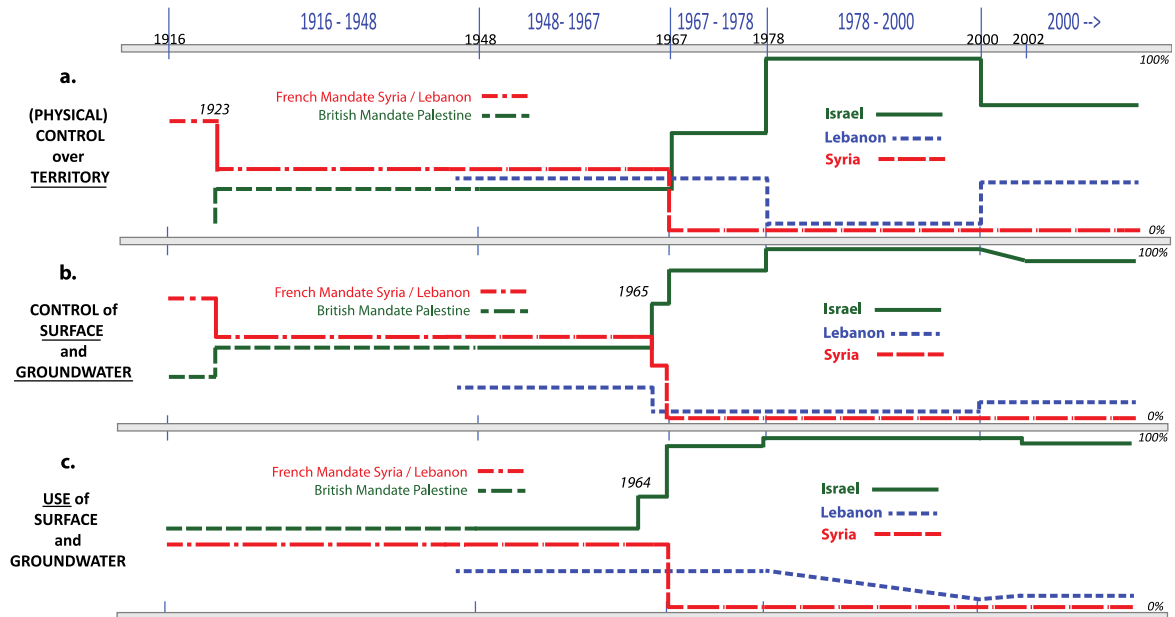
- The Liddan River is by far the strongest and least variable of the three main tributaries, with an average flow measured between 1949 and 2004 of 241 MCM/y, +/- 10%. The Hasbani's average flow is roughly 143 MCM/y +/-43%, whilst the average flow of the Baniyas is 114 MCM/y +/- 30%;
- The average flow of the Upper Jordan River at the confluence of the three main tributaries is 480 MCM/y;
- Transboundary groundwater flows are in the same order of magnitude, very roughly estimated at 250 – 350 MCM/y (*note some of these flows discharge in the springs that feed the Upper Jordan tributaries, and should not be mistakenly double-counted*);

- There is extreme asymmetry in use of the flows, with Lebanon using less than 3% of the flows, Syrian using none, and OSol using the remainder;
- The flow volume most commonly stated as 'Lebanon's legal share' – both inside and outside Lebanon – is 35 MCM/y. This is the figure decided during the 1950s Johnston negotiations, and is considered flawed, at least in the sense that it did not consider domestic or industrial water needs;
- Historic water use in Lebanon may be more than is normally held, though no estimate based on archival record has been attempted;
- OSol occupation of Cheba'a and Ghajar is primarily for military, religious and political reasons, and not primarily for continued control of the water;
- Transboundary water pollution is a possible / likely source of future conflict; and
- Existing OSol control over use of the flows is exerted through physical and non-physical means, that is, through 'remote control'. This last point is elaborated upon in greater detail following.

2.2.1. Control and Use of the Upper Jordan flows

Figure 2.3 shows the evolution over time in the control of territory and water, and use of water within the UJR Basin. Part (c) of Figure 2.3 shows clearly that Lebanon has scarcely developed the river since 1965, when OSol bombed the works for the diversion of the Hasbani that the Arab League had been planning. OSol has since been able to exert control to ensure continued use of the flows, whilst occupying the entire basin (during the 1978 invasion and subsequent occupation of southern Lebanon), and after withdrawing from most Lebanese territory in 2000. During the latter period, the status quo is maintained through 'remote control'; that is, through deterrence reinforced by expressions of military or political conflict (Zeitoun, Talhami and Eid-Sabbagh 2013b).

Figure 2.3 Relative (a) control over territory, (b) control over surface water and groundwater, and (c) use of transboundary water flows in the Upper Jordan Basin (from Zeitoun, *et al.* 2013a: Fig 3).



2.2.2. The Government of Lebanon Position Report on the 2002 Wazzani Springs Dispute

As mentioned in the Introduction, the war of words that erupted over the Government of Lebanon's construction of a small pumping station at the Wazzani Springs in 2002 highlights a number of issues: i) the lack of basic water infrastructure development in southern Lebanon; ii) opposing Lebanese and OSol positions on control and use of the flows; iii) continued tensions created by the asymmetry in use of the flows and possible transboundary pollution; and iv) inconsistent and selective use of international water law to inform unofficial negotiations positions. This section elaborates on the final point.

At the height of the Wazzani Dispute, the Government of OSol asserted to US intermediaries their concern over the issue escalating into violence, Lebanon's lack of 'prior notification' (which is one of the main principles of the UNWC), and OSol's 'historic rights' established by its 'prior use' of the flows (which is one of the several determining factors of the principle of 'equitable and reasonable use') (Anon 2011, pers.comm). There was also an expressed desire to reach an agreement on Lebanese withdrawals. The OSol approach to manage the conflict was thus based on selective principles of IWL, though no

mention was made of equitable and reasonable sharing, or for the use of IWL as the basis/backbone for resolution of the tensions.

The official government position on the Wazzani Dispute (*Government of Lebanon Position Report - Service Area of the Hasbani Watercourse* of October 2002) demonstrates that the use of IWL by the Government of Lebanon was more comprehensive, though legal principles were also invoked in an ad-hoc and inconsistent manner. For example, Section 5 ('Legal Terms of Reference') affirms Lebanon's accession to the 1997 UN Watercourses Convention (UNWC) and states that "Lebanon's actions in relation to International watercourses are governed by the norms and principles of International Law reaffirmed by the above Convention". The Position Report then lists a number of guiding rules, including the "Right of all the riparian States to utilize the international watercourse", "The principle of equitable and reasonable use of water", "The No Harm rule", and "The principle of notification".

While the *Position Report* is thus consistent with the three main principles of the UNWC, the language supporting each rule sometimes contradicts the spirit or the letter of the UNWC. In the opening paragraphs, for example, the Position Report asserts that "Any observer who wishes to visit the site will clearly see that Lebanon is not diverting the Hasbani watercourse, particularly since there are no relevant construction works being undertaken on the watercourse" (p2). This is asserted even though the Government of Lebanon had indeed mobilised to begin construction at the time, and clearly intended to abstract from the river.

Under the first rule mentioned above, the report also asserts that "Lebanon is being denied its basic, natural and legitimate right to utilize its water". The suggestion that some water can be 'Lebanese' may be read as an assertion of sovereignty over a fluid resource. As we shall see in Section 3.2, this contradicts the spirit of IWL – whose primary doctrines for sharing transboundary waters (we shall see) are 'Limited Territorial Sovereignty', and 'Community of Interests'. The same law does assert that the state of Lebanon has a basic right to an equitable and reasonable sharing of the Jordan River, and thus a legal entitlement to develop the Wazzani Springs – and the nuances in wording are important.

As a further example, the *Position Report* states that "in planning to pump the Wazzani water, Lebanon does not divert the watercourse nor does the Wazzani water supply project affect Israel in any way. Lebanon's aim is to supply Lebanese villages with water to satisfy their vital, basic, humanitarian, social and domestic needs. In pursuing this goal, Lebanon is exercising, as a sovereign State, an unequivocal right well established under International Law" (p20). While the intent demonstrated by the middle sentence is

laudable and undeniable, the first and last sentences are contradictory in a number of ways. Lebanon is arguably diverting some of the Hasbani through the pumping station, and the withdrawals will affect downstream OSol to an extent. Whether the minor abstraction of flows constitutes a “serious and material” breach of law is an important but separate issue discussed in Sections 6 and 7. Furthermore, and as previously mentioned, the invocation of sovereignty is incongruent with basic tenets of IWL.

We thus see selective use of IWL by OSol, and comprehensive but inconsistent use of IWL by Lebanon. The need for a more solid and comprehensive legal analysis is clear.

3. International Water Law and Norms

Interaction between states over transboundary waters is a fundamentally political process. River beds and aquifers cross national boundaries, and so rivers and groundwater provide very material links between states that may otherwise have none — as is the case between Lebanon and OSOI. This mis-match between the physical boundaries of river basin the borders imposed by states (see e.g. Warner, *et al.* 2008; Cook and Spray 2012) can be thought of as *basin-border dissonance*.

3.1. Confronting the dissonance between river basins and political borders

When grappling with the challenge of static state governance over a fluid resource, this study recognises that the politics of transboundary waters are subordinate to – and not determining of – the broader political context within which they play out. It follows that the possible influence of international law upon inter-state transboundary water interaction must be considered within the enabling or constraining effects of power and international politics at this broader level. Relations between states typically determine whether or not IWL and river-level cooperation can lead to water conflict resolution, in other words.¹²

Nonetheless, less-powerful states tend to draw upon international law (and IWL) to meet their own interests, or to define their international legal rights. While all/most states tend to draw on international law when it suits their interests, the more powerful states sometimes have alternatives not open to the weaker ones – such as the ability to carry out political alliances, gunboat diplomacy, or sanctions, etc. (as discussed further in Section 3.6).

In any case, establishing the legal framework that can serve to address the basin-border dissonance is crucial to all the states that share a water resource, and international water law (IWL) must be studied in considerable depth. The following sections discuss the evolution in the doctrines, actors and principles of IWL, as well as some of the debates most relevant to the case at hand. The focus is on the rights and obligations pertaining primarily to the distribution of water between states, and less on environmental (i.e. water quality), resolution mechanisms.

The dissonance has been addressed in several different ways over the decades, with distribution of the flows split according to at least four doctrines.

¹² In some cases such as the 1960 Indus Waters Treaty, the reverse may be true.

3.2. Four doctrines of inter-state water sharing

Always the contest of power struggles, the development of IWL has reflected the downstream-upstream pattern of human settlement and development along rivers. The lower (i.e. downstream) reaches of any river are normally settled and developed first, as this is where the land is generally more flat and fertile and thus suitable for the agriculture required to sustain cities. People in Egypt downstream on the Nile River settled in greater numbers, for instance, than in upstream Ethiopia. Likewise, downstream development in Iraq can be compared with more recent hydro-power plans in upstream Turkey on the Tigris and Euphrates rivers. Over time and especially with the development of hydropower, upstream states inevitably embark on 'hydraulic missions' (Allan 2001) of their own — often with consequences for downstream states. In the case at hand, for example, downstream Palestinian and OSol development of the Huleh marshes and Lake of Tiberias has preceded Lebanese or Syrian development of the Hasbani or Banias rivers.

The inter-state conflicts created by basin-border dissonance and un-coordinated development of rivers has been addressed by the international water legal community through the development of at least four doctrines (or "principal theories" (McCaffrey 2007: Ch 5)) on inter-state distribution of flows: Absolute Territorial Sovereignty, Absolute Territorial Integrity, Limited Territorial Sovereignty, and Community of Interests.

Absolute Territorial Sovereignty (ATS). ATS is also known as the Harmon Doctrine, after the US Attorney General Judson Harmon invoked it in relation to downstream Mexico on the Rio Grande / Rio Bravo. The doctrine asserts that a "state is free to dispose, within its territory, of the waters of an international river in any manner it deems fit" (Salman 2007a: 627). This doctrine is clearly in the interests of upstream states, and has been largely discredited (including by the US) due to the serious impact it can have on downstream states (i.e. damming of the flows in the most extreme case). ATS seems to have resurfaced recently in the 2008 Draft Aquifer Articles, however, as we shall see.

Absolute Territorial Integrity (ATI). ATI "establishes the right of a riparian state to demand continuation of the natural flow of an international river into its territory from the upper riparian or riparians, but imposes a duty on that [upstream] state not to restrict such natural flow of waters to other lower riparians." (Salman 2007a: 627). The doctrine of ATI is thus the reverse of Absolute Territorial Sovereignty. The ATI doctrine is clearly in the interests of downstream states, and largely discredited for the impact it can have on upstream states (i.e. preventing or compromising any development of the river by the upstream state).

Limited Territorial Sovereignty (LTS). The doctrine of LTS “asserts that every riparian state has a right to use the waters of the international river, but is under a corresponding duty to ensure that such use does not harm other riparians.” (Salman 2007a: 627). In a sense, LTS tackles the ‘basin-border dissonance’ by trying to rise above and beyond the restrictive notion of sovereignty, and is at odds with both ATS and ATI. LTS is currently the most common basis for the distribution principles of IWL.

Community of Interests (Col). Col also rises above the notion of sovereignty by considering how the flow of water renders it more compatible to being viewed as common property and to the common interests of states the water runs through¹³ (McCaffrey 2007: 148). Col re-enforces the doctrine of LTS, implying in essence that the “exercise of sovereign rights is subject to certain responsibilities” (McCaffrey 2007: 165). Any distribution guided by this doctrine would have to weigh the interests of the different states against each other, a task that is significantly more difficult to conceptualise than those arising from the doctrines of ATS or ATI. Col is also more coherent with basin management concerns, as it views a basin as a single biophysical entity, and furthermore implies joint or collective action.

3.3. Evolution of the principles of International Water Law

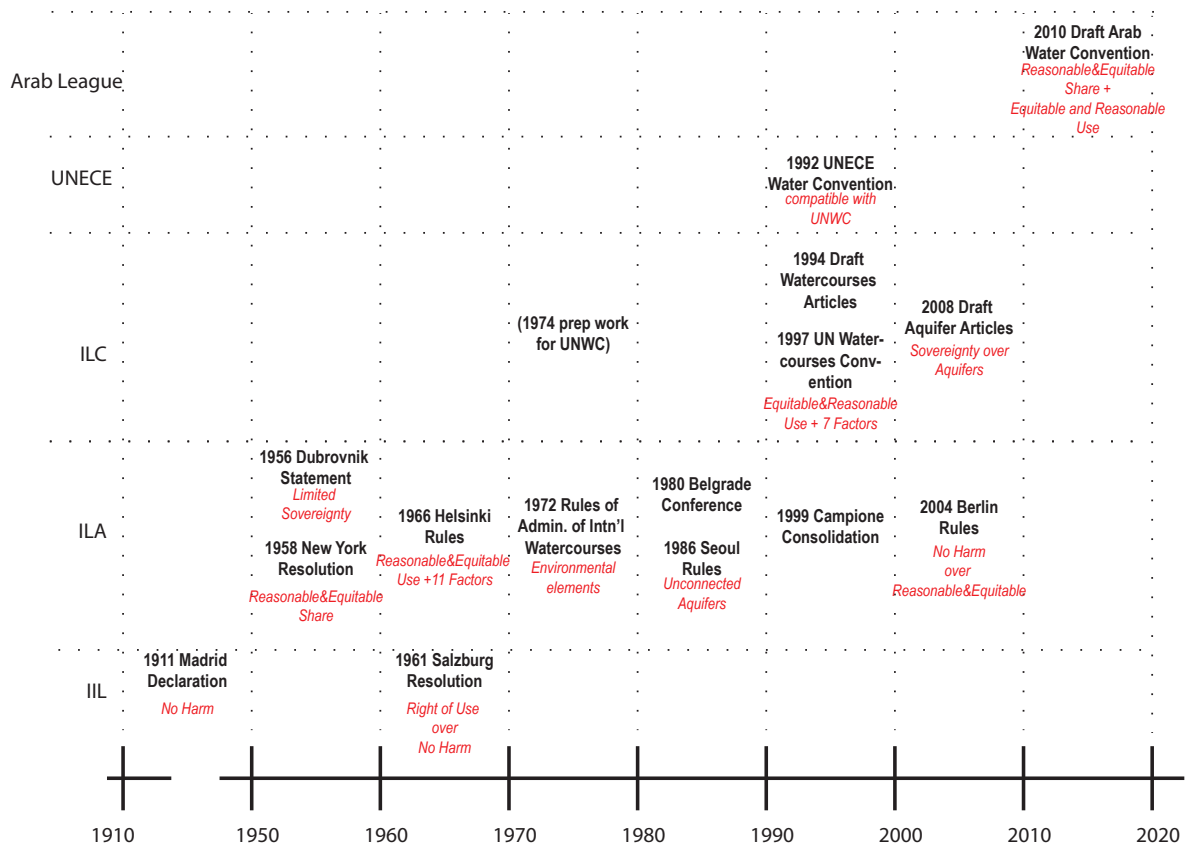
International Water Law (IWL) comprises a body of customary and treaty law, as well as drafts developed by a number of private organisations. Perhaps not surprisingly, these different sources may support one or several of the doctrines on water-sharing. The development of IWL is well covered by legal scholars (e.g. (Dellapenna 2003; McCaffrey 2005; Salman 2007a; Rieu-Clarke, *et al.* 2012)) and is re-presented in **Figure 3.1** and discussed following.

The main actors in the development of IWL include two scholarly NGOs: the Institute of International Law (IIL) and the International Law Association (ILA); and two UN bodies: the International Law Commission (ILC) and the UN Economic Commission for Europe (UNECE). Three main types of water are of concern: surface water, groundwater hydraulically connected to surface water, and groundwater not hydraulically connected to surface water (i.e. ‘fossil water’).¹⁴

¹³ And that the Permanent Court of International Justice ruling on the River Oder in 1929 referred to the “single waterway” between multiple states (McCaffrey 2007: 149).

¹⁴ Note that like the science community, the law community is well behind in considering the entire balance of water. It does not consider soil water, atmospheric water (i.e. transboundary clouds) or virtual water (i.e. food imports).

Figure 3.1 Evolution of International Water Law. Sometimes co-evolving, other times evolving independently. The principles developed at each step are in *red italics*. Source: authors.



In some cases the development of IWL has very much co-evolved amongst the various actors and rules. In other cases, rules and principles appear to have developed in parallel or independent of each other.

Salman (2007a) and Rieu-Clarke (2012) discuss how the ‘no harm’ principle was first developed by the IIL at the 1911 Madrid Declaration, who later (at the 1961 Salzburg Resolution) asserted states’ “right of use” over the principle of ‘no harm’. In keeping with the doctrine of LTS, the IIL may have been influenced by the ILA’s clear support for it in its 1956 Dubrovnik Statement and 1958 New York Resolution. It was here that the basic right of states to a “reasonable and equitable share” of water was first declared on the international plane. Concurrently, the ILA developed the Helsinki Rules, which invoked the principle of “reasonable and equitable utilization” as “the cardinal rule for international

water law” (Salman 2007b: 631). The Helsinki Rules also detailed eleven factors from which to derive ‘reasonable and equitable use’¹⁵.

The ILA continued to develop IWL, through the consideration of environmental issues and law at the 1972 adoption of the Rules of Administration of International Watercourses and the 1980 Belgrade Conference. In 1974, The ILC began their preparatory work to examine state practice in order to codify customary law. The 1986 Seoul Rules first broached the topic of groundwater not hydraulically connected to surface water, i.e. fossil water.

Meanwhile, the UN Economic Commission for Europe developed the Water Convention, in 1992. This drew upon the ILA’s Helsinki Rules and the ILC’s ongoing work in its General Provision 1c, which calls for state parties “to ensure that transboundary waters are used in an equitable and reasonable way”.

The ILC completed its codification of state practice in 1994 with the final adoption of its Draft Articles, which formed the basis of intergovernmental negotiations in the UN leading to the adoption in 1997 of the UN Watercourses Convention (UNWC). Amongst other substantive and procedural obligations, the UNWC details the obligations of ‘no significant harm’, and ‘equitable and reasonable use’. Drawing heavily on the ILA’s Helsinki Rules for this latter principle, the UNWC also details seven illustrative factors¹⁶ from which to derive ‘equitable and reasonable use’. The UNWC also notably carries with it the procedural principle of a “general obligation to cooperate”, as we shall see.

¹⁵ “Article V of the Helsinki Rules states that the relevant factors to be considered include, but are not limited to: (a) the geography of the basin, including in particular, the extent of the drainage area in the territory of each basin state; (b) the hydrology of the basin, including in particular the contribution of water by each basin state; (c) the climate affecting the basin; (d) the past utilization of the waters of the basin, including in particular, existing utilization; (e) the economic and social needs of each basin state; (f) the population dependent on the waters of the basin in each basin state; (g) the comparative costs of alternative means of satisfying the economic and social needs of each basin state; (h) the availability of other resources; (i) the avoidance of unnecessary waste in the utilization of waters of the basin; (j) the practicability of compensation to one or more of the co-basin states as a means of adjusting conflicts among uses; and (k) the degree to which the needs of a basin state may be satisfied, without causing substantial injury to a co-basin state (ILA, 1966).” Salman 2007: 629]

¹⁶ “Article 5, requires taking into account all relevant factors and circumstances, including: (a) geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character; (b) the social and economic needs of the watercourse states concerned; (c) the population dependent on the watercourse in the watercourse state; (d) the effects of the use or uses of the watercourse in one watercourse state on other watercourse states; (e) existing and potential uses of the watercourse; (f) conservation, protection, development and economy of the water resources of the watercourse and the cost of measures taken to that effect; and (g) the availability of alternatives, of comparable value, to a particular planned or existing use.” Salman 2007 : 633]

On the back of the development of the UN Watercourses Convention, the ILA pushed to further develop the Helsinki Rules, leading to the 1999 Campiense Consolidation and eventually to the 2004 Berlin Rules (see e.g. Dellapenna 2006). The Berlin Rules incorporate aspects of international environmental law, International Humanitarian Law, international human rights law, and parts of the UNWC (including ‘equitable and reasonable use’). However, the Berlin Rules crucially place equitable and reasonable use subordinate to the principle of ‘no harm’.

The ILC began work on the 2008 Draft Aquifer Articles (DAA) in 2002, with a view to bridging perceived weaknesses of the UNWC with respect to environmental issues and fossil groundwater. Developed in closer coordination with hydro-geologists, the DAA extend in a new direction — to focus on the geological structure that the water flows through (the *aquifer*), more than the groundwater itself. As we discuss below, this was and continues to be hotly debated by the legal community, and the approach of the DAA also contradicts the doctrine of the Community of Interests and the view of water as a flowing, rather than static, resource.

In 2010 the Arab League began to develop the Arab Water Convention, drawing heavily from the Helsinki Rules, and the UNWC. It has not been ratified, at the time of writing.

3.3.1. ‘No Harm’ vs. ‘Equitable and Reasonable Use’: a sterile debate

There has been a long-standing debate over the supremacy of principles of ‘no harm’ and ‘equitable and reasonable use’. Which principle is invoked by which state typically depends on a particular basin’s configuration of power, riparian position, and level of development. As Salman (2007a: 633) asserts, developed downstream states such as Egypt may tend to find ‘no harm’ suits their national interests, as it may be seen to protect against upstream developments by states such as Ethiopia (and is thus somewhat in keeping with the doctrine of ATI). Upstream states may prefer ‘equitable and reasonable use’ as it provides some scope for use of the water at a later stage in their development trajectory. Lengthy legal debate has ensued¹⁷ with the case for ‘equitable and reasonable use’ based on the detail of its seven factors – which *includes* the possible harm (as well as benefits) of the intended use (“the effects of the use or uses of the watercourse in one watercourse State on other watercourse States” and “existing and potential uses of the watercourse”).

Salman (2007a: 633) asserts that “the prevailing view is that the [UN Watercourses] Convention has, like the Helsinki Rules, subordinated the obligation not to cause

¹⁷ For more on the debate, see Chapters 10 and 11 of McCaffrey (2007).

significant harm to the principle of equitable and reasonable utilization”. This can be discerned from Article 7, paragraph 2, of the UNWC, which provides in essence that if harm occurs, the situation is to be resolved in accordance with the principle of equitable utilisation. This is important to the case at hand because it provides Lebanon, as the upstream and later-developing state, with a legal justification for developing its water resources in an equitable and reasonable way, even if that development results in some ‘significant harm’ to OSol – as discussed in further detail in Section 6.2.2.

In as much as the two principles are compatible, the debate is sterile. The goal of fair transboundary water sharing remains equitable and reasonable (read as balanced) utilisation of the shared water resources, not the avoidance of harm at all costs (see McCaffrey 2007: Chs 10, 11).

3.4. The Main Legal Instruments and norms of IWL

This section covers the primary sources that comprise International Water Law – shown in **Table 3.1**. The considerable areas of overlap are more closely scrutinised in relation to Lebanon, in Chapters 5 and 6.

Table 3.1 The Main legal instruments and norms of international waters considered in this study. Note the Helsinki Rules have also pioneered and influenced codification (if unofficially), though are not considered further in relation to the case at hand.

<i>UN Watercourses Convention</i>	<i>UNECE Water Convention</i>	<i>Draft Aquifer Articles</i>	<i>Arab Water Convention</i>	<i>Human Right to Water</i>
[UNWC]	[UNECE WC]	[DAA]	[AWC]	[HRW]

UN Watercourses Convention

The 1997 UN Convention on the Law of the Non-navigational Uses of International Watercourses (UN Watercourses Convention, or UNWC) is the result of the ILC’s investigations of state practice, and is thus seen as being largely a codification of customary international law. The UNWC was adopted by the UN General Assembly on 21 May 1997 by 103 votes in favour, 26 abstentions, and 3 against – see Annex B. It applies to all surface water, and to groundwater hydraulically connected to surface water via aquifers (McCaffrey 2007: 30).

The UNWC will enter into force after 35 countries have acceded to it, and with 32 currently acceded, Entry into Force (EIF) is expected soon.¹⁸ As the UNWC's Special Rapporteur Stephen McCaffrey (2008) points out, as the UNWC reflects customary international law, EIF is not strictly speaking necessary, and the principles and rules set forth in it are binding on *all* countries, whether or not they accede to the Convention. The implication is that even States who are not parties to these conventions/treaties are deemed to have accepted these rules as being rules of customary international law.¹⁹

UNECE Water Convention (UNECE Convention)

The UN Economic Commission for Europe's Water Convention was adopted in 1992 and entered into force on 6 October 1996. With a secretariat to support its implementation, the UNECE WC has proven useful throughout Europe (e.g. UNECE 1992; UNECE 2011) and in 2012 has 'gone global' – that is, countries from all over the world have been welcomed to accede to it. As a regional instrument, it is more detailed and specific than the UNWC, though the two are considered not incompatible. There is certainly the prospect of both the UNECE WC and the UNWC being in force at the global level before long, which is seen as “an opportunity to strengthen the legal architecture around international watercourses” (Rieu-Clarke, Moynihan and Magsig 2012: 39). Conceptual work on the coordinated implementation of the two conventions is already underway (see e.g. Kinna, *et al.* 2013; UNECE 2013).

Draft Aquifer Articles (DAA)

The 2008 Draft Articles on the Law of Transboundary Aquifers (DAA) were initiated by the ILC with the support of the UNESCO International Hydrological Programme (IHP) in 2002. Its Special Rapporteur Chusei Yamada states the need to “provide legal regime for the proper management of aquifers in view of the critically important freshwater resources” (Stephan 2009: 3). The DAA had initially set out to fill the gap of the UNWC in relation to fossil water, though has evolved to cover not only groundwater but also the geological structure through which groundwater passes (the aquifer). As such, the DAA define and

¹⁸ For updates see Annex B and

http://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-12&chapter=27&lang=en

¹⁹ Cf. Draft Articles on the Law of Treaties with commentaries, Text adopted by the International Law Commission at its eighteenth session, in 1966, and submitted to the General Assembly as a part of the Commission's report covering the work of that session, Yearbook of the International Law Commission, 1966, Vol. II, Reports of the Commission to the General Assembly, Commentary of Draft Article 34, pp.230-231: “ (...) a codifying convention purporting to state existing rules of customary law may come to be regarded as the generally accepted formulation of the customary rules in question even by States not parties to the convention”.

add the hydrogeological concepts “recharge zone”²⁰ and “discharge zone”²¹ to the body of law. The DAA also re-introduce the notion of state sovereignty into law.²² McCaffrey (2009: 288) points out that the DAA are *incompatible* with the doctrine of Limited Territorial Sovereignty, and thus with both the UNWC and UNECE WC (see further discussion in Section 5.2.1).²³ Unlike the UNWC, the elaboration of the DAA were not an exercise in codification, and the draft articles are not informed by authority or state practice. It is thus doubtful that the DAA – should they be agreed as a Convention – would be binding on all states regardless of whether they accede to it.²⁴ At its Autumn 2013 session, the General Assembly decided to delay the vote a second time, by including the item in the agenda of its seventy-first (2016) session.

Arab Water Convention (AWC)

The Draft Framework on Shared Water Resources in the Arab Region was prepared in 2010 by ESCWA and the League of Arab States (Centre for Water Studies and Arab Water Security) (ESCWA 2011). It draws heavily on the letter of the UNWC and also the 2011 Nile Basin Cooperative Framework Agreement (CFA). As with the CFA, the AWC holds ‘equitable and reasonable use’²⁵ as a General Principle, though a) without listing the seven factors that comprise ‘equitable and reasonable use in the UNWC, and b) re-introducing the concept of ‘reasonable and equitable share’. Article 8.1 of the Draft AWC states “Each sharing state is entitled, within its territory, to benefit from a reasonable and equitable share of the quantity and quality of the shared water resource”²⁶ (see Moussa 2013). The AWC was originally to be reviewed at the Arab Ministerial Water Council third session (of June 2011), but has yet to be agreed.

²⁰ Recharge Zone “means the zone which contributes water to an aquifer, consisting of the catchment area of rainfall water and the area where such water flows to an aquifer by runoff on the ground and infiltration through soil” (DAA Art 2.g).

