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## Water Management as a Tool to reach Sustainable Peace; The Case of Israel and Syria

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## **Abstract**

### **Title: Water Management as a Tool to reach Sustainable Peace; The Case of Israel and Syria**

In my thesis essay I have researched the impact of water management on the outcome of peace negotiation and treaty in the case of Israel and Syria. My research question was “*How should the water resources of the Golan Heights be addressed in a coming peace treaty between Israel and Syria for this treaty to be sustainable?*”. I emanated from the theory advocated by researchers Ohlsson, Homer-Dixon and Gleick, arguing that the detailed incorporation of water management in negotiations as well as in a final peace treaty between countries is crucial for these to be sustainable. I used this theory in analysing the extended data related to the two countries’ water resources and water policies, as well as two previous rounds of negotiation. I came to the conclusion that for any future negotiation to lead to a sustainable peace agreement between the two countries, it is crucial for them to establish very detailed stipulations on the shared water resources. Both Israel and Syria are in great need of accessing and controlling water resources, however Israel is much more dependent than Syria on the waters of the Golan Heights. When an internationally recognized borderline between the countries in the future will be established, it will by default be situated on or closely connected to vital water resources. Therefore the water management, including use of and withdrawal from these resources needs to be clearly regulated, otherwise conflict might rise again between the two countries. If water management would be included in the peace treaty in as thoroughly manner as the theorists suggests, this would enable the treaty to become sustainable, as well as make feasible the resolution of related conflicting matters.

*Keywords:* Syria, Israel, water management, peace negotiation and agreement, Golan Heights water resources, border disputes, water scarcity

## **Abbreviations**

BCM – Billion Cubic Metres

CBS – Israel's Central Bureau of Statistics

CM – Cubic Metres

DMZ – Demilitarized Zone

ESCWA – United Nations Economic and Social Commission for Western Asia

FAO – Food and Agriculture Organization of the United Nations

INSS - Institute for National Security Studies, Tel Aviv University

JCSS - Jaffee Center for Strategic Studies, Tel Aviv University

MCM – Million Cubic Metres

MENA – Middle East and North Africa

NWC – National Water Carrier

UN – United Nations

UNDOF – United Nations Disengagement Observer Force

UNRWA – United Nations Relief and Work Agency

UNTSO – United Nations Truce Supervision Organization

# List of Tables and Maps

## Tables

Table 1: Israel’s Fresh Water Resources and Discharge 2001 ..... 41

Table 2: Syria’s Fresh Water Resources and Discharge 2007..... 44

Table 3: The Water of the Golan Heights and its Total Water Discharge 1995..... 49

Table 4: The Population and Urbanization of Israel and Syria ..... 50

Table 5: Countries Official Water Usage in the Agricultural, Industrial and Domestic Sector  
Years 2005/2006 and 2025 ..... 52

Table 6: The Withdrawn Water of Syria and Israel from the Golan Heights in MCM/yr and its  
Percentage of the Countries Total Water Revenue..... 54

## Maps

Map 1: Israel's Water Resources ..... 42

Map 2: Syria's Water Resources..... 45

Map 3: Water Resources Shared by Israel and Syria ..... 48

# Table of Contents

Abstract.....	2
Abbreviations.....	3
List of Tables and Maps .....	4
Tables.....	4
Maps .....	4
Table of Contents.....	5
1) Introduction .....	7
1.1) Purpose and Problem Statement.....	8
1.2) Applied Method and Limitations .....	9
1.3) Ethical Considerations.....	11
2) Historical Background.....	13
2.1) The Years before 1948 .....	13
2.2) 1948: the Proclamation of Israel and Following War .....	14
2.3) 1967 War and its Consequences.....	16
2.4) The Interim Period .....	18
3) Previous Research .....	20
3.1) Literature about the Waters of the Middle East .....	20
3.2) Literature about Peace Negotiations and Water Management .....	22
3.3) Literature about the Security Complex of the Golan Heights.....	24
4) Theories of Water Management as a Means of Reaching Sustainable Peace .....	26
4.1) Theoretical Overview .....	27
4.2) Theoretical Framework, Main Points of the Theories.....	35
4.3) The Israel-Jordan Peace Treaty .....	37
5) The Concerned Water Resources .....	39
5.1) The Existing Water Resources .....	39
5.1.1) Israel's Water Resources .....	39
5.1.2) Syria's Water Resources .....	42
5.1.3) Water Resources Shared Between or Affecting both Israel and Syria.....	45
5.2) The Actual Water Need of the Countries and their Actual Utilization of the Existing Water .....	49
5.2.1) Israel's Population and Water Utilization .....	49
5.2.2) Syria's Population and Water Utilization.....	50
5.2.3) Israel's and Syria's Official Water Usage in Respective Sector:.....	51
5.2.4) The Actual Water Need of Israel and Syria .....	52
5.3) The Economic and Strategic Aspects of Controlling the Water .....	53
5.4) The Waters of the Golan Heights in Israel's and Syria's Current and Future Total Water Revenue .....	54
6) The Peace Negotiations of 1992-1996 and 1999-2000 .....	55
6.1) Negotiations 1992-1996 .....	55
6.1.1) Negotiations 1992-1996; the Position of Syria .....	55
6.1.2) Negotiations 1992-1996: the Position of Israel.....	56
6.1.3) Outcomes of the Negotiations 1992-1996.....	58
6.2) Negotiations 1999- 2000 .....	59
6.2.1) Negotiations 1999- 2000; the Position of Syria .....	59
6.2.2) Negotiations 1999-2000; the Position of Israel.....	60

6.2.3) Outcomes of the Negotiations 1999- 2000.....	61
6.3) Demands in Previous Negotiations Related and Unrelated to Water.....	61
6.3.1) The Issue of the Shared Water Resources in Previous Negotiations .....	61
6.3.2) Demands by Israel in Previous Negotiations Unrelated to Water.....	63
6.3.3) Demands by Syria in Previous Negotiations Unrelated to Water .....	63
7) Water Management as a Tool to Reach Sustainable Peace Between Israel and Syria.....	64
7.1) The Importance of Including Water Management in Coming Peace Negotiations and Final Peace Treaty between Israel and Syria.....	64
7.2) Water Management as an Integral Part of Peace Negotiations and Agreements to Reach Sustainable Peace .....	66
8) Summary and Conclusions.....	70
Glossary explanation .....	72
References .....	74
Literature .....	74
Literature Reviews.....	77
Reports and Legal Documents.....	77
Other Internet Sources .....	79
Appendices .....	81
Appendix 1 .....	81
U.N. Security Council Resolution 242 .....	81
Appendix 2 .....	83
U.N. Security Council Resolution 338 .....	83
Appendix 3 .....	84
Treaty of Peace between The State of Israel and The Hashemite Kingdome of Jordan ..	84

# 1) Introduction

In this introduction I intend to give an account of the purpose of my thesis and what my problem statement consists of. I intend to give an explanation to the organization of the thesis and my applied method.

The politically tense situation in the region of the Middle East has innumerable different aspects, one of which is water.<sup>1</sup> The region counts as one of the most arid in the world and already in 1993 nine out of 14 countries in the area faced problems of water scarcity.<sup>2</sup> This has in the past led to many violent conflicts but has also been the source of cooperation and agreements between countries.

Today Middle Eastern water is often linked to matters of national defence as well as bearing great economic value. In the case of Syria and Israel, who are both facing severe water scarcity and whom have been in a state of war since 1948, the water issue has been closely connected to the many border disputes, including the armed escalation that led to the Six-Day War in 1967. The two states are part of a hydropolitical security complex, sharing important water resources.<sup>3</sup>

There are some researchers of peace and conflict who claim that “there can be no comprehensive, lasting, or stable Middle East peace without a Syrian-Israeli peace”.<sup>4</sup> This conclusion stems partly from the widely held view among researchers of peace and security that Syria is the only neighbouring country that still poses some kind of military threat to Israel.<sup>5</sup> In the event of renewed peace negotiations, and eventually a peace treaty, it is my thesis that for the negotiations and final treaty to lead to a sustainable peace between the two countries, it is crucial to give specific attention to the issue of water management. To evaluate and highlight the importance of this, I will study the water situation for both countries in relationship to the viewpoints towards water management in two recent previous negotiations.

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<sup>1</sup> When the term “the Middle East” is used, it throughout the text refers to “the region from Egypt in the west through Iran in the east, and from Turkey in the north to the Arabian Peninsula in the south” as defined by William L. Cleveland in *A History of the Modern Middle East* from 2000, p xiii.

<sup>2</sup> Ohlsson Leif, “The Role of Water and the Origins of Conflict” (1995), p 15

<sup>3</sup> Lindholm, Helena “Water and the Arab-Israeli Conflict” (1995), p 58

<sup>4</sup> Drysdale, Alasdair and Hinnebusch, Raymond *Syria and the Middle East Peace Process* (1991) p 1

<sup>5</sup> *Ibid* p 2

## **1.1) Purpose and Problem Statement**

### **Purpose**

This essay focuses on the extent to which the water issue influences the outcome of peace negotiations between Israel and Syria. My research question is:

**How should the water resources of the Golan Heights be addressed in a coming peace treaty between Israel and Syria for this treaty to be sustainable?**

In peace talks initiated in the past both countries were eager to draw the new border line with the seemingly underlying purpose of obtaining highest possible access to vital water resources. Since the water resources therefore appear to be of crucial interest for both parties, it is necessary to examine this issue further. In the larger context, that Israel and Syria reaches a stable peace agreement is in the interest of and has an effect on the broader region, and it is of particular interest to Jordan, Lebanon, the Palestinian Territories and Turkey whom all are affected by the outcomes of agreement over water, since they have connections to the same disputed water wells.

### **Problem Statement**

To highlight these important aspects, I will examine my main question, based on my chosen theory, through a division into three sub questions. Questions one and two are based on factual circumstances and answered mainly by deriving empirical facts and applying these on the theoretical framework. Question three is more analytical and is answered by applying the theoretical framework to the particular situation of the two countries.

The first question intends to *thoroughly evaluate the overall water situation* of the two countries:

**1) Why are the water resources of the Golan Heights important to the two riparian states?**

What needs to be examined more thoroughly here is:

- 1a) How much water is actually there in the disputed area?
- 1b) To what extent does the water of the Golan Heights account for in the countries total water revenue?
- 1c) What is the actual water need of the two riparian countries, and how much of the existing water is actually being utilized?
- 1d) Which are the economic and strategic aspects of controlling the water?

To find the answers to questions 1a-1c I will compare official statistic and data about the current water resources and demography, as well as expected changes herein, of the two

countries. Finally for question 1d I will look at analyses made by the theorists regarding water as an asset in conflict.

The second sub question intends to *establish what part water played in previous negotiations between Israel and Syria*

## **2) How was the issue of the shared water resources addressed in previous negotiations?**

Questions to be examined here are:

2a) Was the issue of water a clearly expressed part of the previous negotiations?

If yes, how was it discussed?

2b) Which other issues were given high importance by the parties?

To examine question two I will turn to official documents describing the previous negotiations which took place in the years 1992-1996 and 1999-2000, as well as media coverage regarding this. Before 1992 there were unofficial peace endeavours yet no official peace negotiations between the two countries. Therefore I have chosen these two periods of official negotiation as valid reference to a coming peace resolution.

The third sub question intends to *investigate how water, according to the theorists, should be addressed in peace negotiations and agreements.*

## **3) How can water management serve as a tool to reach sustainable peace between Israel and Syria?**

3a) Why is it important to include water management in coming peace negotiations and final peace treaty between Israel and Syria?

3b) Did the issue of the shared water have an impact on the previous negotiations?

3b) According to the theorists, how should water management be addressed as an integral part of peace negotiations and agreements?

## **1.2) Applied Method and Limitations**

My thesis is a case study of the two countries Israel and Syria and their respective approaches towards their common water resources. My basis is the theoretical framework of water management as a means of reaching sustainable peace. This theory stresses the crucial interconnection between the possible outbreak of conflict as well as the positive outcome of conflict resolution, and water management. I will use the combined research of three scholars,

Leif Ohlsson, Thomas F. Homer-Dixon and Peter H. Gleick who all have studied water resource management and peace resolution in an interconnected manner and are experts in this field. My main research question, as well as the sub-questions, is outlined based on the main theoretical points highlighted by these three scholars.

I will base my research on information from existing literature and by evaluating official water statistic. Besides various books and articles from credible journals, I will also refer to article reviews and legal documents and reports. By comparing this extended information and data related to the concerned water resources I hope to be able to present new data and draw new conclusions, that can later also be applicable on similar cases.<sup>6</sup> I will also analyse information from two recently held periods of peace negotiations.

I will try to limit other data related to the peace process, as to keep the main focus of the thesis to the relation Israel – water management – peace negotiations - Syria. I am aware of that there are several other issues that quite probably will be up for discussion in the peace negotiations, one of them being the role of Hezbollah in Syrian and Lebanese political sphere.<sup>7</sup> Factors that I will mention only in brief are other concerns than water within the peace process, such as security arrangements, timeframe and international influence. Also information about other countries connected to the water; Lebanon, Jordan, Occupied Palestinian Territories, Turkey and Iraq will be kept to a minimum. The one area to be given somewhat more attention is the Palestinian Territory of the West Bank, since it is de facto incorporated within Israeli borders and highly interconnected to the water resources. I believe that regardless of the development within these above mentioned areas, water management holds a strong significance in itself to the outcome of peace negotiations, why this focus in my thesis is very valid.

One limitation stems from the fact that I do not know sufficient Arabic to assimilate information from Arabic resources. My language skills comprise full knowledge of English, Swedish and some colloquial Arabic, whereas my sources by default will be mainly in the first two ones. There is an extended amount of official information from the Israeli state in English, but literally none from the Syrian state. I will try to compensate my insufficient

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<sup>6</sup> Persson, Stefan *Dödlägen i internationella förhandlingar* (1992), p 40

<sup>7</sup> Hezbollah is a Shi'a Islamist political and paramilitary organisation founded in 1982. It was established in Lebanon with the assistance and support of Iran and Syria, with one of its goals to resist the Israeli occupation of Lebanon. Hezbollah currently holds seats within the Lebanese parliament, but is politically influential far beyond the Lebanese borders. It has for example provided assistance to the second Palestinian Intifada, and has close ties to Hamas. In 2006 there was a month-long war between Hezbollah and Israel, claiming many (mainly) Lebanese civilian victims. Israel is interested in Syria stopping its support for Hezbollah. For further reading, see for example *Voice of Hezbollah, The Statements of Sayyed Hassan Nasrallah* (2007)

knowledge of Arabic by extracting relevant information from various official reports as well as Middle Eastern media websites writing in English.

Another obstacle that I might face is finding accurate statistic and data about the concerned water resources. I will in first hand use data from trustworthy international organisations, such as the UN (United Nations) organ ESCWA (Economic and Social Commission for Western Asia). However, these organisations rarely make fact-finding research themselves; rather they rely on data handed to them by the individual countries. There could be reasons for a government authority to distort such data for the general public abroad as well as domestically. Many reasons might therefore exist to lack of data, or susceptible data. As a conclusion, extracting all the data of interest from one source might be proven impossible. I will therefore use several sources, and try to match them taking into consideration time accuracy as well as trustworthiness of source. In cases where no official data exist, I will refer to the most common mentioned data used by other researchers.

### ***1.3) Ethical Considerations***

In my research I will be careful in my use of biased material. My research evolves around an infected elongated conflict, why it is almost impossible to find literature describing the matter in and holding a completely neutral view. I will try to be aware of the different authors' views, avoiding the too clearly biased ones. I will try to use references representing both Syrian, Israeli and Western respected scholars, whose information can be matched with one another.

### ***1.4) Thesis Disposition***

In chapter one, the introduction, I have explained the purpose of my thesis. I have tried to give a brief introduction to the geographical area and political conflict at hand, and why I find it interesting as well as important to study the related problem further. I have in detail described my research questions which are the base of my analysis. I have also introduced the theoretical approach to investigating my questions, as well as the limitations I expect to face throughout my work. Last I have also mentioned the ethical considerations at hand.

This will be followed by chapter two where I will give a brief historical background to the current political situation. In this historical chapter it is my intention to give the reader a comprehension of the events which lead to the current water situation of the countries Israel and Syria, and these countries disputes around the shared water resources.

In chapter three I will present an overview of previous research regarding the interconnected areas of Middle Eastern water resources and management, and the specific literature on peace negotiations and the Golan Heights.

In chapter four I will describe the method I have chosen for addressing and analyzing my research questions. I will describe different spectres of the chosen theory, the three researchers promoting it, the critic voiced against the theory and my reasons for choosing this particular theory.

In chapter five, six and seven I will answer my research questions. In chapter five, I will correlate and analyse the empirical data about the water resources connected to the area of the Golan Heights. In chapter six I will describe the positions in and result of the previous peace negotiations between Israel and Syria, and how the water was addressed in these negotiations. In chapter seven I will investigate further how water management could best serve as a tool for the outcome of a sustainable peace agreement between the two countries.

This will then be followed by a summary of my thesis and findings in the eighth and final chapter.

Finally, to facilitate for the reader, I will compile a list of water management related words mentioned throughout the thesis, explained in both English and Swedish.

## 2) Historical Background

In this chapter I intend to give an overview of the background of the disputed area, the historical events that led to the current situation as well as the two countries previous political policies towards each other with focus on the shared water resources.<sup>8</sup>

### 2.1) The Years before 1948

The first borders between what would eventually become Israel and Syria were made out in 1923 between the French and the British mandates who at this time were in control of the area. At a peace conference held 1919 previous to the decision, delegates from the Arab countries as well as representatives from the Zionist movement were able to post requests and wishes about where the borders should be drawn, before the final settlement was decided. The Zionist movement, preparing for the establishment of a Jewish home in Palestine, clearly stated that Israel's economic security would rest upon access to considerable water resources.<sup>9</sup> The Arab representatives did not voice any specific concern about the water resources, but instead stressed that the rights of the Arabic population in the region must be protected in the wake of constructing the new state of Israel.<sup>10</sup>

The border established in the Anglo-French Treaty in March 1923 between the French Syrian mandate and the British Palestinian mandate, was drawn out as follows regarding the water resources; the Hasbani River would be entirely within Palestine, the Baniyas spring would originate and flow for 100 metres within Syria with the rest inside Palestine.<sup>11</sup> Both sides of the Jordan River and the Sea of Galilee, including a 10 metre strip on its eastern side, became part of the British protectorate Palestine. In the treaty Syria was granted access to the eastern side of the lake and Syrian fishermen were entitled to fish from it even though the lake itself did not lie on Syrian territory.<sup>12</sup>

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<sup>8</sup> For more detailed history of the relationship between Israel and Syria and their neighbours, see for example *Syria and Israel, From War to Peacemaking* from 1995 by Moshe Ma'oz or *A History of the Modern Middle East* from 2008 by William L Cleveland.

<sup>9</sup> Dolatyar, Mustafa and Gray, Tim S. *Water Politics in the Middle East, A Context for Conflict or Co-operation?* (2000), p 94

<sup>10</sup> Wolf, Aaron T. *Hydropolitics along the Jordan River: Scarce water and its impact on the Arab-Israeli conflict*, first edition (1995) United Nations University Press, p 22-25

<sup>11</sup> *Ibid*, p 26-27

<sup>12</sup> Amery, Hussein A. and Wolf, Aaron T. *Water In The Middle East – A Geography of Peace*, first edition (2000), p 153

Syria gained full independence in 1946. Up until the proclamation of the state of Israel in 1948, there were many internal conflicts between the Arab population and the, due to settlement, continuously growing amount of Jews in Palestine. Britain turned to the UN for help to solve the escalating crisis in the area, and the UN issued a Partition Plan in 1947. The outcome of the plan was that the UN divided the previous British protectorate Palestine into one Israeli and one Palestinian State, and the Sea of Galilee came to be part of Israel, the Jordan River partly on Israeli, partly on Palestinian territory. The Syrian border, however, was just 10 metres away from the eastern shore of the Sea of Galilee.<sup>13</sup> The Jordan River literary functioned as the border between Israel and Syria between the years 1949 and 1969.<sup>14</sup>

## **2.2) 1948: the Proclamation of Israel and Following War**

In 1948, immediately after the proclamation of the state of Israel, Syria, together with Egypt, Jordan, Iraq, Lebanon and Saudi Arabia, declared war against the new state.<sup>15</sup> Consequently, the Golan Heights, while constituting the border between the concerned two countries, became a heavily militarized area.<sup>16</sup> Syria took control over the 10 metre wide strip east of the Sea of Galilee.<sup>17</sup> Both countries hereafter used the lake for fishing. In the years following, all countries along the important water sheds, i.e. Syria, Israel and Jordan, started allocating and making use of the water resources in a unilateral manner. In July 1949 an armistice agreement between Israel and Syria was signed, establishing three demilitarized zones, DMZ, between the countries (see Map 3, page 48 ). These zones, located between the 1923 border and the 1948 cease-fire lines, were all connected to water resources. The first one was close to the headwaters of Baniyas River, the second stretched from the southern Lake Huleh to the northern Sea of Galilee, surrounding the Jordan River. The third lay at the south-eastern shore of the Sea of Galilee.<sup>18</sup> The observance of the armistice agreement was to be monitored by the

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<sup>13</sup> See for example Hof, Fredric C. "The Water Dimension of Golan Heights Negotiations" from 1997, p 131, or Ma'oz, Moshe *Syria and Israel, From War to Peacemaking* from 1995, p 27

<sup>14</sup> Hof, Fredric C. "The Water Dimension of Golan Heights Negotiations" (1997), p 130

<sup>15</sup> Wolf, Aaron T. *Hydropolitics along the Jordan River: Scarce water and its impact on the Arab-Israeli conflict*, first edition (1995) United Nations University Press, p 42

<sup>16</sup> Throughout the history, Israel has been backed both politically, through both stated approval and/or encouragement for political decisions, as well as military, by constantly improving and modernizing the military forces, by the USA (see for example Ma'oz, Moshe *From Conflict to Peace? Israel's Relations with Syria and the Palestinians* from 1999, p 399). Syria was militarily supported by the USSR from the 1950s and until its dissolution (see for example Ma'oz, Moshe *Syria and Israel, From War to Peacemaking* from 1995, p 52 and 122).