²¹ Discharge Zone “means the zone where water originating from an aquifer flows to its outlets, such as a watercourse, a lake, an oasis, a wetland or an ocean” (DAA Art 2.h).

²² In Draft Article 3: “Each aquifer State has sovereignty over the portion of the transboundary aquifer system located within its territory”.

²³ Potential remedies are proposed in McCaffrey (2011).

²⁴ To the extent that they overlap with the UNWC, the DAA could be considered a codification, but only to this extent. The commentaries discuss as much: Draft article 3, comment N.3 *in fine*, p.40: “(...) The reference to “international law” has been added to indicate that, although the present draft articles have been elaborated against the background of the continued application of customary international law, there are other rules of general international law which remain applicable”.

²⁵ Draft AWC Article 8.2: “...sharing States agree to take all appropriate measures to ensure that this water resource is utilized in an equitable and reasonable manner”. This compares with Draft CFA Article 4 (1): “Nile Basin states shall in their respective territories utilize the water resources of the Nile River basin in an equitable and reasonable manner”.

²⁶ This compares with Draft CFA Article 4(1): “Each basin state is entitled to an equitable and reasonable share in the beneficial uses of the water resources of the Nile river basin”.

Human Right to Water

The UN General Assembly adopted a resolution on the Human Right to Water and Sanitation (UN Doc A/64/L.63/Rev.1) on 28 July 2010. The resolution “recognizes the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights”. In linking to other human rights, the Resolution on the HR to Water re-enforces several other international instruments where the right to water is recognised outright (as in the International Covenant on Economic, Social and Cultural Rights - General Comment 15), or more implicitly (though the right to food or life, as in the Rights of the Child and the UN Declaration on Human Rights).

The links between the HR to Water and customary international water law are tentative,²⁷ because they apply to either individuals or state governments, respectively. HR law is meant to protect the individual against acts by his/her own government, not against acts by other governments. If the actions of State A deprive an individual in State B of his/her water, it is up to State B (and not to the individual) to make a claim against State A. This would imply the Government of Lebanon making a claim against the Government of the OSol, if the latter’s acts deprived individuals in Lebanon of sufficient water to satisfy the Human Right to Water. On the other hand, the UNWC’s requirement that “vital human needs” be considered when resolving a conflict between uses (UNWC Art. 10 (2))(or in determining ‘equitable and reasonable’ utilisation, in the case of the DAA (Art 5.2) does provide some scope for IWL to consider impact upon individuals (though it would still be the government that would assert that right, not the individual).

The Primary Substantive and Procedural Obligations of IWL

A number of principles and obligations have been established through the debates, doctrines and general evolution of IWL through state practice. The following are not contested, being compatible with the Helsinki Rules, the UN Watercourses Convention, the UNECE Water Convention, the Draft Aquifer Articles, and the draft Arab Water Convention. A greater discussion follows in Section 5.2.

Substantive obligations/principles/rules

- ‘Equitable and Reasonable Use’ [UNWC: Equitable and Reasonable Utilisation (Arts. 5 and 6)].
- ‘No significant harm’ [UNWC: Obligation to Prevent Significant Harm to Other Riparian States (Art. 7)]

²⁷Leb (2012: 644) points out that the 1966 International Covenant on Civil and Political Rights (ICCPR) and the 1966 International Covenant on Economic, Social and Cultural Rights (ICESCR) both mention water and include extraterritorial obligations.

- ‘Protection of the Environment’ [UNWC: Protection and Preservation of Ecosystems of International Watercourses (Art. 20)]

Procedural obligations/principles/rules

- Obligation to Cooperate [UNWC: General Obligation to Cooperate]
- ‘Prior Notification’ [UNWC: Obligation of Prior Notification and Related Obligations]

3.5. Other Relevant International Law and Principles

3.5.1. International Humanitarian Law (IHL)

International Humanitarian Law (IHL) is the body of law addressed by the Geneva Conventions, which are upheld by the International Committee of the Red Cross (ICRC). As they address the behaviour of all actors during armed conflict, IHL and the Geneva Conventions are also commonly referred to as ‘the law of war’ (*jus in bello*).

Tignino (2010) discusses the relevance of Article 52 (1) of the Geneva Conventions’ Additional Protocol I²⁸ which calls for the “protection of civilian objects which are not military objectives” by combatants. Based solidly on the tenet of non-discrimination (Pejic 2001), Article 54 (Para. 2) and Article 55 of the same protocol call for the “Protection of the Natural Environment” and “Objects indispensable to the survival of the civilian population” during times of armed combat (ICRC 1994a; see also Rieu-Clarke, Moynihan and Magsig 2012: Table 6.2). Destruction of civilian water infrastructure in times of armed conflict is also considered a violation of the right to an adequate standard of living stated in the ESCR Convention (Article 11(1)),²⁹ as well as in the UNGA Human Right to Water (Tignino 2011), and in the 1997 UN Watercourses Convention (Article 29) (McCaffrey 2007).

3.5.2. Treaty Law (and coercion)

Treaty Law is seen as the most refined source of International Law. The law of treaties is codified in the 1969 Vienna Convention on the Law of Treaties.³⁰ Treaties reflect the consent of two or more actors to be bound to the terms of a written agreement. States are bound to international treaties by signature and ratification, and must then accept the legal consequences which arise from their violation. In the hierarchy of sources of International Law, treaties would generally prevail over any inconsistent principles of

²⁸ Adopted 8 June 1977, as an addition to the 1949 Geneva Convention of 1949.

²⁹ See also General Comment 15 of the UN Committee on Economic, Social and Cultural Rights.

³⁰ Entered into force in 1980 (United Nations, *Treaty Series*, vol. 1155, p. 331).

customary international law, since their provisions are more specific than those principles.³¹

As such, the provisions of a treaty signed between two states – for instance the 1994 Peace Treaty between Jordan and OSol – would prevail over less-specific principles of IWL, in the event they were inconsistent with each other. However, the rules of treaty law on successive treaties relating to the same subject matter provide that a later treaty would prevail over an earlier one, to the extent they were not compatible with each other (Vienna Convention on the Law of Treaties, Article 30(3)).

Treaty Law is also quite specific about countering the role that coercion plays in the signing of a treaty. Articles 51 and 52 refer specifically to the use of “Coercion of a representative of a State”, or “Coercion of a State by the threat or use of force.”³² In the former case, the State’s consent would be without legal effect; in the latter situation, the treaty would be void if its conclusion was coerced by the threat or use of force in violation of the UN Charter. It would be more difficult for treaty law to deal with more subtle forms of coercion, since these could be difficult to establish even though they may be no less real (and Treaty law has thus been called ‘blind’ to the use of *covert* coercion (Woodhouse and Zeitoun 2008)).

3.5.3. *Exceptio*, reciprocity, and ‘countermeasures’

The *exceptio non adimpleti contractus* (hereinafter ‘**the *exceptio***’) is a general principle of public as well as private law,³³ and also relevant to international legal relations. Fundamentally, the *exceptio* is considered to be an application of the general principle of **reciprocity**,³⁴ i.e.,

“a right entitling a party to a reciprocal contract to refuse to carry out his [sic] obligations as long as his co-contractor has not performed his own or offered to

³¹ Thus the general principle of treaty interpretation that *the specific controls the general*, commonly referred to as the “*lex specialis*” principle (*generalia specialibus non derogant*).

³² The full text of Article 52 reads “A treaty is void if its conclusion has been procured by the threat or use of force in violation of the principles of international law embodied in the Charter of the United Nations.”

³³ Cf.: O'Neill, Philip; Salam, Nawaf, Is the *Exceptio Non Adimpleti Contractus* Part of the New *Lex Mercatoria*, in: Gaillard (ed.), *Transnational Rules in International Commercial Arbitration* (ICC Publ Nr. 480,4), Paris 1993, at 147 et seq, par. 159, III. Conclusion. Also: Separate opinion of Judge Simma on the ICJ *Judgment of 5 December 2011, Application of the Interim Accord of 13 September 1995 (the former Yugoslav Republic of Macedonia v. Greece)*, Summaries of Judgments, Advisory Opinions and Orders of the International Court of Justice, N. 190, the “Separate opinion of Judge Simma”, par. 4.

³⁴ Reciprocity is just one of the features of *exceptio*. Fontanelli lists the “the values that are at the basis of the *exceptio* (reciprocity; good faith; even-handedness; *ex iniuria ius non oritur*; non-wrongfulness of non-performance due to impossibility; and even self-defence, to an extent” (cf. *Filippo Fontanelli*, *The Invocation of the Exception of Non-Performance: A Case-Study on the Role and Application of General Principles of International Law of Contractual Origin*, p.129).

do so. The *Exceptio* is based on the idea that mutual obligations are dependent on each other and must, therefore, be carried out at one and the same time. (...) By virtue of this *Exceptio*, the situation of equilibrium between the parties, which should have existed at the moment of contract formation, is thus maintained at the time of its performance”.³⁵

This definition takes the example of contracts in general,³⁶ but the *exceptio* also applies to at least certain international treaties.³⁷ Article 60 of the previously-discussed Vienna Convention on the Law of Treaties concerns “*Termination or suspension of the operation of a treaty as a consequence of its breach*”, and explicitly states that:

“1. A material breach of a bilateral treaty by one of the parties entitles the other to invoke the breach as a ground for terminating the treaty or suspending its operation in whole or in part. 2. A material breach of a multilateral treaty by one of the parties entitles:(...) (b) a party specially affected by the breach to invoke it as a ground for suspending the operation of the treaty in whole or in part in the relations between itself and the defaulting State; (c) any party other than the defaulting State to invoke the breach as a ground for suspending the operation of the treaty in whole or in part with respect to itself if the treaty is of such a character that a material breach of its provisions by one party radically changes the position of every party with respect to the further performance of its obligations under the treaty. 3. A material breach of a treaty, for the purposes of this article, consists in: (a) a repudiation of the treaty not sanctioned by the present Convention; or (b) the violation of a provision essential to the accomplishment of the object or purpose of the treaty. (...)”.

In essence, the principle of *exceptio* could be used to assert that a violation of an obligation under IWL by one State could lead to a legitimate breach of a corresponding obligation by another State, so long as the initial violation consists of a ‘serious or material’ breach.

³⁵ Cf.: O'Neill, Philip; Salam, Nawaf, op.cit., par. 152, II, *in limine*.

³⁶ Compa.: “*Inadimplenti non est adimplendum*”, i.e. “One has no need to respect his obligation if the counter-party has not respected his own.” This is used in civil law to briefly indicate a principle (adopted in some systems) referred to as the synallagmatic contract.

³⁷ The commentary to the articles on Responsibility of States for Internationally Wrongful Acts, prepared by the International Law Commission and adopted by the U.N. General Assembly, states: “the exception of non-performance (*exceptio inadimplenti contractus*) is best seen as a specific feature of certain mutual or synallagmatic obligations and not a circumstance precluding wrongfulness.” Materials on the Responsibility of States for Internationally Wrongful Acts, U.N. Doc. ST/LEG/SER.B/25, p. 143 (2012) (hereafter State Responsibility Articles).

Such an assertion would also be well-founded as a **countermeasure**. In the words of the Articles on the Responsibility of States for Internationally Wrongful Acts prepared by the International Law Commission and adopted by the U.N. General Assembly, countermeasures are “measures, which would otherwise be contrary to the international obligations of an injured State *vis-à-vis* the responsible State.”³⁸ So long as it is necessary to have recourse to them, and they are proportional to the breach by the responsible state, such countermeasures are considered lawful under international law. Proportionality is all but guaranteed where a countermeasure is taken by way of reciprocity.

This approach has been recognized by the International Court in the context of transboundary waters in the case of the Gabčíkovo-Nagymaros Project (Hungary v. Slovakia).³⁹ There, the Court recognized the right of an injured State to take “certain measures, including countermeasures”, in the case of “[t]he violation of ... treaty rules or of rules of general international law”.⁴⁰

Judge Simma’s separate opinion in the case concerning the *Application of the Interim Accord of 13 September 1995* between the former Yugoslav Republic of Macedonia and Greece⁴¹ contains the following statement concerning reciprocity:

“In international law, reciprocity still lies closer to the surface, at the root of various methods of self-help by which States may secure their rights; it has been crystallized into international law's sanctioning mechanisms, among them countermeasures and reciprocal non-performance of an agreement with its seed material in the law of treaties. (...).”⁴²

3.6. Critiques of International Law: law vs. politics and power?

The debates between different elements of the international law community demonstrate the careful attention paid to the meaning of words, and thus the undeniable importance of having a good and comprehensive understanding of the law. Having said this, international water law suffers the same obstacles of all international law — it is debated and not readily enforceable. It may be enforced through economic sanctions imposed by the injured state, or even by the use of force (in a very narrow class of cases —

³⁸ Commentary to the Articles on Responsibility of States for Internationally Wrongful Acts, *op. cit. supra*, p. 304, para. 1.

³⁹ ICJ. Reports 1997, p.7.

⁴⁰ Ibid, para. 106, at p.65.

⁴¹ *I.C.J. Reports 2011*, p. 644.

⁴² Summaries of Judgments, Advisory Opinions and Orders of the International Court of Justice, *op.cit.*, see notably the “Separate opinion of Judge Simma (par.4 and 5, *in fine*).

through Security Council authorisation (e.g. following Iraq's invasion of Kuwait), or upon gross and widespread human rights violations (e.g. Nato's actions in Kosovo)). But considering the outcome of inter-state water interaction on the Nile, Tigris, Mekong, Ganges or Jordan Rivers, we see that at the very least IWL is not determining of the transboundary water allocations, though may sometimes shape them. Theory from other social sciences is thus required to interpret what we observe.

This study also accepts that to a certain extent law is made for the powerful by the powerful.⁴³ As B.V.A. Rolling states, "In all positive law is hidden the element of power and the element of interest. Law is not the same as power, nor is it the same as interest, but it gives expression to the former power-relation. Law has the inclination to serve primarily the interests of the powerful. "European" international law, the traditional law of nations, makes no exception to this rule. It serves the interest of prosperous nations. (B.V.A. Rolling in Malanczuk 1997: 33). International Water Law in particular has been criticised as Euro-centric (Moussa 2013) and indeed, the names of all the rules in the development of IWL (**Figure 3.1**) resembles a tour guide to European capitals. Customary international law (as is the UNWC), furthermore, is based on observed practice of states, which — in a realist view of the world — is the outcome of power plays.

As Mirumachi (forthcoming) states: "Reus-Smit has argued that examining the interface of international politics and international law is important to understand how legal principles form institutions."⁴⁴ The author discuss just how political processes render any legal principles effective or ineffective, because of their failure to consider a) co-existing conflict and cooperation (see e.g. Mirumachi and Allan 2007), and b) the influence of power asymmetry. Indeed, the outcome of transboundary water interaction more often than not reflects the power asymmetry of the State actors involved.

The application of the framework of hydro-hegemony to the broader Jordan River Basin and the Upper Jordan River Basin (in Section 2.2) recognises that a position of hegemony in a basin may be held by one riparian actor if there is clear asymmetry in its favour of the balance of three 'pillars': riparian position, exploitation potential, and power (Zeitoun and Warner 2006). The approach emphasises that expressions of power ('hard', or more often 'soft' power) and power asymmetry are key elements in determining outcomes of water conflicts, and the character of interaction between states over the flows. Basin 'hegemons' are found to establish and consolidate control over transboundary resources

⁴³ As Anatole France noted, "The law, in its majestic equality, forbids the rich as well as the poor to sleep under bridges, to beg in the streets, and to steal bread." (Anatole France in: *The Red Lily* (1894), ch.7 (from Messerschmid 2012)).

⁴⁴ Reus-Smit C, 'The Politics of International Law' in Reus-Smit C (ed), *The Politics of International Law* (Cambridge University Press 2004).

through any of a number of tactics informing strategies of a) resource capture; b) containment of challenges from other actors; and c) integration of interests through the use of incentives.

Bargaining and attempts to 'sanction' discourse are seen as forms of 'soft' power that complement more overt expressions of hard power, and can be used towards either integrative or distributive ends (Zeitoun, *et al.* 2011). International law and norms can be viewed as just such an attempt to establish discourse. Indeed, both forms of power are in active use in the Upper Jordan River, where the consequences of OSol expressions of hard power complement the use of select principles of IWL, and other less directed expressions of soft power.

Section 2 – ANALYSIS

4. Audit of Water Resources and Institutions in Lebanon (2013)

4.1. General Condition of the Water Sector (poor water resource governance)

Though it receives considerably more *per capita* precipitation than its neighbours, Lebanon faces significant challenges with water quantity and quality. Management of the water sector must confront unsustainable water use, shortcomings in management staff, a poor state of infrastructure (MED EUWI 2009), and lack of social science and legal analysis to underpin policy. Despite numerous management reforms and investment programmes since the civil war, there has been little improvement since 2000.

Progress towards improving the state of the country's infrastructure has been hindered by a lack of governmental control and regulation, which only became more prevalent after the 2006 war. The roughly 1 million people recently displaced into Lebanon from Syria place an additional strain on water resources, particularly where they settle in the Beka'a Valley and North Lebanon (World Bank 2013).

Most parts of the country still experience water shortages, as roughly 50% of surface water is lost to evaporation, and 17% flows essentially uninhibited to neighboring countries or to the Mediterranean Sea (MoEW 2010a). Seasonal fluctuations create a discrepancy between supply and demand, whereby supply exceeds demand during the rainy winters and yet often falls short during the hot, dry summer (MOE/UNDP/ECODIT 2011). The main reason behind the seasonal water imbalance is the low capacity to store water (only 6% of the total water resources are stored, in comparison to the MENA average of 84% (World Bank 2007)). For their part, the water institutions are hampered by network leaks, unlicensed connections, and unpaid bills (see next section).

An informal private sector has in many places filled the gap, supplying water from private wells or water trucks. Private vendors remain unregulated, and often charge a higher price for water of a poorer quality than that supplied by municipalities. The World Bank estimates the opportunity costs of inadequate public water supply provision to be 1.3 percent of GDP (World Bank, 2009). Wastewater infrastructure also remains underdeveloped in Lebanon, regardless of estimates varying between 61 and 249 MCM/Y for domestic and industrial production respectively (FAO 2009).

The condition of the water sector in Lebanon is reflected in the quality of data, as well. The lack of reliable data is due in part to the poor water governance, as well as to political sensitivities about collecting region-specific baseline indicators. Where data can be found, it is often out of date, and contradictory with other sources.

Even some of the most basic biophysical information required for a comprehensive legal analysis is lacking. This section gathers and generates the latest such data,⁴⁵ and presents it in a way to support the legal analysis, starting with i) a review of Lebanese water institutions, ii) an audit of surface water, and iii) an audit of geology, hydro-geology, and groundwater.

4.2. Lebanese Water Institutions and Policy

4.2.1. History of development of water institutions

Agriculture flourished in Lebanon following the Ottoman conquest in 1516. The rulers established a system of agricultural regulations, including for sustainable use of water between farmers, and dispute resolution. Though unwritten, the regulations are thought to reflect the wisdom of the people, and have endured through generations to the point they are considered custom and habit. As Table D.1 in Annex D shows, from 1870 the Ottoman rulers posted the so-called “Magazine” that included a wide range of water-related legal and regulatory enactments (legislative texts) retrieved from custom and habit, Islamic Laws, and the Napoleonic Code. Some of these enactments are still drawn upon today (Faruqi, *et al.* 2001; Khalife 2001; Khalife 2008; Jaber 2011).

Two key decrees made by the French Mandate authorities during their rule from 1916 to 1943 were to change the character of the water sector. The first decree (No. 144, in 1925) defined the public domain of water – that is, water resources could be licensed, but neither sold nor purchased. The second (No. 320, in 1926) related to water resource use and conservation. Several enactments were issued during the mandate period including the identification of buffer zones of springs, drinking and irrigation water projects in Baalbek and the Beka’a plain (Jaber, 2012), as well as the new Property Law (No. 3339, in 1930).

Following independence in 1943, a number of sporadic legislative texts were developed by the Lebanese authorities to manage water resources. These included the determination of buffer zones on all water resources, wells, and fountains; the management of private well-drilling; licenses for drilling investment; the sale of water in bottles and flasks; and control of pollution from liquid and solid wastes. The new

⁴⁵ There are at least three other ongoing studies relevant to the one at hand, but which have not been published in time to be incorporated here. Readers are advised to consult: i) UNDP – *Provision of assessing the national groundwater resources through data collection and field assessment campaign of groundwater resources across Lebanon*; ii) MoEW - *A conceptual framework for Integrated Water Resources Management (IWRM) in Lebanon*; and iii) FAO - *Hydrogeological Study Of The Underground Water System In The El Marj Plain: The Source Of The Dardara Spring*.

Government of Lebanon also restored privileges that had been granted to private landowners in the Ottoman period, and re-established independent water authorities.

The Ministry of Water and Electricity was established in 1966, having evolved from the General Directorate of the Ministry of Public Works. This was the forefather of the Ministry of Energy and Water (MoEW), which is still active today. The MoEW established two directorates; a) the General Directorate for Water Treatment – responsible for water projects from design to planning to execution and construction supervision, and b) the General Directorate of Investment – which is the guardian of the twenty-one independent water authorities, and the local committees for drinking water provision and irrigation.

Attempts to restructure the water sector began the 1970s, but were interrupted by the 1978 – 2000 civil war. Water policy reform once again came onto the government's agenda in the early 1990s, which took the form of the World Bank-supported *Coastal Pollution Control of Water Supply Projects*. The reform proposals were passed by the council of ministers in 1998, and ratified in the parliament to be the infamous Law No. 221, dated 29 May 2000.

4.2.2. Main actors and their roles

Sub-national responsibilities

Law No. 221 restructured the MoEW to establish the administrative and institutional structure shown in **Figure 4.1**. With henceforth sole responsibility for national water policy, the MoEW is charged to: 1) Monitor, control, measure, and study water resources, and estimate water needs; 2) Monitor the quality of surface and groundwater and set quality standards; 3) Develop and update a national master plan for the allocation of potable and irrigation water resources; 4) develop a wastewater master plan; 5) Design and implement large water infrastructure projects; 6) Perform artificial recharge of groundwater aquifers and monitor extractions; 7) Develop legal framework and procedures to protect water resources from pollution and improve water quality; 8) Issue permits for water prospection and use of public water and property; 9) Conduct and update hydro-geological studies and research, and collect technical water data; 10) Monitor and regulate water establishments and other entities working in the water sector; 11) Enhance and monitor water establishment performance of according to indicators set in their business plans; 12) Set standards and regulations for studies and project execution, surface and groundwater exploitation and wastewater, and water quality monitoring; 13) Perform expropriation transactions for MoEW and water establishments; 14) Provide opinion on permits related to mines and quarries, and their impact on water resources; and 15) Ensure good public relations and provide relevant information related to water conservation.

Law No. 221 also regrouped the 22 existing water authorities to four regional water establishments and one authority shown in **Figure 4.1**: Beka'a, North Lebanon, Beirut and Mount Lebanon, and South Lebanon Water Establishment – as well as the Litani River Authority (LRA). Unlike the Water Establishments, the LRA is not region-specific, but holds the responsibility for hydraulics, dams, and rivers on a national level.

The responsibilities of the local authorities are as follows: 1) to design, implement, operate and maintain potable and irrigation distribution projects based on national master plan and resources allocated by MoEW; 2) to collect, treat and dispose of wastewater based on treatment and outfall sites approved by MoEW; 3) to propose water supply, irrigation and wastewater tariffs; and 4) to monitor water quality for distributed water supply and irrigation.

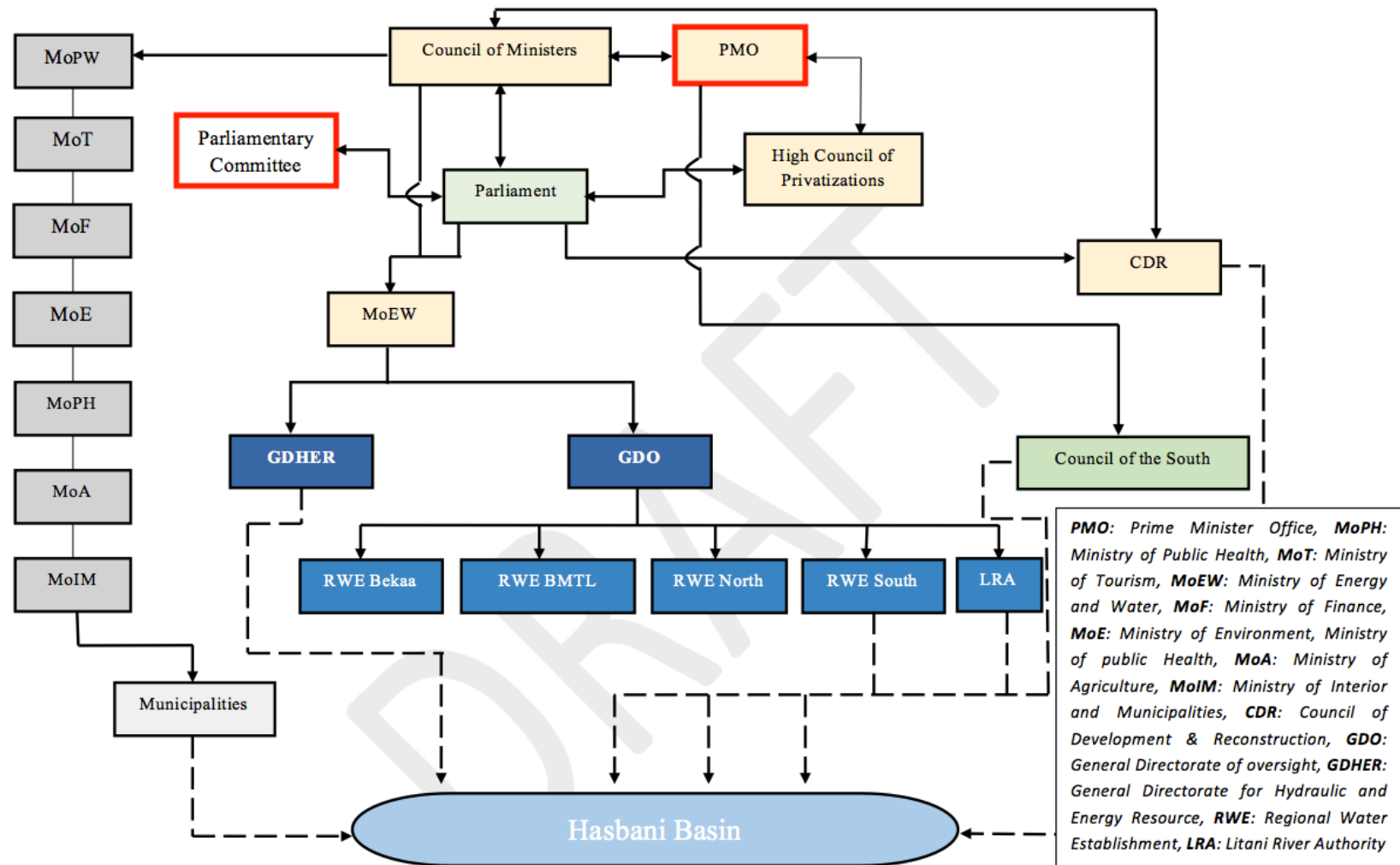
Responsibilities in southern Lebanon and the Hasbani Basin

The management structure shown in Figure 4.1 is evidently complex, particularly for the overlaps of decision-making and influence the different bodies have for both domestic and transboundary flows. For instance, transboundary water issues are discussed by the Parliamentary Committee, but decision-making responsibility lies with the Prime Minister's Office. Within the MoEW, the General Directorate of Hydraulic and Electrical Resources (GDHER) focuses on policy making and regulation, and is responsible for devising the National Water Resources Management strategy, in addition to large projects like dams – including those that have transboundary impacts, such as the proposed Ibl al Saqi dam on the Hasbani River.

The Regional Water Establishment (RWE)-South is responsible for the development of domestic water and wastewater infrastructure throughout southern Lebanon, including the Hasbani basin. The RWE-South is also responsible for implementation and maintenance of infrastructure such as rehabilitating the Wazzani pumping station (even if this was initiated by the Council of the South). The LRA also plays an important role in the Hasbani basin, as the body responsible for development and management of irrigation schemes, as well as measurement of river and spring discharges.

The Council of the South (under the Prime Minister's Office) is responsible for the development projects in the West Beka'a and the South, including those areas occupied by OSol until 2000. The Council is responsible for securing funding (whether from Lebanese government or external donors) and implementing an array of infrastructure projects, including building schools, paving roads, and drilling wells for domestic use, and domestic water and wastewater networks.

Figure 4.1 Institutional arrangement of water sector in Lebanon, in relation to the Hasbani River Basin. Boxes marked in red indicate the actors most influential in transboundary decision making. Single arrows denote a strictly hierarchical relationship; double arrows denote relationships that are more subject to negotiation. *Source:* modified from Zeitoun et al; 2012.



An actor with real influence in the water sector is the Council for Development and Reconstruction (CDR). The CDR has been and remains the key administrative body that binds different Ministries related to infrastructure development. The CDR is responsible for coordinating with donors and international agencies, as well as overseeing all tenders and contracts associated with funding obtained from external sources. This includes, for instance, the proposed Ibl el Saqi dam.

External support to the water sector

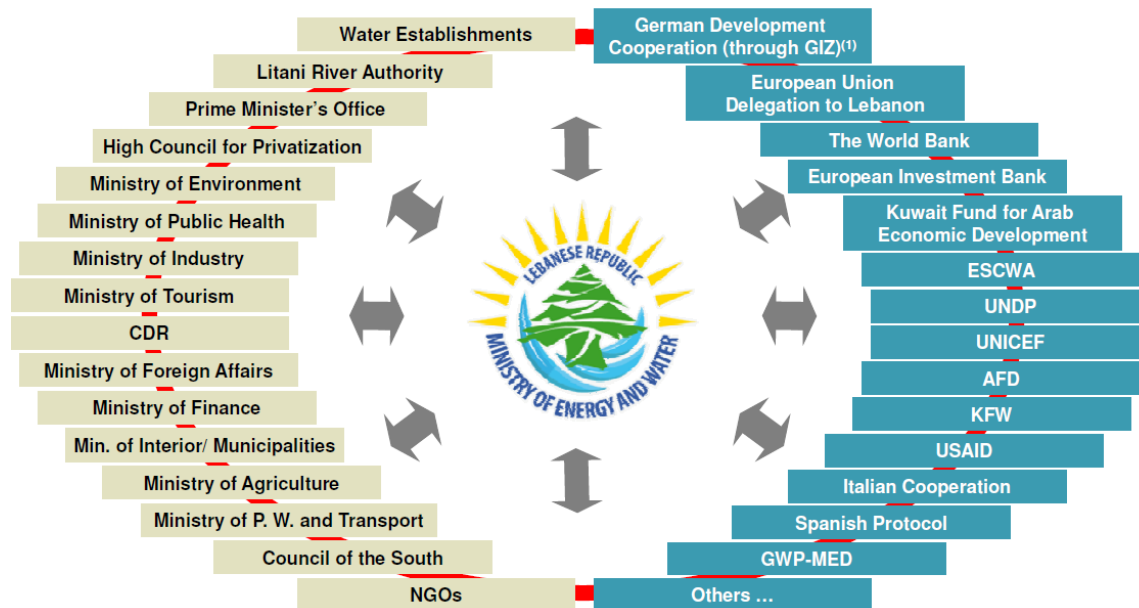
The complex management structure may reflect the very varied supporters of the Lebanese water sector – shown in **Figure 4.2**. These include the Arab Fund for Economic and Social Development, the European Investment Bank, the Islamic Development Bank, the World Bank, AFD (France), KfW/GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit – Germany), Italian Development Corporation, France, Germany, Italy, JICA (Japan), Kuwait Fund for Arab Economic Development, Abu Dhabi Fund for Development, USAID (US), Unicef and UNDP. Most external financial assistance is in the form of loans, while technical assistance is typically in the form of grants.

In the wake of the civil war, a large-scale reconstruction program called the National Emergency Rehabilitation Plan (NERP) was initiated with the aim of improving the country's water and wastewater infrastructure. The funds to repair the extensive damages (Zeitoun, *et al.* 2014) included grants from countries and agencies that normally provide only loans for infrastructure (such as GIZ and the World Bank). Most external assistance is channelled through the government, except for U.S. assistance, which is provided directly to consulting firms (e.g. Chemonics and DAI) working in cooperation with the government or NGOs. The United Nations also plays an important role in the Lebanese water sector, particularly through UNICEF and the United Nations Development Program (UNDP). More recently, the Government of Iran has invested in the sector, notably to assist the construction of the dam on the *Nahr Ibrahim*. All such external assistance is predictably resisted and orchestrated according to existing political fault lines.

4.2.3. Current and future water policies

The Lebanese water sector continues to face shortcomings both in terms of infrastructure and management. Inadequacies in the infrastructure can be classed on three levels, a) water production, given limited resources with suboptimal exploitation, coupled with significant demand growth; b) inefficient transmission and distribution lines, leading to high losses and interruptions in supply; and c) low coverage of wastewater networks and severe shortage in treatment efficiency.

Figure 4.2 Lebanese water sector National stakeholders, and international donors (MoEW 2010a).



Management shortcomings can be classed into five categories: i) Institutional: Incomplete implementation of reform law and weak interagency coordination; ii) Financial & commercial: Inefficient water supply and irrigation tariffs with low collection rates, and no wastewater tariff though increasing pollution and limiting conservation; iii) Legal & regulatory: Gaps in legal framework delaying private sector participation, water users associations, etc.; iv) Environmental concerns, e.g. climate change negatively impacting water resources; and v) Awareness and conservation, i.e. limited conservation activities and high loss percentages.

Due to the political situation and insufficient funding, the Government of Lebanon has in subsequent budgets extended the end of the 10-year Plan from 2010 to 2020. In an attempt to meet the infrastructure and management shortcomings shown in **Table 4.1**, the MoEW has in turn re-tooled the 10 year plan as a short (2010-2012), medium (2012-2015), and long-term plan (2020). Of note in the 10-year Plan is the absence of transboundary-specific policy.

Table 4.1 Proposed activities under the 10-year plan of Lebanon Ministry of Environment and Water (to 2020). Note the Plan does not make reference to transboundary water. *Source:* (MoEW 2010b).

<i>Infrastructure</i>	<i>Management</i>
<i>Surface storage:</i> Target 670 MCM /y to add to available renewable freshwater resources, primarily for drinking purposes (estimated USD2B). Includes the Ibl El Saki dam (50 MCM capacity and estimated capital investment of USD300M).	<i>Institutional re-structuring:</i> 5-year USD14M to perform all priority actions required to complete the restructuring of the five water establishments (WE), to improve on the operating model between WEs and MoEW, to reflect more on irrigation and wastewater responsibilities, strategic planning, water demand management, etc.. Restructuring of MoEW's organization in line with the requirements of Law No. 221 and 247 to focus on policy making and regulation. It also seeks clarification of the responsibilities and coordination among various players in the water sector, and is to involve stakeholder participation in the design and management of irrigation projects according to best practices.
<i>Artificial groundwater recharge:</i> This will increase the water supply by 200MCM/y, through drilling deep wells , with pilot areas near Beirut, Tripoli and Ba'albeck (though not in the Hasbani catchment). (EstimatedUSD130M till the end of the plan (2020)).	<i>Water supply tariff:</i> A new consumption-based tariff which includes fixed and volumetric charges for domestic water and wastewater supply, plus the design and implementation of alternative irrigation tariff structures based on the specificities of existing and anticipated irrigation schemes (e.g. to the new Litani irrigation Canal 800 project). (estimated USD7M to end 2015).
<i>Optimizing of surface water resources:</i> USD100M is allocated for superficial improvement of surface water spring catchment, towards an increase of 10-15% of initial flow during low seasons (for an additional 68 MCM by year 2020).	<i>Financial and commercial:</i> The goal is to strengthen the legal framework in order to improve the performance of the delivery of water and wastewater services and support the implementation of the proposed strategic initiatives. This will be through production of the final version of the draft Water Code, plus its implementation (estimated USD4M).
<i>Water supply transmission and distribution works</i> to save over 0.2 MCM/y in losses, through full and partial replacement of 2,800 km of transmission lines, and 9,600km of distribution lines, plus 561 storage tanks. This includes the construction of Awli-Beirut and Canal 800 in the Litani basin, including conveyors and related transmission system and equipment	<i>Water conservation and awareness campaign:</i> Conservation initiative and campaigns for domestic, industrial and irrigation demand. This includes installation of conservation and efficiency kits, complete retrofit of large water consumers (industrial, commercial). Adoption of high efficiency on-farm irrigation techniques, e.g., drip, irrigation, sprinkler irrigation, overhead irrigation where applicable, coordination with Ministry of Agriculture for the adoption towards lower water-consuming crops, plus public outreach, awareness and farmer education programs, and farm audits and optimization according to local conditions.

Irrigation rehabilitation and expansion: Rehabilitation and replacement of existing over gauged irrigation system network and implementation of additional 15, 000 ha of irrigation schemes until 2015 and 15, 000 ha between 2016 and 2020. The overall cost is USD577M.	<i>Environmental concerns:</i> Development of flood mitigation arrangements, improvement of wastewater quality, evaluation of environment consequences of the proposed strategic environment assessment, and improvement of climate change knowledge – particularly its implication on the vulnerability of the water sector (estimated USD 18M by 2020).
<i>Wastewater collection and treatment:</i> The goal is collection and treatment to at least preliminary level of 80% by 2010 and 95% by 2020, pre-treatment of all industrial wastewater by 2020, reuse of 20% of treated wastewater by 2015, and 50% by 2020, retreatment and reuse of all inland wastewater by 2020 and secondary treatment by 2020 of coastal wastewater where reuse is economically justified (estimate USD 3.1B).	

4.3. Water Resources Audit

This section collects and presents the most recent biophysical data of processes affecting the water cycle. The focus is on Lebanon, but extends throughout the UJR Basin where possible. The review of climate data is followed by a synthesis of the biophysical aspects of surface water and groundwater resources.

A note on the quality of data

Competent water resources management obliges a solid scientific understanding of the resource, based on accurate, sustained and reliable observation. The south of Lebanon in particular lacks such data, due to low levels of technical expertise, decades of internal instability, OSol invasions (e.g. 2006), and the 1978 – 2000 occupation. Many of the pre-invasion monitoring and gauging stations were destroyed by the OSol “Defence” Forces during the occupation, or fell into disrepair following lack of maintenance (see **Figure 4.4**). There are also *gaps* in data, notably on water use and water quality – both of which are central to any estimate of Lebanon’s basic right to an equitable and reasonable share. The reader should thus be aware that some of the data presented here may be fragmented, out-dated, or are very rough estimates. Where the data is particularly unreliable, additional notes have been made in the text.

4.3.1. Climatic conditions (rainfall, snowmelt, floods)

The lack of reliable data is evident through the national-level hydrological data shown in **Table 4.2**, which shows the extremes in precipitation and river flow that exist in Lebanon, between wet and dry years.

The typical Mediterranean climate has rain falling for 80 to 90 days between September to April. In Lebanon 90% of the total annual precipitation falls erratically in the winter months – in particular between November and March (MSL 1977; MOE/UNDP/ECODIT 2011). River flows peak during winter or spring depending on the elevation of their sources (see e.g. photos of Figure 4.12). The higher altitudes are greatly affected by snowmelt, from snow which has accumulated between December and February at altitudes above 1500m ASL. As such, the peak demand for water coincides with the driest season – during the summer months.

Climate and precipitation – a highly variable Hasbani micro-climate

Quite apart from the well-known dry summer seasons, droughts are expected to occur earlier in the season (RoL - MoE 2011). The Hadley HadCM2/HHGGax model predicts an average of 1.6°C increase in temperature by the year 2020, and an equivalent average of about 3% less precipitation (Khawlie 2003), while Lebanon's 2nd Communication to the UNFCCC relate a 2°C increase in temperature to a 16% reduction in "total volume of water resources" (RoL - MoE 2011: xv). Some local researchers project a higher value, based on shorter period projections. Such projections throw into doubt Lebanon's positive water balance, with the business-as-usual scenario showing an annual deficit of up to 800 MCM (Khawlie 2002).

Lebanon is divided into four main climatic regions from the coast inwards, dominated by the North-South alignment of the main mountain ranges (the Lebanon, and Anti-Lebanon ranges). The coastal stretch of narrow plains (from 200 to 400m ASL) receives an average 700mm rain annually. The Mount Lebanon region (up to 2080m ASL) receives between 800-1400mm of rain, with snow on elevated areas – as shown in **Figure 4.3**. The inner Beka'a plain (averaging about 900m ASL) receives up to 700mm in the south but only 250mm in the north (due to barrier action of the high Mount Lebanon peaks in the north). The Anti-Lebanon region further inland – which comprises most of the Hasbani and Upper Jordan River watershed (and whose highest peak is in Jabel el Sheikh / Hermon at 2814m) receives a very wide range of precipitation – between 300mm and 1100m.

However, the mountainous topography creates local 'micro-climates' that can deviate significantly from the general characteristics of the climate. For instance, the coastal Mount Lebanon acts as a barrier to most climatic forces from the western Mediterranean, of inland areas to the East. This barrier is subdued in the south of the country, down to approximately 600m ASL, making the sea influence much deeper inland there than is the case to the north. The Hasbani watershed gets its own climatic character from the co-incidence of this sea influence and the highest mountain peaks (particularly from Ibl el Saqi in the west to Hermon in the east).

Table 4.2 Comparison of research on Lebanese water-climate factors. *Compiled by authors from various sources.*

Description		Plassard (1971)	UNDP (1970)	Jaber (1995)	Geadah (2002)	World Bank (2003)	MoEW, 2011	MED EUWI (2009)	Khawlie (2002)
Precipitation (mm)		-	940	8600	-	820		800 - 1000	-
Evapotranspiration (mm)		-	-	4300	-	380		500 - 600	-
Precipitation (Mm³)		8600	9800		8600	8600	8600	8320 – 10400	4,500 - 9000
Evapotranspiration (Mm³)		4300	-		4300	400	4500	4300-6240	2250 - 4500
Total flow of the major streams (Mm³)		1800	4300		1774	3800	1425 (internal)	3673-4800	2570 (coastal) 1304 (internal)
Surface flow to neighboring countries (Mm³)		160 (Hasb.)	680	510*	670		700	300 - 670	415 Orontes
				160 (Hasbani)					95 El kabir
									160 Hasbani
Groundwater flow to neighboring countries (Mm³)		150 (Palestine)	-	150 (Palestine)	300		300	310	to Syria 175 to Palestine 125
Flow of submarine sources (Mm³)		880	711	880**	800	700	400	385 - 1000	270
Total resources (Mm³)	Avg. year						4100	2600 - 4800	3400
	Dry year						-	1400 - 2200	
Exploitable resources (Mm³)	Surf. water	1800					2200	1500	3874
	G.water	800		400			500	700 - 1165	1156
	total				2000		2700	1400 - 2200	2000

Wastewater re-use and desalination not included. *Surface water to Syria (Assi & El Kebir);** Unexploited water (into ground & sea). See also MoEW (2011: Table 3.5).

Figure 4.3 Photo showing the Hasbani micro-climate, with snow still present on Jebel el Sheikh (Mt. Hermon) in the background, and groundcover of Hasbani valley in foreground (June 2013). *Photo by C. Abdallah.*



As **Figure 4.4** shows, the interior Hasbani micro climatic zone receives in the range of 600 to 1100 mm precipitation per year. The average 940mm/year means a cumulative annual volume of rainfall in the basin of 565 MCM. Here again, however, the accuracy of figures should be questioned. Prior to 1970 (and indicated as 'BCW' (Before Civil War) on **Figure 4.4**) there was one meteorological gauging station for every 73 square kilometres. In 2009, the Lebanese Agriculture Research Institute (LARI) constructed the stations indicated as 'ACW' (After Civil War). This precipitation data is shown in Tables D.1 and D.2 of Annex D.

The Hasbani micro-climate is also characterised by extremes in temperature: from summer heat (16 to 35 degrees Celsius, depending on elevation) and winter cold (from -3 to +12 degrees Celsius). Certainly, the temperature variation depends on elevation, with a decrease of 0.6 to 1 deg C for every 100m elevation. Other aspects are of equal importance, however, including humidity, the influence of the Mediterranean, and type, nature and density of green cover. The Rachaya meteorological station, for instance, shows -0.3 deg C and +28.9 deg C as 30-year averages of minimum temperature in January and maximum temperature in July, respectively, while the relative atmospheric humidity scores an annual average of 63%. An example of the variability (for Kfar Qouq) is provided in Figure 4.5.

Figure 4.4 The Hasbani micro-climatic zone, showing precipitation patterns, and distribution of meteorological stations *before* [BCW] and *after* the civil war [ACW]; by c. Abdallah.

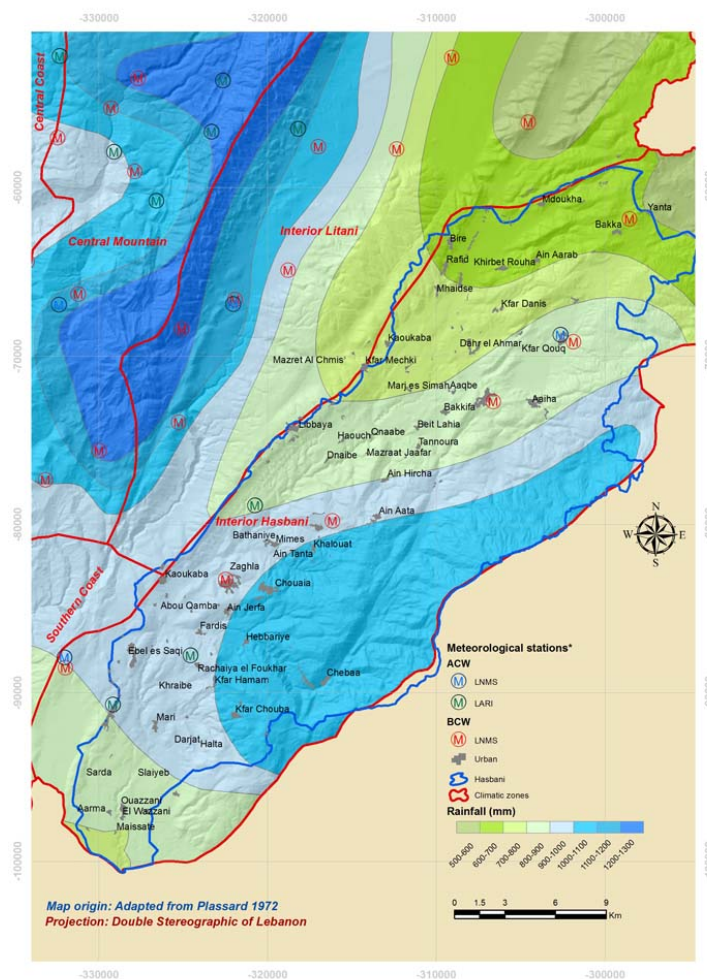
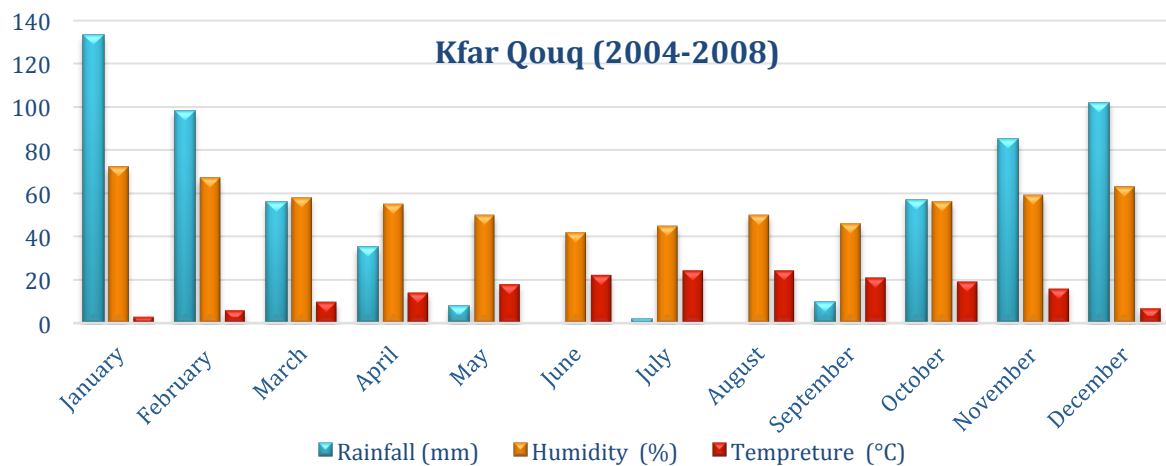


Figure 4.5 Monthly average measurements of precipitation, humidity, and temperature at Kfar Qouq meteorological station in the Hasbani region. *Compiled from AFIAL database.*

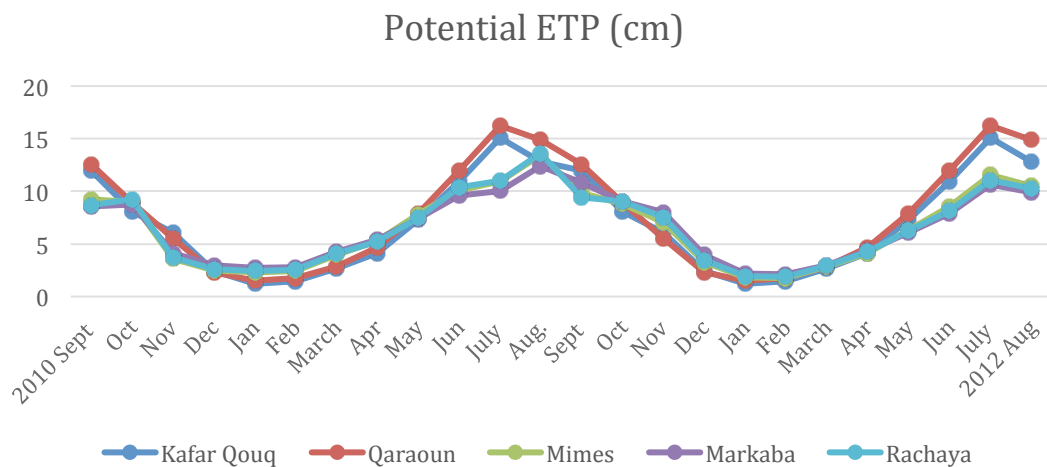


Evapotranspiration

There are no direct measurements of evapotranspiration in the Hasbani basin, or indeed throughout Lebanon, though studies have estimated that 45 to 55% of the amount of the rainfall throughout Lebanon evapotranspires (Jaber 1995; FAO 2001; Khawlie 2002; see also MoEW 2010a). The annual potential evaporation for Mount Hermon has been estimated at 1900 mm, and 1000 to 1200 mm when accounting for altitude (Rimmer and Salingar 2006). Observed data reported by Abou Khaled et al., (1972) show high potential evapotranspiration values during the summer, with maximum values in July.

Where records do exist, the Thornwaite method (which is a function primarily of monthly temperature and heat index) has been used to calculate the potential evapotranspiration inside and around the basin where records exist. These estimates – as shown in Figure 4.6 – reveal a range of 760 mm and 910 mm for the Rachaya (1235 m ASL) and Qaroun (843 m ASL) stations.⁴⁶

Figure 4.6 Calculated monthly average potential evapotranspiration in and near Hasbani basin (2010-2012) (Thornwaite method). By C. Abdallah.



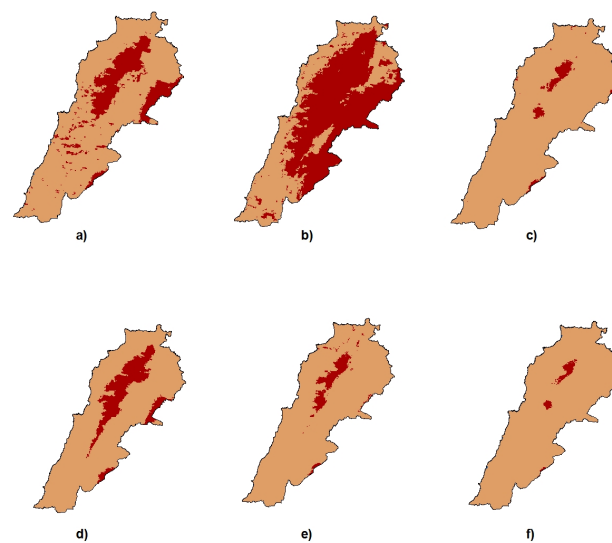
Snow and snowmelt

While estimates of changing snowmelt have been made at the national level (see e.g. Shaban 2008; RoL – MoE 2011), there have been no estimates of the influence of snow-melt on river discharge or groundwater replenishment in the Upper Jordan River basin. This section provides the first estimate of the influence of such snow falling above 1500m ASL from December to March.

⁴⁶ Comair et al (2012: Fig 2) provide estimates throughout the Jordan River Basin, though the global resolution provided by MODIS and TRMM (without comparing with ground control stations) is more coarse.

GIS tools were used to analyse and model the MOD10A2 snow modules from MODIS satellite images (resolution 500m) from 2001 to 2012 – as shown in **Figure 4.7**. The analysis has estimated a snow water equivalent varying from 144 MCM/y in dry seasons to 163 MCM/y⁴⁷ in wet seasons. The bulk of this water percolates through the karstic geology to infiltrate the aquifers, and re-appears on the surface as springs (e.g. the Liddan Spring, as we will see in the following section).

Figure 4.7 Maximum eight day snow coverage extent (shown in red) from MODIS satellite images (MOD10A2) of 2003 over Lebanon where a) day 9, b) day 57, c) day 73, d) day 89, e) day 97 and f) day 113. *Source: C. Abdallah.*



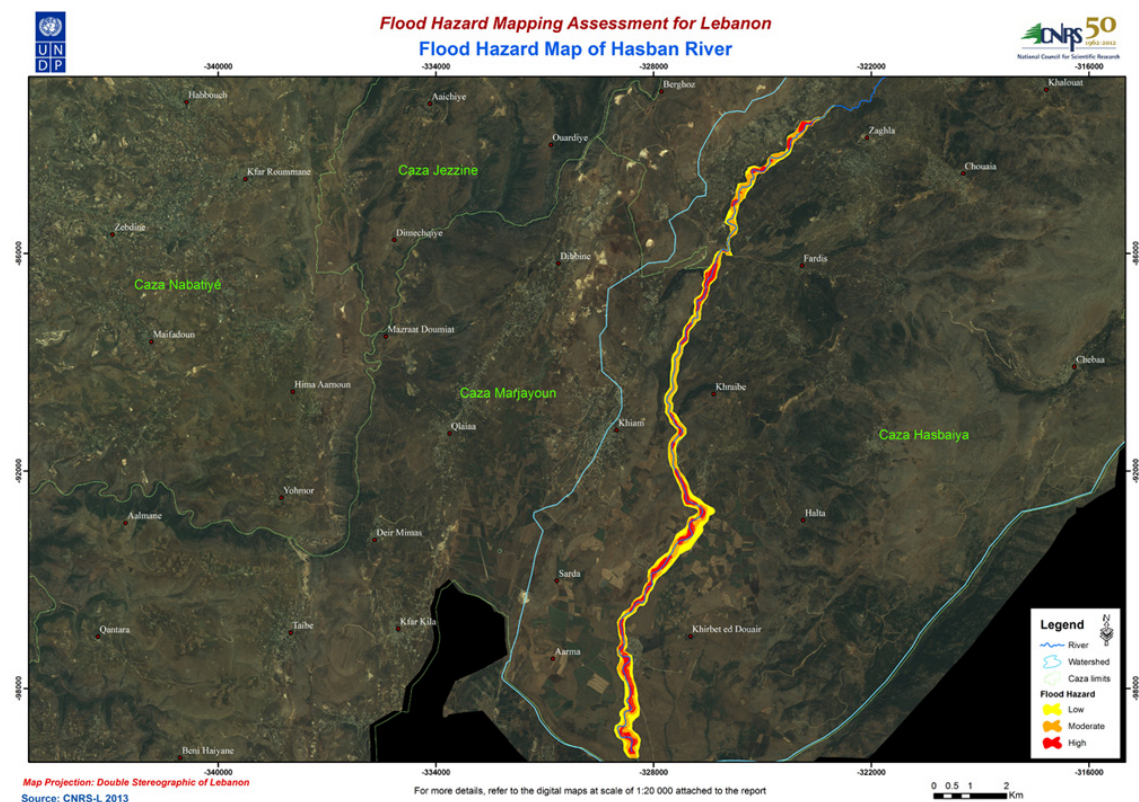
Floods

Data for flood flows derives from documents found in local church records (dating as far back as the 1600s) and archived microfilms of the *An-Nahar* and *As-Safir* newspapers from year 1971 to 2012 (see Figure D.1 in Annex D). These have been reviewed to suggest increasing frequency of flooding disasters throughout Lebanon, though it is difficult to tell without a reliable baseline. Floods at the Hasbani have long been known to destroy roads and agricultural lands, causing landslides, interrupting livestock raising, and isolating communities (especially the floods of 2003, for example).

⁴⁷ This first estimate of snow melt is very much dependent on rates chosen for evapotranspiration, which are not based on methodological or comprehensive observation. Rates used in other models (for example in Comair et al (2012)) are considerably higher.

A very recent and previously unpublished Flood Hazard Map Assessment by the Lebanese National Council of Scientific Research (Remote Sensing Center (LCNRS-RS)) has modelled all rivers in Lebanon for 10, 20, 50, 100 year return periods (LCNRS, 2013). The model of the Hasbani shown in Figure 4.8 reflects the relatively narrow gorge the river runs through, though the damages (shown in Figure 4.9) can still be substantial. The peak flows for a 10-year flood are estimated at 130 m³/s, at 194 m³/s for a 50-year flood, and 220 m³/s for a 100-year flood⁴⁸ (LCNRS, 2013).

Figure 4.8 Flood Hazard Map of the lower Hasbani River (Abdallah, *et al.* 2013).



⁴⁸ These figures match closely with OSol gauging data at Ma'ayan Baruch and Sneir stations, which show 143, 185, 202, and 227 m³/s (for 10, 20, 50, 100 year floods, respectively) – from HSI Yearbooks of 1966, 1967, 2002, 2003, and 2009. These correspond to roughly 4,500 MCM/y to 7,150 MCM/y, though the flood pulses cannot be meaningfully compared with base or average river flow.

Figure 4.9 Flood damages on the Hasbani River, 8 January 2013. **Left:** the al Afrah resort, just downstream of Wazzani Springs; **Right:** damaged Hasbaya road just south of Hasbaya. Photos by C. Abdallah.



4.3.2. Surface Water

This section presents the latest information about surface water flows, building upon Section 3 of the *Upper Jordan River Hydropolitical Baseline* (Zeitoun, *et al.* 2012). It does not cover water quality, for which data remains lacking.