<sup>17</sup> Ma'oz, Moshe *Syria and Israel, From War to Peacemaking* (1995), p 19, 27

<sup>18</sup> Neff, Donald "Israel-Syria: Conflict at the Jordan River, 1949-1967" (1994), p 27

UNTSO (United Nations Truce Supervision Organization), originally stationed in Palestine in 1948 to supervise the foundation of Israel.<sup>19</sup>

Several disputes about how the water should be shared between the countries followed, resulting in occasional violent clashes. A treaty was signed in June 1953 between Israel and Syria, where the countries agreed to share the River Yarmuk between them.<sup>20</sup> Because of the increasingly tense situation related to the common water resources, and on the request of UNRWA (United Nations Relief and Work Agency), the USA sent a special envoy to the area, lead by Eric Johnson. The “Johnston negotiations” went on for two years, 1953-1955, aiming at settling the matter of sharing the water of the Jordan Basin. An agreement was however never ratified.

Both Israel and Syria started unilaterally to withdraw water from the River Jordan, Israel through its newly constructed NWC, National Water Carrier, which it started to build in July 1953.<sup>21</sup> Syria, and several other Arab nations, were concerned about Israel’s NWC allocating water from the Sea of Galilee and the Jordan River to the Negev desert, and started planning for allocation on behalf of themselves. The NWC was completed in 1964 and constitutes a wide stretching network of pipelines, supplying water to a major part of Israel from the less arid northern parts. Besides being gathered from the Northern and the Coastal aquifer, the majority of the water is stemming from the Sea of Galilee, with its intake on the north-western shore of the Sea of Galilee.

In the 1960’s Syria’s ruling Bath party started to train, arm and support Palestinian guerrilla fighters, so called fedayeen, to attack Israel from within.<sup>22</sup> In 1965 one of its first operations was intended to damage a section of the NWC in the Lower Galilee area.<sup>23</sup>

Israel frequently denied Syrian fishermen to fish on the Sea of Galilee. The unilateral approach to water withdrawal by the countries continued, leading to the inevitable overlapping in plans, followed by an increase in tension, including an escalated arms race, eventually resulting in the outbreak of the June 1967 War. One of the main factors to the conflict eventually resulting in the outbreak of war was, according to many scholars, the for

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<sup>19</sup> UNTSO *Background*

<sup>20</sup> Wolf, Aaron T. *Hydropolitics along the Jordan River: Scarce water and its impact on the Arab-Israeli conflict*, first edition (1995), p 45

<sup>21</sup> Ma’oz, Moshe “From Conflict to Peace? Israel’s Relations with Syria and the Palestinians” (1999) p 397

<sup>22</sup> Drysdale, Alasdair and Hinnebusch, Raymond *Syria and the Middle East Peace Process* (1991) p 100

<sup>23</sup> Ma’oz, Moshe *Syria and Israel, From War to Peacemaking* (1995), p 82

many years previously ongoing struggle for water.<sup>24</sup> The Israeli Premier Levi Eshkol went so far as to state that “water is a question of life for Israel”.<sup>25</sup>

### **2.3) 1967 War and its Consequences**

In June 1967 Israel attacked Egypt, Jordan and Syria. The Six-Day war resulted in Israel taking possession of the West Bank, Gaza and the Egyptian Sinai Peninsula. In the West Bank, Israeli authorities immediately enforced laws prohibiting the Arab population from drilling new wells without an almost impossible to obtain permission, sealing many existing wells and put general restriction on the access to water, making the Israeli state effectively in control of all the fresh water resources, including all of the Jordan River.<sup>26</sup> Regarding Syria, this was the beginning of Israeli occupation over the major part of the 1 750 square kilometre big area of Syrian Golan Heights lasting up till present date.<sup>27</sup> The occupation extended Israeli area to the eastern side of the Sea of Galilee as well as all of the Golan Heights, including most of the Jordan headwaters. The DMZ seized to exist, but UNTSO observers stayed in the area.<sup>28</sup> In the aftermaths of the conflict, many Syrians fled or were expelled, until, from a total population of 139 000, only about 6 000 Druze were left.<sup>29</sup> At this point in history the previous Syrian president Hafez al-Asad held the position of defence minister. Many historians point to the fact that Asad regarded himself as being personally responsible for the loss of the Golan Heights, thereafter being politically possessed by the thought of regaining the territory and restore his wounded pride.<sup>30</sup>

Since this year, Israel has been in the political dilemma of deriving a large amount of its vital water from areas it ceased in occupation, mainly the groundwater of the West Bank and the water connected to the Golan Heights, both areas it does not have right to derive water from according to international law. In 1967 the chief Israeli strategic thinker Yigal Allon, referred to by Moshe Ma'oz, expressed the water strategy as such: “Our control over the Golan Heights... derives from Israel’s overall strategy, since this means defending the chief

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<sup>24</sup> See for example Shemesh, Moshe *Prelude to the Six-Day War: The Arab-Israeli Struggle Over Water Resources* from 2004, p 1, Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* from 2004, p 9 or Haddadin J, Munther “Water in the Middle East Process” from 2002, p 325

<sup>25</sup> Gleick, Peter H. “Water and Conflict, Fresh Water Resources and International Security” (1995), p 90

<sup>26</sup> Dolatyar, Mustafa and Gray, Tim S. *Water Politics in the Middle East, A Context for Conflict or Co-operation?* (2000), p 106

<sup>27</sup> Muslih, Muhammad “The Golan: Israel, Syria, and Strategic Calculations” (1993)

<sup>28</sup> UNTSO *Background*

<sup>29</sup> Neff, Donald “Israel-Syria: Conflict at the Jordan River, 1949-1967” (1994), p 37. According to the CIA World Factbook, the number of these internally displaced refugees has risen and in 2007 they counted about 300 000 (CIA World Factbook on Syria, 100326)

<sup>30</sup> Ma'oz, Moshe *Syria and Israel, From War to Peacemaking* (1995), p 120

water resources”.<sup>31</sup> Israel immediately started to build settlements in the Golan area.<sup>32</sup> In 1970, Syria continued its water securement strategy and started to develop a series of small dams in the Yarmuk headwaters, causing concern among both the Israelis and the Jordanians. Jordan in 1970 abandoned the previous held strategy of Arab countries united against Israel, and developed a de facto peaceful relationship with the country.<sup>33</sup> This situation continued until the official peace treaty was signed in 1994.<sup>34</sup>

In 1973 a new war erupted, as both Egypt and Syria launched attacks against Israel. For a short period, Syria was back in control over the Golan Heights, before Israel reoccupied the territory again. During the 70s, the Syrian President Hafez al-Asad made some attempts to approach Israel, for example in 1974 by stating that Syria no longer opposed the UN Resolution 242 from 1967 as long as Israel withdrew from the Arab land occupied in 1967 and granted the Palestinians their rights.<sup>35</sup> This announcement was soon followed by a statement that Syria also accepted UN Resolution 338 from 1973.<sup>36</sup> Israel had accepted the 242 Resolution already in 1964, with some reservations.<sup>37</sup> The Israeli Prime Minister Golda Meir, however, “...did not consider Syria as a partner for negotiations and certainly would not give up any part of the Golan Heights. As far as the Palestinians were concerned, Meir stated in 1972 that they did not exist as a people”.<sup>38</sup> In principle this statement meant that Meir considered the water resources of the West Bank to be extracted for the Jewish population only. In 1974 Meir even went as far as claiming that “the Golan was an inseparable part of Israel”.<sup>39</sup>

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<sup>31</sup> Ma’oz, Moshe *Syria and Israel, From War to Peacemaking* (1995), p 113

<sup>32</sup> There is a still a large population of Syrian Druze on the Golan Heights, with their 20 000 in 2009 they outnumber the Israeli settlers (see for example Israel Ministry of Foreign Affairs *Focus on Israel- The Druze in Israel*). According to Israel, the Druze are in favour of remaining under Israeli rule instead of under Syrian; however they only express this desire in private, out of fear to upset the Syrian regime (see for example Shalev, Shalev, Aryeh *Israel and Syria: Peace and Security on the Golan* from 1994, p 72). The growth of the Jewish settlements has steadily continued, since its beginning in 1967, to in 2000 encompass about 17 000 inhabitants living in 32 communities (see for example Miller, Reuben *The Israeli-Syrian Negotiations* from 2000, p 124).

<sup>33</sup> Ma’oz, Moshe “From Conflict to Peace? Israel’s Relations with Syria and the Palestinians” (1999) p 400

<sup>34</sup> Ibid, p 407

<sup>35</sup> Ibid, p 400, 402

<sup>36</sup> The UN resolution 242 proclaimed, among other things, the “withdrawal of Israel armed forces from territories occupied in the recent conflict”, and “the establishment of demilitarised zones”. The UN resolution 338 among other things proclaimed that “negotiations shall start between the parties concerned under appropriate auspices aimed at establishing a just and durable peace in the Middle East”. For full texts of the resolutions, see Appendix 1 and Appendix 2

<sup>37</sup> According to Moshe Maoz in *Syria and Israel, From War to Peacemaking* (1995), p 103, Israeli officials stated that “it is only within the establishment of a permanent peace with secure and recognized boundaries that other principles (i.e. withdrawal of Israeli armed forces) can be given effect”.

<sup>38</sup> Ma’oz, Moshe “From Conflict to Peace? Israel’s Relations with Syria and the Palestinians” (1999) p 400

<sup>39</sup> Ibid, p 411

However; in 1974 the two countries after negotiations managed to reach one agreement, the “Disengagement Agreement on the Golan Heights”. This agreement stipulated among other things that both parties agreed to hold an official ceasefire towards each other.<sup>40</sup> This agreement also established a new demilitarized zone between Israel and Syria where the UNDOF (United Nations Disengagement Observer Force) became stationed to monitor and supervise that the two countries stuck to and implemented the agreement.<sup>41</sup> In 1979 Egypt, after the defeat of the war 1973, choose to sign a peace treaty with Israel, benefiting by Israel giving them back the Sinai Peninsula.<sup>42</sup> By the end of the 1970’s, Israel formally stated that they considered the Golan Heights to be de facto part of Israel.<sup>43</sup>

## **2.4) The Interim Period**

During the 1980s and 1990s several peace talks were held between Israel and Syria. However, up until the 1990s, Israel consequently refused to negotiate about any agreement that meant that it had to give back the Golan Heights.<sup>44</sup> Yitzak Rabin, who served as Israel’s defence minister during the years 1984-1990, stated that he did not regard Syria under the leadership of Asad as an acceptable partner to enter into peace negotiations with.<sup>45</sup> Syria during this period continued on its previous mission; to expand and modernize its army, to be able to function as a military counterpart to Israel.

In 1991 there was a first official Israeli document suggesting that peace might be reached by giving up some of the country’s control over water. It was the Tel Aviv University’s Jaffee Center for Strategic Studies, JCSS (now incorporated in the Institute for National Security Studies, INSS) which in a comprehensive study of the prospects for multilateral cooperation and regional water resources came to the conclusion that it was possible to withdraw from the West Bank and the Golan Heights and still safeguard the water resources of Israel.<sup>46</sup> This was, and has never been, a position favourable to the larger Israeli population, why the document at this particular point was censored.<sup>47</sup>

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<sup>40</sup> Shalev, Aryeh *Israel and Syria: Peace and Security on the Golan* (1994), p 39

<sup>41</sup> United Nations Disengagement Observer Force. *Facts and Figures* The agreement of the demilitarized zone has been kept until today, and as of November 2009 UNDOF had 1270 employees in the area, whereof 1050 were armed troops.

<sup>42</sup> Ma’oz, Moshe “From Conflict to Peace? Israel’s Relations with Syria and the Palestinians” (1999) p 401

<sup>43</sup> Ma’oz, Moshe *Syria and Israel, From War to Peacemaking* (1995), p 115

<sup>44</sup> Ma’oz, Moshe “From Conflict to Peace? Israel’s Relations with Syria and the Palestinians” (1999) p 402

<sup>45</sup> *Ibid*, p 414

<sup>46</sup> Hof, Fredric C. “The Water Dimension of Golan Heights Negotiations” (1997), p 134

<sup>47</sup> Wolf, Aaron T. *Hydropolitics along the Jordan River: Scarce water and its impact on the Arab-Israeli conflict*, first edition (1995) United Nations University Press, p 68, 69

In 1991 the Madrid Peace Conference sponsored by USA and the later dissolved USSR was held in Spain, aiming at negotiating a peace settlement between Israel and the Palestinians, Syria, Lebanon and Jordan. Syria here criticized Israel harshly and stated that it did not acknowledge Israel's legitimacy.<sup>48</sup> Syria, claiming that it wanted a "just and comprehensive peace" based on UN resolutions, insisted on all of the by Israel occupied territories to be returned before any steps towards peace could be taken. Israel during these negotiations refused to give up any of the occupied territories as a precondition, however stating that there was a possibility for Israeli withdrawal from some of the occupied territory as an outcome of peace settlement.<sup>49</sup> The conference eventually lead up to Israel and Syria being able to start official peace negotiations in 1992.

Since the two rounds of negotiations between 1992-1996 and 1999-2000, described in chapter four, several important things have happened. In June 2000 Hafez al-Asad, who had been the Syrian president for three decades and largely shaped its policies towards its neighbours, passed away. He was succeeded by his son, Bashar al-Asad, who still remains in power. Israel had attacked Lebanon in 1982, and occupied a territory in southern Lebanon between 1985 and 2000. During these years, Syria was keeping troops in Lebanon, claiming to support one of the groups fighting in the Lebanese civil war. Syria also supported several resistance groups against Israel, among them Hezbollah.<sup>50</sup> In 2005 Syria withdrew from Lebanon, where its military troops had been stationed since 1976.

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<sup>48</sup> Ma'oz, Moshe *Syria and Israel, From War to Peacemaking* (1995), p 215

<sup>49</sup> *Ibid*, p viii, 216

<sup>50</sup> Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004), p 118

### **3) Previous Research**

In this chapter, I will describe some of the previously published literature related to my thesis in a non comprehensive list, intended to give a brief insight about previous research and suggested further reading

Even though there has been little research done about the specific topic of water management as a crucial factor to the outcome of a peace agreement on the Golan Heights between Syria and Israel, extensively generous literature exists about related topics. Both the history and conflicts in this particular area of the Middle East, theories about negotiations as well as the existing water resources in the region, have been described in numerous books and articles.

Here follows an overview of some of the literature describing the subjects of water in the Middle East, negotiation and water management and the particular area of the Golan Heights in an interrelated manner. I have separated the literature into three categories, the first one describing water in the Middle East in general, the second more focused on negotiations and how water management can be included into this, and the last describing the more specific area of the Golan Heights.

#### **3.1) Literature about the Waters of the Middle East**

There consists an extensive literature describing the water resources of the Middle East, perhaps because this region in general is very arid and relies heavily on its water. However, most of the literature concerning this field is published before the year 2000, making them more valid as historical reference than material to analyze in my thesis.

Some authors, such as Peter Rogers, Professor of Environmental Engineering at Harvard University, and Peter Lydon, associate at the University of California at Berkeley's Institute of Governmental Studies, describe the areas of North Africa and the Gulf. In the book *Water in the Arab World, Perspectives and Prognoses* from 1996 edited by the two authors they focus mainly on the water problems of the Maghreb region and the Arabian Peninsula. However, the book also gives a good overview of the different legal frameworks regarding shared water utilization referred to in the political debate.

The water resources of the extended MENA region (Middle East and North Africa) is also given attention in *The Middle East Water Question, Hydropolitics and the Global Economy* from 2001 by J.A.Allan, Professor of Geography at the SOAS (School of Oriental and African

Studies) of the University of London. Allan's book describes the problems related to the water deficiency of the MENA region in economical, political and legal terms. The author is of the opinion that due to bad water management the MENA region as a whole actually ran out of water decades ago. Water is being seen as a common good, and is therefore extracted without regulations and limitations, particularly for agricultural use.

The book *Water Wars, Coming Conflicts in the Middle East* from 1993 by John Bulloch, and Adel Darwish, two British Journalists specializing in the politics of the Middle East, gives an overview of the different water-sheds and -resources in the Middle East where there is a great feasibility for conflict. The main focus is given to the River Nile Basin, but the book also has a specific chapter about the Jordan River basin as well. The authors' motive behind writing the book was their theory that water, instead of oil, would be the resource most struck by conflict in the future.

One who has written more exclusively about the waters connected to the Jordan River Basin is Aaron T Wolf, Professor of Geography in the Department of Geosciences at Oregon State University and a specialist regarding environment and water resources management. In his book *Hydropolitics along the Jordan River* from 1995 he describes the political relations between the countries along the Jordan River from a historical and water related perspective. He also extensively describes the hydrology of the river. The author's view is that water can serve as an enhancing factor in cooperation, leading to a positive outcome of peace talks, and he examines how this can be done in the basin of the Jordan River in particular. Wolf deepens his focus on the water resources of the Jordan River Basin and how the different riparian states perceives the water resources in geopolitical, economical and environmental aspects in *Water in the Middle East, A Geography of Peace* from 2000, which Wolf has edited together with Hussein A. Amery, Associate Professor at Colorado School of Mines, Golden, Colorado. This book also contains a separate chapter on the water dimension related to the Golan Heights negotiations.

Also Miram R Lowi, Associate Professor at Princeton University, has written extensively on water and security in the Middle East. In *Water and power, The politics of a scarce resource in the Jordan River basin* from 1993 Lowi claims that when it comes to the waters connected to the Jordan river, the affected conflicting states have not been able to agree upon the managing of their shared water resources due to disagreement and unresolved issues regarding other political matter, which in the eyes of the parties needs to be solved first. According to Lowi, the roots of the conflict lay in the scarcity of water in the region, the unequal power balance between the states and the Zionists expansion on the cost of the

regions Arab population. Lowi analyses what makes the water important to the riparian states and how the political climate has affected the parties sharing the waters of the Jordan River whether or not to cooperate hereupon. Lowi focuses mainly on the relationship between the countries of Jordan and Israel from the 1950s until the 1980s. In the book *Environment and Security* (edited by Miriam R. Lowi and Brian R. Shaw, 2000, also mentioned below), Lowi in her article “Water and Conflict in the Middle East and South Asia” claims that environmental change such as the increased scarcity and depletion of water is often considered a threat to national security, why it has a potential to lead to conflict. Lowi particularly mentions the case of Israel and Palestine, whom in the peace talks of 1991 postponed the discussion over water to the final negotiations, due to the political sensitivity of the matter.

Several of the above mentioned authors raise matters such as desalination and an effective legal framework regarding shared water utilization as important questions to be highlighted in response to the in the near future expected water shortage in the area. Many of the authors also mention the water resources connected to the Jordan River Basin as particularly important in the discussion of water scarcity in the Middle East.

### **3.2) Literature about Peace Negotiations and Water Management**

Most of the literature about peace negotiations describes the topic in a quite general manner. It is hard to find more specific literature on what part water management can play in peace negotiations. One book, however, that addresses water resource management in the area around the Jordan River, and gives suggestions to how the management could develop to maximise the water supply output is *Integrated Water Resources Management and Security in the Middle East* from 2007, published by NATO Security through Science Series. Examples mentioned in the book on how to enhance the political security of the area through water management are expansion of desalination plants, wastewater recycling and more effective rainwater harvesting.

Munther J Haddadin was the chief Jordanian Negotiator over Water, Energy and Environment in the Israeli-Jordanian negotiations leading up to the Peace treaty in 1994. He has written several books and articles on the subject of water management as a vital part of peace negotiations, for example *Diplomacy on the Jordan: International Conflict and Negotiated Resolution (Natural Resource Management and Policy)* from 2002. His main focus is on the Jordanian political aspects of accessing and controlling the waters of the Jordan River.

This theme is analysed further in *An Analytical Study of the Jordanian-Israeli Peace Talks of 1991-1994* from 2003 by Hasan Mohammad Hussein Momani. This is Momani's thesis work for the degree of Doctor of Philosophy in International Relations, where he studies the Jordanian-Israeli peace talk of 1991-1994. Momani briefly mentions the shared water resources, stating that even though Israel historically considered the access to water as having lower priority than access to land and security, the water quickly grew in importance.

Two authors who touch on both subjects of water politics in the Middle East as well as water management as a means to reinforce peace are Mostafa Dolatyar, Iranian Government Foreign Ministry Director for West European Affairs, and Tim S.Gray, Emeritus Professor of Political Thought at Newcastle University specializing in resource management. In their book *Water Politics in the Middle East, A Context for Conflict or Cooperation?* from 2000 the authors conclude that water scarcity in the Middle Eastern area has throughout history served as a platform for cooperation, reinforcing peaceful cooperation between countries. They even go so far as to claim that in general, water scarcity has actually served as a stimulus to international peacemaking. Dolatyar and Gray believe that the best way to deal with the Middle East's increasing water scarcity is by applying a holistic environmental perspective, which would reach beyond security, economical, legal and technological approaches to the problem. The authors believe that the best way to solve the water crisis in the Middle East is to start looking at the water as an economic commodity, which within trade can be bought from water rich to water scarce countries. Even though the authors stress that water problems need to be solved by cooperation, equitable sharing and efficient utilization, and conclude that water scarcity in the Middle East is definitely a "stimulus to international peace making"(p 212), they do not specify at all how this water management could be integrated in peace negotiations.

Also Aaron T Wolf, mentioned above, has together with Jesse H. Hamner, Manager of the Research and Visualization Environment at University of North Texas, written on water cooperation as a tool in conflict resolution on water disputes. In their article "Trends in Transboundary Water Disputes and Dispute Resolution" from the book *Environment and Security* (edited by Miriam R. Lowi and Brian R.Shaw, 2000) the authors' claim that the forced sharing of water sheds between countries has more often led to peaceful cooperation than to war. They believe that no Arab-Israeli warfare had water neither as a cause nor a goal. They continue arguing for water cooperation as a way to reach peace by mentioning that there are 124 bilateral treaties regarding international water resources, of these 21 are multilateral. Of all these treaties, two concern the Middle East, the 1994 Peace Treaty between Israel and

Jordan, and the 1995 Israeli-Palestinian Interim Agreement on the West Bank and Gaza Strip. Even though the authors fail to recognize the flaws in these specific agreements, they do admit that most of these 124 treaties are not very effective, lacking enforcement mechanisms of monitoring, information-sharing as well as water allocation.