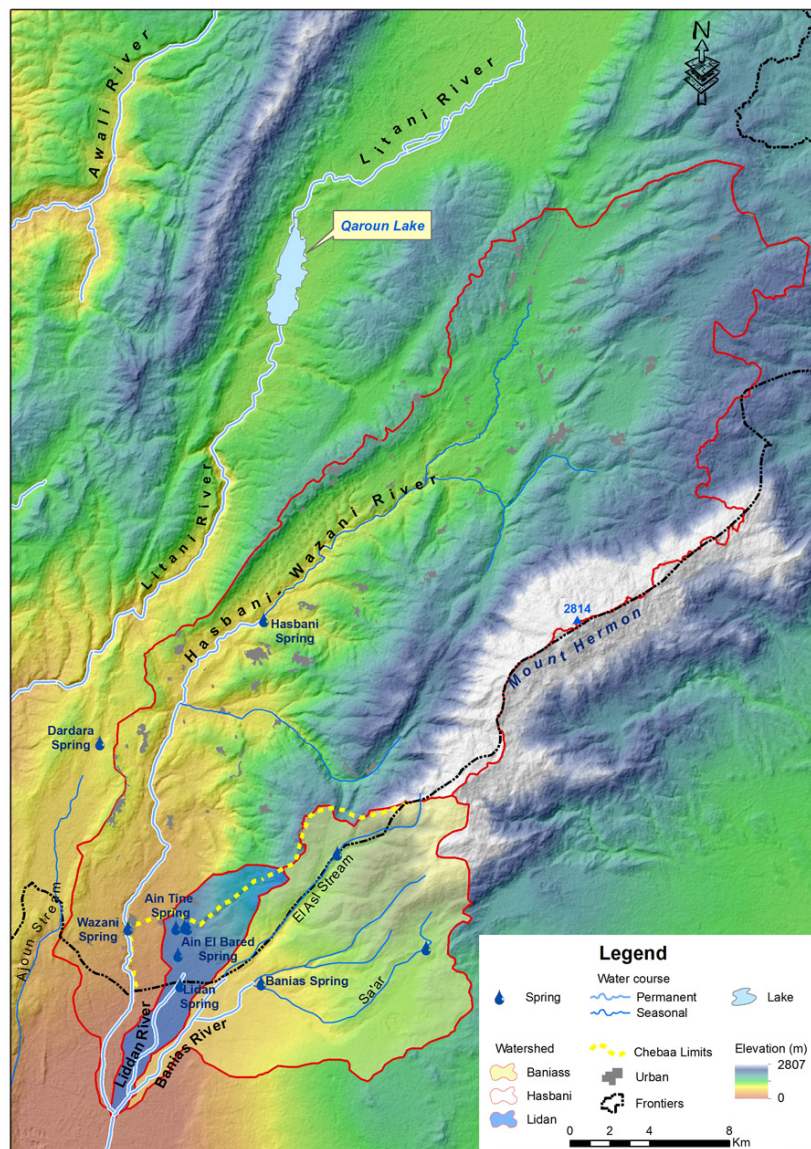
Rivers

As **Figure 4.10** shows, the Upper Jordan River Basin is part of the Lake of Tiberias Basin, and composed of three main sub-basins: the Hasbani River Basin; the Liddan River Basin; and the Baniyas River Basin. It is also fed by the much smaller Ajoun Stream (Meri plain), through a series of streams that drain the Marjayoun and Bourj el Mlouk heights from west to east, and the Jabal Ard al Gharbie heights, near Khiam village, from east to west (Bou Jaoude 2013).

With a surface area of 670 km² (including the Marj el Khowkh area⁴⁹) (Abdallah, *et al.* 2006), the **Hasbani River Basin** crosses the OSol border at its southern edge, and follows the border with Syria along the crest of Mt Hermon (Jebel el Sheik) on its eastern side. The Hasbani basin borders on both the Baniyas and Liddan basins along (though not entirely aligned with) the provisional blue line of the occupied Cheba'a Farms. It borders the Litani Basin on the west, and the Marj el Khowkh plain in the southwest.

⁴⁹ The Marj al Khowkh plain is often considered part of the Hasbani Basin, and included in surface area estimates. Klein (1998) estimates the basin size without the plain at 629km². Rain falling on the plain in Lebanon in fact generates the Ajoun Stream, which joins the Hasbani just south of the border in the OSol.

Figure 4.10 Surface water flows of the Upper Jordan River, showing the Hasbani, Liddan, and Banias Rivers, Ayoun Stream, and related springs. *Source: C. Abdallah.*



The Hasbani originates at the Hasbani Springs, near the town of Hasbaya. The springs are fed from groundwater which fell as rain or snow probably to the north or east within or outside of the basin. From Hasbaya, the Hasbani River runs towards the southern border through Ibl el Saqi and Rachaya, at which point much of the river seems to infiltrate into the aquifer – to the extent that the river bed here is dry during the summer months (see Figure 4.12). The river flows again shortly thereafter, and increases substantially with the flow of the river-side Wazzani Springs near the town of Ghajar.

The larger river then forms the current line of separation between Lebanon and the OSol-occupied Lebanese Cheba'a Farms for roughly three kilometres, to join the Banias and Liddan at the confluence of the Upper Jordan in OSol. As **Figure 4.10** shows, the Hasbani River also has three tributaries within Lebanon – the Nahr Abou

Djaji; Nahr el Fardis and Nahr Sreid. There are furthermore several minor seasonal rivulets contributing to the tributaries, as several springs and snow-melt from Hermon-Hasbaya area and Beka'a el-Gharbi.

The **Banias River Basin** covers about 150 km² on the southern flank of Mt Hermon. It is formed by a number of sub-catchments feeding seasonal streams and springs, of which the Banias is by far the most important. The al-'Asl Stream (also known as Wadi al 'Asl, or Sion) is the Banias' most northern seasonal source, and fed by a spring at 1,000m above sea level (Hartmann 2008). The north-western flank of the wadi is the hillside of Mount Hermon – a large part of which is located within the Cheba'a Farms.

The **Liddan River Basin** is the smallest of the three main basins, covering about 24km² (Klein 1998). The river is fed primarily by the Liddan ('Dan') Springs, which are located immediately south of the 1949 armistice line within OSol. As discussed in Zeitoun et al (2012), the strong discharge of the Liddan Spring – which is by far the main source of the river – is due to the fact that it is recharged essentially fully from groundwater originating inside and outside of the basin, in Syria and Lebanon.

Figure 4.11 shows both the significant differences in flow of each river, as well as their high variability. From Zeitoun et al. (2012: Fig 3.6), we note that the average flow measured just upstream of the confluence of the three main Upper Jordan River tributaries during the period 1949-2004 is 241 MCM/y for the Liddan, 123 MCM/y for the Hasbani, and 114 MCM/y for the Banias. The average flow of the Upper Jordan River at the confluence of the three rivers is thus taken as approximately **480 MCM/y**.

Figure 4.11 a) Mean annual discharge, and b) specific mean annual discharge of the Hasbani, Banias, and Dan Rivers, from 1944 – 2008 (ESCWA-BGR 2012: Fig 6). The figures shown in m³/s reflect closely the estimates of 241, 123, and 114 MCM/y for the Liddan, Hasbani, and Banias, respectively (see Zeitoun, *et al.* 2012). Note the indicated size of the basin differs from text of this study.

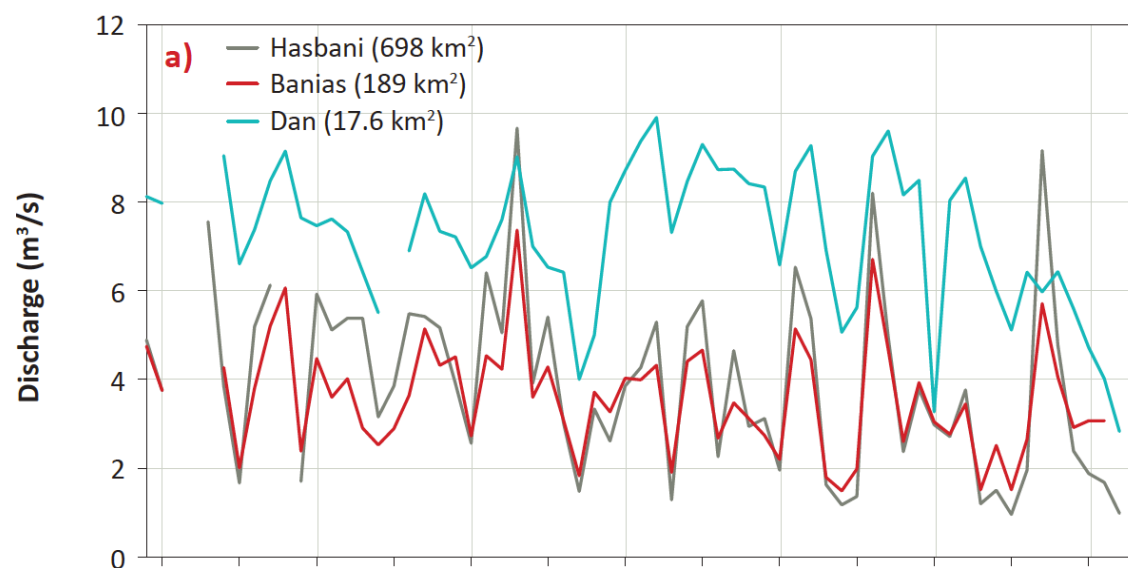


Figure 4.12 Photos of the Hasbani basin in 2013, from upstream to downstream (from top and from left). **A.** Dry river course downstream near Rachaya (West Beka'a), May 2013; **B.** Hasbani Springs at full flow during floods in February; **C.** Flow at Naba'a el Wazzani resort, just downstream of the Wazzani Springs, 3 March; **D.** Fardiss tributary on right joining Hasbani mainstream, February; **E.** Hasbani River flowing towards south (towards the right) near Ibl el Saqi, February. *Photos by C. Abadallah.*



A



B



C



D



E

Figure 4.13 The Ajoun stream flowing south within Lebanon, with OSol in background, in 2013 (left to right): February, March, June, August.



February



March



June



August

4.3.3. Groundwater and geology – The aquifer system

Reliable data on groundwater resources is even more scarce than it is for surface water. Readers are directed to the review of basic geology of the area provided in Section 3.3 of the *Hydropolitical Baseline* study. This section deepens the review, to explain the provenance and dynamics of groundwater, and surface water-groundwater interaction throughout the aquifer system. It does not cover water quality, for which data remains lacking.

The aquifer system associated with the Upper Jordan River is very diverse, as would be expected in a mountainous area with 2.5km difference in elevation over only 20km (from Mount Hermon at 2814m ASL to 300m at Majidiye). Hundreds of thousands of years of tectonic movement have resulted in multiple overlaid aquifers and sub-aquifers, an abundance of fractures, very different permeability and infiltration rates, and numerous aquicludes inter-fingering with aquifers. The very varied surface landforms and drainage characteristics combine with these sub-surface features to characterise the physical water availability in the area.

Basic geology

As can be seen in **Figure 4.15**, all the major geological elements within the Hasbani Basin (morphology, formations distribution, structures, and orientations) follow a roughly north-south orientation. The steep slopes, flat plains, and rugged wadis reveal Jurassic to Quaternary formations of varying lithologies. This wide spectrum of features greatly influences the rivers' morphology (river structure) and is due primarily to the tectonics, with ongoing uplifts (pushing Hermon's peak yet higher), and fracturing due to several large active faults. A second main factor of the structure of the rivers is the varied rock formations, which have very different resistance to erosion (Jurassic 52%, Cretaceous 30%, Palaeogene 9%, Neogene 6%, with Quaternary deposits along valleys and depressions). A lesser factor explaining the varying morphology is the continuous flow and erosion of water, both on the surface and sub-surface.

Figure 4.14 Aquifers in the Upper Jordan River Basin (UNDP 1970). Compare with Figure 4.15, below.

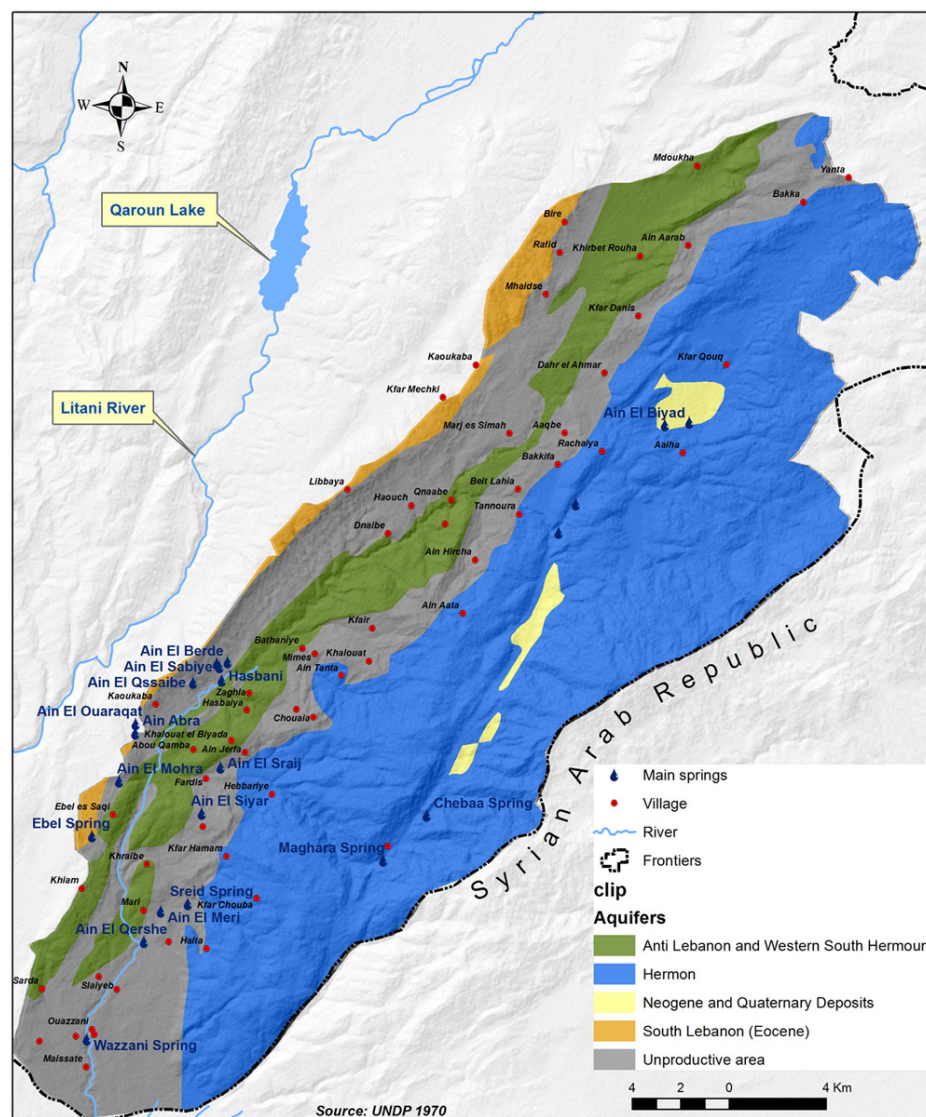
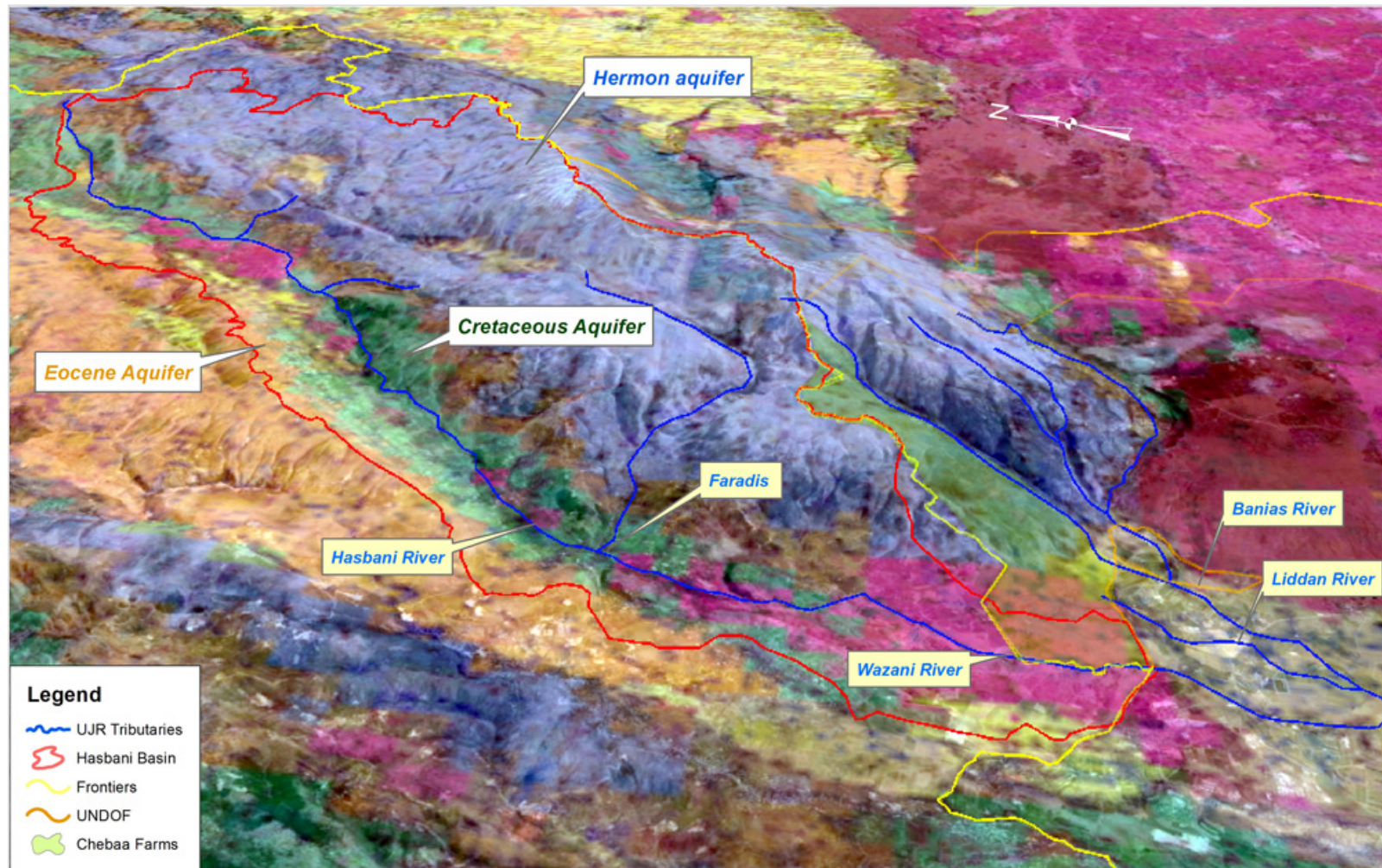


Figure 4.15 Rock formation, morphology, river basins and aquifers in the northern parts of the Upper Jordan River Basin. Note the orientation of the faults in a roughly North-North-east direction, reflecting the plate tectonics. The figure is intended to show both the links between surface water and groundwater (covered in the UNWC), and the “aquifer system” (as defined in the DAA). *Source: C. Abdallah.*



Geomorphology

The rock structures that comprise the aquifer system under the Upper Jordan River have experienced several evolutionary phases during the Tertiary and Quaternary ages. Geomorphologically, they can be subdivided into four sections: the elevated areas, the gentle slopes, the lower slopes and the basaltic plain.

The elevated areas (defined as those situated above 1500 m ASL) make up 33% of the Hasbani Basin, and are characterized by steep slopes (greater than 60% gradient), interspersed with localised depressions and abundant Karstic features (Sinkholes, lapies, dolines and poljie). The gentle slopes (from 900 to 1500 m ASL) occupy 42% of the Hasbani Basin, and are where the bulk of villages are found. The slopes are typically dominant rolling topography (with 8 to 30% gradients), and a number of different rock types: limestone, marly limestone, sandstones, marls and clays belonging to the Cretaceous and Palaeogene deposits. The lower slopes (from 500 to 900 m ASL) comprise 19% of the basin, and are much less steep – with 0 to 5% gradients. These are composed primarily of limestone, marls and basalt rocks. The plain (elevations below 500 m ASL) constitute the southern part of the basin – around the Wazzani Springs, up to Sarrada - Ain Aarab –Darjat. These are underlain by basalts of the Pliocene and occupies an area of 7%, and reach to an elevation of about 160m at the very southern border of the country.

The importance of the north-south orientations upon water movement and availability

A quick scan of Figure 4.15 reveals four major distinctive natural features with clear 'orientations' (also referred to as 'natural attitude'). Each of these serves to interpret the major hydrological character of the study area, allowing greater interpretation of the surface and sub-surface water regimes:

- *The trend of the tectonic elements.* The general tectonics of the region and its evolutionary geology have resulted in four huge masses of aquifer geological formations (the Jurassic in Mount Hermon and southern tail of Mount Lebanon, the Cenomanian lying parallel at the base of Mount Hermon, and the Eocene lying in the middle) to form a 'funnel' that is wider in the northern elevated areas than in the lower southern areas. This structure contributes considerable water to the area of study, particularly in the sub-surface.
- *The trend/distribution and lithologies of the different geological formations.* The uplifting, fracturing and moving masses of the tectonic activity has further resulted in availing major and secondary fracture systems that are crucial in water transmission through large areas, as well as locally (both north-south and east-west). The activity also determined the distribution of different masses of permeable and impermeable formations that explains the many sources and springs scattered throughout the area.

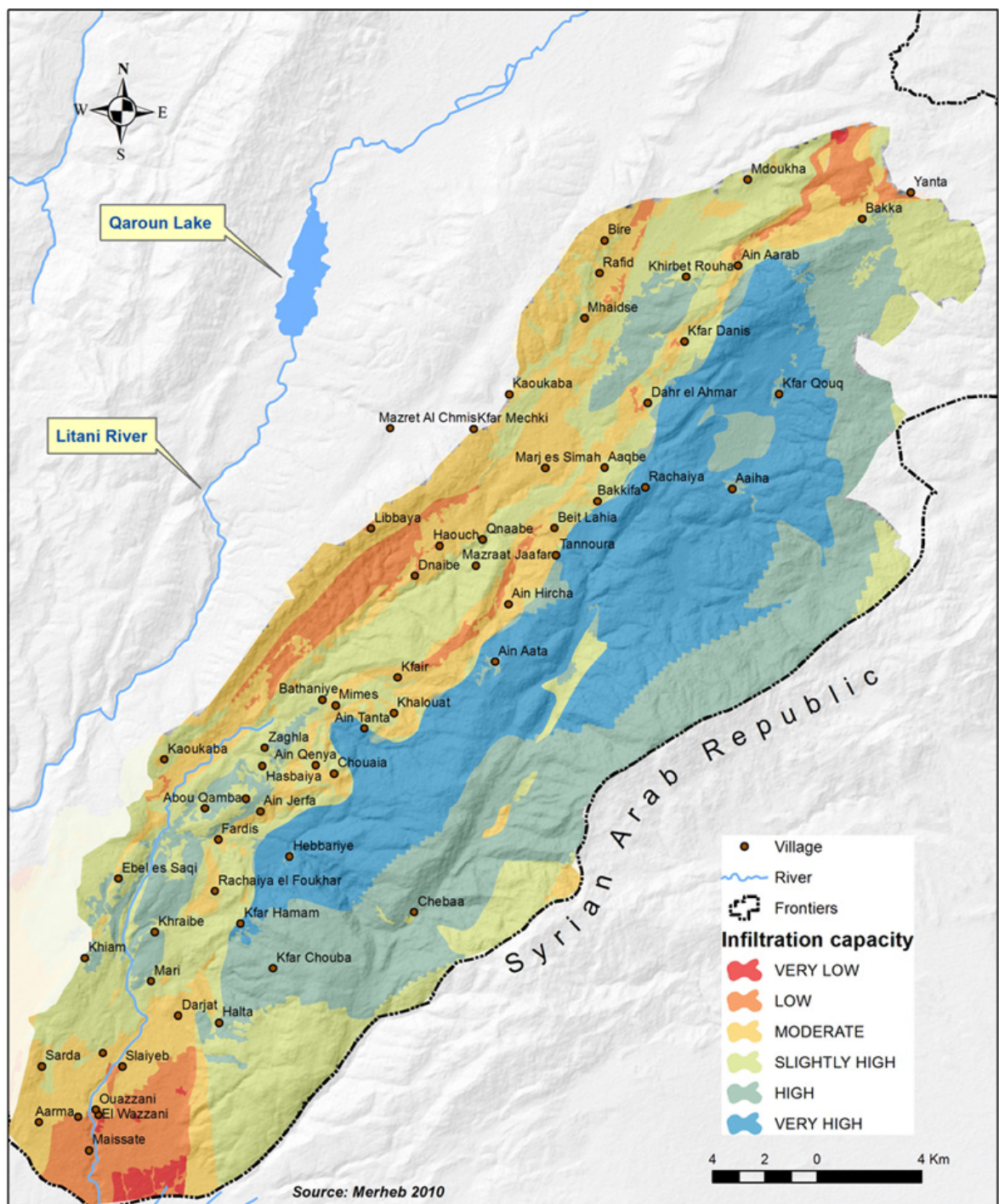
- *Morphological/drainage control.* A further feature relevant to water movement is the elevated topographic mass receiving considerable snow and rain on Mount Hermon and its western slopes during winter and spring. With the majority of infiltration occurring on the more fractured Western (i.e. Lebanese) flanks, we may note that the majority of drainage lines are again north-south or east-west, thus contributing to the reserve of water in the study region. The Hasbani River is the major North-South channel for surface water, of course, as are Cretaceous and Eocene aquifers for groundwater.
- *Historical geological evolution (internal and external)* Similarly, surficial processes (water and snow, heat and cold) acting on the varied lithologies of the mother rock produce different types of soil cover with differential water retention. This reflects the active geological evolution in the area that acted both internally (uplift, fracturing, volcanism, displacements) and externally (drainage, karst, soil, mass movements) to form the structure currently driving hydrology, hydro-geology – and the water conflict.

Infiltration capacity⁵⁰

Figure 4.16 shows that the infiltration capacity of the surface terrain varies considerably, from very high to low. Very high infiltration occurs over the highly karstified and fractured Jurassic formations over moderate elevations, while the high rate of infiltration is taking place over the highest elevations of the less karstic Jurassic – both of which occur along the length of the eastern stretch of the basin at Jabel el Sheikh. A slightly higher rate is found over the other aquifers, i.e. Cenomanian and Eocene, while the moderate infiltration over the other Cretaceous aquifer is still greater than the low and very low infiltration occur over the volcanic deposits and marly-clayey deposits. This explains in part the relatively large contribution of snowmelt to the discharge of springs (discussed in Section 4.3.1).

⁵⁰ Infiltration capacity is the maximum rate at which soils and rocks can absorb rainfall. The infiltration capacity tends to decrease as the soil moisture content of the surface layers increases. That depends upon such factors as mineralogy, grain size (clayey, organic matter, sandy, loamy, etc.) and vegetation cover. The rock surface infiltration depends also on several parameters which are the densities of faults and lineaments, drainage lines, lithological facies, karstic domain, and landcover/landuse.

Figure 4.16 Infiltration capacity map of Hasbani watershed (Merheb, 2010).



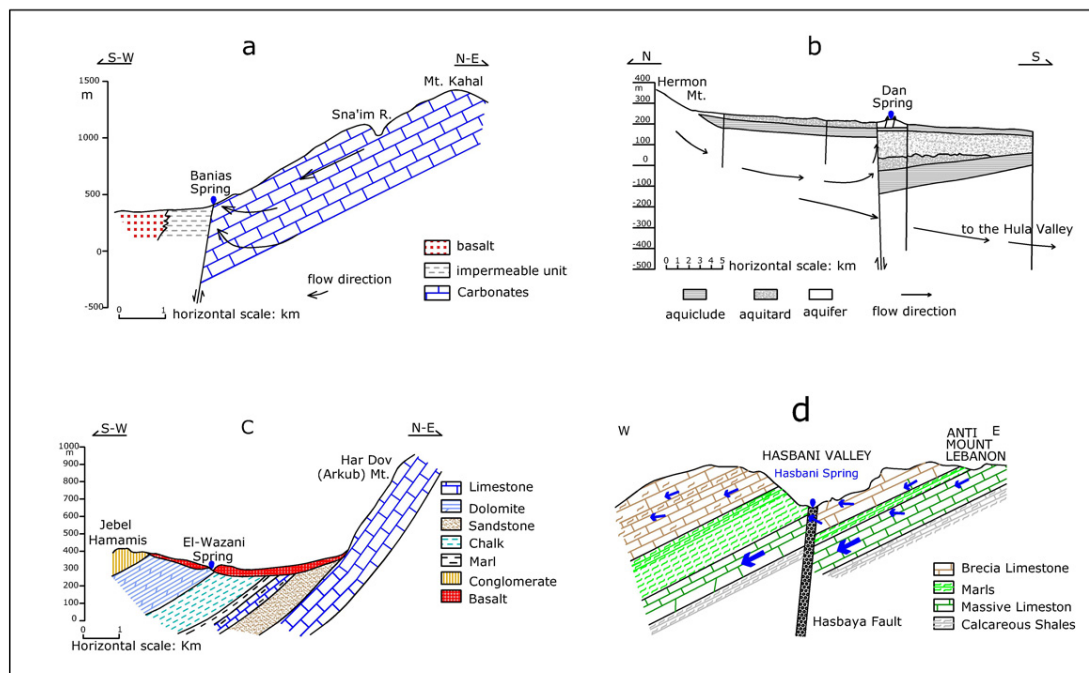
The values of storage and transmissivity of the various rock masses are unfortunately incomplete, and available only for the major aquifers or semi-aquifers. The Cenomanian's transmissivity is 2.7×10^{-6} to 3.7×10^{-6} m³/sec, and its storage capacity is 1.12×10^{-6} m³ /hr/1m drawdown; the Turonian's are 2.7×10^{-6} to 3.7×10^{-6} m³/s and storage of 1.12×10^{-6} m³/hr/1m drawdown. The Eocene has a transmissivity of 10^{-2} to 10^{-4} m/s, while these values for the Aptian and Jurassic (J6) aquifers are: 2.6 - 3.4×10^{-6}

and $2.3-3.2 \times 10^{-6} \text{ m}^3/\text{sec}$, and 1.22×10^{-6} and $1.17 \times 10^{-6} \text{ m}^3/\text{hr}/\text{m}$ drawdown, respectively; while the Jurassic aquifer (J4) has values $2.5-5.9 \times 10^{-6} \text{ m}^3/\text{s}$ transmissivity and $1.6 \times 10^{-6} \text{ m}^3/\text{hr}/\text{m}$ drawdown for storage capacity.

The Aquifer system

The geology and morphology have combined to construct three main aquifers shown in **Figure 4.15**: Hermon Aquifer, The Anti Lebanon Western Mount Hermon Cretaceous basin, and the south Bekaa Eocene (ref UNDP study 1970). Each is composed mainly of carbonate rocks (i.e. limestone and dolomitic limestone, some of which are highly karstified). These form an “aquifer system”, in the language of the 2008 Draft Aquifer Articles.

Figure 4.17 Hydrogeological cross-sections at each of the main springs in the Upper Jordan River: a) Banias, b) Liddan, c) Wazzani, d) Hasbani.



Hermon Aquifer

The Hermon Aquifer has an infiltration surface of approximately 370 km^2 and is on average about $1,500 \text{ m}$ deep. It is limited along its western border by the low permeability Lower Cretaceous complex, whose main direction of groundwater flow is towards the West and South-Southwest. The southern part of the Hermon Aquifer is bounded by the calcareous rocks laid against the recent basalts of the Huleh plains. The *Rachaya fault* separates this Jurassic body into two distinct hydrogeological compartments (due to the presence of marly interlayers which promote the role of barrier by the fault, hence partially preventing groundwater flow between the two

compartments). The western compartment has developed due to deep karstification not evident in the eastern one.

The Hermon Aquifer issues several important springs: Cheba'a, Ayha and Sraid Springs. This latter is a typical karst spring that discharges large volumes in late winter spring but dries up almost completely in the summer. The UNDP 1970 study also shows that the Hermon Aquifer contributes *in part* to feeding the Wazzani Springs, which flow mainly from the Cretaceous Aquifer. Hydrogeological investigations indicate a hydraulic relation between the Jurassic groundwater and the Sannine Limestone Aquifer, which is part of the Cretaceous Aquifer as described following.

Mount Hermon Cretaceous Aquifer ('Cretaceous Aquifer')

The Cretaceous Aquifer is an elongated basin positioned at the foothills of Mount Hermon covering an area of 101 km² and roughly 800m deep. It is limited to the West by the Senonian Marls or recent deposits, to the east by the mountain ridge, and to the South by the more recent basaltic flow of the Hasbani. The bed formations are visibly intensely fractured and karstified. The groundwater itself has widened the fractures, to the point that they are significant enough to allow up to 40% of the precipitation falling on top of the aquifer to infiltrate (UNDP, 1970). This aquifer feeds a number of springs issuing along the contact between the calcareous rocks and the Senonian Marls or more recent deposit, most notably, the *Hasbani* and *Wazzani springs*. As groundwater flow throughout the basin tends Southwest and West–Southwest, this aquifer may also contribute to the *Liddan* spring, further downstream along the Hasbani River the groundwater flow direction becomes mainly Southwest.

South Bekaa Eocene Aquifer ('Eocene Aquifer')

The Eocene Aquifer has an infiltration area of about 250km², of which only 36 km² extends into the Hasbani Basin. It's thickness varies considerably from only 100 to 800m. It's geological structure form a syncline axis divided into 3 main sub-basins, of which a small part of the central sub-basin and traces of the southern part extend into the Hasbani Basin. The aquiferous formation outcrops west of Kaoukaba and are highly fractured and crushed. The aquifer part between Marjayoun and Ibl el Saqi is rich in ground water – as indicated by the large number of municipal and private wells.

Springs

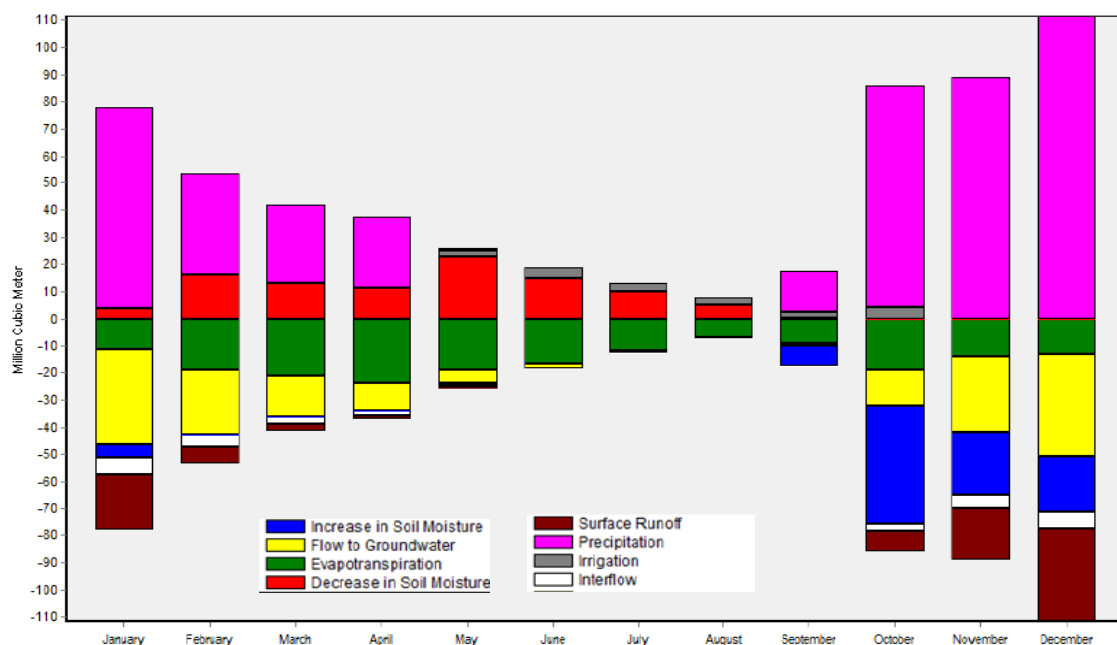
A full list of the springs inside the Hasbani Basin is provided in **Table 4.3**.

Table 4.3 Springs in the Hasbani Basin. *Modified from Jacobs Gibb (2007).*

Name of spring	*XYZ coordinates	Description
Hasbani Spring	-323350 m; -82250 m; 550 m	The Hasbani Spring is located close to the boundary between the Sannine Formation and Quaternary. It is fed from the Sannine Formation, and has a discharge varying between 0.5 and 1m ³ /s.
Wazzani Spring	-328910 m; -97088 m; 273 m	This spring is fed from the Sannine formation (C4) and has a discharge varying between 0.3 and 0.8 m ³ /s. It is located in the village of Ghajar.
Sreid Spring	-324745 m; -91485 m; 510 m	This spring is fed from the Kesrouan Formation (J4), and has a discharge varying between 0 - 0.4 m ³ /s. The data was collected prior to the 1970's; no discharges from the Sreid Spring were later observed.
Chebaa Spring	-314887 m; -87839 m; 1339 m	This spring is fed from the Kesrouan Formation (J4) and has a discharge of 0.35 m ³ /s with an annual discharge of 10 Mm ³ (UNDP 1970)
Maghara Spring	-316673 m; -89691 m; 1230 m	This spring is fed from the Kesrouan Formation (J4) and has a discharge of 0.33 m ³ /s during summer and to 0.64 m ³ /s in winter. It is located to the south of Chebaa village.
Ain El Ajouz	-323100 m; -81500 m; 647 m	This spring is at stratigraphic contact (the Chekka acquiclude with an aquifer), and it has a low discharge and dries out during the summer season.
Ain El Sabiye	- 323430 m; -81700 m; 610 m	This spring is also stratigraphic (Chekka Formation-C6), and it has a low discharge and dries out during the summer season.
Ain El Berde	- 323540 m; -81550 m; 640 m	Same, contact with the Chekka Formation (C6), and it has a low discharge and dries out during the summer season.
Ain El Metne	-323440 m; -82250 m; 580 m	This spring issues close to the boundary between the Chekka and Quaternary, it is near the Hasbani Spring, and it has a low discharge.
Ain El Qssaibe	-324530 m; -82350 m; 670 m	This is another contact spring with the Chekka Formation (C6), and it has a low discharge and dries out during the summer season.
Ain El Ouaraqat	-326895 m; -84050 m; 620 m	Ditto with the Chekka Formation (C6). It has a low discharge and dries out during the summer season.
Ain Abra	-326905 m; -84435m; 560 m	Ditto from the Chekka Formation (C6). It has a low discharge and dries out during the summer season.
Ain El Mohra	-327465 m; -68445 m; 645 m	Ditto from the Chekka Formation contact. It has a low discharge and dries out during the summer season.
Ain El Sraij	-323390 m; -85845 m; 540 m	This spring is fed from the Hammana Formation (C2b) aquifer. It has a low discharge and dries out during the summer season. It is located northeast from Fardis village.
Ain El Siyar	-324165 m; -87750 m; 780 m	This is also fed from the Hammana aquifer. It has a low discharge and dries out during the summer season.
Ebel Spring	-328685 m; -88680 m; 593 m	This spring is fed from the Middle Eocene (e2b) aquifer. It has a medium discharge and dries out during the summer season.
Ain El Meri	-325860 m; -91800 m; 410 m	This spring is fed from the Chouf Formation (C1) semi-aquifer. It has a low discharge and dries out during the summer season and is located east of Meri village.
Ain El Qershe	-326560 m; -93050 m; 350 m	This is also fed from the Chouf Formation semi-aquifer. It has a low discharge and dries out during the summer season.

Groundwater in the UJR Basin is not consistently recharged, due to the dominance of fractured karstic geologic formations (especially in elevated areas), and the uneven rainfall patterns. The phenomena has significant influence over the sustainable use of water, though is very poorly understood. Application of the WEAP model has provided the results shown in **Figure 4.18**. The figure reveals the monthly variations of water intake/outtake, as well as considerable monthly differences in soil moisture – which we address in the following section.

Figure 4.18 Results of the WEAP water modelling of the Hasbani watershed (Merheb, 2010). Of particular relevance to the study at hand are the changes in intra-annual flows to groundwater, and soil moisture.



Springs issuing from structural effects within the Jurassic and Cenomanian aquifers tend to be much stronger throughout the year. Springs issuing from other geology or formations – especially contact stratigraphy or from the semi-aquifers – are perennial, and tend to dry in the summer months. The elevation and proximity to snow accumulation accounts for other differences in flow.

Transboundary aquifers and transboundary groundwater

The aquifer system is connected at numerous points with the surface flows, and across international political borders. As with surface water, an estimate of the volume of the flows across borders is a fundamental element of the water conflict – and of direct relevance to international water law. This section supplements the findings of the *Hydropolitical Baseline* study (Section 3.3) to interpret these flows in a manner useful to both aspects of groundwater.

Based on the work of Brielmann (2008) and others, the *Baseline* study asserted that effectively the entire recharge zone of the Liddan Springs lies in Syria or Lebanon. The four previously-discussed distinctive natural features of the rock structures in Lebanon (trend of tectonic elements, distribution and lithologies of the different geological formations, drainage control, and geological evolution) serve to explain the finding.

As such, and in the language of the Draft Aquifer Articles, the bulk of the groundwater recharge zone of the aquifer system in the Upper Jordan River Basin is in Lebanon. The “discharge zone” of the aquifer system is shared between Lebanon (the Hasbani and Wazzani Springs), OSol (the Liddan Springs), and Syria (the Banias Springs). With the results of an in-depth of hydrogeological study currently being undertaken not yet available, we rely on the *Baseline*’s secondary-data estimate of **250 to 350 MCM/y**, flowing generally southwards. Brielmann (2008: 18) estimated what he called the “subsurface catchment area” for the Liddan at 1320 km². These figures remain subject, of course, to significant uncertainty, given the absence of reliable precipitation data, the extent of the groundwater recharge zone, flow and percolation coefficients.

5. Legal Audit of Environmental and Water Obligations of the Upper Jordan River states

This section identifies, reviews and assesses the legal instruments relevant to transboundary waters in the Upper Jordan River Basin. Covering both international environmental and water instruments, it then checks the compatibility of rights and obligations of each. In drawing out areas of potential conflict and complement, this ‘audit’ lays the base for positions and arguments for Lebanese support.

5.1. Audit of Existing Environmental Legal Instruments of the Upper Jordan Coriparian States

The Upper Jordan River co-riparian States have each signed a number of international environmental and water treaties – and political declarations, as shown in Table 5.1.

Table 5.1 International Environmental Treaties and Political Declarations agreed by Lebanon, Syria and OSol. [primarily from WaterLex Legal Database www.waterlex.org/waterlex-legal-database].

<i>Political Declarations</i>	Lebanon	Syria	OSol
2011 - WHO Resolution - Drinking-Water, Sanitation and Health - World Health Assembly (24 May 2011) [WHO Resolution]	✓	✓	✓
2010 - United Nations General Assembly Resolution (UN GA RES) - The Human Right to Water and Sanitation - UN Doc. A/64/L.63/Rev.1 [HR to Water]	✓	✓	--
<i>Treaties</i>			
1997 Convention on the Law of the Non-Navigational Uses of International Watercourses [UNWC]	✓	✓	--
1997 Kyoto Protocol to the United Nations Framework Convention on Climate Change [Kyoto Protocol]	✓	✓	✓
2006 Convention on the Rights of Persons with Disabilities [CRPD]	✓	✓	✓
1994 Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa [Convention on Desertification]	✓	✓	✓

1989 Convention on the Rights of the Child [CRC]	✓	✓	✓
1979 Convention on the Elimination of All Forms of Discrimination against Women [CEDAW]	✓	✓	✓
1977 Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflict (Protocol I)	✓	✓	--
1977 Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II)	✓	--	--
1966 International Covenant on Economic, Social and Cultural Rights [ICESCR]	✓	✓	✓
1966 - International Covenant on Civil and Political Rights [ICCPR]	✓	✓	✓
1949 Geneva Convention (IV) relative to the Protection of Civilian Persons in Time of War [Geneva Conventions]	✓	✓	✓

Apart from the water-related Declarations and Conventions, we may note the following from the table: First, OSol has not acceded to Geneva Conventions Additional Protocols I & II – the ‘law of war’ discussed in Section 3.5. Second, all three States in question have voted in favour of the WHO resolution on water and health. This is directly related to consideration of the ‘vital human needs’ of the UNWC and the DAA, and the Human Right to Water, but this link is not developed further, here. Third, there appear to be no issues of non-compatibility between the conventions and declarations. It is thus considered that none of the environmental obligations of either Lebanon, Syria or OSol clash with the more specific water obligations discussed below.

5.2. Audit of Existing and Potential International Water Legal Instruments of the Upper Jordan River Coriparian States

This section investigates the detail and compatibility of the i) substantive principles/obligations/rules and ii) procedural obligations/principles/rules of each of the main legal instruments. As the Arab Water Convention remains a draft at the time of writing, it is excluded from the analysis.

Positions of UJR riparian States to the legal instruments

Table 5.2 narrows-in from the above to focus on the relevant *water* norms of the riparian States in question. The OSol’s non-ratification of the UNWC and lack of support for the HRW are perhaps the most relevant of these. As noted in Section 3.4,

the UNWC in large measure reflects *customary* international law, and to that extent is binding upon all states, whether or not they have acceded to it (or if it is in force). Thus, behaviour by any of the Jordan River co-riparian States that is in contravention to the UNWC (i.e. inequitable and unreasonable use, significant impact, or lack of prior notification) would be a violation of international water law (as discussed in further detail in the following sections). Similarly, OSol's abstention on the UNGA vote on the HR to water does not mean it is not bound by the right, which exists independently of the UN General Assembly resolution.

Table 5.2 International *water* Conventions and Political Declarations agreed by Lebanon, Syria and OSol.

	Lebanon	Syria	OSol	Notes
<i>UN Watercourses Convention [UNWC]</i>	✓ ⁵¹	✓	--	Has not yet entered into force
<i>Human Right to Water [HRW]</i>	✓	✓	--	
<i>UNECE Water Convention [UNECE WC]</i>	--	--	--	Open for accession by non-ECE countries by end 2013.
<i>Draft Aquifer Articles [DAA]</i>	--	--	--	Still draft (at time of publishing)
<i>Arab Water Convention [AWC]</i>	<i>involved</i>	<i>involved</i>	--	<i>Under discussion</i>

Background to the Lebanese position on the UN Watercourses Convention

Investigations of the archives of the Center for Legal Consulting, Research and Documentation at the Lebanese Ministry of Foreign Affairs has revealed a number of documents tangentially relevant to this study. Those of particular interest to the study at hand are presented and discussed here.

Document No. 2907/1998 dated 27/8/1998 by the Lebanese Ministry of Justice's Commission: The Ministry of Justice's Commission in 1998 suggested a year prior to Lebanon's ratification of the UNWC that the government not do so because it is not in Lebanon's interest, as a source state – دولة منبع.

⁵¹ Per Law N.67 dated 31/3/1999.

2009 Hasbani Dam Memo: A Memorandum concerning the Ibl al Saqi Dam on the Hasbani River was drafted in July 2009 (details of the date are not provided). The memo considers that Lebanon may build the dam because of its sovereign rights (provided that some conditions apply), noting that the UNWC is not yet in force.

The Center for Legal Consulting, Research and Documentation – Lebanese Ministry of Foreign Affairs’ correspondence N. 34/15 dated 29/3/2010. In March 2010 the Center for Legal Consulting, Research and Documentation (of the Ministry of Foreign Affairs) corresponded with the Directorate of Economic Affairs. The Center there states its remarks and criticism of the Parliamentary Commission’s 2009 recommendation of the Strategic Water Plan (which was recommended by a Parliamentary Commission on 6/4/2009).

Note that Annex C also provides further details of Lebanese bi-lateral agreements with Syria.

Lebanese and OSol positions on the Draft Aquifer Articles

The Lebanese and OSol positions on the DAA may be discerned from comments made in official internal correspondence, or in commentaries to the DAA itself. This study has not exhausted all such documents, nor has it sought to interview the individuals involved.

The Draft Article 3 of the DAA on ‘sovereignty’ reads as follows:

“Each aquifer State has sovereignty over the portion of the transboundary aquifer or aquifer system located within its territory. It shall exercise its sovereignty in accordance with international law and the present draft articles”.

Only six States commented on Draft Article 3 as adopted on its first reading: Austria, Brazil, Cuba, OSol, Portugal, and Turkey (McCaffrey 2009: 290). The OSol comment on the first draft is very similar to that of Brazil’s: “Israel welcomes the emphasis the draft articles give to the issue of sovereignty over transboundary aquifers. However, Israel does not support the making of exceptions to accepted international law on this issue. Therefore, Israel suggests adding the word “international law and” after the word “with” to draft article 3” (UN ILC 2008b: para 92).

While further investigations would be required to accurately assess the meaning of the suggestion, it can be read in the first instance as OSol assuring the law does not go against its interests. The careful attention paid (but not objection) to the wording suggests OSol is fully in support of the clause, which might favour its position with downstream states (i.e. Jordan, but especially the Palestinians on the West Bank, with whom it is co-riparian to considerable groundwater resources). OSol’s insistence on linking the draft article with existing international law also mildly suggests that it might also be interested in relying on other bodies of law – perhaps in anticipation of

development by upstream states (i.e. Lebanon, Syria) supported through claims of legal-based sovereignty.

In internal Government of Lebanon correspondence,⁵² the National Council for Scientific Research (CNRS) offered remarks on the DAA to the Center for Legal Consulting, Research, and Documentation. The document enumerates its technical remarks on the Draft Aquifer Articles, among which bullet point No. 2 suggests a correction of technical wording in Article 2 para. B⁵³ (also as noted in the UNGA minutes below). The correspondence does not discuss Article 3 of the DAA (regarding sovereignty).

Further evidence of Lebanon and OSol input on the wording of the Draft Aquifer Articles comes from the minutes of the UNGA Sixth Committee meeting of 18 October 2011 (UNGA 2012: 6):

"39. Ms. Saab (Lebanon), reiterating the views her Government had relayed in the report of the Secretary-General (A/66/116), said that the definitions of "aquifer" and "aquifer State" could benefit from further elaboration. She highlighted inconsistencies between the terminology of the draft articles and that of the 1997 Convention on the Law of the Non-navigational Uses of International Watercourses, such as the use of "transboundary" in draft article 2, subparagraph (c), as compared to the term "international" in the corresponding part of the text of the Convention; another example was the use of the same definition for "discharge zone" in the draft articles as had been used for "international aquifers" in the Convention.

...

44. Mr. Zemet (Israel), reiterating the strategic importance of water resources in general, and aquifers in particular, said that, in developing rules regarding water resources, due consideration must be given to the fact that aquifers were vulnerable to all types of pollution and took longer to self-clean than surface waters. Israel remained of the view that the approach adopted by the Study Group of the International Law Association on the draft articles should have been embraced by the Commission, particularly with regard to the treatment on an equal footing of the two general principles that had gained the recognition of States, namely the equitable and reasonable use of aquifers and the obligation not to cause significant harm to other aquifer States. That approach, whereby neither principle prevailed over the other, was consistent with that adopted in the Helsinki Rules on the Uses of the Waters of

⁵² Specifically, *Lebanese National Scientific Research Council (CNRS) correspondence N.855 S. (ص)* dated 23/3/2011 on the Draft Aquifer Articles.

⁵³ The suggested wording is as follows: "مجموعة طبقات المياه الجوفية" (لأن تواجد الطبقات الجوفية يكون بشكل عمودي). This text appears over and above the remarks made by the Lebanese representative at the UNGA meeting (discussed following).

International Rivers⁵⁴ (1966), as updated by the Berlin Rules on Water Resources (2004).”

The comments made during this 2011 meeting suggest that Lebanon’s main input to the DAA has been limited to technical issues, and concerns over consistent wording. The comments by the representative of OSol suggest that it is in effect taking what may be considered a ‘midstream’ perspective. It can be read as an attempt to reinforce the importance of both the ‘equitable and reasonable use’ and ‘no harm’ principles, thus re-igniting the sterile debate discussed in Section 3.3.1. This might support OSol’s interests of continued control of water resources it is downstream of Lebanon and Syria (thus concern for ‘significant harm’) and Jordan and the Palestinians on the other (seeking to ensure equitable and reasonable use of aquifers (surface water not mentioned)). Further interpretation is required for greater certainty.

In any case, while any of the actors involved can assert sovereignty, implementation of the assertion favours the most powerful (see Zeitoun, Mirumachi and Warner 2011).

5.2.1. Compatibility of the Substantive obligations/principles/rules

This section discusses the most relevant substantive obligations/principles/rules stated in some or all of the four main legal instruments – and presented in

Table 5.1.⁵⁵

A note on natural law. It is striking that none of the four main legal instruments make direct reference to ‘natural law’. Natural law is relevant to international public law in general, and particularly to this study, as it concerns one of the most vital natural resources as well as international relations (see e.g. Raymond 1947; Tabbah 1951; Burlamaqui 2007; SHD 2009). The gap is further striking as some of the instruments do mention principles of natural law, notably: equity, reason, and good faith. In the sense that the gap is common to each of the instruments, there are no issues of compatibility.

⁵⁴ In fact, the Helsinki Rules do not put ‘equitable use’ and ‘no harm’ on equal footing, as the UNWC. The Helsinki Rules make harm one of the factors to be considered in arriving at an equitable allocation. The Convention, as indicated above, would deal with harm that is actually caused by resolving the situation in a manner that is equitable and reasonable to all concerned states.

⁵⁵ As the Human Right to Water relates more to internal and less to international obligations, discussion of it is somewhat backgrounded here.

Table 5.3 Substantive obligations/principles/rules in the main relevant international legal instruments

Substantive obligations	UN Watercourses Convention [UNWC]	UNECE Water Convention [UNECE WC]	Draft Aquifer Articles [DAA]	HR to Water [HRW]	General remarks/ Observations /Implications	Compatible?
Natural law	--	--	--	--	Natural Law is not stated in any of the main legal instruments, though is considered relevant and the source of several of the norms developed.	OK
Equitable and Reasonable Utilisation	Art.5; also Art. 24 par. A and B	Art. 2-c	Draft Art. 4	Compa. : Preamble, Par. 3; Par.6	The UNWC also adds “optimal and sustainable utilisation” – see discussion in text below. By way of comparison, the HRW discusses “equitable access” and “fair and equal”.	NO
Factors relevant to ERU	Art.6 (cf. also Art. 24 Par. 2-b; cf. also art. 8)	--	Draft Art.5	--	Art. 24 Par. 2-b of UNWC adds “rational utilisation”; Art. 8 adds ‘spirit of cooperation’.	OK
Sovereignty	--	--	Draft Art.3: sovereignty of Aquifer States (territorialism)	--	See discussion in text below.	NO
Good faith	Art. 3.5; Art. 31	Art. 10	Draft Art. 7 and 19	--	The UNECE’s Art. 10 states reciprocity and good neighbourliness ; The UNWC has both procedural obligations (Art 31 - related to data vital to national security), and substantive obligation (Art. 3.5 -which is related to negotiating watercourses agreements); The DAA has both procedural obligations (Art. 19 – related to data vital to national security) and substantive obligation (Art. 7 – concerning general obligation to cooperate)	OK
Prevention of significant harm	Art. 7; Art. 32 <i>in fine</i>	--	Draft Art. 6	--	--	OK
Right to water and sanitation	--	Mentioned, but not explicitly	--	Art. 1; Art. 3	Recognised in HRW as an essential Human Right.	OK

Vital human needs	Art.10 par.2 <i>in fine</i>	--	Draft Art.5 <i>in fine</i>	--	The DAA mention of vital human needs is one of the Factors relevant to ERU (see above)	OK
Protection from armed conflict	Art. 29	--	Draft Art. 18	--	--	OK
Env'l protection (in general)	Art. 20	Art. 3- 1- g; Annex II	Draft Art. 10-15	--	UNECE Annex II has Guidelines for development.	OK
Pollution Mngmnt (in particular)	Art. 21	Art. 2.2	Draft Art. 11	--	--	OK

" -- " indicates that the concerned obligation/principle/rule is not mentioned in the regarded international legal instrument. ' OK ' indicates that the specified obligation/rule/principle is not incompatible between the international legal instruments. ' NO ' indicates incompatibility between some or all of the instruments.

Substantive Obligations/principles/rules

SO1. Equitable and reasonable utilisation (ERU). The principle of equitable and reasonable use of transboundary waters is mentioned explicitly in the UNWC (Art. 5), the DAA (Draft Art. 4), and the UNECE WC (Art. 2-c). The HRW expands on the concept of equity, but not in relation to transboundary waters. Paragraph 3 of the Preamble declares “equitable access to safe drinking water and sanitation”, while Paragraph 6 reaffirms the responsibility of States to treat all human rights⁵⁶ globally in a “fair and equal manner”. In the sense that equitable access can only be effectively guaranteed following equitable use, there are no issues of non-compatibility.

SO2. Factors relevant to equitable and reasonable utilisation. Of the three instruments that mention ‘equitable and reasonable use’, only the UNWC (Art. 6, and Art. 24 Para. 2-b) and the DAA (Art. 5) elaborate upon the factors relevant to its definition. Quite apart from the debate of *No Harm vs. Equitable and Reasonable Use* (see Section 3.3.1), there are nuances in how each of these instruments refers to the latter.

On the obligations of equitable and reasonable use, the text of the DAA is closely based on that of the UNWC. Nonetheless, the differences are worthy of investigation. The most obvious differences between the list of ERU factors in the UNWC and DAA relate to:

- i) Particular biophysical aspects of the body of water under consideration. Of course the DAA refers much more clearly to aquifers and groundwater, specifying the quantification of “the contribution to the formation and recharge of the aquifer or aquifer system” (Article 5.1d). The DAA distinguishes between the geological particularities or aquifers (i.e. their formation and recharge dynamics), though this latter point is also comparable to the UNWC’s “factors of a natural character”;
- ii) Use vs. effect. The DAA is marked too by explicitly stating that both the “actual and potential *effects*” of the utilisation of the aquifer or aquifer system are to be taken into consideration, whereas the UNWC limits its enumeration to “existing and potential *uses*”. This addition might appear to favour downstream states that have already developed their resources, as it could be interpreted as preventing new upstream development.
- iii) Vital Human Needs. While “vital human needs” is mentioned explicitly in both texts (see below), the DAA goes further in suggesting that “special regard” shall be given to them when determining ERU (Art. 5.2). This addition would seem to favour riparians with communities more dependent upon the resource.

⁵⁶ The right to safe and clean drinking water and sanitation is considered by the HRW as an essential human right (cf. Article 1 of the HRW, mentioned here – below).

iv) Factors vs. Circumstances. The UNWC states “all relevant factors and circumstances” be taken into account when determining equitable and reasonable use, whereas the DAA shortens this to “all relevant factors”. This omission is not explained, and suggests a simplification of definition, as well as a reduction of space for the consideration of particular circumstances.

v) Economy of use. Whereas the UNWC suggests “Conservation, protection, development and economy of use”, the DAA drops the latter. This could suggest the DAA favours riparians that are less economically ‘efficient’ with their use of water (in terms of ‘crops per drop’ or ‘dollars per drop’ (Allan 2001), for example).

vi) Comparable value. The UNWC specifies that evaluation of available alternatives shall be “of comparable value”. This means that a state should not be forced to use an alternative in order to avoid disadvantaging another state, when that alternative is of significantly less value.

vii) Spirit of Cooperation. The UNWC states that riparians shall “enter into consultations in a spirit of cooperation”. The “spirit of cooperation” is not mentioned explicitly in the DAA. This omission is not explained, but it can be hypothesised that the ILC felt it redundant in light of the General Obligation to Cooperate (Draft Article 7).

These nuances between the UNWC and DAA factors for ERU are considerable, and their relevance to the case at hand are taken up in the following sections. They are not significantly different from a legal standpoint, however, and the four instruments are considered not incompatible.

SO3. Sovereignty. This is perhaps the main issue of non-compatibility between the UNWC and the DAA. To recall, Draft Article 3 of the DAA states that

“Each aquifer State has sovereignty over the portion of the transboundary aquifer or aquifer system located within its territory. It shall exercise its sovereignty in accordance with international law and the present draft articles”.

One chief concern with the article is that it paves a way for the return of the doctrine of Absolute Territorial Sovereignty (ATS), allowing States to act without consideration for other states. As McCaffrey (2011: 566) asserts, the DAA contain a “serious flaw: they introduce the novel and potentially dangerous concept that a state has sovereignty over the portion of a transboundary aquifer located within its territory.”