I believe there is a lack of specific examples on how water management should be incorporated into peace negotiations and agreements for a lasting positive outcome. What is highlighted though is the requirement that conflicting countries show positive intentions and good will to solve water sharing conflicts. The authors also point to the creation of legal frameworks that effectively regulate cooperation, equitable sharing and efficient utilization between countries as an important tool to solve water sharing conflicts.

### **3.3) Literature about the Security Complex of the Golan Heights**

There only exists some literature on the specific topic concerning the security complex of the Golan Heights. One example is the writings of Moshe Ma'oz, Professor Emeritus of Islamic and Middle Eastern Studies at The Hebrew University in Jerusalem and Visiting Scholar at Harvard University, who also served as adviser to several governments in Israel. Ma'oz has published several books and articles about the security complex prevailing between Israel and its Arab neighbours. In *Syria and Israel, From War to Peacemaking* from 1995 Ma'oz gives a circumstantial overview of the relationship between Israel and Syria between the years 1948 to 1995. He believes that a peace between the two countries is crucial for a peaceful settlement in the larger Middle Eastern area.

Two authors who have wide knowledge about Middle Eastern Politics in general and Syria's politics in particular, are Alasdair Drysdale, Professor of Geography, University of New Hampshire, and Raymond Hinnebusch, Professor of International Relations and Middle East Politics at the University of St. Andrews, Scotland and Director of the Centre for Syrian Studies. In their book *Syria and the Middle East Peace Process* from 1991 the authors analyse how Syria's policies and actions towards Israel was affected by USA and previous Soviet Union, and focuses specially on the late Syrian president Hafez al-Asad standpoints to engaging in peace negotiations with Israel. The authors conclude that Asad was cautiously positive about negotiating with Israel, and definitely keen on showing that Syria had a crucial part to play in resolving conflicts in the Middle Eastern area. They also stress that a lasting peace agreement between Syria and Israel can not be reached without American diplomacy,

and that there also can be no Middle Eastern peace in the broader sense, without a Syrian-Israeli peace.

Another author who has high knowledge of previous peace negotiations between Israel and Syria is Aryeh Shalev. A previous Israeli army general during the 1950s, directly involved in security affairs between the two countries, Shalev has valuable but by default non-objective insight about the relationship and political strategies regarding the two countries dealings with the Golan Heights. In his book *Israel and Syria: Peace and Security on the Golan* from 1994 Shalev describes the security issues of the Golan Heights, representing Israel's point of view. Shalev outlines which bottom-line security arrangements, focusing mainly on the topography and structure of military forces, Israel will have to insist on when negotiating with Syria. He also dedicates one chapter to Israel's water resources. Shalev sees the insistence of Syria to include the fate of the Palestinians into the peace talks as one of the main obstacles to a solution.

Yet another scholar with much insight in the security issues of the Golan Heights is Itamar Rabinovich. He is President of Tel Aviv University and served as Israel's chief negotiator with Syria in the peace talk of 1992-1995. In his book *Waging Peace, Israel and the Arabs 1948-2003* from 2004 he gives a historical overview of Israel's relationship to its Arab neighbours and the efforts to peace negotiations taken between them, focusing on Israel-Palestine. Rabinovich represents the Israeli point of view, and claims that Israel occupied the many Arab territories in 1967 (including the Golan Heights) out of aspiration to reach peace, since they believed that by gaining better bargaining chips it would increase the chances of establishing peace with its neighbours.

The majority of the literature relating most to my area of research stem from before the year 2000. The political arena has undergone many important changes since then and therefore many important aspects have not been given attention. The last ten years unforeseen extensive focus in the international debate about the implications of environmental changes is another factor which brings importance to my subject of research. Concluding this, I see an informational gap my thesis could fill, why it is important.

## 4) Theories of Water Management as a Means of Reaching Sustainable Peace

In this chapter I will describe the school of theory I have chosen to analyze my research questions. To answer my main question, “*how should the water resources of the Golan Heights be addressed in a coming peace treaty between Israel and Syria for this treaty to be sustainable?*” “ I will start with a brief summary of the current academic discussion concerning the connection between environment and peace, conflict and conflict resolution. This will be followed by an explanation to my choice of theoretical framework. Thereafter I will describe the theories of three scholars who have studied the interconnection of water resource management and the possibilities of peaceful outcome of conflict ridden situations. These three scholars’ combined research outlines the theory I have applied to my thesis. I will summarize the theory’s three main points which constitutes the framework of my analysis. Finally in this chapter I will mention one rare and valid example of a peace agreement in the Middle East which aimed at stipulating a number of water relating issues.

It is hard to find researchers of conflict and peace that altogether oppose the existence of a connection between conflict and changing environmental conditions. Instead the opinions differ on *which* environmental issues have the most severe impact on the cause, development and solving of conflicts. Some scholars stress the environmental changes themselves; e.g. the degradation of soil due to pollution and water drainage, droughts and floods. Others mention the effects that can follow by environment change; e.g. population displacement, destruction of social infrastructure, lowered economical output from farming, overall economical decline and increasing social distress, all factors that might make people turn to the use of force to change their situation.

A number of researchers on conflict, peace and negotiation have pointed to the important connection between the inclusion and consideration of environmental factors, such as water management, to the sustainability of peace resolutions and agreements. This particular connection has caught many scholars’ attention due to a number of reasons; such as the fact that many major as well as minor water resources are shared between two or more countries, forcing them to cooperate on this issue. Another fact is that fresh water resources all over the world are constantly diminishing both in quantity and sometimes also in quality. These facts in connection to a constantly increasing population globally, and an increasing urbanization in

less developed countries, makes the demand for and the pressure on these scarce resources even higher. This increases the risk for tension and outbreak of conflict. One renowned expert of environment and water resource management, Aaron T. Wolf, mentioned in chapter 2, and Arnon Medzini claims in an article that one crucial part of conflict resolution is to separate the concept of territorial sovereignty from water security, dealing in depth with the water aspects in a separate section of the peace negotiation and agreement. Wolf and Medzini continues in describing how to maximize the effectiveness of such a water agreement; i.e. by “offering joint management, monitoring and enforcement strategies, as well as encouraging greater transparency in water data across boundaries”.<sup>51</sup>

For my thesis I have chosen theories claiming a connection between water scarcity, water management and peaceful cooperation. The theories of water management as a means of reaching sustainable peace incorporate a number of issues important for my area of interest, which will become evident in my final summary of the theories. The theorists whom I refer to have written extensively on interrelated matters, therefore I have tried to pinpoint their theoretical aspects most valid for my research.

#### **4.1) Theoretical Overview**

Leif Ohlsson, a researcher specialized in environment related resource deficiencies and conflict at Göteborg University, Sweden, has done much research about the connection between sharing of water resources and the outbreak of conflict.

Ohlsson concludes that since almost none of the world’s major rivers are within the borders of one single state, both the potential for water conflicts as well as the potential for conflict resolution and peaceful cooperation over shared waters is large.<sup>52</sup> He calls the riparian problem the most classical water problems throughout history.<sup>53</sup> He mentions the Israeli occupation of the Golan Heights as one example where control over water has been an integral part of a country’s, in this case Israel, political strategy in warfare.<sup>54</sup> But he also stresses that Israel is world leading in water recycling and re-use, which are important and

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<sup>51</sup> Medzini, Arnon and Wolf, Aaron T. “Towards a Middle East at Peace: Hidden Issues in Arab-Israeli Hydropolitics” (2004), p 193

<sup>52</sup> Ohlsson, Leif “The Role of Water and the Origins of Conflict” (1995), p 22

<sup>53</sup> Ohlsson, Leif “Water - An Elusive and Ultimate Constraint for Development“ (1992), p 5

<sup>54</sup> Ohlsson, Leif *Sambanden mellan miljö och konflikter* (1998), p 5

necessary parts of future water policies.<sup>55</sup> Ohlsson also stresses that it is important to include demographical changes such as population increase when evaluating a country's water need.<sup>56</sup>

It is Ohlsson's belief that maintaining a level of conflict, or even engaging in war, is the most costly and destructive way for countries to handle a water resource crisis. Engaging in warfare could mean risking losing substantial parts of the concerned water altogether, why the conflicting parties should be more prone to engage in peaceful water management instead.<sup>57</sup> Ohlsson mentions that about 70 % of all the world's fresh water resources are used within the agricultural sector, highlighting this sector as being of high importance to a country's overall water policy.<sup>58</sup> He believes that water management including changed irrigation policies could benefit the overall water situation of countries facing conflict. He mentions that, fortunately for many countries, their methods of irrigation are quite old-fashioned and wasteful, leaving a considerable room for water efficiency within this area.<sup>59</sup> Ohlsson believes that, as the overall water scarcity steadily increases, so will the ambitions of solving water allocation issues in a peaceful, negotiated manner, and that the chances of this to happen are in situations where the matter is most acute, i.e. where countries face severe problems related to water scarcity. Ohlsson also stresses the importance of including all the different aspects of the shared water resources, for example its flow and origin, and consideration of surface as well as groundwater, into the water management plan.<sup>60</sup> In case of a shared river, the entire river basin must be included in the management plan.<sup>61</sup> The water management also needs to be affirmed in "appropriate institutional tools" to be effective in peace negotiations.<sup>62</sup>

Several conflict researchers agree with Ohlsson and stress the important link between environmental impacts and the outbreak of conflict. Thomas F. Homer-Dixon, professor at the Centre for Environment and Business, Faculty of Environment, University of Waterloo, specializes in global security related to environmental changes. Environmental scarcity contributing to a creation of conflict sensitive societies, according to Homer-Dixon, occurs when there is a decrease in quality and quantity of renewable resources, population growth

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<sup>55</sup> Ohlsson, Leif "Water - An Elusive and Ultimate Constraint for Development" (1992), p 9

<sup>56</sup> Ohlsson, Leif *Environment Scarcity and Conflict, A Study of Malthusian concerns* (1999), p 7-9

<sup>57</sup> Ohlsson, Leif *Sambanden mellan miljö och konflikter* (1998), p 5

<sup>58</sup> Ohlsson, Leif "Water - An Elusive and Ultimate Constraint for Development" (1992), p 4

<sup>59</sup> Ibid, p 9

<sup>60</sup> Ibid, p 4

<sup>61</sup> Ibid, p 5

<sup>62</sup> Ibid, p 4

and an unequal resource access combined.<sup>63</sup> Already in 1991 Homer-Dixon listed seven major environmental problems which, if not addressed properly, could lead to the outbreak of conflict.<sup>64</sup> One of these is the overuse and pollution of water supplies. When a water resource is shared between several countries, as in the case of Israel and Syria, without clear and specific regulations regarding the water use, and the countries involved are trying to maximize their access and use of the water, the likeliness of conflict outbreak rises even further. Homer-Dixon calls this conflict type “simple scarcity conflict”.<sup>65</sup> The actors, in this case Syria and Israel, might when faced by the prospects of diminishing water resources “.....calculate their interest in a zero-sum or negative-sum situation....”, more likely to lead to the outbreak of a conflict than a peaceful resolution.<sup>66</sup>

According to Homer-Dixon, one of the negative outcomes of the overuse of water is: when the total amount of water diminishes, this among other things leads to a reduced irrigation capacity and an overall economical loss for the countries involved.<sup>67</sup> Homer-Dixon names Syria as an example of the implications water scarcity can have on a society. He mentions the tense relationship between Syria and its neighbour Turkey due to both countries sharing the waters of the Euphrates. He also mentions that Syria for many years suffered from droughts and the fact that Syria has one of the highest population growth rates in the world. Homer-Dixon holds all these correlating factors as examples showing that the country is particularly vulnerable to water scarcity and in urgent need of more water and an improved water management system.<sup>68</sup> Homer-Dixon also raises the topic of Israel’s water policies as a factor increasing the problematic of the situation where water scarcity effects the stability of the whole region. Homer-Dixon is for example of the view that the outbreak of the first intifada was triggered by water scarcity, as well as its consequent economic effects, imposed on the occupied Palestinian population by the Israeli government.<sup>69</sup> However, he believes that the

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<sup>63</sup> Homer- Dixon, Thomas F “Environmental Scarcities and Violent Conflict, Evidence from Cases“ (1994) p 506

<sup>64</sup> Homer-Dixon, Thomas F. “On the Threshold, Environmental Changes as Causes of Acute Conflict” (1995), p 55

<sup>65</sup> Ibid, p 73

<sup>66</sup> Ibid, p 73

<sup>67</sup> Ibid, p 59, 63

<sup>68</sup> Ibid, p 75

<sup>69</sup> Homer- Dixon, Thomas F “Environmental Scarcities and Violent Conflict, Evidence from Cases“ (1994) p 510

superior military strength of Israel will prevent the outbreak of a war over water, despite that Israel withdraws a large amount of its groundwater from illegally occupied territories.<sup>70</sup>

Another scholar of peace and security related to the environment is Peter H. Gleick, currently active at the Pacific Institute for Studies in Development, Environment, and Security in Oakland, California. He has done much research about international conflicts over water resources and sustainable water use, claiming that what is called "ecological" or "environmental" security is going to be one of the main areas in any future discussions relating to international security.<sup>71</sup> This will by necessity be an important focus due to a number of factors, such as rapidly growing populations, greater irrigation demands as well as future climate changes.<sup>72</sup>

Gleick is very engaged in making water disputes a well recognized and considered element in the discussions among researchers of international security.<sup>73</sup> He agrees with Homer-Dixon that when several countries share water resources in a water scarce climate, it is quite likely that the countries will look upon the access of water as a vital part of their national security, possibly making it a matter of conflict between countries.<sup>74</sup> An additional factor here is that access to water resources increasingly is linked to countries economical development. Gleick also believes that the current existing international water law will prove to be insufficient to handle these types of conflict.<sup>75</sup> Politicians need to give water management and its lawful enforcement the same value as for example economical and political aspects to reduce the risk of water related conflicts.<sup>76</sup>

Gleick mentions Israel as a country with wide reaching experience in water planning, utilizing water resources available to them in a very effective manner.<sup>77</sup> However, its policies also encompass the incorporation of water from illegally occupied territories to its overall water management system, giving this water a heightened value in terms of state security and making it a source of conflict.<sup>78</sup>

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<sup>70</sup> Homer-Dixon, Thomas F, Boutwell, Jeffrey H, Rathjens, George W. *Environmental Change and Violent Conflict, Growing scarcities of renewable resources can contribute to social instability and civil strife* (1993), p 44

<sup>71</sup> Gleick, Peter H. "Water and Conflict, Fresh Water Resources and International Security" (1995), p 85

<sup>72</sup> Gleick, Peter H. "Environment and Security: The Clear Connections" (1991), p 17

<sup>73</sup> Boxer, Barusch, reviewed work "The World's Water 2002-2003: The Biennial Report on Freshwater Resources" by Peter Gleick (2003), p 127

<sup>74</sup> Gleick, Peter H. "Water and Conflict, Fresh Water Resources and International Security" (1995), p 84

<sup>75</sup> Gleick, Peter H. "Reducing the Risk of Conflict over Fresh Water Resources in the Middle East" (1994), p 41

<sup>76</sup> Ibid, p 46

<sup>77</sup> Ibid, p 50

<sup>78</sup> Ibid, p 43

According to Gleick, there are four major characteristics which makes water a possible source of conflict; "... (1) the degree of scarcity, (2) the extent to which the water supply is shared by more than one region or state, (3) the relative power of the basin states, and (4) the ease of access to alternative fresh water resources."<sup>79</sup> The clearest example showing all these characteristics is, according to Gleick, the Middle Eastern area, due among other things to its severe aridity and the fact that all major rivers in the area are shared by at least two countries. Here he particularly mentions the Jordan River, being throughout history the centre of water sharing disputes, among others between Syria and Israel. He says that here "water and water-supply systems have been the roots, means and causes of war"<sup>80</sup>.

Gleick claims that most disputes over water do not lead to an escalation of conflict. On the contrary, when countries are faced with the dilemma of having to share a valuable water resource, this more often leads to negotiations, discussions as well as peaceful resolutions, making the water management a tool for peaceful interaction.

One vital tool to make water sharing a means for peaceful settlement between countries is, according to Gleick, the use of legal documentation and international law. In fact, water treaties between individual countries over shared water resources have shown to be quite effective in developing peaceful relations. Water management and regulated water distribution needs to become a crucial part of negotiations and conflict resolution, hereby addressing some of the core issues of conflict, for the outcome of these negotiations and resolutions to be valid and sustainable.<sup>81</sup> Gleick specifically mentions six areas which need be addressed for a sustainable and peaceful outcome of water sharing.<sup>82</sup>

The first is the principle of equitable utilization, meaning that every riparian state is entitled to a reasonable and equitable share of the water in common. The division of the water is hereby shared based on the countries actual water need, calculated by adding a number of factors, such as demographic changes in population and availability of alternative water resources. Gleick points at this as particularly important for the sharing of the waters of the Jordan River.

The second area to be addressed is the prevention of causing harm to other states. The common water should be diverted in a manner as to cause the least amount of harm to the

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<sup>79</sup> Gleick, Peter H. "Water and Conflict, Fresh Water Resources and International Security" (1995), p 89

<sup>80</sup> Gleick, Peter H. "Reducing the Risk of Conflict over Fresh Water Resources in the Middle East" (1994), p 41

<sup>81</sup> Ibid, p 49

<sup>82</sup> Gleick, Peter H. "Water and Conflict, Fresh Water Resources and International Security" (1995), p 112

other riparian states. This opens up to payment of compensation or mitigation in situations where it is unavoidable to cause harm.<sup>83</sup>

The third issue, connecting to the second one, is the obligation of one state to notify and inform other riparian states of any water resource related activity that could affect them, hereby giving them the possibility to object to or trying to influence the action.

The fourth point is the obligation of riparian states to share hydrological data related to the shared water resource with concerned neighbouring countries. Gleick claims that this would have a major impact on cooperation between Middle Eastern countries in specific, since they tend to classify hydrological data to be a national concern only.<sup>84</sup> Sharing of hydrological data is also immensely important for peace negotiations to be fair and effective. “Unless basin states share hydrologic data, no satisfactory agreements on allocations, responses during shortages, and flood management and planning can be reached”.<sup>85</sup> If hydrological data is openly shared, this could positively influence the fifth point, which is the cooperative management of international water resources. The affected countries should all participate in a joint basin commission, working as a negotiator and mediator between the countries on issues relating to the sharing of water resources.

The last important area, affected by all the previous mentioned, is the obligation of the states to peacefully resolve disputes, water related and others, without resorting to violence. Besides these six main areas Gleick also mentions two important sub-areas to be addressed: on-farm management of water should be improved, and the overall water-use, including modifying canals and aqueducts to reduce losses during transfer and improvements in water conservation and reuse, should be made more effective.<sup>86</sup>

The overall critic of these theories mainly concerns the amount of stress given to environmental matters, instead of its actual contents. Among Homer-Dixons critics there are those who claim that he is “overemphasizing the importance of environmental factors in causing violent conflict”.<sup>87</sup> These critics also claim that Homer-Dixon in his research only gives attention to the examples that support his theory, neglecting the ones that don’t. Even though most of Homer-Dixon fellow scholars agree that his research has been path breaking

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<sup>83</sup> Gleick in “Reducing the Risk of Conflict over Fresh Water Resources in the Middle East“ (1994), p 48, quotes the latin maxim used in legal terminology “sic utere tuo ut alienum non laedas” meaning “one should use his own property in such a manner as not to injure that of another” as a standard reference.

<sup>84</sup> Gleick, Peter H. “Reducing the Risk of Conflict over Fresh Water Resources in the Middle East“ (1994), p 47

<sup>85</sup> Ibid, p 47

<sup>86</sup> Ibid, p 42, 50

<sup>87</sup> Smith, Dan, reviewed work: Environment, Scarcity, and Violence by Thomas Homer-Dixon (1999)

in showing the possible connection between environmental issues and the outbreak of conflict, there is however not a common conviction that Homer-Dixon has proven this connection as a definite causal truth. Richard N. Cooper is among the critics who support the notion made by Homer-Dixon that environmental scarcity does not have to lead to the outbreak of conflict, but instead be a promoter of cooperation to reach peaceful solutions.<sup>88</sup> One critic, Marian A. L. Miller, believes that Homer-Dixon does not give enough attention to the impact the international society, both in terms of states and non-state actors, can have on environmental scarcity.<sup>89</sup>

One of Gleicks most famous and most refereed to publications is “The World’s Water 2002-2003: The Biennial Report on Freshwater Resources”, where he as editor presents a wide range of data and statistics concerning the worlds freshwater resources, including for example water quality, conservation and supply implications. His book received mainly positive feedback among fellow scholars, however there were critics who claimed that too much remained unclear over the actual effect on and reaction within societies of environmental changes such as water scarcity.<sup>90</sup> Excluding this claimed unclearness, possibly stemming from lack of extended data, the information that Gleick does present in his report is mainly considered by fellow researchers as a good and politically neutral overview of the different aspects related to water resource problems.

One of the few scholars who claim that water scarcity does not have a part to play in peace negotiations at all, is Jerome Slater, Professor of Political Science and University Research Scholar at the State University of New York at Buffalo. In his article “Lost Opportunities for Peace in the Arab-Israeli Conflict” (printed in *International Security, Vol 27, No 1 Summer 2002*), he highlights the particular case of Israel and Syria and analyzes what role water plays in the conflict between the two countries as well as what part water plays in a solution to the conflict.<sup>91</sup> He rules out that water, even the water connected to the occupied Golan Heights, should have any special role to play in resolving the conflict between the two countries. He draws this conclusion based on his findings that neither Syria nor Israel can secure sufficient water to meet state security standards, no matter if they have access to the Golan Heights water or not. The areas of the two countries are simply too water scarce, too arid, to meet the

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<sup>88</sup> Cooper, Richard N. reviewed work “Environment, Scarcity, and Violence” by Thomas F. Homer-Dixon (1999)

<sup>89</sup> Miller, Marian A. L. reviewed work “Environment, Scarcity, and Violence” by Thomas F. Homer-Dixon (2002)

<sup>90</sup> Boxer, Barusch, reviewed work “The World’s Water 2002-2003: The Biennial Report on Freshwater Resources” by Peter Gleick (2003), p 125

<sup>91</sup> Slater, Jerome “Lost Opportunities for Peace in the Arab-Israeli Conflict” (2002), p 79-106

demands in either of the countries. The only solution to their water deficit problem is to import water, for example from Turkey. However, I find this conclusion fairly illogical, for several reasons. Slater himself in the article gives a comprehensive summary on the high importance both sides have given to the water issue in the past, and the many times water has played a major role in conflict between the countries. I conclude that since the countries have given high importance to water in the past, they are likely to do so in the future as well. In the future, the importance of water to the two countries is even probable to become higher than in the past, due to the fact that the water resources are diminishing, and water therefore becomes an even more precious resource. I also find it illogical that Israel and Syria should diminish in their ambition to try to secure as much water as possible, simply because no deal would secure them enough water. I find it hard to believe that any country should want to rely on another country to secure access to an as basic need as water, however friendly the relationship to this deliverer country might be. It is more logical that a country would try to limit its dependency on another country as far as possible, for example by maximizing its utilization of the water resources it has access to.

Another scholar who believes that water considerations should be kept at a minimum in peace settlement, particularly in the case of Israel versus Syria and the Palestinians, is Hillel Frisch, a Senior Lecturer at the Department of Political Studies, Bar-Ilan University, Israel.<sup>92</sup> One of his main arguments why Israel should not include water issues in peace talks with its neighbours, or even engage in peace talks at all, is that this inevitable would lead to the loss of Israeli control over water. According to Frisch, considering the water consumption of current Israeli lifestyle, any loss of water would be a threat to Israel's mere existence. Frisch also believes that if the Syrians or the Palestinians get control over water connected to the Israeli water system, this will increase the pollution of these waters, due to their negligence and lack of knowledge of water management. He represents no scientific facts supporting his first argument, why I find this based mainly on emotions. His second argument also doesn't hold scrutiny, since pollution of a common water resource can occur whether or not the parties sharing it are at peace or involved in a conflict with one another. In fact, I believe the likeliness of pollution to take place is higher when there are no common regulations, such as legally binding documents, regarding its use.

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<sup>92</sup> Frisch, Hillel "Water and Israel's National Security" (2001)

The combined theory of Homer-Dixon, Gleick and Ohlsson highlights the importance of addressing the linkage between the scarcity of water, water management and conflict resolution. After taking part of particularly Homer-Dixons and Gleicks research, I believe that even though, as some critics claim, the linkage is not completely clear between water resource scarcity and conflict, I find that there is enough evidence to prove not just a clear connection, but a linkage that by being highlighted could serve as a tool to reach a positive outcome in situations where riparian countries in a current state of war, due to their shared resources, are forced to cooperate. The critic from Slater, who rules out any importance of water in peace negotiation and settlement, I find unfounded and illogical. I also don't consider the critic from Frisch very scientific, instead based on emotions and also illogical.

Therefore I continue to believe that Homer-Dixon's, Gleick's and Ohlsson's theory is ideal for my analysis of how it would be possible for Israel and Syria to reach a sustainable peace agreement, by incorporating and explicitly specifying the management their shared water not just in the peace negotiations, but in the final peace treaty itself. I have focused on three main points in their theories, which they all have highlighted as of particular importance, and used these points as framework for my research questions and analysis.

#### **4.2) Theoretical Framework, Main Points of the Theories**

1. According to the theorists, water scarcity can be considered a vital political security issue. When the access to water is not completely secured, for example due to the sharing of water resources with other (possibly conflicting) neighbouring countries, states might calculate their prospects as a zero-sum or negative-sum situation, where they might loose control over diminishing water resources. More specific, water is likely to become a source of conflict between countries in the following cases; (1) if the degree of scarcity is high, (2) if the water supply is shared by more than one region or state, (3) if there is an uneven power relationship between the basin states regarding military and economy, and (4) to what extent a country has access to alternative fresh water resources. As a fifth point (5) can also be included. the overall water policies and management of a country, for example within the irrigation sector, since these policies also effects the incentives to and standpoint in peace negotiations. Therefore it is *important to thoroughly evaluate the overall water situation* of a country, to be able to calculate the possible correlation between water management and conflict prevention.

2. The policies of countries regarding water can, according to the theorists, play a major role in triggering conflict or promoting peaceful agreements. When a water resource is shared between several countries without clear and specific regulations regarding the water use, as in the case of Israel and Syria, and the countries involved are trying to maximize their access and use of the water, the likeliness of conflict outbreak rises even further. International laws and monitoring bodies have proven insufficient to meet all the new challenges connected to water scarcity conflicts, why the responsibility instead lays heavily on the initiatives and actions of the individual countries politicians. To successfully implement a water management ideology in the active policies and documents of a country, and effectively employ them as tools to reach a sustainable peaceful settlement between rival countries, it takes a genuine, committed and clear political will from politicians holding influential positions. Israel here constitutes an interesting example, described particularly by the theorists, by having one of the most advanced, well planned and effective water management systems in the world, and at the same time the water incorporated in this system stems to a large part from illegally occupied territories. Syria on the other hand, is described by the theorists as having a history of water scarcity vulnerability, due to its fast growing population and urbanization in combination with bad water management and complicated relationship with riparian neighbour states. To analyze the possibilities of Israel and Syria to implement water management as an effective tool to reach a sustainable peace agreement, it is therefore *required to investigate how the political leaders have addressed the issue of water in previous negotiations.*
3. Historically, poor water management between countries sharing water resources has many times led to the outbreak of war. But when countries are faced with the dilemma of having to share a valuable water resource, water management has more often served as a tool for peaceful interaction. One vital tool to make water sharing a means for peaceful settlement between countries is the use of legal documentation and international law. In fact, water treaties between individual countries over shared water resources have shown to be quite effective in developing peaceful relations. They are also an essential compliment to existing

international law, which by itself does not cover areas sufficient enough. Things that should be legally documented are, (1) the principle of equitable utilization, meaning that every riparian state is entitled to a reasonable and equitable share of the water in common, (2) the prevention of causing harm to other states, meaning that the common water should be diverted in a manner to cause the least amount of harm to the other riparian states, opening up to payment of compensation or mitigation in situations where it is unavoidable to cause harm, (3) the obligation of one state to notify and inform other riparian states of any water resource related activity that could affect them, hereby giving them the possibility to object to or trying to influence the action, (4) the obligation of riparian states to share hydrological data related to the shared water resource with other countries, (5) the cooperative management of international water resources. The affected countries should all participate in a joint basin commission, working as a negotiator and mediator between the countries on issues relating to the sharing of water resources, and (6) the obligation of the states to peacefully resolve disputes. To *establish how water can serve as a tool to reach a sustainable peace agreement between Israel and Syria* it is proper to look at the above mentioned areas.

### **4.3) The Israel-Jordan Peace Treaty**

One example valid as a reference is the peace treaty between Israel and Jordan in 1994. In this peace treaty the issue of the two countries' shared water was handled thoroughly in a separate article in the treaty, article 6, as well as an annex designed to explicitly clarify the legally binding aspects.

The way the water was included in the peace agreement has however been criticised by several researchers of peace and conflict. Itay Fischhendler, an assistant Professor at the Department of Geography, Hebrew University of Jerusalem, claims that the way water was treated both during the negotiations and in the final agreement was full of ambiguities, leaving it up to both parties to interpret it in a manner convenient for them. By adopting this ambiguous method, often meaning that several issues were simply not addressed at all, Fischhendler claims that this in fact postponed the creation of a lasting conflict resolution. The joint water agencies, which were stipulated to be formed through the agreement, was according to Fischhendler mainly a means to create a public illusion about equality between the two parties, while Israel in fact was the stronger party and the one that through the

agreement obtained the most control over the shared water resources. He concludes that because of this, the arrangements between the two countries concerning the shared water resources have been everything but smooth since the ratification of the agreement.<sup>93</sup>

Maya Manna at the Roger Williams University agrees with Fischhendler that Israel came out as the more profitable part, being able to control the amount of water Jordan would receive on an annual basis.<sup>94</sup> According to Manna, Israel has also used this upper hand position by not allocating as much water as actually stipulated by the treaty to Jordan.<sup>95</sup>

I will hold the Israeli-Jordanian peace treaty as a reference of how a failed effort to implement the theory mentioned above by Ohlsson, Homer-Dixon and Gleick may look like, and see how this example could serve as a tool to learn from and develop, to reach a sustainable peace agreement between Syria and Israel.

For full details of this agreement, see Appendix 3.

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<sup>93</sup> Fischhendler, Itay “Ambiguity in Transboundary Environmental Dispute Resolution: The Israeli Jordanian Water Agreement”, p 105-106

<sup>94</sup> Manna, Maya *Water and the Treaty of Peace between Israel and Jordan*, p 59

<sup>95</sup> *Ibid*, p 62

## 5) The Concerned Water Resources

According to the theorists Homer-Dixon, Gleick and Ohlsson, to calculate the possible correlation between water management and conflict prevention between the Israel and Syria, it is necessary to evaluate their overall water situation.

To answer my first question mentioned in the introduction, **why the waters of the Golan Heights water is important to the two riparian states**, I therefore intend in this chapter to *describe the water resources of the two countries as thoroughly as possible*. I will try to outline the countries water resources in terms of how much water they have access to, how much the individual resources contribute to the complete water supply of the countries and how much the water connected to the Golan Heights amounts to related to the total amount of water. I will also describe the overall water policies of the countries related to population, water utilization and mention the economic and strategic aspects of controlling the water.

### 5.1) The Existing Water Resources

#### 5.1.1) Israel's Water Resources

**General description of water resources and water waste:** A vast part, 60 %, of Israel is classified as arid, and the remaining as semi-arid.<sup>96</sup> Israel has access to renewable water resources to a total amount of 1 670 MCM/yr (million cubic metres), see table below. Of this 595 MCM/yr or 35,6 % constitutes surface water mainly from the Jordan River System, and 1 075 MCM/yr or 64,3 % constitutes groundwater.

Israel has occupied the Palestinian areas of the West Bank and Gaza since 1967. It allocates 953 MCM/yr from the aquifers in these areas.<sup>97</sup> About one quarter of all Israel's water is extracted through the Mountain Aquifer (also called Yarkon-Taninim aquifer). Several water resources are connected to this 130 kilometres long and 35 kilometres wide aquifer. It stretches from Mount Carmel in the north down to Beersheva in the south. The aquifer is fed almost entirely by rain over the West Bank.<sup>98</sup> Even though the water is extracted from the West Bank, only about 20 % of it goes back to the Palestinians living there, Israel taking the

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<sup>96</sup> Israel Ministry of Foreign Affairs *Development of Limited Water Resources: Historical and Technological Aspects* (2000)

<sup>97</sup> Economic and Social Commission for Western Asia (ESCWA) *ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region* (2007), p 29

<sup>98</sup> B'Tselem, The Israeli Information Center for Human Rights in the Occupied Territories *The Water Crisis*

remaining 80 %.<sup>99</sup> Israel is controlling all of the borders of the West Bank, appropriating all access to the waters of the Jordan River.<sup>100</sup> Since the Mountain Aquifer is the only source of water for the Palestinians of Occupied West Bank, and a large amount of Israel's water is allocated from this area, this controversy causes tension between Israelis and Palestinians.<sup>101</sup>

Israel finished building its National Water Carrier (NWC) in 1964. The NWC consists of ca 130 km aqueducts, tunnels, reservoirs and pumping facilities. Through it, water is transported from the northern situated Sea of Galilee to the rest of the country.

Israel is one of the worlds leading nations regarding water utilization, converting salt water to fresh water. Israel has proposed the development of several desalination plants in the Mediterranean, adding to the one already existing, as a solution to the water scarcity in Gaza, West Bank as well as Jordan.<sup>102</sup> Controlled by Israel, the water would be transported through pipelines to the concerned areas, but not to the Israeli community. Israel has a coastal aquifer close to the Mediterranean coast, but due to several decades of overpumping this aquifer is now increasingly becoming invaded by sea water, making the water unsuitable as a fresh water resource.<sup>103</sup>

Israel has a very effective water management, and besides developing desalination plants, it uses drip irrigation within its agriculture, as well as engaging in wastewater recycling and cloud-seeding.<sup>104</sup>

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<sup>99</sup> Patterson, Kendra *Water Management and Conflict: The Case of the Middle East*, p 225

<sup>100</sup> Amnesty International *Thirsting For Justice, Palestinian Access To Water Restricted* (2009), p 2

<sup>101</sup> Amery, Hussein A. and Wolf, Aaron T. *Water In The Middle East – A Geography of Peace*, first edition (2000), p 9-10

<sup>102</sup> Schoenfeld, Stuart, Abitbol, Eric and De Châtel, Francesca “Retelling the Story of Water in the Middle East: Reflections on and about a Conversation at the Dead Sea” (2007), p 20

<sup>103</sup> Israel Ministry of Environmental Protection *Quality of Water Sources: Coastal Aquifer*

<sup>104</sup> Dolatyar, Mustafa and Gray, Tim S. *Water Politics in the Middle East, A Context for Conflict or Co-operation?* (2000), p 92, 107

**Table 1: Israel's Fresh Water Resources and Discharge 2001**

<b>Israel's Fresh Water Resources 2001</b>	<b>Total Water Discharge (MCM/yr)</b>
Jordan River System	595
Yarmuk	12
Aquifers in West Bank and Gaza	953
Others (water desalination plants etc.)	110
	<b>1670</b>

Besides the major water resources mentioned above, Israel has a few minor water sheds, which do not contribute to the national water system in any considerable manner. One worth mentioning is:

**The Yarkon River:** It originates in the West Bank, runs for 27 km before ending in the area of Tel Aviv.<sup>105</sup> Due to substantial pollution, the water of the river is not used for neither domestic nor agricultural purposes, instead it is used for leisure with parks and picnic areas.

Israel also has access to a few non-freshwater resources:

**The Dead Sea:** The Lake is 80 km long and its total area is about 265 km<sup>2</sup>.<sup>106</sup> The water of the lake is unsuitable both for irrigation as well as domestic purpose, due to its very high concentration of salt, the highest in the world.<sup>107</sup> The sea laid at 417 metres below sea level in 2007, and it is dropping by approximately one metre every year.<sup>108</sup>

**The Mediterranean:** Israel borders to the Mediterranean with a 194 km long coastal line.<sup>109</sup>

**The Red Sea:** Israel borders to the Red Sea in a narrow strip of totally 12 km.<sup>110</sup>

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<sup>105</sup> Israel Ministry of Environmental Protection, *Examples of River Restoration: Yarkon River*

<sup>106</sup> Lowi, Miriam R. *Water and power, The politics of a scarce resource in the Jordan River basin* second edition (1995), p 22, Israel Central Bureau of Statistics (CBS) *Israel in Figures 2008*, p 5

<sup>107</sup> According to the Israel Ministry of Environmental Protection in *Water Sources-Dead Sea*, the level of salt concentration in the lake is ten times higher than that of the Mediterranean.

<sup>108</sup> Schoenfeld, Stuart, Abitbol, Eric and De Châtel, Francesca "Retelling the Story of Water in the Middle East: Reflections on and about a Conversation at the Dead Sea" (2007), p 25

<sup>109</sup> Israel Central Bureau of Statistics (CBS) *Israel in Figures 2008*, p 5

<sup>110</sup> *Ibid*, p 5



these water resources stem from outside the borders of Syria.<sup>112</sup> Syria is so far not involved in any production of desalinated water. Of Syria's 16 main rivers six are shared with other countries either up- or downstream. It poses a problem for Syria that its main fresh water resource, the Euphrates river, originates in Turkey, with whom Syria does not have the best relation. Up until today, there exists no tripartite agreement between Syria, Turkey and Iraq regarding their shared water.<sup>113</sup>

Syria is very vulnerable regarding fluctuations in water flow and groundwater levels. It does not possess capabilities to store large amounts of water in times of high water levels for use in times of drought. Its overall water management system is also outdated and ineffective.<sup>114</sup> It is estimated that ca 50 % of the water in the capital Damascus is wasted.<sup>115</sup>

Syria has access to several freshwater resources:

**-Euphrates:** The River Euphrates is Syria's largest river stretching totally 2,330 kilometres.<sup>116</sup> Totally 680 km runs inside Syria.<sup>117</sup> Euphrates' surface area is 450 km<sup>2</sup>.<sup>118</sup> It rises in Turkey, runs through Syria and ends up in Iraq. Syria is guaranteed a flow of 500 CM/second (cubic metres) through a temporary agreement with Turkey, however only 42 % of this water actually arrives in Syria.<sup>119</sup> Euphrates is Syria's most important fresh water resource, accounting for up to 86 % of the total fresh water.<sup>120</sup>

**-Tigris:** The total length of the River Tigris is 1,718 kilometres.<sup>121</sup> Also this river rises in Turkey and makes out a small distance of the border between Syria and Turkey as well as between Syria and Iraq. According to an agreement between the two countries, Syria is

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<sup>112</sup> Economic and Social Commission for Western Asia (ESCWA)

*ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region* (2007), p 28

<sup>113</sup> Miller, Reuben *The Israeli-Syrian Negotiations* (2000), p 126

<sup>114</sup> Dolatyar, Mustafa and Gray, Tim S. *Water Politics in the Middle East, A Context for Conflict or Co-operation?* (2000), p 122-123

<sup>115</sup> Economic and Social Commission for Western Asia (ESCWA)

*Regional Cooperation Between Countries in the Management of Shared Water Resources: Case Studies of Some Countries in the ESCWA Region* (2005), p 7

<sup>116</sup> ESCWA Water Development Report 2007, p 10

<sup>117</sup> AQUASTAT, FAO's Information System on Water and Agriculture *Syrian Arab Republic*

<sup>118</sup> Economic and Social Commission for Western Asia (ESCWA)

*Regional Cooperation Between Countries in the Management of Shared Water Resources: Case Studies of Some Countries in the ESCWA Region* (2005), p 10

<sup>119</sup> *Ibid*, p 7

<sup>120</sup> Lowi, Miriam R. *Water and Conflict in the Middle East and South Asia: Are Environmental Issues and Security Issues Linked?* P 382

<sup>121</sup> Economic and Social Commission for Western Asia (ESCWA)

*ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region* (2007), p 10

expected to regulate so that 60 % of the water flows into Iraq.<sup>122</sup> Both the Euphrates and the Tigris River are subject to extreme seasonal and annual fluctuations.

**-Lake Al-Assad:** This Lake, also called *Buhayrat al Asad*, is a reservoir construction made out of the Tabaqah Dam, which was built on the River Euphrates in 1973. It is ca 80 kilometres long and 8 kilometres wide. The surface area is ca 600 km<sup>2</sup>.<sup>123</sup>

**-Orontes River/ Nahr Al-Aasi:** The 400 km long Orontes River rises in Lebanon, then flows through Syria to finally end up in the sea in Turkey.<sup>124</sup> Through an agreement with Lebanon, of the annual flow of 400 MCM/yr, 80 % or 320 MCM is allocated to Syria, and the rest to Lebanon.<sup>125</sup>

**-Al-Kabeer Al-Janoubi:** The 56 km long River Al-Kabeer Al-Janoubi constitutes the northern border between Lebanon and Syria. Its total surface area is 0,991 km<sup>2</sup>. The estimated annual flow is 15 MCM/yr.<sup>126</sup> Of this water 60 %, or 9 MCM/yr, is allocated to Syria according to an agreement between the counties.

**Table 2: Syria's Fresh Water Resources and Discharge 2007**

<b>Syria's Fresh Water Resources 2007</b>	<b>Total Water Discharge (MCM/yr)</b>
Jordan River System	805
Euphrates	22618
Yarmuk	388
Orontes River	320
Al-Kabeer Al-Janoubi	9
Others (Tigris, Lake Al-Assad etc)	2160
	<b>26300</b>

Syria also has access to one non fresh water resource:

**The Mediterranean:** Syria's north-western coastal border to the Mediterranean is about 190 km long.

<sup>122</sup> Patterson, Kendra *Water Management and Conflict: The Case of the Middle East*, p 213

<sup>123</sup> LakeNet: Protecting and Restoring the Health of Lakes Throughout the World *Lake profile: Bahrat Assad (Buhayrat al Asad)*

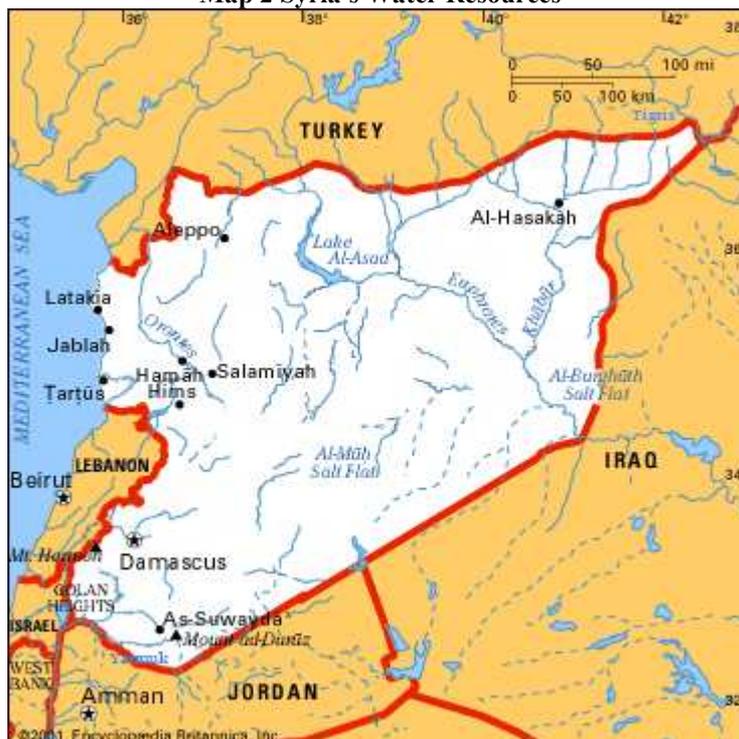
<sup>124</sup> Encyclopedia Britannica *Orontes River*

<sup>125</sup> Economic and Social Commission for Western Asia (ESCWA)

*Regional Cooperation Between Countries in the Management of Shared Water Resources: Case Studies of Some Countries in the ESCWA Region (2005)*, p 15

<sup>126</sup> Ibid, p 12

Map 2 Syria's Water Resources



Map from Encyclopaedia Britannica, Edited by Author

### 5.1.3) Water Resources Shared Between or Affecting both Israel and Syria

The water resources shared between both Syria and Israel are many, comprise a lot of water and can be summed up in the definition of “the Jordan River System/Basin”, that is all water connected to the Jordan River north of the Dead Sea. This system is sometimes divided into “the Upper Jordan River”, constituting the water resources north of the Sea of Galilee, and “the Lower Jordan River” constituting the water south of the lake. The concerned water resources of the Jordan River System are the Sea of Galilee, The Rivers of Jordan, Banias, Yarmuk, Hasbani and Dan as well as Golan Heights surface water.