McCaffrey (2009) argues against the DAA’s Sovereignty clause primarily on the grounds that the ILC was not able to identify any state practice supporting the letter of the article. The DAA thus do not constitute customary international law: “The ILC should have recognised that like the infamous and discredited Harmon Doctrine, these comments, by apparently but a few states, in support of the notion of sovereignty

over transboundary aquifers reflect not state practice but advocacy of a position they considered supportive of their interests”⁵⁷ (McCaffrey 2009: 291).

OSol’s comments on the first draft of the DAA (see Section 0) indicate an awareness of the use of IWL to advocate existing transboundary arrangements it has established with its neighbours. Lebanon’s comments (which have been only in relation only to the terminology in Article 2, and not to Article 3 on Sovereignty) suggest a similar awareness, and thus tacit support for the ‘Sovereignty clause’. However, as discussed in Section 7.3.1, this study concludes that ratifying the DAA would be against Lebanon’s interests.

SO4. Good faith (both a substantive and a procedural obligation (see PO2)). ‘Good faith’ is affirmed in Articles 3.5 and 31 of the UNWC, Article 10 of the UNECE WC (regarding consultations between Riparian Parties), and Draft Articles 7 and 19 of the DAA. It is not referred to in the HRW. The UNECE WC stresses good faith in the form of reciprocity and good neighbourliness, certainly a reflection of its original intended jurisdiction over ECE countries. The UNWC mentions good faith in both procedural and substantive obligations, with the latter in relation to the negotiation of watercourses agreements (Art. 3.5). Thus, the four international legal instruments are considered not incompatible in this regard. The Vienna Convention on the Law of Treaties, in what is perhaps its most fundamental rule, provides in Article 26, entitled “*Pacta sunt servanda*,” that “Every treaty in force is binding upon the parties to it and must be performed by them in good faith.” The obligation could become relevant in the Upper Jordan River Basin were indirect negotiations to re-materialise.

SO5. Prevention of significant harm. The obligation not to cause significant harm is expressly stated in Articles 7 (and 32 *in fine*⁵⁸) of the UNWC: “Watercourse States shall, in utilizing an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States”. Draft Article 6 of the DAA has very similar wording. There is considered no incompatibility with the omission of this obligation from the UNECE WC, given its overall tenor and *raison d’être*. As discussed, there is a perception that developed downstream states tend to find that ‘no significant harm’ suits their interests, while upstream states may prefer ‘equitable and reasonable use’, as this latter provides

⁵⁷ McCaffrey (2009: 291) identifies three particular dangers. One, “it will reinforce the historic tendency of some states to claim absolute sovereignty over the portion in their territories of even transboundary surface waters”. Second, “the notion of “sovereignty” may give a state the idea that it has absolute discretion concerning the water contained in a transboundary aquifer when in fact and in law it does not.” (“the first sentence of Article 3 lets the genie of sovereignty out of the bottle, and the second sentence cannot put it back in.”). Third, “the notion that states are sovereign over the portions of shared freshwater resources located in their respective territories raises the classic problem of how the sovereignties of the two (or more) states sharing surface water or groundwater are to be reconciled”

⁵⁸ The Latin term *in fine* means ‘at the end’, and is used to direct the reader towards the end of the text referred to.

some scope for the use of the water in the trajectory of their national development. The configuration and levels of national development of Lebanon and OSol make this apparent tension of immediate relevance.

But the ‘no harm’ obligation may apply equally to downstream states, if they have extensively developed the watercourse in question. As Salman (2010) and McCaffrey (2007), point out, there is increasing recognition⁵⁹ that such development possibly forecloses upstream use of the flows, because downstream development of a watercourse can be so extensive that any action by the upstream State will cause downstream harm, or give rise to downstream claims of inequity. Known as ‘**foreclosure of future uses**’, the logic also applies to the procedural obligation of prior notification (see below). As such, OSol’s draining and conversion of the Huleh Marshes (at the confluence of the Hasbani, Liddan, and Banias rivers) into agricultural lands in the 1950s is considered a violation of ‘no harm’

SO6. The right to safe and clean drinking water and sanitation as a human right. The HRW recognizes this as an essential human right (cf. mainly Art. 1, and Art.3), with an understanding that the qualification “essential” is important on the legal level in international public law. The right is also mentioned in the UNECE Protocol on Water and Health. The four international legal instruments are considered not incompatible in this regard.

SO7. Requirements of vital human needs. “Vital human needs” are mentioned explicitly in both the UNWC (Art.10 (2) (prioritising these over other uses of water, when resolving disputes) and the DAA (Art.5 (concerning factors relevant to equitable and reasonable utilisation, as previously discussed)). Neither the UNECE WC or the HRW mention vital human needs specifically, though they are clearly reflected in the spirit of the HRW. It is considered that there are no incompatibility issues between the instruments.

SO8. Protection in time of armed conflict. Both the UNWC (Art. 29) and the DAA (Draft Art. 18) call for the protection of “international watercourses and related installations, facilities, and other works” during times of armed conflict through the “principles and rules of international law”. No new rule is laid down in this direct reference to the ‘rules of war’ of International Humanitarian Law (IHL) – which calls for the protection of “objects indispensable to the survival of the civilian population”, amongst others (see Section 3.5). Such provisions are outside of the scope of the HRW, and the UNECE (which was in any case originally intended for states which are generally bounded between them by other applicable (e.g. European) treaties). As such, there is no incompatibility of the provisions. This obligation is of particular relevance to the Jordan River Basin, given the history, ongoing, and likely future armed conflict within and between the co-riparian States.

⁵⁹ This recognition is evident first and foremost in World Bank practice, and elsewhere.

SO9. Environmental Protection. The UNWC calls for states to “protect and preserve the ecosystems of international watercourses” (Art. 20), details for which is fleshed out in the ILC’s commentaries.⁶⁰ The DAA is more stringent in its five articles (Draft Art. 10 – 15) under the section “Protection, Preservation, and Management”, including obligations to protect, monitor and ‘properly manage’ transboundary aquifer recharge and discharge zones. The UNECE provides more details for identifying best environmental practices (Art. 3- 1- g, and Annex II (which provides “Guidelines for the developing of these practices’’)). There are no incompatibility issues between the instruments on this subject. The provision is particularly important in the case of the Upper Jordan River, because of the possibility of significant harm on OSol through transboundary water pollution, and current and planned intensive agriculture in both OSol and Lebanon.

SO10. Pollution. The obligation to “Prevent, reduce, and control” pollution is strongly asserted in much the same wording in the UNWC (Art. 21), the DAA (Draft Art. 11) and the UNECE WC (Art. 2.2). As such, there is clear compatibility between the instruments. As with SO9, the provision is particularly important in the case of the Upper Jordan River, because of the possibility of significant harm on OSol through transboundary water pollution, and current and planned intensive agriculture in both OSol and Lebanon.

5.2.2. Compatibility of the Procedural obligations/principles/rules

This section discusses the most relevant primary procedural obligations/principles/rules stated in some or all of the four main legal instruments under consideration, as presented in **Table 5.4**.

⁶⁰ As just one example, we may note that the obligation refers to any ecosystem on a transboundary watercourse, and not only transboundary ecosystems.

Table 5.4 *Procedural obligations/principles/rules in the main relevant international legal instruments.*

Procedural obligations	<i>UN Watercourses Convention [UNWC]</i>	<i>UNECE Water Convention [UNECE WC]</i>	<i>Draft Aquifer Articles [DAA]</i>	<i>HR to Water [HRW]</i>	General remarks/ Observations / Implications	Compatible?
Natural law	--	--	--	--	Natural Law is not stated in any of the main legal instruments, though is considered relevant and probably the sources of several of the norms developed.	OK
Prior Notification	Art. 12	--	Draft Art. 15.2	--	--	OK
Obligation to cooperate	Art. 8	Art. 2- 6; Art. 9-1	Draft Art. 7	--	--	OK
Good faith	Art. 3.5; Art. 31	Art. 10	Draft Art. 7 and 19	--	The UNECE's Art. 10 states reciprocity and good neighbourliness ; The UNWC has both procedural obligations (Art 31 - related to data vital to national security), and substantive obligation (Art. 3.5 -which is related to negotiating watercourses agreements); The DAA has both procedural obligations (Art. 19 – related to data vital to national security) and substantive obligation (Art. 7 – concerning general obligation to cooperate)	OK
Mutual assistance	--	Art. 15	--	--	--	OK
Resolution of planned activities	Art.17 par.1 <i>in fine</i>	--	Draft Art.15, par.3	--	--	OK
Data Exchange	Art. 8	Art. 13-1-b; Art. 13-4	--	--	--	OK
Indirect procedures	Art. 30	--	--	--	--	OK
Dispute resolution	Art. 33	Art. 22, Annex IV (arbitration)	--	--	--	OK

“ -- ” indicates that the concerned obligation/principle/rule is not mentioned in the regarded international legal instrument. ‘ OK ’ indicates that the specified obligation/rule/principle is not incompatible between the international legal instruments. ‘ NO ’ indicates incompatibility between some or all of the instruments. ‘

Procedural Obligations

PO1. Prior Notification. According to the UNWC (Art. 12), States intending any measures on a transboundary watercourse have an obligation to provide notification for a specified period to other states that may suffer from “the implementation of planned measures which may have a significant adverse effect upon other watercourse States”. A similar obligation exists in the DAA (Draft Art. 15.2). No such obligation exists in the UNECE WC, which further emphasises the UNWC’s benefit in dispute avoidance/resolution (see below). The obligation is usually considered to be most relevant to downstream states, as the ones most likely to suffer “adverse effect”. However, the growing awareness of possible ‘foreclosure of future uses’ (as noted earlier under the substantive obligation of ‘no harm’), suggests a flip-side to the obligation. If downstream development of a watercourse is so extensive that any action by the upstream State will cause downstream harm, or give rise to downstream claims of inequity, it follows that the downstream State should *also* notify its upstream co-riparian of contemplated projects affecting the watercourse. In the case at hand, the level of OSol development of the transboundary surface water and groundwater is such that it is obliged to notify Lebanon of any contemplated projects (for example, signing of bilateral agreements on the lower reaches of the river, with Jordan and the PLO), just as Lebanon would be.

PO2. General obligation to cooperate, and the basis to do so. The general obligation to cooperate is stated in the UNWC (Art. 8) and the DAA (Draft Art. 7). The UNWC obliges states to “cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith”, while the DAA adds the basis of “sustainable development” to the same list. The UNECE (Art. 6) calls for cooperation on the basis of “equality and reciprocity”, which is considered not incompatible with the language of the other instruments. Considering the state of (simple) armistice⁶¹ that exists between Lebanon and Syria and between Lebanon and OSol, the clause is expected to become of greater relevance under different circumstances (but see note on PO6, below). In asserting equality and reciprocity, the clauses may be interpreted to give an advantage to weaker states.

PO3. Good faith (both a procedural and substantive obligation [see SO4]). ‘Good faith’ is affirmed in Articles 3.5 and 31 of the UNWC, Article 10 of the UNECE WC (regarding consultations between Riparian Parties), and Draft Articles 7 and 19 of the DAA. It is also mentioned in the Vienna Convention on the Law of Treaties (Art. 26), though is not referred to in the HRW. The UNECE WC stresses good faith in the form of reciprocity and good neighbourliness, certainly a reflection of its original intended

⁶¹ The truce between Lebanon and the OSol has been signed in Annakoura, Lebanon on the 23rd of March 1949.

jurisdiction over ECE countries. The UNWC mentions good faith in both procedural and substantive obligations, with the latter in relation to the negotiation of watercourse agreements (Art. 3.5). Thus, the four international legal instruments are considered not incompatible in this regard. The Vienna Convention on the Law of Treaties, in what is perhaps its most fundamental rule, provides in Article 26, entitled "*Pacta sunt servanda*," that "Every treaty in force is binding upon the parties to it and must be performed by them in good faith." The obligation could become relevant in the UJR basin were indirect negotiations ever to materialise a second time.

PO4. Mutual assistance. The obligation to provide mutual assistance during "critical situations" is affirmed and spelled-out in the UNECE Convention (Art. 15). The UNWC and DAA appears to contemplate a similar obligation, under "Emergency Situations" (Art. 28, especially paragraphs 3 and 4, and Draft Art. 17, accordingly).

PO5. Resolution of planned activities. "Equitable resolution of situations concerning planned measures/activities" is mentioned in the UNWC (Art.17 par.1 *in fine*) and the DAA (Draft Art.15, par.3), but not in the two other instruments. There is no such obligation in the UNECE WC, nor, understandably, in the HRW. While there is little complementarity between the instruments, there is no clear incompatibility between them. The spirit and letter of this obligation are of relevance to the Upper Jordan co-riparians, given the history of the Wazzani Dispute.

PO6. Exchange of Data and Information. The obligation to exchange data and information is found in the UNWC (Art. 9), the DAA (Draft Art. 8), and the UNECE WC (Art. 13). Each specifies that co-riparian States must respond to the requests of other states for biophysical information of the flows (i.e. "hydrological, meteorological, hydrogeological and ecological"), while the DAA understandably elaborates on groundwater resources. This clause is particularly relevant to Lebanon, given the poor state of such information that exists (particularly for groundwater).

PO7. Indirect procedures / obstacles to direct contact. States are obliged to use "indirect procedures" to fulfil their obligations, even in "cases where there are serious obstacles to direct contacts between Watercourse States" – according to the UNWC (Draft Art. 30). This obligation can be read as emphasising the general obligation to cooperate (see PO2) – even between states with no formal contact. No such emphasis is provided in the UNECE WC nor the DAA (nor, understandably, the HRW), though is of relevance to the case at hand, given the state of (simple) armistice that exists between Lebanon, Syria and OSol.

PO8. Peaceful means of settlement of disputes. The call for peaceful means of settlement of disputes is explicit in the UNWC (Art. 33) and UNECE WC (Art. 22 and Annex IV (regarding arbitration)). The UNWC elaborates the process for mediation attempts, fact-finding missions, and the appointment of a Commission named by the UN Secretary General. It is considered that the absence of the obligation in the DAA

and in the HRW does not make them incompatible. The provision for mediation is seen as beneficial to all states, whether they are up- or downstream, weak or powerful, or the initiators or receivers of a new project. It would be relevant to the Upper Jordan only if OSOI were to enter into an agreement with Lebanon that would provide compulsory dispute resolution, which it has shown unwillingness to do in other contexts.

6. Implications for Lebanon of Basic Rights and Obligations

This section assesses the implications of the basic water legal rights and obligations of Lebanon that stem from the various water legal instruments. In light of the political context that underwrites the legal analysis, there are clear thrusts in two directions:

1. For Lebanon to achieve its basic right to an equitable share of the transboundary resources, the Government of Lebanon must achieve consistency with International Water Law.
2. For Lebanon to meet its legal obligations, the Government of Lebanon may adopt the *exceptio* as the primary principle, and countermeasures and reciprocity as secondary principles. This is based on a) the state of (simple) armistice between Lebanon and OSol, b) an understanding that IWL is as binding upon OSol as it is on Lebanon, and c) serious and material violations of IWL, by OSol.

6.1. Implications of substantive Obligations / Principles / Rules for Lebanon

6.1.1. 'Equitable and reasonable use'

Though estimating Lebanon's basic right to equitable and reasonable use of the Upper Jordan River flows was one of the study's original objectives, the lack of reliable data precludes any robust estimate here. With the expectation that such data will be forthcoming, the method for estimating Lebanon's basic right is provided in Annex E, while the case is provided below.

The case for determining Lebanon's basic right to an equitable and reasonable share

The case for acquiring the data required to deliver a robust estimate of Lebanon's basic right to equitable and reasonable use of water is based on a number of factors:

- The quantity most commonly promoted as 'Lebanon's legal share' is the 35 MCM/y – though this is flawed for the reasons explained earlier, and likely to be low (recall also Section 2.1 and the *Upper Jordan River Hydropolitical Baseline*);
- Transboundary surface water flows in the Upper Jordan River are observed at about 480 MCM/y; Transboundary groundwater flows are estimated at 250 – 350 MCM/y (though their contribution to surface water flows has not been wholly separated and so risk being double-counted);
- Of the transboundary surface water flows, Syria uses none, Lebanon uses about 3% (11 MCM/y) and OSol uses the rest;
- Current Lebanese water use in the Upper Jordan River basin a) remains as highly asymmetric as it has since 1964, b) is less than the (flawed) Johnston estimate, c) is

not sufficient to meet the basic livelihood needs of the people in the basin, and d) is likely less than its basic right.

Implications of 'equitable and reasonable use' for Lebanon

While the degree of asymmetry in use and control over the flows of the Upper Jordan River cannot be quantified, there is little debate as to whether or not this is shared 'equitably and reasonably'. In light of OSol's clear and significant breach of the principle of equitable and reasonable utilisation of freshwater resources it shares with Lebanon, the latter shall continuously claim for the application by OSol of the said principle, and if the latter does not abide to IWL, the Lebanese government would be within its rights in having recourse to *exceptio* or countermeasures.

The line of both arguments (*exceptio*/countermeasures) opens up the legal pathway to Lebanon itself similarly developing and utilising a share of the transboundary water resources that could be beyond 'equitable and reasonable'. If it decided to follow the course of countermeasures in particular, the Government of Lebanon would be required to ensure that its actions conformed to the required purpose of countermeasures (to induce OSol to comply with its obligations) as well as the limits and conditions placed by international law on their use.⁶²

6.1.2. Protection in time of armed conflict / Vital human needs

The obligation to protect "international watercourses and related installations, facilities, and other works" is considered a *renvoi* to International Humanitarian Law (see Section 5.2), and is explicitly understood to apply during periods of armed conflict. In the event of warfare affecting transboundary watercourses or aquifers, States are thus just as much bound by the specific provisions of the conventions on International Humanitarian Law. The calls for protection overlap with the substantive obligations of the UNWC (to prioritise vital human needs over other uses of water (Art. 10)), and DAA (as a factor comprising the definition of 'equitable and reasonable use' (Draft Art. 5)).

Of particular relevance to the Upper Jordan, where no transboundary water agreement is in place, further fundamental protections are given by the 'Martens clause' that is included in a number of conventions and protocols and is now part of general international law.⁶³ In short, the Martens clause calls for the protection of

⁶² See especially Articles 49, 51 and 52 of the State Responsibility Articles, *op. cit. supra*

⁶³ See e.g. UN ILC (2008a: 77) "That [Martens] clause, which was originally inserted in the Preamble of the Hague Conventions of 1899 and 1907 and has subsequently been included in a number of conventions and protocols, now has the status of general international law. In essence, it provides that even in cases not covered by specific international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience".

civilians and combatants, according to customary law, even absent a relevant provision in a given agreement.

The obligations are equally binding on all States in the Upper Jordan River Basin, including the Lebanese resistance as a national actor (The 1977 Protocol II applies to non-international armed conflict). The well-documented heavy asymmetry in war damages to water resources and infrastructure in southern Lebanon and OSol ((see e.g. ICRC 1994b; Zeitoun, Eid-Sabbagh and Loveless 2014) suggests, however, that the latter's violations are considerably more significant.

6.1.3. Good Faith / General Obligation to Cooperate / Mutual Assistance / Data Exchange / Indirect Procedures / Resolution of planned activities

The procedural obligations of Good Faith, General Obligation to Cooperate, Mutual Assistance, Data Exchange, following Indirect Procedures, Peaceful means of settlement of disputes, and Resolution of planned activities are considered together here, for their relevance to states that enjoy diplomatic relations. While customary law obliges all states in the Upper Jordan River Basin to provide mutual assistance and other tangible forms of cooperation to each other, relations are currently such that even the substantive obligations that underpin these procedural obligations are not generally followed.

The direct bearing of these obligations upon Lebanon in particular should be considered in light of a) the state of (simple) armistice that exists between Lebanon and OSol, and b) the notion of "good faith" itself, which is one of the justifications of the *exceptio*.⁶⁴

In fact, the *exceptio* applies in particular to the general obligation to cooperate and the obligation to use indirect procedures to fulfil obligations even in "cases where there are serious obstacles to direct contacts between Watercourse States" (UNWC, Article 30). The *exceptio* thus applies to states even with no formal contact, and *a fortiori* between states having a simple truce between them – such as Lebanon and OSol.

As the principles reflected in the UNWC are seen to apply also to OSol, the condition of reciprocity envisaged by the *exceptio* obliges both Lebanon and OSol to engage in such tangible forms of cooperation. In situations where there are no diplomatic relations, the obligations are no more or less binding on any particular state – and the law clearly falls into the realm of political relations. Thus, there is no reason for OSol to interpret the obligations as binding only upon Lebanon, as the upstream state, nor

⁶⁴ For example, cf.: O'Neill, Philip; Salam, Nawaf, op.cit., par. 154, *in limine*.

any reason for Lebanon to consider the obligations as binding solely upon OSol, as the state which currently controls the bulk of the flows.

6.2. Implications of Procedural Obligations/Principles/Rules for Lebanon

6.2.1. Prior notification

Lebanon's accession to the UNWC obliges it (under Art. 12) to provide a specified period of notification to other states of any "planned measures" that may cause the latter any "significant adverse effect". The planned Ibl al Saqi dam is a case in point.

The extent to which this procedural obligation is binding on the Government of Lebanon must be viewed, however, in the light of further legal and political factors: a) the state of (simple) armistice between Lebanon and OSol; and b) any violations by OSol of the principle of Prior notification. As discussed in Section 5.2.2, the 'foreclosure of future uses' by intensive downstream development obliges OSol to notify Lebanon of any similar projects. Thus, OSol abstractions from the Lake of Tiberias or from groundwater wells within the basin (not to mention distribution of control of the flows in the 1994 Peace Treaty with Jordan) can be read as OSol violations of 'prior notification'.

The direction of argument suggests that the Government of Lebanon is not obliged to provide prior notification, under the principle of reciprocity / *exceptio*. At least so long as OSol is or has been in serious or material breach of the principle in question. The same would be expected to apply to the DAA, once these are definitive and open to ratification. However, the political interests of non-notification should be weighed against the merits that come from Lebanon maintaining a position and behaviour entirely consistent with IWL.

6.2.2. Prevention of significant harm

In the discussion of the (sterile) debate over pre-eminence of the principles 'no harm' vs. 'equitable and reasonable use' (Section 3.3), it was noted that a state's preference might be informed by the particular configuration of factors which inform their interests – notably riparian position, and level of development. In short, downstream states may find the protection provided by the principle of 'no harm' more to their interests, as developing upstream states may similarly find the principle of 'equitable and reasonable'. Discharge of olive oil processing waste, extensive groundwater pumping, and the planned Ibl al Saqi dam are cases in point.

Recall from Section 3.5 that the principle of *exceptio* asserts that a violation of an obligation under IWL by one State could lead to a legitimate breach of a corresponding obligation by another State, so long as the initial violation consists of a 'serious or material' breach. As with 'prior notification', the extent to which this procedural obligation is binding on the Government of Lebanon must be viewed,

however, in the light of: a) the state of (simple) armistice between Lebanon and OSol; and b) any violations by OSol of the principle of Prevention of significant harm.

As discussed in Section 5.2.1, the effect of the ‘foreclosure of future uses’ due to intensive downstream development also obliges downstream States to prevent significant harm back upstream. OSol’s draining of the Huleh marshes in the 1950s was conducted to make the very fertile land arable. This has effectively ‘locked-in’ OSol to a local political economy perpetuating intensive irrigation for decades, such that upstream use by Lebanon of the flows is – in effect, if not in practice – foreclosed. This is a further breach by OSol of a procedural obligation, meaning Lebanon would be within its rights in having recourse to *exceptio* when applicable or to countermeasures, depending on the case at hand.

Of course, and as with Lebanon’s basic right to pursue a share beyond ‘equitable and reasonable use’, any decision to pursue a project that may seriously breach the obligations – i.e. to cause significant harm (e.g. by the construction of a dam on the Hasbani, or extensive groundwater withdrawals) – should be considered only after completing a full analysis of the legal and political implications. Were it to decide to follow the course of countermeasures in particular, the Government of Lebanon would be required to ensure that its actions conformed to the required purpose of countermeasures (to induce OSol to comply with its obligations) as well as the limits and conditions placed by international law on their use.⁶⁵

6.3. Implications of the Legal Instruments for Lebanon

This section discusses the implications of the legal instruments that Lebanon is party to or might consider joining. It is noted that the recommendations are made without any prejudice to the *eventual* relevance of Lebanon’s accession to the Arab Water Convention once the latter is finalized and open to ratification, especially as per the Lebanese Constitution Preamble which expressly states in its paragraph (b.) that: “Lebanon is Arab in its identity and in its association. It is a founding and active member of the League of Arab States and abides by its pacts and covenants”.⁶⁶

It is also noted that the following recommendations are suggested without any prejudice to any of the remarks in earlier Sections, notably those regarding the *exceptio* in the relation between the Government of Lebanon and OSol, and the non recognition of the latter by the Government of Lebanon.

⁶⁵ See especially Articles 49, 51 and 52 of the State Responsibility Articles, *op. cit. supra*

⁶⁶ Unofficial English translation of the Lebanese Constitution, copied 8 February 2010 from <http://www.servat.unibe.ch/law/icl/le00000.html>

6.3.1. UNWC (already ratified)

The internal documents cited in Section 5.2 suggest that the Lebanese ratification of the UNWC was done against the expressed will of key Lebanese players. The memo on the Ibl el Saqi dam and analysis of Sections 6.2 and 6.3 also suggest that Government of Lebanon obligations under the UNWC may curtail or impede national development efforts. This and the *possibility* that Lebanese ratification was done under some form of coercion opens up the option of the Government of Lebanon reversing its position, and pulling out of the UNWC. Given the several other basic rights and benefits the UNWC provides in legal and political circles, however, the opposite is recommended. Lebanon can do nothing but benefit from the application of law to its relations with OSol in respect of transboundary waters. Furthermore, once the Convention enters into force (which is expected within a few years), it will be very difficult indeed for Lebanon to terminate the treaty.

6.3.2. UNECE Watercourses Convention (generally positive)

The Legal Audit has shown that there are no compatibility issues between the UNECE WC and existing Lebanese legal obligations. The Procedural Obligation of providing “mutual assistance” during “critical situations” is an additional obligation Lebanon would incur, though this is considered of little more substance than current obligations under the UNWC (i.e. the General Obligation to Cooperate, and Data Exchange). On the other hand, the provisions of the UNECE WC complement the HRW, and provide solid environmental management guidance. There are also a number of other benefits potentially available to Lebanon through the UNECE Secretariat (see e.g. UNECE 2013). Though OSol is not a Party to the UNECE WC, Lebanon could benefit (politically, more than legally) from the fact that the Water Convention has a very robust secretariat, and potential solidarity from other parties to the convention in relation to its water relations with OSol.

6.3.3. Draft Aquifer Articles (generally negative)

Following internal remarks made by governmental authorities concerning the text of the DAA (see Section 5.2), the Government of Lebanon has expressed no reservations about its ratification, and seems generally supportive. Several points raised show that ratification of the DAA can be viewed both in support of and against Lebanese national interests.

- *Sovereignty*. The DAA’s Article 3 on Sovereignty could work either for or against Lebanon.

On one hand, its premise based on the doctrine of Absolute Territorial Sovereignty would benefit Lebanon, as the source state for most of the transboundary groundwater resources (as most of the recharge zone of the transboundary aquifer lies in Lebanon);

On the other hand, and as with the much more established concept of territorial sovereignty, such sovereignty can be readily violated with little consequence. Simply invoking sovereignty' is insufficient to ensure that any basic right to an equitable and reasonable share that derives from it can actually be implemented. Furthermore any asymmetry in power favours the more powerful, in such a dynamic relationship, (see Zeitoun, Mirumachi and Warner 2011). The concept also contradicts the spirit of the doctrines of Limited Territorial Sovereignty and Community of Interests, and so is in contradiction to the spirit and letter of the UNWC, and to the benefit of no states.

- *Equitable and Reasonable Use.* Draft Article 4d states that Aquifer States “shall not utilize a recharging transboundary aquifer or aquifer system at a level that would prevent continuance of its effective functioning”. Like several of the clauses compared in the compatibility check (Section 5.2), the clause is entirely sensible, though might be argued to favour established ‘downstream’ use.
- *Factors defining Equitable and Reasonable Use.* The differences between the DAA and the UNWC in the factors that define ERU are considered both in support and against Lebanese national interests.

In support of Lebanon’s interests are: the additional emphasis given to ‘vital human needs’ (Art. 5.2); the de-emphasis of ‘efficient use’; and the “contribution of the formation and recharge of the aquifer or aquifer system” (Art 5.1d).

Possibly opposing Lebanon’s interest are: the de-emphasis of the particular context, and the extra protection against effects of use (rather than the right to use) – which could be read as against Lebanon’s plans for national development.

- *Technical guidance and obligations.* The significant flows of transboundary groundwater in the Upper Jordan River basin show the water conflict is as much under the ground as above it. The additional guidance provided by the DAA to specifics of the groundwater resource can be of some use to Lebanon (and, indeed, all states). There is little elaboration in the wording of the technical clauses (in Part III, Art. 9 – 13), though there is significant deliberation in the commentary (i.e. in UN ILC 2008a). The resultant potential obligation upon Lebanon is to protect the recharge zone of the Liddan and Banias springs.
- *Pollution management.* The substantive obligation in the DAA Article 11 to “prevent, reduce and control pollution” is common also to both the UNWC and the UNECE WC. The DAA adds an additional dimension to the Lebanon case, however: “in view of uncertainty about the nature and extent of transboundary aquifers or aquifer systems and of their vulnerability to pollution, aquifer States shall take a precautionary approach”. Given the very high uncertainty in the location, volume, and quality of flows, this clause is very sensible, and places the responsibility upon Lebanon (unless the work could be done “jointly”). As with the previous clause, the

resultant potential obligation upon Lebanon is to protect the recharge zone of the Liddan and Banias springs.

- *Most importantly: incompatibility with UNWC.* As noted above, the DAA and UNWC are incompatible with each other. Notably, the DAA's Draft Article 3 ("sovereignty of Aquifer States") invokes the doctrine of Absolute Territorial Sovereignty, and is against the spirit and letter of the UNWC (and so, the doctrines of Limited Territorial Sovereignty and Community of Interests). In the event that the DAA eventually becomes a Convention, any country that is party to both could thus be pulled in opposite directions. In Lebanon's case, this could lead to inconsistency, and thus the weakening of any benefits it may otherwise obtain in political and legal circles.