**-Jordan River:** The Jordan River and the Sea of Galilee are closely interconnected, which makes it a problem to separate them statistically. Its headwaters, contributing to the Upper part of the river, are the Rivers Hasbani, Dan and the Banias.<sup>127</sup> The quality of the water in the Upper Jordan River is very good, while the Lower Jordan is much more saline.<sup>128</sup> The Jordan River stretches 320 kilometres from the Golan Height to the Dead Sea and constitutes the

<sup>127</sup> The Lower Jordan River is also fed by the Zarqa River, which lies entirely within Jordan, why it is not included in the hydrological complex of Israel and Syria.

<sup>128</sup> Dolatyar, Mustafa and Gray, Tim S. *Water Politics in the Middle East, A Context for Conflict or Co-operation?* (2000), p 89

largest water inflow to the Sea of Galilee.<sup>129</sup> A total of 250 km of the Jordan River flows within the borders of Israel or occupied Israeli territory.<sup>130</sup> The flow of the river was 1400 MCM annually in 1995, and the total renewable annual water supply was 700 MCM.<sup>131</sup> The flow can differ largely, from 200 MCM in dry years to 1000 MCM in wet years.<sup>132</sup>

**-Sea of Galilee (biblical name):** Also known as *Lake Kinneret* (Israeli name) and *Lake Tiberias*, the lake today borders territory occupied by Israel, and constitutes Israel's sole fresh water lake. The range of the lake is ca 53 kilometres, the length ca 21 km and the width ca 13 km. The total area is ca 164 km<sup>2</sup>.<sup>133</sup> The observed water flow into the lake was 840 MCM/yr in 1995.<sup>134</sup> Of these 500 MCM/yr was allocated through the NWC, and 270 MCM/yr evaporated.

The majority of the inflow comes from, as well as ends in, the Jordan River. Today freshwater from the lake is transported to the majority of the Israeli population. The lake constitutes the largest fresh water source for the country and serves as an important national reserve, gathering rainwater during seasons of heavy rain and storing this water during seasons of drought.

**-Baniyas/Hermon River:** The Baniyas River constitutes one of the main flows into the Jordan River, and has its spring in the north-western Golan Heights. It runs for about five kilometres on the occupied Syrian side of the border, before it crosses to the Israeli side. It contributes annually with about 120 million cubic metres, that is 20%, to the water of the Upper Jordan River.<sup>135</sup>

**-Hasbani/Senir River:** The Hasbani originates in Lebanon, and runs there for 17 km before crossing the border.<sup>136</sup> It makes out the northern headwater of the Jordan River and adds an annual flow of 138 MCM to it.

**-Dan River/Liddani:** The Dan originates in the Golan Heights, but thereafter runs within the borders of pre 1967 Israel.<sup>137</sup> Dan has an annual flow of about 245 MCM/yr, and is one of the major contributors to the upper Jordan River, discharging about 50 % of its flow.<sup>138</sup>

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<sup>129</sup> Wolf, Aaron T. *Hydropolitics along the Jordan River: Scarce water and its impact on the Arab-Israeli conflict*, first edition (1995), p 7.

<sup>130</sup> Israel Central Bureau of Statistics (CBS) *Israel in Figures 2008*, p 5

<sup>131</sup> Wolf, Aaron T. *Hydropolitics along the Jordan River: Scarce water and its impact on the Arab-Israeli conflict*, first edition (1995), p 2, 12

<sup>132</sup> Fischhendler, Itay "Ambiguity in Transboundary Environmental Dispute Resolution: The Israeli-Jordanian Water Agreement" (2008), p 94

<sup>133</sup> Israel Central Bureau of Statistics (CBS) *Israel in Figures 2008*, p 5

<sup>134</sup> Wolf, Aaron T. *Hydropolitics along the Jordan River: Scarce water and its impact on the Arab-Israeli conflict*, first edition (1995), p 8

<sup>135</sup> Amery, Hussein A. and Wolf, Aaron T. *Water In The Middle East*, first edition (2000), p 152

<sup>136</sup> Shalev, Aryeh *Israel and Syria: Peace and Security on the Golan* (1994), p 157

The three rivers of Baniyas, Hasbani and Dan together contribute with approximately 500 MCM/yr to the Jordan River system.<sup>139</sup>

**-Golan Surface Water:** Israel has since its occupation of the Golan Heights in 1967, in connection to its establishment of a settler community there, built an irrigation network consisting of about 100 smaller reservoirs. These springs were built to keep the Israeli settlements self sufficient in water, not having to connect them to the wider Israeli water management network. These springs collect surface water on the Golan Heights during the rainy winter season, encompassing between about 105 MCM per year.<sup>140</sup>

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<sup>137</sup> Shalev, Aryeh *Israel and Syria: Peace and Security on the Golan* (1994), p 156

<sup>138</sup> See for example Lowi, Miriam R. *Water and Power, The politics of a scarce resource in the Jordan River Basin* from 1993, p 20, Dolatyar, Mustafa and Gray, Tim S. also refers to Lowi's numbers in *Water Politics in the Middle East, A Context for Conflict or Co-operation?* (2000), p 89

<sup>139</sup> Lowi, Miriam R. *Water and power, The politics of a scarce resource in the Jordan River basin* second edition (1995), p 25

<sup>140</sup> Shalev, Aryeh *Israel and Syria: Peace and Security on the Golan* (1994), p 157

Map 3 Water Resources Shared by Israel and Syria



Map from PASSIA, Edited by Author<sup>141</sup>

**-Yarmuk River:** The Yarmuk River, together with the River Euphrates, constitutes one of the most important water resources to Syria. 10 km south of the Sea of Galilee it joins the Jordan River. 80 % of the river lies within Syria, and the remaining 20 % in Jordan.<sup>142</sup> The Yarmuk has sources in both Syria and Jordan, and constitutes part of the border between them, as well as between Israel and Jordan. It also flows for a small distance within the borders of Israel. In

<sup>141</sup> The map also shows the former Lake Hula. In 1951 Israel started draining Lake Huleh, which marches encompassed 15 000 acres. The lake is today completely drained. For further information, see Donald Neff "Israel-Syria: Conflict at the Jordan River, 1949-1967" from 1994, p 30.

<sup>142</sup> Lowi, Miriam R. *Water and power, The politics of a scarce resource in the Jordan River basin* second edition (1995), p 28

1995 it added about 400 MCM/yr to the Lower Jordan River. Israel also diverts some of its water to the Sea of Galilee.

**Table 3: The Water of the Golan Heights and its Total Water Discharge 1995**

<b>Tributaries to the Jordan River Basin</b>	<b>Total Water Discharge 1995 (MCM/yr)</b>
Jordan River and its tributaries	1448
- Sea of Galilee	840
- Hasbani River	138
- Banias River	120
- Dan River	245
- Golan Surface Water	105
Yarmuk River	400
	<b>1848</b>

I have not found any more recent complete statistics about the water, but there are few indicators that the water situation should have changed in any significant manner. Since 1995 the one major event regarding the water connected to the Golan Heights is the peace treaty between Israel and Jordan, stipulating the sharing of the River Jordan between the two countries. This regulation does however not have to influence the total flow of the water, why I my analysis will rely on the numbers from 1995 to still be valid.

## **5.2) The Actual Water Need of the Countries and their Actual Utilization of the Existing Water**

### **5.2.1) Israel's Population and Water Utilization**

According to UN, the population of Israel was 6.7 million in 2005. The annual population growth is 1,8 %.<sup>143</sup> This concludes that the population is expected to rise to 8,7 million in 2025, an increase by 29,8 %.<sup>144</sup> During this period, the urbanisation rate is estimated to rise from 91 % in 2005 to 93,1 % in 2025, see table below.<sup>145</sup> Israeli authorities as a rule claim that there is a water balance between how much water is produced and how much is

<sup>143</sup> Israel Central Bureau of Statistics *Israel in Figures 2008*, p 5

<sup>144</sup> UN, Department of Economic and Social Affairs, World Population Prospects *The 2008 Revision Population Database, The Case of Israel*

<sup>145</sup> United Nations Department of Economic and Social Affairs, Population Division *World Urbanization Prospects: The 2005 Revision*

consumed in the country, sometimes they claim that Israel in fact produces more water than is being consumed. However, according to several international researchers, Israel presently has a too high water consumption, some claim that up to 15 % more water is being used than what is annually renewable, an impossible equation in the long run.<sup>146</sup>

**Table 4 The Population and Urbanization of Israel and Syria**

	<b>Population in Millions</b>	<b>Population Increase in percentage</b>	<b>Urban Population in Millions</b>	<b>Urbanization Rate in percentage</b>
<b>Israel 2005</b>	6,7		6,1	91 %
<b>Israel 2025</b>	8,7	29,8 %	8,1	93,1 %
<b>Syria 2005</b>	19,1		9,6	50,2 %
<b>Syria 2025</b>	28,5	49,2 %	16,3	57,1 %

**5.2.2) Syria’s Population and Water Utilization**

The population in Syria was 19,1 million in 2005, and by 2025 it is estimated to be 28,5 million, which is an increase by 49,2 %.<sup>147</sup> During this period, the urbanisation rate is also estimated to rise from 50,2 % in 2005 to 57,1 % in 2025, see table above. These two factors together show that there will be an increased demand of water, due to more consumers, and the inevitable increased consumption per person connected to urbanism.

The annual share of available water resources per person in 2007 was 1,247 CM/yr.<sup>148</sup> This is slightly above the water poverty line, which is 1,000 CM/yr.<sup>149</sup> Of the available water per capita 956,9 CM/yr was actually being utilized, leaving only a small margin for any change in the population demography.

<sup>146</sup> See for example Amery, Hussein A, Wolf, Aaron T. *Water In The Middle East – A Geography of Peace*, first edition from 2000, p 9, or Dolatyar, Mustafa and Gray, Tim S. *Water Politics in the Middle East, A Context for Conflict or Co-operation?* from 2000, p 91

<sup>147</sup> UN, Department of Economic and Social Affairs, World Population Prospects *The 2008 Revision Population Database, The Case of Syria*

<sup>148</sup> Economic and Social Commission for Western Asia (ESCWA) *ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region* (2007), p 16

<sup>149</sup> The expression “water poverty line” was coined by Malin Falkenmark, professor at Uppsala University specializing in hydrology. According to her “countries which have 10.000 cubic metres of water per person a year or more have limited water problems; those with 1000-1670 can be regarded as “water stressed”; those with 500-1000 suffer from chronic water scarcity; and those with less than 500 cubic metres of waters a year are beyond.....the water barrier” (see for example Clarke, Robin *Water, The International Crisis* from 1993, p 66)

### **5.2.3) Israel's and Syria's Official Water Usage in Respective Sector:**

Of the water used per person in Syria in 2005, most of it was consumed within the agricultural sector, 845,3 CM/yr, or 88,3 %, followed by the domestic use of 78,7 CM/yr, which is 8,2 %, and the industrial sector 32,9 CM/yr, or 3,4 %, see table below.<sup>150</sup> The total amount of water use was 17,669 MCM/yr, divided into 15,608 MCM/yr for the agricultural sector, 1,453 MCM/yr in the domestic sector and 608 MCM/yr for the industry. The water demand in the different sectors is estimated to rise to 19,430 MCM/yr for agriculture, to 2,825 MCM/yr for the domestic sector and to 1,300 MCM/yr for the industry by the year 2025.<sup>151</sup>

According to the CBS (Israel's Central Bureau of Statistics), the total water consumption of Israel in 2006 was 1,959 MCM, while the total water production was 1,996 MCM.<sup>152</sup> The water was divided into 1,108 MCM, or 56,5%, for the agricultural sector, 737 MCM, or 37,6%, for domestic and public purposes and 114 MCM, or 5,8%, for the industrial sector.<sup>153</sup> However, according to some international researchers Israel uses much more, about 75 %, of its water within the agricultural sector.<sup>154</sup> It is interesting to note that no official statistics showing estimations about water use in 2025 have yet been presented from Israeli government authorities or the CBS. No valid reason appears to why Israel should not be able to present these statistics. On the contrary, Israel's highly advanced and effective water management system should make it an easy task to calculate future water consumption. That Israeli authorities have not presented this data indicates that the matter is politically sensitive.

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<sup>150</sup> Economic and Social Commission for Western Asia (ESCWA)

*ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region* (2007), p 19-23

<sup>151</sup> Economic and Social Commission for Western Asia (ESCWA)

*Sectoral Water Allocation Policies in Selected ESCWA Member Countries; An Evaluation of the Economic, Social and Drought-Related Impact* (2003), p 5

<sup>152</sup> Israel Central Bureau of Statistics *Israel in Figures 2008*, p 21

<sup>153</sup> *Ibid*, p 21

<sup>154</sup> Dolatyar, Mustafa and Gray, Tim S. *Water Politics in the Middle East, A Context for Conflict or Co-operation?* (2000), p 92

**Table 5 Countries Official Water Usage in the Agricultural, Industrial and Domestic Sector Years 2005/2006 and 2025**

	<b>Agriculture in MCM/yr</b>	<b>Agriculture in Percentage</b>	<b>Industry in MCM/yr</b>	<b>Industry in Percentage</b>	<b>Domestic in MCM/yr</b>	<b>Domestic in Percentage</b>
<b>Israel 2006</b>	1 108	56,5 %	114	5,8 %	737	37,6 %
<b>Israel 2025</b>						
<b>Syria 2005</b>	15 608	88,3 %	608	3,4 %	1 453	8,2 %
<b>Syria 2025</b>	19 430	82,4 %	1 300	5,5 %	2 825	11,9 %

However, looking at the statistics presented previously in this chapter, I have tried to make an estimation about Israel's current and future water use, presented below.

#### **5.2.4) The Actual Water Need of Israel and Syria**

Since Israel's population of 6,7 millions in 2005 consumed about 1 959 MCM/yr of fresh water (assuming the same amount as in 2006), this concludes that the average water use per person was 292 CM/person/yr. As shown in Table 4, the urbanization rate is not expected to change a lot. Assuming then that the water consumption per person therefore would remain fairly constant, with an increase in population to 8,7 millions, the average water use for the whole Israeli population in 2025 would be 2 540 MCM/yr. The rise in water need compared to 2005 would therefore be about 29,6 % in 2025.

Syria's population will increase with almost 50 % to 28,5 million, and the urbanization rate is also expected to grow to almost 60 % by 2025, this will result in an immense increase in water need. The water use will increase from 17 69 MCM/yr in 2005 to 23 555 MCM/yr in 2025, an increase with 5 886 MCM or 33 %. However, these numbers might not be completely accurate, since they do not include possible changes, for example of water waste, within the water management system.

### **5.3) The Economic and Strategic Aspects of Controlling the Water**

Many researchers have pointed to Israel's water policies as being integrated into the very establishment and development of the state. Since Israel's foundation 1948, establishing control over water resources has been a vital strategic political concern for the country.<sup>155</sup> Water is an important economic asset, since Israel's agriculture is heavily depending on it. The settlement movement, an important part of Israeli state building, is primarily occupied within agriculture. Of Israel's total water resources, the agricultural sector uses between 57-75%.

Since 1967 a large part of Israel's water is drawn from occupied areas, either Syrian or Palestinian. Due to the fact that Israel has integrated into its national water management system, and become heavily reliant of, the waters of these occupied areas, they have grown in strategic value for Israel.

The waters connected to the Golan Heights, constitutes 36 % of Israel's total water supply, and the waters of the occupied Palestinian areas constitute more than half of Israel's total water, see Table 1 and Table 6. Any peace settlement with either the Syrians or the Palestinians would therefore by default include losing access to vital water resources. In the best case scenario for Israel, it would lose not all but only some of its access to these water resources. Therefore it is very much in Israel's interest to keep as much access to and control over the water of the Golan Heights, in any negotiations over a peace settlement with Syria.

Syria has much access to water besides the waters of the Golan Heights, reducing the value of it both economically and strategically. In fact, the waters of the Golan Heights constitute only about 5 % of all of Syria's fresh water resources, see Table 6. However, Syria is weaker vis-à-vis Israel both military wise as well as economically. Since 1974 Syria has devoted a lot of its finances to strengthen the army, trying to compete with Israel military wise, resulting in a severe economic crisis in the 1990s.<sup>156</sup> Due to bad economic planning, many sectors of the country's infrastructure were neglected and are now outdated and ill managed, including the areas of irrigation and water management. Syria has a large and growing population, requiring water for domestic purposes, as well as an ineffective and water consuming agriculture. Syria has not declared their interest in the waters of the Golan Heights as clear as Israel; however, due to the above mentioned features of water management, it is of vital importance, both

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<sup>155</sup> Frisch, Hillel "Water and Israel's National Security" (2001)

<sup>156</sup> Ma'oz, Moshe *Syria and Israel From War to Peacemaking* (1995), p 260-261

economically and strategically, for Syria to have control over every possible water resource, to counter the domestic demands until the water management system has been modernized.<sup>157</sup>

**5.4) The Waters of the Golan Heights in Israel’s and Syria’s Current and Future Total Water Revenue**

Finding accurate and reliable statistics showing exactly to what extent the waters of the Golan Heights account for of the two countries total water revenue is difficult. However, many if not most scholars writing about the water connected to the Jordan River Basin are presenting fairly similar numbers regarding this, why I will rely on their information.

**Table 6 The Withdrawn Water of Syria and Israel from the Golan Heights in MCM/yr and its Percentage of the Countries Total Water Revenue**

	<b>Israel</b>	<b>Syria</b>
Water discharged from the Jordan River System and Yarmuk (MCM/yr)	607	1293
Percentage of countries total water revenue	36 %	4,9 %

Assuming that the water discharge of the Golan Heights waters remain fairly the same in the coming years, these waters are expected to rise in importance during the coming years. As shown in Table 4 and Table 5 both countries are expecting demographical changes as well as changes within the agricultural sector that by the year of 2025 will have increased the demand for water substantially. If Israel within the coming years should have to give up any or all the water connected to the West Bank due to agreements with the Palestinians, then the importance of the water of the Golan Heights rises immensely to constitute up to 83 % of all its fresh water resources. However, the water connected to the Golan Heights amounts to less than any of the two countries actually use. According to the statistics the water encompasses a total of 1 848 MCM/yr. When the two countries water withdrawal from the area is added up, it totals a number of 1 900 MCM/yr, roughly 50 MCM more than what actually exists.

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<sup>157</sup> Muslih, Muhammad “The Golan: Israel, Syria, and Strategic Calculations” (1993), p 629

## 6) The Peace Negotiations of 1992-1996 and 1999-2000

This chapter intends to give an overview of the last two rounds of peace negotiations, and how the issue of shared water resources was addressed by the two parties. Since the first round of negotiations between 1992-1996 went on for a longer period of time, and matters were more thoroughly discussed, this information is more far reaching than that of the negotiations 1999-2000.