6.3.4. HRW (very positive)

The Government of Lebanon's support of the HRW carries a number of obligations, not all of which are currently being met. The Government of Lebanon is further encouraged to turn the political support for the HRW into planned activities and infrastructure. The new dam underway at Batroun is one such example. Development of sanitation infrastructure in villages throughout the country would also go a long way to meeting the obligations. As discussed in Section 3.4, there is scope for the Government of Lebanon to make a claim against the Government of OSol, if the latter's acts deprived individuals in Lebanon of sufficient water to satisfy the HRW. While this study has not investigated the possibility, the facts reviewed suggest that it is likely that such a case could be made, but that the importance and potential gains from this would not be as significant as pursuing a legal strategy more directly aligned to IWL.

7. Conclusion - Towards a Legal Framework for Lebanon

To recall from the Introduction, the Main Objective of this study was to “provide the basis for the development of a national policy on transboundary waters on the Upper Jordan River Basin, and assist in the development of a common negotiating position”. To meet the objective directly, this concluding section captures the main biophysical and legal findings, makes a number of recommendations for water policy generally, and provides the skeleton of a strategy by which Lebanon may achieve its basic rights and meet its obligations.

7.1. Main Findings

7.1.1. Biophysical findings

To use the language of the Draft Aquifer Articles, **the bulk of the “recharge zone” of transboundary groundwater in the Upper Jordan River Basin is in Lebanon** (and partly in Syria). The “discharge zone” of the aquifer system is shared between Lebanon (the Hasbani and Wazzani Springs), OSol (the Liddan Springs), and Syria (the Banias Springs). These are presented graphically for the first time in Figure 4.14.

Snowmelt has been estimated here for the first time, at roughly 150 MCM/y. The bulk of the snow infiltrates into the “aquifer system” (to return to the wording of the DAA), contributing to the estimated 250 – 350 MCM/y of transboundary groundwater (though some of it also counts towards the estimated 480 MCM/y of transboundary surface water). Snowmelt is particularly sensitive to changes in land use and climate, making any estimate of available transboundary water resources likely to change in the future.

Transboundary water resources are dynamic. The water sector audit of Chapter 4 emphasises how groundwater and surface water flows are determined by a combination of climate, geological movement, infiltration capacity, snowmelt, and of course – water use. All of these are constantly changing, and *this dynamic character should be recognised in any transboundary water policy development or discussions.*

Poor quality of data should not impede application of water law. This study has collated the latest available biophysical data on the water and aquifer systems in question. This has exposed the degree of complexity of such systems, and emphasises both a) that more research is required, to refine the estimates of transboundary surface water and groundwater, but also b) that the systems are so complex – and changing – that the degree of certainty desired may never be achieved. However, *the lack of available data should not – now or in the future – be allowed to be used as an excuse to prevent the principles of IWL from being applied.*

7.1.2. Legal findings

On the whole, **IWL is in Lebanon's favour**. The spirit and letter of the UNWC clearly supports Lebanon's interests to make use of the transboundary waters, and peaceful resolution of the water conflict. Though there are some concerns about the Draft Aquifer Articles and obligations that work against Lebanon's interests, these can be addressed through – and should be considered in light of – the measures described below, and are in any case minor compared to the basic rights and benefits that a position consistent with IWL can bring.

OSoI is in 'serious and material' breach of IWL, notably for decades of water use considered not to be 'equitable and reasonable'. Under the increasingly recognised effect of 'foreclosure of future use', OSoI may also be in 'serious and material' breach of the principles of no significant harm and prior notification.

Under the arguments of *exceptio, foreclosure of future uses, countermeasures and reciprocity*, and given OSoI's likely 'serious and material' breaches of IWL, Lebanon shall continuously claim for the application by OSoI of IWL, but, if the latter does not abide by IWL, Lebanon has eventually grounds to similarly push for more than equitable and reasonable use, and similarly not to provide prior notification of any contemplated projects. This is advised against, however, in light of the political, security and geo-strategical contexts explained below.

Lebanon's basic rights deriving from the principle of 'equitable and reasonable use' remains unquantified. The lack of available data has prevented an estimate of that basic right here, though it remains widely held to be greater than the 35 MCM/y that is typically asserted (which derived from the 1950s Johnston negotiations, and are considered flawed), particularly when groundwater resources are also considered.

The development and execution of a transboundary water policy consistent with IWL will oblige confronting several challenges. The first challenge is the management structure of the water sector, which is burdened by considerable over-lapping in decision-making. A second reason is the lack of analysis undertaken on transboundary water resources in general. The third challenge will be in garnering nation-wide and cross-party support for a policy that should be of interest to all the people of Lebanon, regardless of the government in power.

7.2. Water Policy Recommendations

The Government of Lebanon is advised to **strengthen analysis of political and legal aspects of water**. Technical capacity for water in Lebanon is considerable, but is not matched by social science and legal understandings of water. This could be developed through integrating with universities, specialised NGOs and organisations (such as AFIAL), or commissioning studies in this field.

The Government of Lebanon is advised to continue and **supplement water sector restructuring**. This would mean clarifying lines of communication on transboundary water decision-making to implement the recommended national transboundary water policy. A possible step towards this would include strengthening of the Prime Minister's Office with water lawyers to form a strategic thinking unit. Such a unit would include legal, policy and communications experts, and remain focused solely on transboundary waters.

The Ministry of Energy and Water should **build on the basic biophysical studies** that are currently underway (see Section 4.2).

Better enforcement of regulation and monitoring would assist the Ministry of Energy and Water to conform to Law 221, and serve the Government of Lebanon to respect and implement the recommended national transboundary water policy.

7.3. Outline of a Strategy for Ensuring Lebanon's Basic Rights and Meeting its Obligations

The development of a strategy to ensure that Lebanon achieves its basic rights whilst meeting its legal obligations has three elements discussed further here: a) the accession and adherence to – or rejection of – particular Legal instruments; b) the development of a transboundary water policy consistent with IWL; and c) the development of a Lebanese alternative to a negotiated agreement over transboundary water resources (the 'BATNA').

The three elements of this Lebanese strategy are considered equally important, in light of continued OSol achievement of its own strategic objectives. As detailed in Annex A, OSol objectives are considered to be: 1) maintenance of control of the use of headwaters of the Hasbani River; 2) protection of the Upper Jordan River from contamination; and 3) prevention of the establishment of a precedent of multi-lateral negotiations based on International Water Law. Each of these objectives has been met with downstream neighbours either by use of force or negotiating a treaty in OSol's favour, or a combination of both.

This study has discussed how IWL can be seen as an attempt to establish a dominant discourse, and thus what is permissible (even if not explicitly 'legal') state behaviour on transboundary waters. Hard and soft power are used very effectively by OSol to establish this discourse, and its attempts to influence IWL are probably most cautiously understood as such.

The new information on snowmelt found in this study does not alter this conflict to a significant extent, but does demonstrate the impact of the conflict yet again. It is expected both that there will be less snowmelt and flows in the future, and that these will continue to flow unused by Lebanon, to OSol.

A full transboundary water policy (based on comprehensive analysis) should be in place prior to any formal (or informal) policy resulting in greater water use (e.g. Ibl el Saqi dam on the Hasbani River, or numerous deep wells in the Hasbani Basin). This would provide the backdrop required to pre-empt anticipated OSol reactions, and influence partial third-party intermediaries (thus shifting from reactive to pro-active policy).

7.3.1. Recommendations of accession and non-accession to Legal Instruments

UNWC. The Government of Lebanon's accession to the UNWC is seen as consistent with its compliance with other aspects of international public law. As noted below, the Government of Lebanon is advised to **clarify its positions in relation to the UNWC, and to consistently anchor current and future policy and action firmly within its principles**, except when a breach thereto is justified notably by the exceptio.

UNECE Water Convention. The analysis has shown that there are no significant issues of incompatibility between the UNECE WC and the UNWC, and that there are potential benefits to becoming official Party to the former. The Government of Lebanon is thus strongly recommended to **accede to the UNECE Water Convention without delay**.

Draft Aquifer Articles. The DAA have been interpreted both to support and undermine Lebanon's interests (Section 6.3.3). On balance, the arguments *against* Lebanese ratification of the DAA are considered much more significant in the long term, than are the arguments for it. Most significantly, the inconsistency of the Draft Aquifer Articles with the UN Watercourses Convention is likely to weaken any of the benefits the Government of Lebanon may otherwise obtain in political and legal circles. The Government of Lebanon is thus **advised not to ratify the DAA**.

Arab Water Convention. The Government of Lebanon has an opportunity to influence the AWC process. In light of the importance of transboundary waters to Lebanon (and violations by a powerful downstream co-riparian), **the Government of Lebanon is advised to engage fully** in this process. Particularly once a transboundary water policy is worked out, the Government will have the solid grounding and expertise required to do so.

Human Right to Water. The Government of Lebanon is encouraged to implement all aspects of the Human Right to Water, to which it has acceded.

7.3.2. The development and execution of a transboundary water policy which is consistent with IWL

The development and execution of a transboundary water policy consistent with IWL stands to bring considerable rewards to Lebanon. The rewards include first and

foremost achievement of Lebanon's basic right to equitable and reasonable use of water in the Upper Jordan River Basin, which would allow the execution of planned national development projects. It would also allow the Government of Lebanon to be pro-active on transboundary water issues, highlighting violations by OSol, rather than responding to unfounded allegations requiring diplomatic intervention. It could also open the door to more equitable distribution of the entire Jordan River basin, and thus an end of the Jordan River conflict.

The first step towards such a transboundary water policy is **the development of a solid understanding of OSol's strategy** towards transboundary waters throughout the basin. This is sketched out following, and in Annex A, but has not been documented in detail.

The transboundary water policy would have to be **entirely consistent with the principles of IWL**, notably to achieve Lebanon's basic right to an equitable share. The policy should consider the most effective way of promoting national interests through the various elements of the water sector. To meet its obligations, the Government of Lebanon **may, when needed, adopt the *exceptio* as the primary principle**, and countermeasures and reciprocity as secondary principles.

A solid transboundary water policy would also be based on **a robust estimate of Lebanon's basic right to an equitable and reasonable share** from the Upper Jordan River. This would be based on a comprehensive water balance and different water-demand scenarios (for which a proposed structure is provided in Annex E).

The transboundary water policy would also have to integrate with the ongoing restructuring of the water sector (mentioned above), and **develop new water legislation** to anchor it in national legislation.

7.3.3. Development of the Lebanese BATNA

A Best Alternative to a Negotiated Agreement (BATNA) is "the course of action that will be taken by a party if the current negotiations fail and an agreement cannot be reached", and can be effective to advance interests even when not engaged in formal negotiations. Having a strong BATNA is understood to improve a party's bargaining power, even in very informal negotiations (as the numerous border incidents between OSol and Lebanon could be considered). Given the lack of direct negotiations, and the great asymmetry both in power and in control and use of the transboundary resources, strengthening of the Lebanese BATNA will help define critical initiatives and infrastructure in regards to transboundary water resources.

The risk to the Government of Lebanon is to be re-active to OSol accusations, for instance of failure to protect the recharge zone of the Liddan and Banias springs, of not providing information on groundwater flows, and of abstracting more than Lebanon's fair share (even if this has never been quantified).

To develop such bargaining power, the Government of Lebanon is advised not only to develop a transboundary water policy that is anchored in IWL, but also to **act in consistent and entire accordance with the principles of IWL**. This includes providing notification of any national development projects and measures to ensure the prevention of significant harm to all downstream states – or invoking the *exceptio* if the contrary is decided (except when a breach thereto is justified). Consistency is key here, as those elements of the international community that support IWL would be persuaded if Lebanon is entirely consistent with IWL, especially where other states are not.

In order to stress its compliance with both the spirit and the letter of all of its obligations under international public law, notably IWL (and the UNWC in particular), the Government of Lebanon is advised to **provide an explanation of its position and policy to the Lebanese public**. This would stress the importance of both substantial and procedural IWL obligations to transboundary environmental governance and peaceful relations between transboundary states, without prejudice to the non-recognition by Lebanon of OSol.

The Government of Lebanon is advised to concurrently **develop a campaign of quiet diplomacy**, to make its position and policy entirely clear to the international diplomatic community. This could also include the identification of a retro-active water right (i.e., the quantity of transboundary water foregone since 1964). The establishment of such a right may result in Lebanon leading the three other Jordan River co-riparian States that have ratified the UNWC (Syria, Jordan, the Palestinians) to issue a statement expressing a view that the UNWC reflects customary international law, in the expectation that other states in the region (i.e. OSol) would also abide by it.

In order to build an updated and full case file which would serve the preservation of Lebanon's basic rights in its transboundary water flows and defense of its position in the light of public international law, the Government of Lebanon is advised to **systematically disclose OSol violations of IWL to the Lebanese public and the international community**. The latter includes the Arab Water Council (Arab League), environmental NGOs, academic institutions, and across parliament. Relevant elements of the international community include the diplomatic community (e.g. US, Iran, Germany, UK, EU, Union for the Mediterranean), water circles (e.g. Euromed, GWP, Blue Peace), climate change circles (e.g. IPCC) – and more specifically every three years at meetings of the parties to the UNECE Water Convention.

More specifically, the Government of Lebanon is advised to **build a case for violations** of a) equitable and reasonable use; and b) protection of water resources and infrastructure in time of armed conflict. The principle of 'vital human needs' (both for prioritising use of water for livelihoods (i.e. drinking water and rural agriculture) (UNWC Art. 10), as well as in the definition of 'equitable and reasonable' use (DAA Draft Art.5)) is the first step forward.

ANNEXES

Annex A – Draft outline of OSol strategic interests in the Jordan River Basin

This section is a draft of the observable strategic objectives of OSol in the water resources throughout the Jordan River basin. It is based on another draft prepared by a researcher for a separate study, and is presented here for consideration of the many items of potential relevance.

The strategic objectives of OSol are considered to be: 1) maintenance of control of the use of headwaters of the Hasbani River, 2) protection of the Upper Jordan River from contamination, and 3) prevention of the establishment of a precedent of multi-lateral negotiations based on International Water Law. Each of these objectives is met either by use of force or negotiating a treaty in OSol's favour, or a combination of both.

OSol Objective 1: Maintain Control over the Headwaters of the Upper Jordan River

Conclusions drawn from *The Upper Jordan River Hydropolitical Baseline* specify OSol interests in and methods of control over the water resources in question.

“ [OSol] control of the Hasbani River is centred on the Wazzani Springs/Ghajar

Over half of the flow of the Hasbani measured in [OSol] is attributed to the discharge of the Wazzani Springs (Section 3.2). The flow of the Hasbani upstream of the Wazzani varies considerably throughout the year, often drying up during the summer months. From a water resources management perspective, only the base flows of a river can be counted on for a reliable supply, while flows additional to the base are counted as welcome surplus. Securing the stable flows from the Wazzani Springs is thus more important than establishing control of the entire Hasbani River.

The area around the Wazzani Springs coincides with the 'hydro-strategic territory' of Zohar and Schwarz (Figure 6.1) and Cohen's 'strategic water space' (Section 6.2). There is little evidence to suggest that [OSol]'s occupation of southern Lebanon – which included physical control of the entire Hasbani River Basin – was motivated primarily by control over the water resources. [OSol]'s withdrawal in 2000 from *nearly* the entire occupied zone may, however, be explained in part by hydrological considerations. [OSol]'s continued occupation of the northern part of the town of Ghajar allows it physical control (Section 4.5) over the nearby Wazzani Springs. Coupled with the 'remote' control re-established by deterrence following the 2002 Wazzani dispute (preventing further Lebanese development of water resources), the

continued [OSol] presence at the source of the springs is not inconsequential to their continued flow to [OSol].

[OSol] control of the Upper Jordan River is centred on the Liddan and Banias/Cheba'a Farms

As is the case with the Hasbani River, there is no reason to believe that control over the catchment area of the Banias and Liddan basins was a primary factor for the occupation of the Syrian Golan (in 1967), or invasion and subsequent occupation of southern Lebanon (from 1979). [OSol]'s failure to withdraw completely from Lebanon has multiple explanations, including a hydropolitical one. The flow of the Liddan River is twice as great as each the Banias and Hasbani rivers, and much more reliable (as the base flow (mainly from springs) is very stable). Though the Liddan Springs are located just within [OSol], part of the catchment area (and most of the surface and sub-surface recharge zone) is in Lebanon, and the springs are fed from runoff and snowmelt from Mount Hermon and the Cheba'a Farms. The Banias Springs are located just inside the Syrian Golan, but the river is also derived from rain and snow falling on or infiltrating Hermon. [OSol]'s retention of the Cheba'a Farms following its 2000 withdrawal is attributed mainly to the strategic military (communications) and religious (*Abraham's Covenant of the Pieces*) importance. The occupation thus provides [OSol] full control over the entire catchment areas of the Liddan of the Banias – and thus exclusive use and an ability to control the quality of the surface water flows that ultimately enters the Lake of Tiberias. Control over the recharge zones that lie in Lebanon is exerted through non-physical means, as described below.

...

Control over transboundary flows is possible through non-physical means, but is not sustainable

[OSol]'s occupation of the Golan and southern Lebanon clearly demonstrates how physical control over territory also provides physical control over the flows within that territory. More interesting is the study's exploration of the relation between control over water resources and the *withdrawal* from territory. While [OSol]'s retention of the Cheba'a Farms ensures continued control of the Liddan and Banias, the loss of territory that accompanied the 2000 withdrawal from most of Lebanon was soon followed by Lebanese development of the Hasbani. The near-war and diplomatic activity that followed Lebanon's construction of the 2002 Wazzani Pumping Station served to send clear messages from [OSol] against any future unilateral Lebanese development. The Wazzani pumping station has been abstracting at less than its design capacity in the decade following the incident, and no further development has occurred. The [OSol] 'remote' control established in this way through deterrence suggests a de-coupling of control over territory and of water. The recent failure of cooperative efforts on the Nile Basin (where Egypt employed similar forms of control

over upstream flows (Cascão 2009)) demonstrate that such control is subject to changed hydrological and political circumstances, however, and ultimately not sustainable. “

OSol Objective 2: Protect the Water Resources in the Jordan River Basin from Contamination

The water issue for OSol is much broader than simply just a matter of maintaining the quantity of water flowing into Lake Tiberias. According to Schiff “In addition to the future of Lake Kinneret, we must deal with preventing pollution of the water resources on the Syrian side, and with ensuring that the flow of water from the Baniyas will not harm those who reside downstream” and “Attention cannot be focussed on specific points alone, but rather on the entire northern water basin” (Schiff. Z, 1995 A), hence southern Lebanon as well. Therefore the water issue for OSol, vis-à-vis both Lebanon and Syria, is a matter of security, in terms of ensuring both the quantity and the quality, and as Schiff emphasises is “absolutely strategic and indeed existential” (Schiff. Z, 1994 A).

Considering that the Upper Jordan River provides more than fifty percent of the flow to Lake Tiberias, Schiff claims that “...the water issue is directly linked to security, because the question is one of protecting the water resources” (Schiff. Z, 1995 A); hence maintaining control becomes a strategic objective in itself, either through negotiations or in the status quo through both military and psychological deterrence, at all costs.

The importance of water between OSol and Lebanon has also been an issue in negotiations, primarily with the Syrians in the 1990’s. Schiff claims that “As long as a state of war exists between [OSol] and Syria, and as long as the sources of the Jordan cannot be secured, [OSol] cannot withdraw from the Golan Heights” (Schiff. Z, 1994 A), which presumably is also true for Lebanese territory that remains occupied by OSol. Schiff summarizes OSol’s insistence on issues pertaining to Lebanon being included in the Syrian negotiation track as follows:

“No Israeli-Syrian agreement can ignore the situation in Lebanon, especially southern Lebanon and the Bekaa Valley. No understanding can be reached on Israeli withdrawal from the Golan Heights in the absence of broad security arrangements that include southern Lebanon and the Bekaa and address Syria’s military presence in those areas. For military purposes, the Golan and Lebanon are one bloc, and security arrangements must, as a result, encompass areas falling under three different sovereignties – Syria, Israel and Lebanon.

Lebanon must be included in any agreement and enjoy security arrangements from its two stronger neighbors. It, in turn, must commit itself not to divert the Hasbani River, an important source of the Jordan. Within the framework of this agreement, Lebanon must disarm Hezbollah and prevent potentially disruptive outside forces, e.g., the Iranian Revolutionary Guards, from operating against Israel from its territory. Israel, for its part, would withdraw from its security zone in southern Lebanon.” (Schiff. Z, 1994 A)

It can thus be interpreted that OSol views that security of its water sources, and demilitarisation in both Southern Lebanon and the Golan Heights, must be achieved through negotiations if any withdrawal from occupied Lebanese and Syrian land is to eventuate. Furthermore Schiff asserts that “Water – especially that of OSol’s main (and only) reservoir, the Sea of Galilee – is not some irrelevant military question, but is, in fact, a central strategic problem of national proportions. And it should therefore be a major item on the IDF’s agenda” (Schiff, 2000 A). The negotiations rounds between OSol and Syria are relatively well documented, and in terms of negotiating borders, water has played a central role in the determination of where adjustments could take place, as a result of OSol water experts being assigned to OSol negotiations team alongside military planners. For OSol “water must be viewed as an additional dimension of the terrain” (Schiff, 1989) if OSol’s sources of water are not to be irreparably harmed.

OSol Objective 3: Preventing multi-lateral negotiations

OSol’s military actions and political rhetoric, over the past three decades, reinforce the premise that OSol is implementing a policy of control over the resources rather than simply attempting to secure its existing use from the Upper Jordan River. This is primarily for the purpose of preventing pollution of the water resources, as mentioned above, but also of OSol concern is the precedent that could be set if Lebanon takes actions to increase their withdrawal from the Hasbani, no matter how small, and OSol fails to react. In a similar vein, Eyal Zisser reports that:

“Israeli spokesmen have also explained that, from Israel’s perspective, the problem is not the quantity of water but rather the precedent of unilateral Lebanese action on a particularly sensitive issue. Israeli decision makers are probably also thinking about past experience, i.e., the efforts of Arab states in the early 1960s to divert the sources of the Jordan River that set in motion a chain of events culminating in the Six Day War of 1967” (Zisser, E., 2002).

Schiff adds weight to this argument by analysing further the OSol narrative in response to the Lebanese project to withdrawal additional quantities of water from the Wazzani Spring, which was initiated after the OSol withdrawal from Southern Lebanon in 2000, by stating that:

“Most water experts in Israeli government, and some security officials, believe that Israel must display an aggressive stance toward Lebanon, and be willing to carry out a military response if no allocation agreement is reached. But officials who deal with political-diplomatic matters hold that in light of the Iraq situation, Israel should refrain from steps on the northern border that could precipitate military conflict. That is to say, considerations of timing will influence Israel's decisions.

Israel's forceful approach derives from a number of considerations, not all of which stem from worries about water. Lebanon's move, it's said, violates a quiet international agreement reached between Israel and Lebanon with U.S. mediation. Israel also claims that Lebanon's move could set a dangerous precedent of unilateral steps on key topics, which might influence the Palestinians after peace agreements are reached with them, and also come into play during any future contact”. (Schiff. Z, 2002 A)

By the end of 2002, Schiff followed up on this piece by suggesting that “The red line could even be crossed over the issue of the Wazzani water. [OSol] is not looking for a confrontation, but if the unilateral actions in Lebanon continue and [OSol]’s water sources are seriously compromised, there will be no avoiding an [OSol] response” (Schiff. Z, 2002 B). OSol’s actions demonstrate their obvious preference for maintaining the status quo and avoiding the onset of bilateral negotiations with Lebanon, prior to resolving the dispute over the Golan Heights with Syria. OSol therefore views any attempt by Lebanon to utilise additional quantities of water, no matter how small, from the Hasbani and Wazzani as a dangerous threat to the status quo, because it begins to challenge OSol’s control of the shared water resources of the Jordan River Basin and its ability to maintain what has become commonly accepted – the highly inequitable distribution – which has been in place for decades at the expense of all of the Arab riparians.

OSol has been extremely successful in ensuring that negotiations with all of the Arab riparians of the Jordan River Basin remain on the bilateral front and do not develop into regional negotiations as proposed in the Arab Peace Initiative of 2002 at the Beirut Summit of the Arab League by then-Crown Prince, King Abdullah of Saudi Arabia, which was later re-endorsed at the Riyadh Summit in 2007. In regards to water, the main reason for this is because OSol’s leverage would be considerably weakened by an Arab alliance over the acquisition of their share of the water from the Jordan River Basin, all of which have access to (utilise) far less than their equitable and

reasonable share in accordance with customary international law. This is especially true, considering that all of the Arab riparians have either signed (Lebanon, Syria and Jordan) the 1997 United Nations Convention on the Law of the Non-navigational Uses of International Watercourses, or in the case of Palestine, expressed that upon achieving statehood they would sign the convention as a matter of priority.

In this regard, Jordan is the first and only Arab country to supposedly settle its water dispute with OSol, as part of the Treaty of Peace between the State of OSol and the Hashemite Kingdom of Jordan, which was signed in 1994. Considering the outcome of the agreement between OSol and Jordan, OSol was overwhelmingly successful in upholding its policy of control by ensuring that Jordan only receive a transfer of water from the Lower Jordan River, hence Lake Tiberias, which is allocated by OSol to Jordan in the summer, but only after Jordan supplies the equivalent quantity during the winter, as stated in “Article I. Allocation, Clause 1. Water from the Yarmouk River”, from the agreement (OSol-Jordan Peace Treaty, 1994). It is important to note that the OSol-Jordanian Peace Treaty, in regards to water, falls far short of the quantity of water allocated to Jordan in the Johnston Plan, which is often referenced as a benchmark for the distribution of water from the Jordan River Basin, not to mention what Jordan’s equitable and reasonable share would be, in accordance with customary international water law. Furthermore, OSol ensured that the agreement referred to a “rightful share” for both of the riparians and secured OSol’s claim to the water from the Yarmouk River, as stated in Article 6, Clause 1 of the Agreement: “The Parties agree mutually to recognise the rightful allocations of both of them in Jordan River and Yarmouk River waters and Araba/Arava ground water in accordance with the agreed acceptable principles, quantities and quality as set out in Annex II, which shall be fully respected and complied with” (OSol-Jordan Peace Treaty, 1994).

In preparation for negotiations prior to the signing of the agreement, Schiff gives us a rare glimpse into OSol’s negotiations position in regards to Jordanian water demands:

“The Jordanians are demanding that the land and water rights Israel took away from them be returned. Israel will reply that there can be no discussing previous rights, that a new leaf needs to be turned, and that it is possible that Israel will not only not make concessions, but will make new demands.” (Schiff, 1994 B)

Schiff then poses a theoretical question and proceeds to answer it and in doing so reveals aspects of OSol’s negotiations position vis-à-vis the Arab riparians of the Jordan River Basin:

“How will Israel respond? There will be no new allocation of water. Israel does not recognize water debts to Jordan, and it has no extra water. In other words, Johnston is dead, and his Plan with him. In any case, no aspect of his Plan has been carried out. As to the Arab claim regarding

*historic rights to the drainage basin and their contribution to the water sources, Israel will reply (also on the basis of international law) that the current utilization of the waters must be considered, as well as the economic damage that Israel would suffer if its water quotas were to be cut. Of course, this is a sweeping approach. The water team has taken the correct decision: to treat the water issue in an overall, regional fashion; if not, water could be given to Jordan, then to the Palestinians, the Syrians will take their share, and Israel will be left with an empty trough. Even so, we must not forget that **if we reach wise agreements with Jordan, this will be a positive precedent for a regional plan involving other countries.**"*
(Schiff, 1994 B)

It becomes clear that Schiff applies OSol's negotiations position vis-à-vis Jordan holds lessons for potential negotiations with the other Arab riparians of the Jordan River Basin. Although he refers to a positive precedent being set in relation to a regional plan, if OSol achieves its water objectives through negotiations with Jordan, it can be inferred that he is referring to an OSol regional negotiations strategy in dealing with other bilateral negotiations and not regional or multilateral negotiations, considering that OSol has always maintained that Palestine is not a riparian to the Jordan River Basin. Furthermore, it can be expected that OSol will likely deploy a similar approach in negotiations with Lebanon and Syria, as this will enable OSol to maintain its control over the strategic resource of Lake Tiberias while resolving the water rights issue with the Arab riparians by opting to supply each of the riparian countries' water at the expense of allowing self-production to eventuate.

It is clear from the text of the agreement that Jordan signed with OSol, that Jordan conceded away their rightful allocation of the shared water resources from the Jordan River Basin to OSol for the illusive promise of "effective cooperation" that they sought in order to acquire additional significant quantities of water, which would outstrip what they conceded, through the development of "new water" (e.g. seawater desalination and bulk water importation). Time elapsed since the agreement was signed is beginning to prove that this approach is yielding negligible benefits for Jordan. It is this very illusion of cooperation that allows OSol to deflect international criticism over the highly inequitable distribution of resources that persists and their sheer indifference to upholding customary international law, while enabling them to acquire international funding for bilateral and multilateral projects, that encourages OSol to engage with the other Arab riparians in this very manner.

As a result of a historic record being established from previous rounds of negotiations on water between OSol and Syria as well as OSol and Palestine, Lebanon would be wise to heed the lessons which can be derived from the Syrian and Palestinian experiences. Of particular relevance to Lebanon in regards to the Hasbani River and potential territorial compromises, OSol will most probably maintain as it did with the

Syrians that “Among the water sources to be protected is the Sea of Galilee, [OSol]’s sole large reservoir, which is inside [OSol] territory proper. The international border runs ten meters from the lake’s northeastern shore. The border must be corrected so as to prevent disputes in the future” (Schiff, 1994 A). At the same time, OSol will most probably insist, as it did with the Palestinians, that when the final borders are drawn that adjustments be made on the frontier, for they “would greatly restrict the degree to which [OSol]’s water system could be damaged in the event of a future misunderstanding” (Schiff, 1989); hence OSol’s insistence on maintaining a presence in the town of Ghajar near the Wazzani Springs.