### 6.1) Negotiations 1992-1996

#### 6.1.1) Negotiations 1992-1996; the Position of Syria

In the fall of 1992, Syria's Foreign Minister Faruq al-Shara stated that Syria was willing "to sign a total peace with Israel, based on the two resolutions 242 and 338, in return for full Israeli withdrawal from Arab land occupied in 1967".<sup>158</sup> This included besides the Golan Heights the occupied Palestinian territories of the West Bank, the Gaza Strip, the Arab part of Jerusalem, and Lebanon.<sup>159</sup> In September 1992, Syria presented a draft of a proposed "Declaration of Principles" about a Syrian-Israeli peace agreement.<sup>160</sup> Overall, the concepts in the draft were unacceptable to Israel; however, the initiative of presenting a draft was looked upon very favourably. Rabin agreed to enter into official negotiations with Syria, and during the following two years, intense secret negotiations took place, finally ending up in official negotiations at ambassadorial level in 1994 and a draft agreement between the two countries.<sup>161</sup>

In the negotiations conducted 1994 Syria seemed to have reached a genuine will to solve the conflict and was ready to make concessions to reach a peace settlement.<sup>162</sup> Syria did in these negotiations give up one until then very important priority; the liberation of Palestine. This step was taken after PLO, through its chairman Yasser Arafat, and Israel agreed upon certain interim self-governance for the Palestinians, as well as mutual recognition, in the Oslo accord in August 1993.<sup>163</sup> The Syrian concession included the demand of full Israeli withdrawal from both the West Bank and Gaza, establishing of a Palestinian state on that land as well as the

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<sup>158</sup> Slater, Jerome "Lost Opportunities for Peace in the Arab-Israeli Conflict" (2002), p 94

<sup>159</sup> Ma'oz, Moshe *Syria and Israel From War to Peacemaking* (1995), p 226, 231

<sup>160</sup> Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004), p 45

<sup>161</sup> Slater, Jerome "Lost Opportunities for Peace in the Arab-Israeli Conflict" (2002), p 95

<sup>162</sup> Hinnebusch, Raymond A. "Does Syria Want Peace? Syrian Policy in the Syrian-Israeli Peace Negotiations" (1996), p 42

<sup>163</sup> Ma'oz, Moshe *Syria and Israel From War to Peacemaking* (1995), p 236

right for refugees to return or to be compensated. This concession has since then been one of the main controversies among Syrian nationals; the general political opinion is strongly in favour of helping the Palestinians back to their national rights.<sup>164</sup> Instead the main focus of Syrian authorities in the negotiations 1994 was the Golan Heights themselves; a peace in exchange for the unconditional returning of the in 1967 occupied territories, and that the new border should be the one of before 1967. Syria however still included the withdrawal of Israeli forces from southern Lebanon as part of the conditions for peace.<sup>165</sup> In return Syria offered to accept a full normalization of relationships with Israel.<sup>166</sup> This included normalization of economic and diplomatic relations.<sup>167</sup> Syria also renounced the previous insistence on that Israel should commit to the principle of full withdrawal, and accepted unconditional talks. Syria also proclaimed itself willing to allow phased settlement and demilitarization zones, as well as letting international peacekeeping forces work on the Golan.<sup>168</sup> One main point of disagreement in the negotiations was what should be first priority; full peace or full withdrawal from the Golan.<sup>169</sup> Syrian authorities did not accept Israel's demand for normalization of relationship before peace, but stated that normalization instead should be the outcome of peace. Also the speed of withdrawal was a major point of argument, Israel wanting the period to be between five-eight years, Syria insisting on a maximum period of two years.<sup>170</sup>

### **6.1.2) Negotiations 1992-1996: the Position of Israel**

In the summer of 1992 Yitzhak Rabin, at this time the Israeli Prime Minister, stated that he accepted the UN Resolution 242 to be applied on the Golan Heights.<sup>171</sup> Rabin proclaimed that he would not go so far as to discuss territorial issues with Syria, before the Israeli population was convinced that Asad genuinely wanted peace and normalization.<sup>172</sup> Rabin stated that Israel's extent of withdrawal from the Golan Heights would depend upon the extent of the

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<sup>164</sup> Hinnebusch, Raymond A. "Does Syria Want Peace? Syrian Policy in the Syrian-Israeli Peace Negotiations" (1996), p 49

<sup>165</sup> Seale, Partick and Butler, Linda "Asad's Regional Strategy and the Challenge from Netanyahu" (1996), p 35

<sup>166</sup> Hinnebusch, Raymond A. "Does Syria Want Peace? Syrian Policy in the Syrian-Israeli Peace Negotiations" (1996), p 47

<sup>167</sup> Slater, Jerome "Lost Opportunities for Peace in the Arab-Israeli Conflict" (2002), p 105

<sup>168</sup> Hinnebusch, Raymond A. "Does Syria Want Peace? Syrian Policy in the Syrian-Israeli Peace Negotiations" (1996) p 51

<sup>169</sup> Ibid, p 52

<sup>170</sup> Ma'oz, Moshe *Syria and Israel From War to Peacemaking* (1995), p 247

<sup>171</sup> Ma'oz, Moshe "From Conflict to Peace? Israel's Relations with Syria and the Palestinians" (1999) p 414

<sup>172</sup> Ma'oz, Moshe *Syria and Israel From War to Peacemaking* (1995), p 228

implementations Syria was willing to take the peace agreement to.<sup>173</sup> This literary meant that in return for *full* peace from Syria's side, Israel would be willing to give up *all* of the Golan Heights.

However, soon Israel switched position, claiming that it was not interested in exchanging the complete Golan Heights in return for peace. Benjamin Netanyahu, during 1993-1999 the leader of the Israeli Likud Party, went as far as to state that Syria could be negotiated into an agreement without Israel having to give up any of the territory of the Golan Heights.<sup>174</sup> Netanyahu stated that he would never return the Golan Heights to Syria, and demanded that Syria should negotiate without any preconditions.<sup>175</sup> However, in 1993 Rabin indicated to Asad that Israel was ready to withdraw from all of the Golan Heights, as long as Israel's requirements for security and normalizations were met. Rabin conveyed this message orally and in secret, and was not willing to put it on print.<sup>176</sup> Golan Heights was considered an important security area to Israel, due partly to its settlements there, but also because of its vast water resources.<sup>177</sup> The official demands of Israeli authorities for peace was "normalization of relations", including diplomatic relations, trade and tourism.<sup>178</sup> Regarding the borderline, Israel did not believe that there was a completely established border between the two countries. Directly after the establishment of the Israeli state, war broke out between it and its neighbouring states, leaving the borderline ambiguous, an armistice line, and this border dispute had not been settled. Therefore Israel preferred to refer to the 1923 border line, between the Syrian mandate and the Palestinian mandate, as the most relevant border between Israel and Syria.<sup>179</sup> In return of full peace and normalization, Israel however agreed to make the border between the countries the line of June 1967, instead of the 1923 line.<sup>180</sup> Israeli preconditions included the reduction of and complete restructuring of the Syrian army as well as Israel being allowed to keep an early warning station on Syrian territory.<sup>181</sup> Rabin however stated a "readiness to uproot Jewish settlements in the Golan in return for peace".<sup>182</sup> Israel also wanted the Lebanese case to be a complete separate deal, and not part of the negotiations with Syria. In 1994, Rabin added another precondition, i.e. that any final agreement had to be

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<sup>173</sup> Ma'oz, Moshe "From Conflict to Peace? Israel's Relations with Syria and the Palestinians" (1999) p 414

<sup>174</sup> Seale, Partick and Butler, Linda "Asad's Regional Strategy and the Challenge from Netanyahu" (1996), p 27

<sup>175</sup> Hajjar, Sami G. "The Israel-Syria Track" (1999), p 113

<sup>176</sup> Seale, Patrick "The Syria-Israel Negotiations: Who Is Telling the Truth?" (2000), p 66-67

<sup>177</sup> Hinnebusch, Raymond A. "Does Syria Want Peace? Syrian Policy in the Syrian-Israeli Peace Negotiations" (1996), p 50

<sup>178</sup> Ibid, p 51

<sup>179</sup> Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004), p 60

<sup>180</sup> Slater, Jerome "Lost Opportunities for Peace in the Arab-Israeli Conflict" (2002), p 96

<sup>181</sup> Seale, Partick and Butler, Linda "Asad's Regional Strategy and the Challenge from Netanyahu" (1996), p 36

<sup>182</sup> Ma'oz, Moshe *Syria and Israel From War to Peacemaking* (1995), p 246

ratified by the Israeli public through a national referendum.<sup>183</sup> In July 1994 Rabin stated that Israel would be ready to withdraw to the border of 1967 in return of full peace with Syria and guarantees that the flow of the headwaters of the Jordan River would be uninterrupted. Rabin also “publicly stated that peace was more important than keeping certain settlement on the Golan”.<sup>184</sup>

Yitzhak Rabin was assassinated in November 1995. Rabin’s death was a setback to the peace negotiations in more than one sense. Rabin had never told Shimon Peres, who succeeded Rabin as Prime Minister, that he had made an indirect promise to Syria about full withdrawal from the Golan Heights to the 1967 line of border.<sup>185</sup> However, Peres claimed that he was committed to Rabin promise, as long as Israel’s needs were met. Peres wanted to move at a faster pace than Rabin in peace negotiations, and suggested public meeting between himself and Asad. Asad however rejected this idea, and stated that he wanted the establishment of an agreement to come first.<sup>186</sup>

### **6.1.3) Outcomes of the Negotiations 1992-1996**

The negotiations started with discussions about secondary issues, leaving the core issues for a later state. Matters discussed were for example the meaning of full withdrawal. The two countries argued about the borderline to where the withdrawal should be done. Both countries here stated an interest in accessing the Sea of Galilee. Syria wanted the border to be the one of pre 1967, leaving the northern shore of the lake within Syrian territory, while Israel mainly insisted on the border to be that of 1923, meaning that the entire lake would be within Israeli territory. Both countries also expressed the need of an agreement of sharing the other water sources in the Golan, such as the Jordan River.<sup>187</sup>

There was a disagreement over the time for withdrawal. Israel insisted on a withdrawal over five years, while Syria wanted the withdrawal to be done within maximum two years. A second disagreement was on the military positions of the countries. Israel wanted Syria to

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<sup>183</sup> Slater, Jerome “Lost Opportunities for Peace in the Arab-Israeli Conflict” (2002), p 96. According to Moshe Ma’oz in “From Conflict to Peace? Israel’s Relations with Syria and the Palestinians” from 1999 (p 414), the public opinion polls since 1967 up until the 1990s have shown about 90 % support from the Israeli Jews to keep Golan Heights area under Israeli control. However, during the 1990s the Israeli public opinion shifted, showing that up to 45 % of them now would accept to give back the whole area of the Golan Heights to Syria in return for full peace and normalization.

<sup>184</sup> Hinnebusch, Raymond A. “Does Syria Want Peace? Syrian Policy in the Syrian-Israeli Peace Negotiations” (1996), p 53

<sup>185</sup> Seale, Patrick “The Syria-Israel Negotiations: Who Is Telling the Truth?” (2000), p 75

<sup>186</sup> Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004), p 72-73

<sup>187</sup> Hinnebusch, Raymond A. “Does Syria Want Peace? Syrian Policy in the Syrian-Israeli Peace Negotiations” (1996), p 54

withdraw its military positions to Damascus, and a major reduction in Syria's standing army forces. Syria stated that this was negotiable, but that the Israeli requested early-warning station on Mount Hermon in northern Golan was out of the question.<sup>188</sup>

The negotiations went on officially until the summer of 1996, when Israel's newly elected Likud government, with Netanyahu as Prime Minister, made it clear that they believed there was no commitment, agreement or promise from the Israeli side to withdraw to 1967 border line.<sup>189</sup>

The Israeli representative in the peace negotiations, Itamar Rabinovich, claims that Israel was considering Asad as unreliable, based on his continued support for Hezbollah and their attacks against Israel from Lebanon.<sup>190</sup> Israel was attacking Lebanon and did not want support for any armed resistance. However, Netanyahu's personal views were equally haltering; he believed that the Golan Heights were crucial to Israel's survival and that the major problem did not lie in Israel's territorial dispute, instead in the Arab's refusal to accept the reality of Israel and its right to exist.<sup>191</sup> Rabinovich quotes Netanyahu for saying "An agreement based on withdrawal from the Golan in return for a peace treaty and normalization has no value".<sup>192</sup>

## **6.2) Negotiations 1999- 2000**

### **6.2.1) Negotiations 1999- 2000; the Position of Syria**

In late 1999 new negotiations were initiated. Asad expressed his devotion to the peace negotiation by assigning a very high ranked politician, his Foreign Minister Faruq al-Shara, to be the Syrian negotiator.<sup>193</sup> There was however still several contradictory opinions. Syria wanted the negotiations to be resumed where the previous left off, that is with the starting point of the promises Asad had received from both Rabin and Peres.<sup>194</sup> This included that the border should be drawn in accordance to the line of 1967. Syria also demanded that Israel withdraw all its armed forces as well as all civilians to behind this border. Syria wanted a demilitarized zone to be created on equal terms on both sides of the border.<sup>195</sup> Syria also expressed that for the peace treaty to be signed, a parallel peace treaty between Israel and

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<sup>188</sup> Hinnebusch, Raymond A. "Does Syria Want Peace? Syrian Policy in the Syrian-Israeli Peace Negotiations" (1996), p 54

<sup>189</sup> Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004), p 117

<sup>190</sup> Ibid, p 76-77

<sup>191</sup> Ibid, p 82

<sup>192</sup> Ibid, p 86

<sup>193</sup> Ibid, p 131

<sup>194</sup> Seale, Patrick "The Syria-Israel Negotiations: Who Is Telling the Truth?" (2000), p 76

<sup>195</sup> Slater, Jerome "Lost Opportunities for Peace in the Arab-Israeli Conflict" (2002), p 98

Lebanon, including complete Israeli withdrawal from southern Lebanon, must be made, making it clear that it saw the two peace treaties as inseparable.<sup>196</sup> If Israel fulfilled this, both Syria and Lebanon would resume normal relations with Israel, facilitating a climate more enabled to discuss arrangements around water and security arrangements. Asad repeated his statement in previous negotiations, that Syria would not engage in any public diplomacy before an agreement had been reached.<sup>197</sup>

### **6.2.2) Negotiations 1999-2000; the Position of Israel**

In May 1999 Ehud Barak became new Prime Minister of Israel. Following Asad's initiative to nominate his Foreign Minister as negotiator, Barak decided to put himself as the head of the Israeli negotiating delegation, and included several other high ranked Israeli politicians.<sup>198</sup> However, Israeli representatives were reluctant to clarify where they wanted the new borderline to be, only stating that it should take "into account security and other vital interests of the Parties...".<sup>199</sup> Israel was also vague about its armed forces, saying that it would agree to "relocate" them, not specifying to where. Israel wanted the demilitarized zone to be made out of the area emptied of the relocated soldiers, as well as from "the existing area of separation established under the agreement of disengagement of ...1974".<sup>200</sup> Barak also included the precondition added by Peres in the previous negotiations; that the final agreement had to be ratified by the Israeli public through a national referendum.<sup>201</sup> Some researchers who studied the negotiations claim that security and water issues were actually cornerstones in the Israeli position.<sup>202</sup> According to the Israeli chief negotiator in the first peace talks, Rabinovich, the Israelis believed that Asad would be flexible in where to draw the exact border line of 1967, and that this flexibility would allow Israel to get access to more of the water resources than was originally included in the 1967 border line.<sup>203</sup> Barak saw the full control over the Sea of Galilee as major part of Israel's water regime and security.<sup>204</sup>

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<sup>196</sup> Dergham, Raghida *A Syria-Israel Summit: Prospects for Peace*, (2000)

<sup>197</sup> Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004), p 132

<sup>198</sup> Ibid, p 131

<sup>199</sup> Slater, Jerome "Lost Opportunities for Peace in the Arab-Israeli Conflict" (2002), p 99

<sup>200</sup> Israel Ministry of Foreign Affairs *Hareetz Daily publishes US Document- A Framework for Peace between Israel and Syria - 13 January 2000*, point II:2

<sup>201</sup> Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004), p 126

<sup>202</sup> Miller, Reuben "The Israeli-Syrian Negotiations" (2000), p 119

<sup>203</sup> Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004), p 125

<sup>204</sup> Ibid, p 139

### **6.2.3) Outcomes of the Negotiations 1999- 2000**

Barak during 1999-2000 faced strong domestic resistance to withdraw from the Golan Heights, and decided to abruptly end the negotiations. Another factor leading up to the faltering of the negotiations was Asad's diminishing health and eventual death in June 2000.<sup>205</sup>

When the negotiations came to a standstill in January 2000, many questions were still unresolved. Israel and Syria had agreed to let an international peacekeeping force retain the facilities on Mount Hermon, which Israel had used as early warning station.<sup>206</sup> Despite that both Israel and Syria seemed able to agree upon drawing the border at the June 1967 line, no official decision was taken on this issue. One main stumbling point was Israel's insistence on altering the borders of 1967 slightly, to include more of the water resources. Asad on the other hand still insisted on obtaining part of the shore of the Sea of Galilee.

In the two rounds of negotiations several other factors besides the ones directly connected to the Golan Heights was raised by the two parties. It is possible that the outcome of future negotiations would benefit from a separation of these issues from the ones connected to the Golan Heights, and instead deal with them in a completely different forum.

## **6.3) Demands in Previous Negotiations Related and Unrelated to Water**

### **6.3.1) The Issue of the Shared Water Resources in Previous Negotiations**

In the previous peace negotiations the main stumbling point expressed by both parties, was a disagreement over where to draw the final border between the two countries. Even though it might not have been stated specifically in these peace talks, both countries wanted the border to be drawn in a for them ultimate favourable manner regarding the access to the water resources. Studying the water map of the Golan Heights, and the claims from both sides about the drawing of the border, the conclusion is evident that one of the main priorities in this matter *was* the access to water.

In the first round of negotiations, the topic of water was given some attention from both sides. On Syria's behalf, Asad agreed to dedicate a specific part of the final agreement to the sharing of the waters between Israel and Syria. Asad clearly stated that it was not in Syria's

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<sup>205</sup> Slater, Jerome "Lost Opportunities for Peace in the Arab-Israeli Conflict" (2002), p 99

<sup>206</sup> Ibid, p 98

interest to cut the flow of water to the Sea of Galilee, nor to pollute the lakes water. Syria would agree to refrain from withdrawing drinking water from the Sea of Galilee, but wanted access to the lake for its fishermen on the same conditions as prior to 1967.<sup>207</sup>

Israel on their side stated that they wanted guarantees from Syria that the flow of the headwaters of the Jordan River would be uninterrupted if the territory where they lie would be returned to Syria.<sup>208</sup> Besides this particular concern, Netanyahu made a statement saying that Israel wanted the distribution of water between the two countries to be “fair”.<sup>209</sup> After the murder of Rabin in late 1995, his successor Peres stated that he particularly held the issue of Israel’s water security, including unhindered water flow from the Sea of Galilee, high in any future dealing with Syria.<sup>210</sup>

In the second round of negotiations, Syria addressed the importance of an agreement on the water issues based on relevant international principles. The referring to international principles implied that Syria wanted all of the waters of the Golan Heights to be under complete Syrian sovereignty.<sup>211</sup> However, regarding the use of the water resources, Syrian officials also stated that Syria had no intention of diverting the headwaters of the Jordan River, neither to withdraw freshwater from the Sea of Galilee.

On Israel’s behalf, Barak had by now acknowledged the indirectly expressed view of Rabin in previous negotiations, i.e. that the line of border should be that of the 1967 line.<sup>212</sup> However, he did not include the shore of the Sea of Galilee in this, but wanted the entire lake to be within Israeli territory.<sup>213</sup> This would prohibit Syria access to the lake for fishery purposes. Regarding the water issue at large, Israel stated that it wanted to “ensure the continuation of Israel’s current use in quantity and quality of all the surface and underground waters in the areas from which Israeli forces will be relocated”.<sup>214</sup> This in effect meant that Israel wanted a continued full access to and use of all the water resources of the Golan Heights, including the Jordan River and its tributaries as well as the Sea of Galilee. This would exclude any Syrian control over or use of these water resources, despite that some of them would be partly within Syrian territory. So even when Israel and Syria had both been able to agree to the line of border to be that of 1967, Israel still wanted the water resources to be managed under special regulatory, instead of being regulated by the border line.

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<sup>207</sup> Slater, Jerome “Lost Opportunities for Peace in the Arab-Israeli Conflict” (2002), p 105

<sup>208</sup> Ma’oz, Moshe *Syria and Israel From War to Peacemaking* (1995), p 249

<sup>209</sup> Hajjar, Sami G. “The Israel-Syria Track” (1999) p 114

<sup>210</sup> Seale, Patrick “The Syria-Israel Negotiations: Who Is Telling the Truth?”(2000), p 76

<sup>211</sup> Slater, Jerome “Lost Opportunities for Peace in the Arab-Israeli Conflict” (2002), p 98

<sup>212</sup> Ibid, p 96

<sup>213</sup> Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004), p 125

<sup>214</sup> Slater, Jerome “Lost Opportunities for Peace in the Arab-Israeli Conflict” (2002), p 98

### **6.3.2) Demands by Israel in Previous Negotiations Unrelated to Water**

One major cause of the collapse of the first round of peace talk was Israel's annoyance over Syria's involvement in Lebanese politics and resistance movement. By now, both Israel and Syria has officially left Lebanese territory. Therefore, it is likely that the issue of Lebanon will be largely diminished in coming negotiations. However, Israel might still insist on including the issue of Hezbollah, who is operating from Lebanon and whom Israel considers a threat to their state security, in the peace negotiations.

### **6.3.3) Demands by Syria in Previous Negotiations Unrelated to Water**

Syria has for a long time had a vision of Arab unity vis á vis Israel, and therefore wanting them to negotiate as one entity towards Israel. This is no longer possible, since many of the other Arab countries have chosen to engage in separate peace talks with Israel. In both rounds of peace negotiations mentioned in chapter four, Asad firmly held the position of including Lebanon in any peace settlement with Israel. This is now rendered impossible, since Syria no longer has a direct influence over Lebanese politics. It is therefore likely that any new peace negotiations will not include a Syrian demand neither of inclusion of a Lebanese, nor a Palestinian, bilateral settlement. This makes me assume that the main focus of the coming negotiations instead will be solely on the Golan Heights.

## **7) Water Management as a Tool to Reach Sustainable Peace Between Israel and Syria**

To investigate my main research questions I will emanate from the theoretical framework outlined in chapter four describing under what circumstances water is of importance for peace negotiations and how water management should be addressed in negotiations and final settlement.

Regarding the utilization of the existent water resources, as well as the attitude towards water management, the two countries differ immensely. Israel today has one of the world's most efficient water utilization, with few possibilities to develop further besides in the fields of desalination and wastewater treatment. And since these two areas are both very costly and does not have the capability of releasing any considerable amount of water, the possibilities to gain more water has literary come to an end for Israel. For Syria the situation is quite the opposite. Syria has a well recorded water waste throughout its entire water management system, particularly within the area with the maximum water use; irrigation. This leaves a major potential for Syria to make its water management more effective. Already now, both Israel and Syria are extracting more water from the water resources of the Golan Heights than what is recharged every year. Unless this water behaviour changes and the two countries start cooperate regarding utilization, the water resources are bound to steadily diminish. It should therefore be in the interest of both countries to establish legal documents and regulations regarding the water resources shared with its neighbours.

### ***7.1) The Importance of Including Water Management in Coming Peace Negotiations and Final Peace Treaty between Israel and Syria***

There are two main reasons why water management needs to be thoroughly integrated in peace negotiations and final settlement between Israel and Syria. As shown by the theorists the risk of tension between countries increases if there exist an overall water scarcity in the area, if the countries share water resources, and if they have limited access to other water resources. This is evidently the case of Israel and Syria, as demonstrated in chapter five. The second main reason is that by not integrating, clearly defining or regulating the shared water resources, this leaves the door open for future misunderstandings and differences in interpretation regarding the use of the shared water resources. Both countries thereby run a

risk of losing substantial parts of the concerned water through unilateral use. Since the water is vital for both countries, an alteration of any kind in the water flow could lead to hostilities or the outbreak of conflict. For the sustainability of a peace agreement it is therefore crucial to include water management.

The water has shown to be of great importance to the two countries in the matter of where to draw the final and internationally recognized border between them. Of the water resources connected to the Golan Heights, almost all are affected by a future alteration of borders. As shown in chapter six, in the two previous rounds of peace negotiations, the two countries have put claims on both the 1923 borders, between the Syrian French mandate and the British Palestinian mandate, as well as the borders of pre 1967, before Israel occupied the Golan Heights, to be acknowledged as the future border line.

If in a coming peace settlement the border line would be that of 1923, this would mean that the entire River Hasbani would end up inside Israeli territory. Both sides of the Jordan River as well as the entire Sea of Galilee would also end up within Israeli territory. However, Syria would be granted access to a ten metre strip on the eastern side of the lake, and Syrian fishermen would be allowed to use it for fishery.

If instead the new border would be that of pre 1967, this would mean that the Jordan River would form the border between the two countries, granting both access to it. Syria would have the northern shore of the Sea of Galilee with the borders ten metres to the east of the lake, hereby also granting access to the lake by fishermen.

The River Baniyas is currently completely within occupied Israeli territory. Both of the borders 1923 and 1967 would leave the origins of the River Baniyas inside Syrian territory, it would then flow for about 100 metres within Syria before entering into Israel.

The surface water of the Golan Heights, currently collected and used by the Israeli settlements, is one water resource which in a peace settlement will lie entirely within Syrian territory, whether the border will be drawn at the 1923 or the 1967 line. However, there could still be disputes about how it should be used. If Israel withdraws entirely from the Golan, the question will arise of what should happen with the infrastructure related to the abandoned settlements. Israel might ask that the irrigation network connected to these settlement should be dismantled, and hereby enable that all the surface water instead can flow freely into the Jordan River and the Sea of Galilee, maximising the amount of water in these two resources. The Israelis could argue that by moving their settlers to Israeli territory, the overall water need of Israel expands, why the need to maximise their water resources increases. However, if Syria plans to resettle the Golan, the water infrastructure system already existing there, might

serve as an excellent ground to start from. The Syrians could also argue their right to use the surface water as they like, considering that it would be entirely within their territory

## ***7.2) Water Management as an Integral Part of Peace Negotiations and Agreements to Reach Sustainable Peace***

Studying the two previous rounds of negotiations, it becomes clear that the water resources and their management were not addressed in a clear enough manner as advocated by the theorists Homer-Dixon, Gleick and Ohlsson. They mention six important areas that should be addressed and managed clearly. According to the theorists, for the outcome of peace negotiations and agreements to be sustainable, it is of crucial importance that water is legally regulated between the countries. The issues that need to be documented are;

(1) The principle of equitable utilization, meaning that every riparian state is entitled to a reasonable and equitable share of the water in common. What is reasonable and equitable should be calculated based on the countries actual water need, derived through demographic changes in population and availability of alternative water resources. Both Israel and Syria have valid water claims, based on rather different aspects. Syria has a growing population, and is expecting a considerable rise in urbanization. Syria's need is also based on the fact that it has an outdated water management system, leading to large water waste and irregularity in water balance, as well as the fact that many of its major water resources are shared with neighbouring countries. Israel has a maximized urbanization rate, and its population is not expected to rise considerably. Israel has much less access to other water resources than Syria, and a majority of its current water resources are ethically debatable and unstable, increasing the value of the Golan Heights water. When addressing the principle of equitable utilization in future negotiations, it would be beneficial for both countries to revise if their water needs might be modified. However, the two countries are in very different positions to do so. If Syria would invest in a speedy modernization of their water management system, this could not only improve the country's overall economical situation, including a more reliable and sustainable outcome of agriculture, but also in a better calculated water regulation. Israel, on the other hand, might possibly invest even more money in their already extremely efficient water management system. Since Israel's population and urbanization is fairly stable, it might also consider cutting back in the country's overall water use per capita. However, Israel's biggest dilemma lies in the fact that a large amount of water stems from Occupied Territory. Conflicting parties are more likely to unilateral withdraw water, without considering other

affecting parties. Therefore it could be in Israel's interest to engage in peaceful cooperation with the populations of these territories, as to discuss the water sharing in a for all parties favourable and, more important, regulated, manner. To include the principle of equitable utilization in a future peace agreement is of high importance for the sustainability of the agreement. Unless it is clearly established, down to the smallest details, what rights the two countries have to use the water resources, there exists a risk of interpretations. If any of the two countries does not perceive the utilization of the other country to be fair, this might lead to new escalation of conflict. To establish clear rules, based on open accounted for facts of water need, facilitates a feasibility to understand, recognize and accept the other party's needs and rights.

(2) The prevention of causing harm to other states. This means that the common water should be diverted in a manner as to cause the least amount of harm to the other riparian states, opening up to payment of compensation or mitigation in situations where it is unavoidable to cause harm. Since both parties, and particularly Israel, in the past has diverted considerably amounts of water from the Golan Heights water resources without consideration for the other riparian, this issue, as well as issue number

(3); the obligation of one state to notify and inform other riparian states of any water resource related activity that could affect them, hereby giving them the possibility to object to or trying to influence the action, these two issues are of crucial importance to be included in a future peace settlement between Israel and Syria. Because of the fact that Israel is currently diverting a lot of the water, it is possible that Syria might ask for compensation, or alteration of the Israeli diversion, or both. If the possibility of compensation is revised, it is important to establish whether it should be paid retrospective (for already diverted water), if it should be a single payment or be a continuous yearly payment based on that year's amount of water withdrawal. These two points are also crucial based on the fact that any peace agreement involves Israel conceding Syria at least limited access to several of the water resources, to which it today is denied access. It is a vital security concern for Israel that granting Syria access to these waters does not pose the threat to Israel of Syrian water diverting or polluting. These two issues should be quite easily resolved, due to the fact that Syria has clearly stated that it does not have an interest in affecting the Israeli water withdrawal negatively. The future of the Israeli settlements and their water reservoirs might be up for discussion under these two points as well. Here Israel might ask for compensation to evacuate them, and to leave the water system intact for future Syrian residents to use.

(4) The obligation of riparian states to share hydrological data related to the shared water resource with other countries. For peace negotiation to be effective, and a peace settlement between Syria and Israel to be fair and sustainable, it is important to establish trust. This can be achieved by sharing previous classified hydrological data. Israel here has an advantage through its well managed water system, where all data is well recorded. Syria on their side might have to invest in developing their hydrological data collection. The open sharing of these data could effectively undermine suspicions and mistrust between the countries, as well as lead to shared actions against water deficiency, water fluctuation and drought, benefiting the water situation for both countries.

(5) The cooperative management of international water resources, meaning that the affected countries should all participate in a joint basin commission, working as a negotiator and mediator between the countries on issues relating to the sharing of water resources. Establishing of a joint water basin commission is particularly important for the sustainability of a future peace treaty between Israel and Syria. Such a commission could effectively, openly and fairly deal with any future water disagreement, argument or dispute. This would minimize the risk of conflict rising or escalating between the parties.

(6) The obligation of the states to peacefully resolve disputes. Considering the two countries past, where both parties have been seen resorting to violence on a number of occasions, stipulating that they need to consider all possible peaceful solutions to uprising problems is of vital importance for a future peace agreement. By stipulating cautiousness, and making the parties examine all possible peaceful solutions to disputes, the possibility of a continuous peaceful relationship is maximised.

Of these above mentioned six points, only the second one, the prevention of causing harm to other states, has been addressed at all in the previous negotiations. Syria in both rounds of negotiations clearly stated that it had neither intention to nor interest in diverting the headwaters of the Jordan River, cutting the flow of water to the Sea of Galilee, polluting the lakes water, nor withdrawing freshwater from the lake. Regarding the first point mentioned by the theorists, the principle of equitable utilization, which means that every riparian state should be entitled to a reasonable and equitable share of the common water, Israel has actually made statements opposing this. Particularly in the second round Israel implied that regardless of the water resources geographically becoming part of Syrian territory, Israel still wants to stay in control over how they are being utilized, ensuring that Israel can continue to withdraw the same quantity of water as it currently does. This would mean not just that Syria would not have ultimate control over its own territories, but also that it would be prevented to

withdraw literary any water from the water resources. As seen above in the description of the water utilization, Israel is already utilizing the water resources of the Golan Heights to its maximal capacity. Therefore even the slightest change in water flow caused by Syrian water use would effect the Israeli water utilization. This leaves literary no possibility for Syria to make use of this water at all, regardless of whether there exists a need from their side to use it or not.

As seen above in the evaluation of the six points, it is crucial to stipulate all six points as clear as possible in the treaty, thereby minimizing the room for interpretation, for a future peace treaty between Israel and Syria to be lasting and sustainable.

## 8) Summary and Conclusions

The water shared between Israel and Syria is indeed a contaminated and sensitive issue. As the water scarcity in the area worsens, the water resources will increase in importance in the future, as well as being crucial for the outcome of coming peace negotiations. There are several reasons why politicians ought to engage in integrating water management in peace negotiations as well as peace agreements.

I answered my main question “*How should the water resources of the Golan Heights be addressed in a coming peace treaty between Israel and Syria for this treaty to be sustainable?*” in three subquestions. In the first one, I examined *why the waters resources of the Golan Heights were important to Israel and Syria.*

After investigating Israel’s and Syria’s water status, I believe that it is clear that the waters of the Golan Heights are very important to both countries, and slightly more to Israel. Both countries face water scarcity likely to worsen. Syria has an outdated water system, wasting a lot of water, as well as expecting growing population and increased urbanization within the coming years. Syria however is not very depending on the waters of the Golan Heights, since it has access to several other water resources, and has a great potential to develop its water management system. Israel, on the other hand, already has one of the most efficient water management systems in the world, maximising its water utilization. Withdrawing a lot of its water from the Golan Heights, the main other water resource is disputable, since it stems mainly from occupied West Bank. Being illegal according to international regulations, the access to this water will quite likely be diminished in the event of peace with the Palestinians. Therefore, even though Israel’s population and urbanization is not expected to change considerably, the dependency on the Golan Heights water is expected to rise.

In the second subquestion, I investigated *how the issue of the shared water resources had been addressed in previous negotiations between the two countries.* When examining the two previous rounds of negotiations, it became clear that both countries regarded the water resources of the Golan Heights as important. It could actually be considered one of the main reasons to why the negotiations faltered, since one of the main disagreements in both rounds of negotiations was where to draw the new border line between the two countries. Both countries insisted on drawing the border in the way most advantageous for them regarding access to and control over the water resources. However, when studying how the theorists

suggest the water resources to be addressed in negotiations, it became evident that neither Israel nor Syria gave this matter enough attention, and even partly addressed it in a contrary manner than what the theorist suggest.

The third subquestion, *how water management can serve as a tool to reach sustainable peace between Israel and Syria*, connects back to my main question. After having studied the theorists' suggestions about how to incorporate water management as a tool to reach a sustainable peace agreement, and comparing this to the case of Israel and Syria, several things become evident. The described circumstances under which water management can serve as a tool for countries to reach sustainable peace definitely correlate to the case of Israel and Syria. However, in the previous negotiations, water management was neither given attention nor appreciation enough. If in future negotiations, as well as in the final peace treaty, water management would be integrated correctly, it could serve as a solid foundation for the sustainability of these, as well as a perfect base to start from regarding other matters of disagreement. Particularly the two points "the prevention of causing harm to other states" and "the obligation of the states to peacefully resolve disputes" lays the foundation for many other matters to be solved in the best possible way. However, all the points of water management needs to defined in the clearest possible way for them to serve their purpose. It is crucial that there is no room left for interpretation regarding how the shared water should be handled. As shown in chapter four, the one attempt so far, the peace treaty between Jordan and Israel, to incorporate water management in a peace treaty, did not clarify the shared water management enough, leading to conflicting interpretations and breaches of the treaty, as well as not serving as a sustainable base for future interaction between the two countries. This further highlights the importance of pinpointing the shared water management in the final peace agreement between Israel and Syria. If any of the two countries does not perceive the utilization of the water to be fair, this might lead to new escalation of conflict. To establish clear rules, based on open accounted for facts of water need, facilitates a feasibility to understand, recognize and accept the other party's needs and rights.

I believe that my findings highlight the necessity of including clearly outlined water management as a vital part of negotiations and agreement between Israel and Syria, as well as similar countries sharing water resources and facing water scarcity. Besides increasing the likeliness of sustainability of peace agreements, water management can also serve as an excellent base to deal with other issues of conflict.

## Glossary explanation

*Aquifer:* **Akvifer** A layer of rock or soil that can absorb and hold water

*Annual flow:* **Årligt flöde** The yearly flow of a certain water source

*BCM:* **Miljard kubik meter** Billion cubic metres

*Brackish water:* **Bräckt vatten, vatten med högre salinitet än sötvatten men lägre än havsvatten** Water that has more salinity than fresh water, but not as much as seawater, water which is salty in an unpleasant way

*CM:* **Kubikmeter** Cubic metres

*Desalinated water:* **Avsaltat vatten** Water which has been processed to remove excess salt and other minerals from it

*Groundwater recharge:* **Uppsamling av grundvatten** A hydrologic process where water moves downward from surface water to groundwater, also called drainage or deep percolation

*Effluent:* **Avloppsvatten** Liquid waste, especially chemicals produced by factories, sewage,

*Headwaters:* **Källflöde/källflod** Streams forming the source of a river

*Hydrology:* **Hydrologi** The branch of geology that studies water on the earth and in the atmosphere: its distribution, uses and conservation

*MCM:* **Miljoner kubikmeter** Million cubic metres

*Mean annual flow:* **Årsmedelflöde** The average flow of water during a year

*Mean groundwater recharged:* **Genomsnittlig återfyllnad av grundvattnet** The average amount of water moving downward from surface water to groundwater

*Non conventional water resources:* **Okonventionella vattenresurser** Water which is accessible through man made processes, for example desalination water, treated wastewater and rainfall enhancement

*Precipitation:* **Nederbörd** Rain or snow etc. that falls, and the amount of this that falls

*Rechargeable water:* **Återvinningsbart vatten** The type of water which is possible to be recharged

*Renewable water resources:* **Förnybar vatten källa** The type of water resource which is possible to be replenished

*Riparian:* **Strandnära** Of or relating to or located on the banks of a river or stream

*Salinity:* **Salthalt** Concentration of salt, saltiness

*Surface runoff:* **Yt-utströmning** The water flow which occurs when soil is infiltrated to full capacity and excess water, from rain, snowmelt, or other sources flows over the land

*Treated wastewater:* **Renat avloppsvatten** Wastewater which has undergone a physical, chemical or biological treatment processes to the extent that it can be used for drinking and industrial and agricultural purposes

*Wastewater:* **Avloppsvatten** Water discharged from domestic residences, commercial properties, industry, and/or agriculture, can contain a wide range of potential contaminants

*Water revenue:* **Vatten inkomst** The total value of water

## References

### Literature

Amery, Hussein A. and Wolf, Aaron T. *Water In The Middle East – A Geography of Peace*, first edition (2000)

Clarke, Robin *Water, The International Crisis* (1993) Biddles Ltd, Guildford and King's Lynn

Cleveland, William L. *A History o the Modern Middle East*, second edition (2000) Westview Press

Dolatyar, Mustafa and Gray, Tim S. *Water Politics in the Middle East, A Context for Conflict or Co-operation?* (2000) Antony Rowe Ltd

Drysdale, Alasdair and Hinnebusch, Raymond *Syria and the Middle East Peace Process* (1991) Council on Foreign Relations Press

Fischhendler, Itay “Ambiguity in Transboundary Environmental Dispute Resolution: The Israeli Jordanian Water Agreement” from *Journal of Peace Research* 2008; 45; 91

Frisch, Hillel “Water and Israel’s National Security” Water article 6 from *Efficient Use of Limited Water Resources: Making Israel a Model State* (2001), BESA: The Begin-Sadat Center for Strategic Studies, Bar-Ilan University in Israel

Gleick, Peter H. “Environment and Security: The Clear Connections“ from *Bulletin of the Atomic Scientists* Vol 47, Nr 3 (1991), pages 17-21

Gleick, Peter H. “Reducing the Risk of Conflict over Fresh Water Resources in the Middle East“ from *Water and Peace in the Middle East* (1994), editors Isaac, Jad and Shuval, Hillel, Elsevier Science B.V., pages 41-54

Gleick, Peter H. “Water and Conflict, Fresh Water Resources and International Security” from *Global Dangers, Changing Dimensions of International Security* (1995), editors Lynn-Jones, Sean M. and Miller, Steven E, The MIT Press

Haddadin J, Munther “Water in the Middle East Process” from *The Geographical Journal*, Vol 168, No 4, (Dec 2002), pages 324-340

Hajjar, Sami G. “The Israel-Syria Track”, from *Middle East Policy council*, Journal Volume VI, 1999, No 3, pages 112-130

Hinnebusch, Raymond A. “Does Syria Want Peace? Syrian Policy in the Syrian-Israeli Peace Negotiations” from *Journal of Palestine Studies*, Vol 26, No 1, 1996, pages 42-57

Hof, Frederic C. “The Water Dimension of Golan Heights Negotiations” from *Middle East Policy* 1997, Vol V, No 2, pages 129-141

Homer-Dixon, Thomas F. *Environment, Scarcity, and Violence* (1999) Princeton University Press

Homer-Dixon, Thomas F. "Environmental Scarcities and Violent Conflict, Evidence from Cases" (1994) from *Theories of War and Peace* editors, Brown, Michael E, Côté Jr, Owen E, Lynn-Jones, Sean and Miller, Steven E, (2000, third printing), The MIT Press, pages 501-536

Homer-Dixon, Thomas F, Boutwell, Jeffrey H, Rathjens, George W. *Environmental Change and Violent Conflict, Growing scarcities of renewable resources can contribute to social instability and civil strife* Scientific American, Vol 268, No 2, 1993, pages 38-45

Homer-Dixon, Thomas F. "On the Threshold, Environmental Changes as Causes of Acute Conflict" from *Global Dangers, Changing Dimensions of International Security* (1995), editors Lynn-Jones, Sean M and Miller, Steven.E, The MIT Press

Lindholm, Helena "Water and the Arab-Israeli Conflict" from *Hydropolitics: conflicts over water as a development constraint* (1995), editor Ohlsson, Leif, Zed Books University Press

Lowi, Miriam R. "Water and Conflict in the Middle East and South Asia: Are Environmental Issues and Security Issues Linked?" from *The Journal of Environment and Development*, 1999 Vol. 8, No. 4, pages 376-396

Lowi, Miriam R. *Water and power, The politics of a scarce resource in the Jordan River basin* second edition (1995) Cambridge University Press

Manna, Maya *Water and the Treaty of Peace between Israel and Jordan*, Center For Macro Projects and Diplomacy Working Papers Series, Spring 2006 Vol: 10

Ma'oz, Moshe "From Conflict to Peace? Israel's Relations with Syria and the Palestinians" *Middle East Journal*, Vol. 53, no 3, Special Issue on Israel (1999), pages 393-416

Ma'oz, Moshe *Syria and Israel, From War to Peacemaking* (1995) Oxford University Press

Medzini, Arnon and Wolf, Aaron T. "Towards a Middle East at Peace: Hidden Issues in Arab-Israeli Hydropolitics" *Water Resources Development* Vol 20, No 2 (June 2004), pages 193-204

Miller, Reuben "The Israeli-Syrian Negotiations" *Mediterranean Quarterly* Vol 11, No 4 (Fall 2000), pages 117-139

Muslih, Muhammad "The Golan: Israel, Syria, and Strategic Calculations" *Middle East Journal*, Vol 47, No 4 (Autumn 1993), pages 611-632

Neff, Donald "Israel-Syria: Conflict at the Jordan River, 1949-1967" from *Journal of Palestine Studies*, Vol 23, No 4 (Summer 1994), pages 26-40

Ohlsson, Leif *Environment Scarcity and Conflict, A study of Malthusian concerns* (1999) PhD Thesis, Department of Peace and Development Research Göteborg University

Ohlsson, Leif *Livelihood Conflicts: Linking poverty and environment as causes of conflict* (2000), Sida, Swedish International Development Cooperation Agency

Ohlsson, Leif *Sambanden mellan miljö och konflikter* (1998) Sida, Styrelsen för internationellt utvecklingssamarbete

Ohlsson, Leif "The Role of Water and the Origins of Conflict" from *Hydropolitics: conflicts over water as a development constraint* (1995), editor Ohlsson, Leif, Zed Books University Press

Ohlsson, Leif "Water – An Elusive and Ultimate Constraint for Development" from *Regional Case Studies of Water Conflicts* (1992) editor Leif Ohlsson, Padrigu, Peace and Development Research Institute Gothenburg University, pages 1-20

Patterson, Kendra "Water Management and Conflict: The Case of the Middle East" from *Transnational Trends: Middle Eastern and Asian Views* edited by Amit Pandya and Ellen Laipson, The Henry L. Stimson Center (July 2008), pages 213-227  
100406

Persson, Stefan *Dödlägen i internationella förhandlingar* (1992) Studentlitteratur's Printing Office, Lund Political Studies 73

Rabinovich, Itamar *Waging Peace, Israel and the Arabs, 1948-2003* (2004) Princeton University Press

Schoenfeld, Stuart, Abitbol, Eric and De Châtel, Francesca "Retelling the Story of Water in the Middle East: Reflections on and about a Conversation at the Dead Sea" from *Integrated Water Resources Management and Security in the Middle East*, published by NATO Security through Science Series (2007)