With the exception of Lebanon, since no meaningful negotiations have taken place between the two states, OSol, as previously stated, has presumably dealt with the water dispute over the Hasbani River, in the negotiations with Syria. This is an exception to OSol’s normal practice of maintaining bilateral negotiations with each of the other riparians of the Jordan River Basin, namely Syria, Jordan and Palestine. Schiff confirms this when he writes on OSol red lines in negotiations with Syria:

“With regard to water, the Israelis want substantial defense of their water sources, both the Sea of Galilee and the sources of the Jordan River. Israeli public opinion is very opposed to Syria claiming any part of the Sea of Galilee, whereas Syria states that the seashore is within its 1967 border.

Any agreement signed between Israel and Syria will include understandings about Lebanon at least implicitly and must incorporate provisions that at least serve to quell the other two actors.” – (namely Hezbollah and Iran) – (Schiff, 2000 B).

The primary reason for this is because through the OSol-Syrian negotiation track, OSol can extract concessions from Lebanon through Syria, which will set a dangerous precedent by providing OSol leverage vis-a-vis Lebanon, both in terms of security and water related issues in Southern Lebanon, without even having to negotiate with Lebanon.

Annex B – UNWC Voting Record and Accessions

Figure B.1 UN Watercourses Convention Voting Records. *Source:* Rieu-Clarke (2012: Fig B.9).

UN Watercourses Convention Voting Records					
Sponsors (38)	In Favour (106)		Abstentions (26)	Absent (31)	Against (3)
Antigua and Barbuda	Albania	Madagascar	Andorra	Afghanistan	Burundi
Bangladesh	Algeria	Malawi	Argentina	Bahamas	China
Bhutan	Angola	Malaysia	Azerbaijan	Barbados	Turkey
Brazil	Antigua and Barbuda	Maldives	Bolivia	Belize	
Cambodia	Armenia	Malta	Bulgaria	Benin	
Cameroon	Australia	Marshall Islands	Colombia	Bhutan	
Canada	Austria	Mauritius	Cuba	Cape Verde	
Chile	Bahrain	Mexico	Ecuador	Comoros	
Denmark	Bangladesh	Micronesia	Egypt	Democratic People's	
Finland	Belarus	(Federated States of)	Ethiopia	Republic of Korea	
Germany	Belgium*	Morocco	France	Dominican	
Greece	Botswana	Mozambique	Ghana	Republic	
Grenada	Brazil	Namibia	Guatemala	El Salvador	
Honduras	Brunei Darussalam	Nepal	India	Eritrea	
Hungary	Burkina Faso	Netherlands	Israel	Guinea	
Italy	Cambodia	New Zealand	Mali	Lebanon	
Japan	Cameroon	Nigeria*	Monaco	Mauritania	
Jordan	Canada	Norway	Mongolia	Myanmar	
Lao People's Democratic Republic	Chile	Oman	Pakistan	Niger	
Latvia	Costa Rica	Papua New Guinea	Panama	Palau	
Liechtenstein	Côte d'Ivoire	Philippines	Paraguay	Saint Kitts & Nevis	
Malaysia	Croatia	Poland	Peru	Saint Lucia	
Mexico	Cyprus	Portugal	Rwanda	Saint Vincent and the Grenadines	
Nepal	Czech Republic, Denmark	Qatar	Spain	Senegal	
Netherlands	Djibouti	Republic of Korea	United Republic of Tanzania	Solomon Islands,	
Norway	Estonia	Romania	Uzbekistan	Sri Lanka	
Portugal	Fiji*	Russian Federation		Swaziland	
Republic of Korea	Finland	Samoa		Tajikistan	
Romania	Gabon	San Marino		The former Yugoslav Republic of Macedonia	
Sudan	Georgia	Saudi Arabia		Turkmenistan	
Sweden	Germany	Sierra Leone		Uganda	
Syrian Arab Republic	Greece	Singapore		Zaire	
Tunisia	Guyana	Slovakia		Zimbabwe	
United Kingdom of Great Britain and Northern Ireland	Haiti	Slovenia			
United States of America	Honduras	South Africa			
Uruguay	Hungary	Sudan			
Venezuela	Iceland	Suriname			
Vietnam	Indonesia	Sweden			
	Iran (Islamic Republic of)	Syrian Arab Republic			
	Italy	Thailand			
	Jamaica	Trinidad and Tobago			
	Japan	Tunisia			
	Jordan	Ukraine			
	Kazakhstan	United Arab Emirates			
	Kenya	United Kingdom of Great Britain and Northern Ireland			
	Kuwait	United States of America			
	Lao People's Democratic Republic	Uruguay			
	Latvia	Venezuela			
	Lesotho	Vietnam			
	Liberia	Yemen			
	Libyan Arab Jamahiriya	Zambia			
	Liechtenstein				
	Lithuania				
	Luxembourg				

*The official vote recorded 103 votes in favour. Subsequently, Belgium, Fiji and Nigeria stated they intended to vote in favour.

Figure B.9 |
UN Watercourses Convention
Voting Records

Figure B.2 Status of UN Watercourses Convention, end 2013. *Source: [UN Treaty Database](#)*

Participant	Signature	Ratification, Acceptance(A), Accession(a), Approval(AA)
Benin		5 Jul 2012 a
Burkina Faso		22 Mar 2011 a
Chad		26 Sep 2012 a
Côte d'Ivoire	25 Sep 1998	
Denmark		30 Apr 2012 a
Finland	31 Oct 1997	23 Jan 1998 A
France		24 Feb 2011 a
Germany	13 Aug 1998	15 Jan 2007
Greece		2 Dec 2010 a
Guinea-Bissau		19 May 2010 a
Hungary	20 Jul 1999	26 Jan 2000 AA
Iraq		9 Jul 2001 a
Ireland		20 Dec 2013 a
Italy		30 Nov 2012 a
Jordan	17 Apr 1998	22 Jun 1999
Lebanon		25 May 1999 a
Libya		14 Jun 2005 a
Luxembourg	14 Oct 1997	8 Jun 2012
Montenegro		24 Sep 2013 a
Morocco		13 Apr 2011 a
Namibia	19 May 2000	29 Aug 2001
Netherlands	9 Mar 2000	9 Jan 2001 A
Niger		20 Feb 2013 a
Nigeria		27 Sep 2010
Norway	30 Sep 1998	30 Sep 1998
Paraguay	25 Aug 1998	
Portugal	11 Nov 1997	22 Jun 2005
Qatar		28 Feb 2002 a
South Africa	13 Aug 1997	26 Oct 1998
Spain		24 Sep 2009 a
Sweden		15 Jun 2000 a
Syrian Arab Republic	11 Aug 1997	2 Apr 1998
Tunisia	19 May 2000	22 Apr 2009
United Kingdom of Great Britain and Northern Ireland		13 Dec 2013 a
Uzbekistan		4 Sep 2007 a
Venezuela (Bolivarian Republic of)	22 Sep 1997	
Yemen	17 May 2000	

ANNEX C – Lebanese Bi-lateral Legal Instruments

The only existing bilateral legal instruments for transboundary waters signed by Lebanon are those agreed to with Syria, described below.⁶⁷ These agreements are found to have little direct bearing on the study at hand either because their provisions are very general, or they are not related to the Upper Jordan River Basin.

Syria-Lebanon Agreement dated 20/9/1994

The Syria-Lebanon Agreement dated 20/9/1994 regards the distribution of the *El Assi* river water stemming in Lebanon. The Lebanese Law that allowed the latter's ratification is Law N. 464 dated 12/12/2002.

Syria-Lebanon Memorandum of Understanding and Cooperation in the field of environment dated 24/2/2000

Interestingly, the Syria-Lebanon Memorandum of Understanding and Cooperation in the field of environment dated 24/2/2000 was signed between the Ministries of Environment (and not the Ministry of Foreign Affairs) of each country. The Lebanese text allowing its ratification is the decree N. 6077 dated 16/8/2001 of which the following articles deserve mention. Article 3 concerns coordination and cooperation with Arab states about Arab environmental matters. Article 7 regards cooperation in the field of water safety and sanitary engineering. In addition, Article 8 pertains to cooperation in the field of complete environmental administration, and Article 16 pertains to common commissions.

Annex dated 3/3/2002, to Syria-Lebanon above-mentioned Agreement dated 20/9/1994

A 2002 Annex to the 1994 Syria-Lebanon *El Assi* Agreement relates also to the *El Kebir* and *Al Janoubi* rivers. Article 6 of the Annex relates to all the watercourses, and refers to the minutes of the meeting held in Damascus on 11/1/1997 between Lebanon's Minister of Water and Electricity Resources and Syria's Minister of Irrigation.

Syria-Lebanon Convention, dated 20/4/2002

The Syria-Lebanon Convention aims for sharing the water of *El Kebir* and *Al Janoubi* rivers, and for the construction of a common dam on it. The Lebanese Law which allowed this convention's ratification is Law N. 458 dated 29/8/2002.

⁶⁷ Cf. Sader Publishers (in Arabic): صادر في الاتفاقيات الدولية الخاصة، المنشورات الحقوقية صادر، 2007، القسم الخامس، ص. 5211 وما يليها

Annex D – Miscellaneous Lebanese Water Institutions

Table D.1 List of relevant laws, decrees and decisions related to water sector (MoE/URC/GEF; 2012).

Type	Number	Title	Date issue	Remarks
<i>Creation and organization of water syndicates and their role</i>				
Law	221	Organization of the water sector	2000	Amended by Law 241, 2000 and Law 377, 2001
Decree	8122	Application of some clauses of Law 221	2002	Fusion of water committees into regional water services
Decree	65	Creation of water Syndicate for the water use of El Jawz River	1943	
Decision	320	Conservation and use of public water	1926	Amended by the decree 680, 1990. Includes clauses for the creation of water syndicates
<i>Creation and organization of water infrastructure</i>				
Decision	3	Water policy for the creation of dams and hill lakes	2003	10 years strategy; under Law 221, 2000
Decree	13785	Creation of the Green Plan	1963	Installation of hill lakes, water reservoirs, irrigation system on farm level
Decree	20022	Creation of Qasmiyeh irrigation scheme	1958	Irrigation scheme for farmers using water of Qassmiyeh (Litani) River.
Ottoman Law		Rights for irrigation and use of distribution network and rivers and their maintenance	1918	
Ottoman Law		Irrigation Law	1913	
<i>Water use</i>				
Law	3339	Property Law	1930	
Ottoman Law		Ottoman Journal for judicial provisions, regulation of water use	1876	

Table D.2 Available data on stations in & near Hasbani watershed BCW

Caza	Station	Elevation (m)	Years of record	Average Annual Precipitation (mm)
Marjayoun	Markaba	670	5	1256
Marjayoun	Marjayoun	760	25	894
Hasbaya	Hasbaya	750	27	1030
Hasbaya	KfarZabad	940	28	991
Bint Jbeil	Aitaroun	680	32	787
Bint Jbeil	Ain Ibel	765	12	802
Rachaya	Kafar Qouq	1210	10	948
Rachaya	Rachay	1235	25	847
Rachaya	Yanta	1500	8	593

Table D.3 Available data on stations in & near Hasbani watershed ACW

Caza	Station	Elevation (m)	Years of records	Aver. Ann. Precipitation mm	Operator	Notes
Marjayoun	Marjayoun	760	3	957.4	LNMS	
Rachaya	Kafar Qouq	1210	3	658.75	monthly -LNMS	
West Bekaa	Qaraoun	843	11	745.7	LNMS	
Bint Jbail	Kafar Dounine	560	7	749.84	LNMS	
Hasbaya	Mimes	820	3	505.46	LARI	
Marjayoun	El Khyem	714	3	873	LARI	many gaps
Marjayoun	Markaba	520	3	1354.865	LARI	many gaps
Rachaya	Rachaya	1235	3	817.6	LARI	many gaps

Annex E – Method to Calculate an Actor’s Basic Right to Equitable and Reasonable Use of Transboundary Waters

The most explicit method for estimating the ‘equitable and reasonable’ share of use of transboundary flows is provided in the ‘Operational Tool’ of the *Legal Assessment Model* (Wouters, *et al.* 2005: 43+), with further guidance provided in Rieu-Clarke *et al.* (2012). The method is centred around the data required to quantify – and then negotiate – each of the factors relevant to ‘equitable and reasonable use’.

Initial steps taken in this study towards the determination of each actor’s basic right to equitable and reasonable use suggest collecting and estimating data for a comprehensive audit of both a) water availability (including for soil water, which requires greater data on evapotranspiration rates and soil moisture levels), and b) water use – in the past, current, and future (through scenarios). The relevant data-collection matrices are provided for future calculations, below.

Audit of physical water availability required to estimate an actor’s basic right to an equitable and reasonable share of a transboundary water resource.

	Quantity	Quality
Surface water		
Soil water		
groundwater		

Audit of water use required to estimate an actor’s basic right to an equitable and reasonable share of a transboundary water resource.

	Historic use	Current Use (2011)	Projected Needs Scenario A	Projected Needs Scenario B	Projected Needs Scenario C
Surface water					
Soil water					
groundwater					

References

- Abdallah, C, Bou Kheir, R, Khawlie, M and Faour, G (2006). Comparative Analysis of Drainage Networks Extracted from DEMs and conventional Approaches in Lebanon. *Lebanese Science Journal* 7(1): 49-62.
- Abdallah, C, Hdeib, R, Higaz, S, Darwish, T and Merheb, M (2013). *Flood hazard mapping assessment for Lebanon*. Beirut, UNDP/CNRS-2382.
- Allan, J A (2001). *The Middle East Water Question: Hydropolitics and the Global Economy*. London, UK: I.B. Tauris.
- Anon (2011, pers.comm). Anonymised phone interview. 26 August 2011.
- Beaumont, P (1997). Dividing the Waters of the River Jordan: An Analysis of the 1994 Israel-Jordan Peace Treaty. *Water Resources Development* 13(3): 415 - 424.
- Bou Jaoude, I (2013). *Hydrogeological study of the underground water system in the el marj plain: the source of the Dardara spring*, Study presented to FAO, August 2013.
- Briellmann, H (2008). Recharge and discharge mechanism and dynamics in the mountainous northern Upper Jordan River Catchment, Israel, LMU Muenchen: Faculty of Geosciences.
- Burlamaqui, J-J (2007). *Principes du droit naturel*. Dalloz (reprenant dans son intégralité le texte de la "nouvelle édition revue et corrigée" dudit ouvrage, parue en 1756).
- Comair, G F, McKinney, C and Siegel, D (2012). Hydrology of the Jordan River Basin: Watershed Delineation, Precipitation and Evapotranspiration. *Water Resources Management* (DOI 10.1007/s11269-012-0144-8).
- Cook, B R and Spray, C J (2012). Ecosystem services and integrated water resource management: Different paths to the same end? *Journal of Environmental Management* 109: 93 - 100.
- Courcier, R, Venot, J P and Molle, F (2005). *Historical Transformations of the Lower Jordan River Basin (in Jordan): Changes in Water Use and Projections*. Comprehensive Assessment of water management in agriculture, Research Report 9. Colombo, Sri Lanka, International Water Management Institute.
- Daoudy, M (2008). A Missed Chance for Peace: Israel and Syria's Negotiations Over the Golan Heights. *Journal of International Affairs* 61(2): 215 - 234.
- Dellapenna, J W (2003). Water Rights and International Law. In *The Iraqi Marshlands: A Human and Environmental Study*. Nicholson, E. and P. Clark (ed.). London, UK: Politico's.
- Dellapenna, J W (2006). Equitable Participation and the New Paradigm for International Water Law: The Key to Governance of the Global Water System. International Conference - Governance and the Global Water System:

- institutions, actors, scales of water governance facing the challenges of global change. Bonn, Germany, Global Water Systems Project.
- Eiland, G (2009). *Defensible Borders on the Golan Heights*. Jerusalem, Jerusalem Center for Public Affairs.
- el Musa, S (1997). *Water Conflict - Economics, Politics, Law and Palestinian-Israeli Water Resources*. Washington DC, USA: Institute for Palestine Studies.
- ESCWA (2011). *ESCWA Water Development Report 4: National Capacities for the Management of Shared Water Resources in ESCWA Member Countries*. E/ESCWA/SDPD/2011/4. New York, UN Economic and Social Commission for Western Asia.
- ESCWA-BGR (2012). Ch6: Jordan River Basin. In *Inventory of Shared Water Resources in Western Asia*. (ed.). Beirut: UN Economic and Social Commission for Western Asia (ESCWA), and the German Federal Institute for Geosciences and Natural Resources (BGR). 169 - 222.
- FAO (2001). *FAO Statistical Databases*. FAOSTAT CD-ROM 2001. Rome, Food and Agriculture Organization of the United Nations.
- FAO (2009). *Irrigation in the Middle East region in figures*. FAO Water Reports No. 34. Franken, K. Rome, Food and Agriculture Organization.
- Faruqui, N, Biswas, A and Bino, M (2001). *Water Management in Islam*. United Nations University Press. 149 pp.
- Fischhendler, I (2008). Ambiguity in Transboundary Environmental Dispute Resolution: The Israel-Jordanian Water Agreement. *Journal of Peace Research* 45(1): 91 - 110.
- Geadah (2002). Valuation of Agricultural and Irrigation Water: the Case of Lebanon. Water Demand Management Forum on Water Valuation, 25 - 27 June 2002, Beirut.
- Haddadin, M (2001). *Diplomacy on the Jordan: International Conflict and Negotiated Resolution*. International Development Research Centre and Kluwer Academic Publishers.
- Hartmann, A (2008). Process-based modelling of karst springs in Mt. Hermon, Israel, Institut für Hydrologie Albert-Ludwigs-Universität Freiburg im Breisgau.
- Hof, F C (2009). *Mapping Peace between Syria and Israel*. Special Report 219. Washington DC, United States Institute of Peace. March 2009.
- ICRC (1994a). *Handbook of the International Red Cross and Red Crescent Movement - International Humanitarian Law*. Geneva, Switzerland: International Committee of the Red Cross.
- ICRC (1994b). Lebanon: Water supply problems during the 1989 and 1990 wars. In *Water and War: Symposium on Water in Armed Conflict, Montreux, 21-23 November 1994*. (ed.). Geneva: International Committee of the Red Cross.
- Jaber, B (1995). *Water problems of Lebanon (Arabic)*. Beirut: National Congress on Water Strategic Studies Centre. 67 pp.

- Jaber, B (2011). *Water sector Legislations and special regulations: The developmet of legislation and water systems in Lebanon (Arabic)*. Beirut: National Congress on Water Strategic Studies Centre. 10 pp.
- Jacobs Gibb (2007). *Design fo Ebel El Saqi Dam on Nahr El Hasbani, Hydrogeological Report*, Jacobs Gibb in association with RELK&P Consulting Engineers.
- Khalife, I (2001). *Lebanon: water and the border (Arabic)*. Beirut: al-Mu'allif.
- Khalife, I (2008). *Lebanon: water and the border - Documents on Cheba'a Farms (Arabic)*. Beirut: Joseph Hajj Press.
- Khawlie, M (2002). Shared water resources in Lebanon: A case study (Arabic). Arab Seminar on international legal basis for shared water, Damascus, ASCAD.
- Khawlie, M (2003). The impacts of climate change on the water resources of Lebanon - Easter Mediterranean. In *Climate change in the Mediterranean: socio-economic perspectives of impacts, vulnerability and adaptation*. . Gupponi, C. and M. Schecter (ed.). London: Edward Edgar. 94 - 107.
- Kinna, R, Rieu-Clarke, A and Loures, F R (2013). Global UN Water Conventions: Options for Coordinated Implementation. *Discussion Paper*: University of Dundee.
- Klein, M (1998). Water Balance of the Upper Jordan River Basin. *Water International* 23(4): 244 - 248.
- Leb, C (2012). The right to water in a transboundary context: emergence of seminal trends. *Water International* 37(6): 640 - 653.
- Malanczuk, P, (Eds). (1997). *Akehurst's Modern Introduction to International Law - 7th Edition*. London and New York: Routledge.
- McCaffrey, S (2005). The Human Right to Water Revisited. In *Water and International Economic Law*. Brown Weiss, E., L. Boisson deChazournes and N. Bernasconi-Osterwalder (ed.). Oxford, UK: Oxford University Press.
- McCaffrey, S (2007). *The Law of International Watercourses*. Oxford: Oxford University Press.
- McCaffrey, S C (2009). The International Law Commission Adopts Draft Articles on Transboundary Aquifers. *The American Journal of International Law* 103: 272 - 293.
- McCaffrey, S C (2011). The International Law Commission's flawed Draft Articles on the Law of Transboundary Aquifers: the way forward. *Water International* 36(5): 566 - 572.
- MED EUWI (2009). *Summary Report - Policy Dialogue on Integrated Water Resources Management Planning in the Republic of Lebanon*, European Union Water Initiative - Mediterranean.
- Mirumachi, N and Allan, J A (2007). Revisiting transboundary water governance: power, conflict cooperation and the political economy. Proceedings from CAIWA International Conference on Adaptive and Integrated Water Management: Coping with Scarcity, 12 - 15 November 2007, Basel, Switzerland.

- Mirumachi, N, Zeitoun, M and Warner, J (forthcoming). Transboundary water interactions and the UN Watercourses Convention: Allocating waters and implementing principles. In *The UN Watercourses Convention in Force: Strengthening International Law for Transboundary Water Management*. Rieu-Clarke, A. and F. R. Loures (ed.). London: Routledge.
- MOE/UNDP/ECODIT (2011). *State & Trends of the Lebanese Environment*. Beirut, Lebanon Ministry of the Environment, United Nations Development Programme, ECODIT.
- MoEW (2010a). *National Water Sector Strategy: Baseline*, Ministry of Energy and Water (Lebanon). 15 September 2010.
- MoEW (2010b). *National Water Sector Strategy: Strategic Roadmap*, Ministry of Energy and Water (Lebanon). 27 December 2010.
- Moussa, J (2013). International Water Law & Allocation in the Nile Basin: A coherent system of law or empty rhetoric? Presentation given to the UEA Water Security Research Centre, 8 March 2013, University of East Anglia, Norwich, UK.
- MSL (1977). *Atlas Climatique du Liban*, Meteorological Service of Lebanon, Ministry of Public Works and Transport.
- Pejic, J (2001). Non-discrimination and armed conflict. *International Review of the Red Cross* 83(841): 183 - 194.
- Phillips, D, Attili, S, McCaffrey, S and Murray, J (2007a). The Jordan River Basin: 1. Clarification of the Allocations in the Johnston Plan. *Water International* 31(5): 16 - 38.
- Phillips, D, Attili, S, McCaffrey, S and Murray, J (2007b). The Jordan River Basin: 2. Potential Future Allocations to the Co-riparians. *Water International* 31(5): 39 - 62.
- Plassard, J (1971). *Carte pluviométrique du Liban au 1/200 000*, Ministry of Public Works and Transport (Lebanon).
- Raymondis, L-M (1947). Contribution à l'Etude du Droit Naturel: Le Droit Naturel comme Base de Validité et comme Guide du Législateur, Une vision juridique et politique. Thesis submitted for the degree of. Faculté de droit. l'Université de Toulouse, Toulouse.
- Rieu-Clarke, A, Moynihan, R and Magsig, B-O (2012). *UN Watercourses Convention: User's Guide*, IHP-HELP Centre for Water Law, University of Dundee.
- Rimmer, A and Salingar, Y (2006). Modelling precipitation-streamflow processes in karst basins: The case of the Jordan River sources, Israel. *Journal of Hydrology* 331(3-4): 524 - 542.
- RoL - MoE (2011). *Lebanon's Second National Communication to the United Nations Framework Convention on Climate Change*. Beirut, Ministry of Environment, Republic of Lebanon.

- Salman, S M A (2007a). The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: Perspectives on International Water Law. *Water Resources Development* 23(4): 625 - 640.
- Salman, S M A (2007b). The United Nations Watercourses Convention Ten Years Later: Why Has its Entry into Force Proven Difficult? *Water International* 32(1): 1 - 15.
- Salman, S M A (2010). Downstream riparians can also harm upstream riparians: the concept of foreclosure of future uses. *Water International* 35(4): 350 - 364.
- Selby, J (2003a). Dressing up Domination as 'Co-operation': The Case of Israeli-Palestinian Water Relations. *Review of International Studies* 29(1): 121-138.
- Selby, J (2003b). *Water, Power and Politics in the Middle East - The Other Israeli-Palestinian Conflict*. London, UK: I.B. Tauris.
- Selby, J (2013). Cooperation, Domination and Colonisation: The Israeli-Palestinian Joint Water Committee. *Water Alternatives* 6(1): 1 - 24.
- Shaban, A (2008). Indicators and Aspects of Hydrological Drought in Lebanon. *Water Resources Management* 23(10): 1875 - 1891.
- SHD (2009). Droit Naturel et Droits de l'Homme. Journées Internationales de la Société d'Histoire du Droit, mai 2009, Grenoble et Vizille.
- Sosland, J K (2007). *Cooperating Rivals: The Riparian Politics of the Jordan River Basin*. New York, USA: State University of New York Press. 294 pp.
- Stephan, R M, (Eds). (2009). *Transboundary Aquifers: Managing a Vital Resource: The UNILC Draft Articles on the Law of Transboundary Aquifers*. Paris: United Nations Educational, Scientific and Cultural Organisation.
- Tabbah, B (1951). L'enseignement du droit et la coopération internationale. *Revue Internationale de Droit Comparé* 3(4): 238 - 248.
- Tignino, M (2010). Water, international peace, and security. *International Review of the Red Cross - Humanitarian debate: law, policy, action* 92(879).
- Tignino, M (2011). The right to water and sanitation in post-conflict peacebuilding. *Water International* 36(2): 242 - 249.
- UN ILC (2008a). *Draft articles on the law of transboundary aquifers*. Report of the International Law Commission, Sixtieth session, A/63/10, International Law Commission.
- UN ILC (2008b). *Shared natural resources: comments and observations by Governments on the draft articles on the law of transboundary aquifers*. Refers to Report of the International Law Commission, Sixtieth session. Ref A/CN.4/595, International Law Commission. 5 May - 6 June and 7 July-August 2008.
- UNDP (1970). *Liban - Etude des eaux souterraines*. New York, United Nations Development Programme.
- UNECE (1992). *Convention on the Protection and Use of Transboundary Watercourses and International Lakes*. Helsinki, 17 March 1992, UN Economic Commission for Europe.

- UNECE (2011). *Second Assessment of transboundary rivers, lakes and groundwaters*. ECE/MP.WAT/33, United Nations Economic Commission for Europe.
- UNECE (2013). *Guide to Implementing the Water Convention*. ECE/MP.WAT/39, United Nations Economic Commission for Europe - Convention on the Protection and Use of Transboundary Watercourses and International Lakes.
- UNGA (2012). *Sixth Committee - Summary record of the 16th meeting held at Headquarters 18 October 2011*. Ref A/C.6/66/SR.16, UN General Assembly.
- Warner, J, Wester, P and Bolding, A (2008). Going With the Flow: River Basins as the Natural Units for Water Management? *Water Policy* 10(S2): 121 - 138.
- Watson, G R (2000). *The Oslo Accords*. Oxford: Oxford University Press. 442 pp.
- Woodhouse, M and Zeitoun, M (2008). Hydro-Hegemony and International Water Law: Grappling with the Gaps. *Water Policy* 10(S2): 103 - 119.
- World Bank (2003). *Republic of Lebanon: Policy Note on Irrigation Sector Sustainability*. Report No. 28766 - LW. Washington DC, The World Bank, Water, Environment, Social and Rural Development Group (Middle East and North Africa Region and Agriculture and Rural Development Department).
- World Bank (2007). *Making the Most of Scarcity: Accountability for Better Water Management Results in the Middle East and North Africa*. MENA Development Report. Washington, DC, The International Bank for Reconstruction and Development / The World Bank.
- World Bank (2009). *West Bank and Gaza: Assessment of Restrictions on Palestinian Water Sector Development Sector Note April 2009*. Middle East and North Africa Region - Sustainable Development. Report No. 47657-GZ Washington, The International Bank for Reconstruction and Development.
- World Bank (2013). *Lebanon: Economic and Social Impact Assessment of the Syrian Conflict*. Report No. 81098 - LB, World Bank. 20 September 2013.
- Wouters, P, Vinogradov, S, Allan, A, Jones, P and Rieu-Clarke, A (2005). *Sharing Transboundary Waters - An Integrated Assessment of Equitable Entitlement: The Legal Assessment Model*. International Hydrological Programme - Technical Documents in Hydrology No. 74. Paris, UNESCO. Especially Part 1, for theory.
- Zeitoun, M (2008). *Power and Water: The Hidden Politics of the Palestinian-Israeli Conflict*. London: I.B. Tauris.
- Zeitoun, M, Eid-Sabbagh, K, Dajani, M and Talhami, M (2012). *Hydro-political Baseline of the Upper Jordan River*. Beirut, Association of the Friends of Ibrahim Abd el Al.
- Zeitoun, M, Eid-Sabbagh, K and Loveless, J (2014). The Impact of war on water in Lebanon-Israel 2006 through the Analytical Frame of Water+Armed Conflict. *Disasters* 38(1): 22 - 44.

- Zeitoun, M, Eid-Sabbagh, K, Talhami, M and Dajani, M (2013a). Hydro-hegemony in the Upper Jordan Waterscape: Control and use of the flows. *Water Alternatives* 6(1): 86 - 106.
- Zeitoun, M, Mirumachi, N and Warner, J (2011). Transboundary water interaction II: Soft power underlying conflict and cooperation. *International Environmental Agreements* 11(2): 159 - 178.
- Zeitoun, M, Talhami, M and Eid-Sabbagh, K (2013b). The Influence of Narratives on Negotiations over and Resolution of the Upper Jordan River Conflict. *International Negotiation* 18(2): 293 - 322.
- Zeitoun, M and Warner, J (2006). Hydro-Hegemony: A Framework for Analysis of Transboundary Water Conflicts. *Water Policy* 8(2006): 435-460.