Seale, Patrick "The Syria-Israel Negotiations: Who Is Telling the Truth?" from *Journal of Palestine Studies*, Vol. 29, No 2, Winter 2000, pages 65-77

Seale, Patrick and Butler, Linda "Asad's Regional Strategy and the Challenge from Netanyahu" from *Journal of Palestine Studies* XXVI no 1 (1996), pages 27-41

Shalev, Aryeh *Israel and Syria: Peace and Security on the Golan* (1994) Tel Aviv University, Jafee Center for Strategic Studies

Shemesh, Moshe "Prelude to the Six-Day War: The Arab-Israeli Struggle Over Water Resources" from *Israel Studies* 2004, Vol 9, No 3, pages 1-45

Slater, Jerome "Lost Opportunities for Peace in the Arab-Israeli Conflict" from *International Security*, Vol 7, No 1 (Summer 2002), pages 79-106

Wolf Aaron T. *Hydropolitics along the Jordan River: Scarce water and its impact on the Arab-Israeli conflict*, first edition (1995) United Nations University Press

## **Literature Reviews**

Boxer, Barusch reviewed work “*The World’s Water 2002-2003: The Biennial Report on Freshwater Resources*” by Peter Gerick, ECSP Report, Issue 9 (2003), pp 124-127

Cooper, Richard N. reviewed work “*Environment, Scarcity, and Violence*” by Thomas F. Homer-Dixon, Foreign Affairs, Vol. 78, No. 3 (May - Jun., 1999), pp. 135-136

Miller, Marian A. L. reviewed work: *Environment, Scarcity, and Violence* by Thomas F. Homer-Dixon, The American Political Science Review, Vol. 96, No. 3 (Sep., 2002), pp. 689-690 (2002)

Smith, Dan, reviewed work: *Environment, Scarcity, and Violence* by Thomas Homer-Dixon Journal of Peace Research, Vol. 36, No. 6 (Nov., 1999), pp. 754-755

## **Reports and Legal Documents**

### **ABS Energy Research**

Report: “The Water and Waste Utilities of the World - Market Research Report” from 2006, pages 208-210, 217-218

*Case of Syria*

*Case of Israel*

<http://www.absenergyresearch.com/cmsfiles/reports/Water-and-Waste-Report-2006.pdf>  
100525

### **Amnesty International**

*Thirsting For Justice, Palestinian Access To Water Restricted*

Report October 2009

<http://www.amnesty.org/en/library/asset/MDE15/027/2009/en/e9892ce4-7fba-469b-96b9-c1e1084c620c/mde150272009en.pdf>  
091208

### **AQUASTAT, FAO's Information System on Water and Agriculture Food and Agriculture Organization of the United Nations (FAO)**

*Computation of long-term average annual renewable water resources by country (in km<sup>3</sup>/year) 2008 Country: Israel*

[http://www.fao.org/nr/water/aquastat/water\\_res/israel\\_wr.xls](http://www.fao.org/nr/water/aquastat/water_res/israel_wr.xls)  
10025

*Computation of long-term average annual renewable water resources by country (in km<sup>3</sup>/year) 2008 Country: Syria*

[http://www.fao.org/nr/water/aquastat/water\\_res/syria\\_wr.xls](http://www.fao.org/nr/water/aquastat/water_res/syria_wr.xls)  
100525

*Syrian Arab Republic*

<http://www.fao.org/nr/water/aquastat/countries/Syria/index.stm>  
100525

### **Economic and Social Commission for Western Asia (ESCWA)**

*ESCWA Water Development Report 2: State of Water Resources in the ESCWA Region (2007)*

<http://www.escwa.un.org/information/publications/edit/upload/sdpd-07-6-e.pdf>  
100525

*Sectoral Water Allocation Policies in Selected ESCWA Member Countries; An Evaluation of the Economic, Social and Drought-Related Impact* (2003)

<http://www.escwa.un.org/information/publications/edit/upload/sdpd-03-13.pdf>  
100525

*Regional Cooperation Between Countries in the Management of Shared Water Resources: Case Studies of Some Countries in the ESCWA Region* (2006)

<http://www.escwa.un.org/information/publications/edit/upload/sdpd-05-15.pdf>  
100525

### **Israel Central Bureau of Statistics (CBS)**

*Israel in Figures 2008*

[http://www1.cbs.gov.il/www/publications/isr\\_in\\_n08e.pdf](http://www1.cbs.gov.il/www/publications/isr_in_n08e.pdf)  
100525

### **Israel Ministry of Environmental Protection**

*Examples of River Restoration: Yarkon River*

[http://www.sviva.gov.il/bin/en.jsp?enPage=e\\_BlankPage&enDisplay=view&enDispWhat=object&enDispWho=Articals%5E12075&enZone=Examples\\_River&enVersion=0&](http://www.sviva.gov.il/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=object&enDispWho=Articals%5E12075&enZone=Examples_River&enVersion=0&)  
100328

*Quality of Water Sources: Coastal Aquifer*

[http://www.sviva.gov.il/bin/en.jsp?enPage=e\\_BlankPage&enDisplay=view&enDispWhat=object&enDispWho=Articals%5E12059&enZone=Quality\\_Water&enVersion=0&](http://www.sviva.gov.il/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=object&enDispWho=Articals%5E12059&enZone=Quality_Water&enVersion=0&)  
100328

*Wastewater Treatment and Reuse* Israel Environment Bulletin, Autumn 2000, Vol. 23/4

[http://www.sviva.gov.il/Enviroment/Static/Binaries/Articals/reuse\\_3.doc](http://www.sviva.gov.il/Enviroment/Static/Binaries/Articals/reuse_3.doc)  
100525

*Water Sources-Dead Sea*

[http://www.sviva.gov.il/bin/en.jsp?enPage=e\\_BlankPage&enDisplay=view&enDispWhat=Object&enDispWho=Articals^12057&enZone=Water\\_Sources](http://www.sviva.gov.il/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Object&enDispWho=Articals^12057&enZone=Water_Sources)  
090903

### **Israel Ministry of Foreign Affairs**

*Development of Limited Water Resources: Historical and Technological Aspects* (2000) By Dov Sitton

<http://www.mfa.gov.il/MFA/Facts+About+Israel/Land/FOCUS+on+Israel-+Development+of+Limited+Water+Reso.htm?DisplayMode=print>  
100525

*Hareetz Daily publishes US Document- A Framework for Peace between Israel and Syria - 13 January 2000* by Akiva Eldar

<http://www.mfa.gov.il/MFA/Peace+Process/Guide+to+the+Peace+Process/Ha-aretz+Daily+publishes+US+Document-+A+Framework.htm?DisplayMode=print>  
100525

*Israel-Jordan Peace Treaty, Annex II, Water and Related Matters*

<http://www.mfa.gov.il/MFA/Peace%20Process/Guide%20to%20the%20Peace%20Process/Israel-Jordan%20Peace%20Treaty%20Annex%20II>  
100525

*Treaty of Peace between The State of Israel and The Hashemite Kingdom of Jordan (1994)*  
<http://www.mfa.gov.il/MFA/Peace+Process/Guide+to+the+Peace+Process/Israel-Jordan+Peace+Treaty.htm>

100525

*Focus on Israel- The Druze in Israel*

[http://www.mfa.gov.il/MFA/MFAArchive/2000\\_2009/2002/12/Focus%20on%20Israel-%20The%20Druze%20in%20Israel](http://www.mfa.gov.il/MFA/MFAArchive/2000_2009/2002/12/Focus%20on%20Israel-%20The%20Druze%20in%20Israel)

100525

**United Nations Department of Economic and Social Affairs, World Population Prospects**

*The 2008 Revision Population Database*

*The Case of Israel*

*The Case of Syrian Arab Republic*

<http://esa.un.org/unpp/>

100525

**United Nations Department of Economic and Social Affairs, Population Division**

*World Urbanization Prospects: The 2005 Revision*

[http://www.un.org/esa/population/publications/WUP2005/2005WUP\\_DataTables3.pdf](http://www.un.org/esa/population/publications/WUP2005/2005WUP_DataTables3.pdf)

100525

**United Nations Disengagement Observer Force**

<http://www.un.org/en/peacekeeping/missions/undof/>

*Fact and Figures*

<http://www.un.org/en/peacekeeping/missions/undof/facts.shtml>

100113

**United Nations Truce Supervision Organization**

<http://www.un.org/en/peacekeeping/missions/untso/>

*Background*

<http://www.un.org/en/peacekeeping/missions/untso/background.shtml>

100525

**Other Internet Sources**

**CIA World Factbook**

Middle East: Syria

<https://www.cia.gov/library/publications/the-world-factbook/geos/sy.html>

100326

**B'Tselem, The Israeli Information Center for Human Rights in the Occupied Territories**

*The Water Crisis*

<http://www.btselem.org/english/Water/Index.asp>

100525

**Encyclopaedia Britannica**

*Orontes River*

<http://www.britannica.com/EBchecked/topic/433091/Orontes-River>

0906121

**LakeNet: Protecting and Restoring the Health of Lakes Throughout the World**

*Lake profile: Bahrat Assad (Buhayrat al Asad)*

<http://www.worldlakes.org/lakedetails.asp?lakeid=10195>

100525

**The Washington Institute for Near East Policy**

Dergham, Raghida *A Syria-Israel Summit: Prospects for Peace*, (2000)

<http://www.washingtoninstitute.org/templateC07.php?CID=146>

100525

# Appendices

## Appendix 1

### U.N. Security Council Resolution 242

November 22, 1967

*Following the June '67, Six-Day War, the situation in the Middle East was discussed by the UN General Assembly, which referred the issue to the Security Council. After lengthy discussion, a final draft for a Security Council resolution was presented by the British Ambassador, Lord Caradon, on November 22, 1967. It was adopted on the same day.*

*This resolution, numbered 242, established provisions and principles which, it was hoped, would lead to a solution of the conflict. Resolution 242 was to become the cornerstone of Middle East diplomatic efforts in the coming decades.*

#### **The Security Council,**

**Expressing** its continuing concern with the grave situation in the Middle East,

**Emphasizing** the inadmissibility of the acquisition of territory by war and the need to work for a just and lasting peace in which every State in the area can live in security,

**Emphasizing** further that all Member States in their acceptance of the Charter of the United Nations have undertaken a commitment to act in accordance with Article 2 of the Charter,

1. Affirms that the fulfillment of Charter principles requires the establishment of a just and lasting peace in the Middle East which should include the application of both the following principles:
  - Withdrawal of Israeli armed forces from territories occupied in the recent conflict;
  - Termination of all claims or states of belligerency and respect for and acknowledgement of the sovereignty, territorial integrity and political independence of every State in the area and their right to live in peace within secure and recognized boundaries free from threats or acts of force;
2. Affirms further the necessity

- For guaranteeing freedom of navigation through international waterways in the area;
  - For achieving a just settlement of the refugee problem;
  - For guaranteeing the territorial inviolability and political independence of every State in the area, through measures including the establishment of demilitarized zones;
3. Requests the Secretary General to designate a Special Representative to proceed to the Middle East to establish and maintain contacts with the States concerned in order to promote agreement and assist efforts to achieve a peaceful and accepted settlement in accordance with the provisions and principles in this resolution;
  4. Requests the Secretary-General to report to the Security Council on the progress of the efforts of the Special Representative as soon as possible.

## **Appendix 2**

### **U.N. Security Council Resolution 338**

**October 22, 1973**

*In the later stages of the Yom Kippur War -- after Israel repulsed the Syrian attack on the Golan Heights and established a bridgehead on the Egyptian side of the Suez Canal -- international efforts to stop the fighting were intensified. US Secretary of State Kissinger flew to Moscow on October 20, and, together with the Soviet Government, the US proposed a cease-fire resolution in the UN Security Council. The Council met on 21 October at the urgent request of both the US and the USSR, and by 14 votes to none, adopted the following resolution:*

#### **The Security Council,**

1. Calls upon all parties to present fighting to cease all firing and terminate all military activity immediately, no later than 12 hours after the moment of the adoption of this decision, in the positions after the moment of the adoption of this decision, in the positions they now occupy;
2. Calls upon all parties concerned to start immediately after the cease-fire the implementation of Security Council Resolution 242 (1967) in all of its parts;

Decides that, immediately and concurrently with the cease-fire, negotiations start between the parties concerned under appropriate auspices aimed at establishing a just and durable peace in the Middle East.

### ***Appendix 3***

## **Treaty of Peace between The State of Israel and The Hashemite Kingdome of Jordan**

October 26, 1994

Parts of the Treaty related to water:

### **Article 6 - Water**

With the view to achieving a comprehensive and lasting settlement of all the water problems between them:

1. The parties agree mutually to recognize the rightful allocations of both of them in the Jordan River and Yarmuk River waters and Arab/ 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.
2. The Parties, recognizing the necessity to find a practical, just, and agreed solution to their water problems and with the view that the subject of water can form the basis for the advancement of co-operation between them, jointly undertake to ensure that the management and development of their water resources do not, in any way, harm the water resources of the other Party.
3. The Parties recognize that their water resources are not sufficient to meet their needs. More water should be supplied for their use through various methods, including projects of regional and international co-operation.
4. In light of paragraph 3 of this Article, with the understanding that the co-operation in water-related subjects would be to the benefit of both Parties, and will help alleviate their water shortages, and that water issues along their entire boundary must be dealt with in their totality, including the possibility of trans-boundary water transfers, the Parties agree to search for ways to alleviate water shortages and to co-operate in the following fields:

a. development of existing and new water resources, increasing the water availability, including cooperation on a regional basis as appropriate, and minimizing wastage of water resources through the chain of their uses;

b. prevention of contamination of water resources;

c. mutual assistance in the alleviation of water resources;

d. transfer of information and joint research and development in water-related subjects, and reviews of the potentials for enhancement of water resources development and use

5. The implementation of both Parties' undertakings under this Article is detailed in Annex II

## **ANNEX II - WATER RELATED MATTERS**

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Pursuant to Article 6 of the Treaty, Israel and Jordan agreed on the following Articles on water related matters:

### Article I: Allocation

#### 1. Water from the Yarmouk River

a. Summer period - 15th May to 15th October of each year. Israel pumps (12) MCM and Jordan gets the rest of the flow.

b. Winter period - 16th October to 14th May of each year. Israel pumps (13) MCM and Jordan is entitled to the rest of the flow subject to provisions outlined hereinbelow: Jordan concedes to Israel pumping an additional (20) MCM from the Yarmouk in winter in return for Israel conceding to transferring to Jordan during the summer period the quantity specified in paragraphs (2.a) below from the Jordan River.

c. In order that waste of water will be minimized, Israel and Jordan may use, downstream of point 121/Adassiya Diversion, excess flood water that is not usable and will evidently go to waste unused.

## 2. Water from the Jordan River

a. Summer period - 15th May to 15th October of each year. In return for the additional water that Jordan concedes to Israel in winter in accordance with paragraph (1.b) above, Israel concedes to transfer to Jordan in the summer period (20) MCM from the Jordan River directly upstream from Deganya gates on the river. Jordan shall pay the operation and maintenance cost of such transfer through existing systems (not including capital cost) and shall bear the total cost of any new transmission system. A separate protocol shall regulate this transfer.

b. Winter period - 16th October to 14th May of each year. Jordan is entitled to store for its use a minimum average of (20) MCM of the floods in the Jordan River south of its confluence with the Yarmouk (as outlined in Article II below). Excess floods that are not usable and that will otherwise be wasted can be utilised for the benefit of the two Parties including pumped storage off the course of the river.

c. In addition to the above, Israel is entitled to maintain its current uses of the Jordan River waters between its confluence with the Yarmouk and its confluence with Tirat Zvi/Wadi Yabis. Jordan is entitled to an annual quantity equivalent to that of Israel, provided however, that Jordan's use will not harm the quantity or quality of the above Israeli uses. The Joint Water Committee (outlined in Article VII below) will survey existing uses for documentation and prevention of appreciable harm.

d. Jordan is entitled to an annual quantity of (10) MCM of

desalinated water from the desalination of about (20) MCM of saline springs now diverted to the Jordan River. Israel will explore the possibility of financing the operation and maintenance cost of the supply to Jordan of this desalinated water (not including capital cost). Until the desalination facilities are operational, and upon the entry into force of the Treaty, Israel will supply Jordan (10) MCM of Jordan River water from the same location as in (2.a) above, outside the summer period and during dates Jordan selects, subject to the maximum capacity of transmission.

### 3. Additional Water

Israel and Jordan shall cooperate in finding sources for the supply to Jordan of an additional quantity of (50) MCM/year of water of drinkable standards. To this end, the Joint Water Committee will develop, within one year from the entry into force of the Treaty, a plan for the supply to Jordan of the abovementioned additional water. This plan will be forwarded to the respective governments for discussion and decision.

### 4. Operation and Maintenance

- a. Operation and maintenance of the systems on Israeli territory that supply Jordan with water, and their electricity supply, shall be Israel's responsibility. The operation and maintenance of the new systems that serve only Jordan will be contracted at Jordan's expense to authorities or companies selected by Jordan.
- b. Israel will guarantee easy unhindered access of personnel and equipment to such new systems for operation and maintenance. This subject will be further detailed in the agreements to be signed between Israel and the authorities or companies selected by Jordan.

## Article II: Storage

1. Israel and Jordan shall cooperate to build a diversion/storage dam on the Yarmouk River directly downstream of the point 121/Adassiya Diversion. The purpose is to improve the diversion efficiency into the King Abdullah Canal of the water allocation of the Hashemite Kingdom of Jordan, and possibly for the diversion of Israel's allocation of the river water. Other purposes can be mutually agreed.
2. Israel and Jordan shall cooperate to build a system of water storage on the Jordan River, along their common boundary, between its confluence with the Yarmouk River and its confluence with Tirat Zvi/ Wadi Yabis, in order to implement the provision of paragraph (2.b) of Article I above. The storage system can also be made to accommodate more floods; Israel may use up to (3) MCM/year of added storage capacity.
3. Other storage reservoirs can be discussed and agreed upon mutually.

## Article III: Water Quality and Protection

1. Israel and Jordan each undertake to protect, within their own jurisdiction, the shared waters of the Jordan and Yarmouk Rivers, and Arava/Araba groundwater, against any pollution, contamination, harm or unauthorized withdrawals of each other's allocations.
2. For this purpose, Israel and Jordan will jointly monitor the quality of water along their boundary, by use of jointly established monitoring stations to be operated under the guidance of the Joint Water Committee.
3. Israel and Jordan will each prohibit the disposal of municipal and industrial wastewater into the course of the Yarmouk or the Jordan

Rivers before they are treated to standards allowing their unrestricted agricultural use. Implementation of this prohibition shall be completed within three years from the entry into force of the Treaty.

4. The quality of water supplied from one country to the other at any given location shall be equivalent to the quality of the water used from the same location by the supplying country.
5. Saline springs currently diverted to the Jordan River are earmarked for desalination within four years. Both countries shall cooperate to ensure that the resulting brine will not be disposed of in the Jordan River or in any of its tributaries.
6. Israel and Jordan will each protect water systems in its own territory, supplying water to the other, against any pollution, contamination, harm or unauthorised withdrawal of each other's allocations.

#### Article IV: Groundwater in Emek Ha'arava/Wadi Araba

1. In accordance with the provisions of this Treaty, some wells drilled and used by Israel along with their associated systems fall on the Jordanian side of the borders. These wells and systems are under Jordan's sovereignty. Israel shall retain the use of these wells and systems in the quantity and quality detailed in Appendix to this Annex, that shall be jointly prepared by 31st December, 1994. Neither country shall take, nor cause to be taken, any measure that may appreciably reduce the yields or quality of these wells and systems.
2. Throughout the period of Israel's use of these wells and systems, replacement of any well that may fail among them shall be licensed by Jordan in accordance with the laws and regulations then in effect. For this purpose, the failed well shall be treated as though it was

drilled under license from the competent Jordanian authority at the time of its drilling. Israel shall supply Jordan with the log of each of the wells and the technical information about it to be kept on record. The replacement well shall be connected to the Israeli electricity and water systems.

3. Israel may increase the abstraction rate from wells and systems in Jordan by up to (10) MCM/year above the yields referred to in paragraph 1 above, subject to a determination by the Joint Water Committee that this undertaking is hydrogeologically feasible and does not harm existing Jordanian uses. Such increase is to be carried out within five years from the entry into force of the Treaty.

#### 4. Operation and Maintenance

a. Operation and maintenance of the wells and systems on Jordanian territory that supply Israel with water, and their electricity supply shall be Jordan's responsibility. The operation and maintenance of these wells and systems will be contracted at Israel's expense to authorities or companies selected by Israel.

b. Jordan will guarantee easy unhindered access of personnel and equipment to such wells and systems for operation and maintenance. This subject will be further detailed in the agreements to be signed between Jordan and the authorities or companies selected by Israel.

#### Article V: Notification and Agreement

1. Artificial changes in or of the course of the Jordan and Yarmouk Rivers can only be made by mutual agreement.

2. Each country undertakes to notify the other, six months ahead of time, of any intended projects which are likely to change the flow of either

of the above rivers along their common boundary, or the quality of such flow. The subject will be discussed in the Joint Water Committee with the aim of preventing harm and mitigating adverse impacts such projects may cause.

#### Article VI: Co-operation

1. Israel and Jordan undertake to exchange relevant data on water resources through the Joint Water Committee.
2. Israel and Jordan shall co-operate in developing plans for purposes of increasing water supplies and improving water use efficiency, within the context of bilateral, regional or international cooperation.

#### Article VII: Joint Water Committee

1. For the purpose of the implementation of this Annex, the Parties will establish a Joint Water Committee comprised of three members from each country.
2. The Joint Water Committee will, with the approval of the respective governments, specify its work procedures, the frequency of its meetings, and the details of its scope of work. The Committee may invite experts and/or advisors as may be required.
3. The Committee may form, as it deems necessary, a number of specialized sub-committees and assign them technical tasks. In this context, it is agreed that these sub-committees will include a northern sub-committee and a southern sub-committee, for the management on the ground of the mutual water resources in these sectors.